SLR-TJ – 344

Seat No.	

Set **P**

S.E. (Electrical) (Part – I) (New CBCS) Examination, 2017
ENGINEERING MATHEMATICS – III

Day and Date : Tuesday, 12-12-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

N.B. *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book on Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) ***All*** *questions are* ***compulsory****.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*
5) ***Use*** *of calculator is* ***allowed****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The complementary function of $(D^2 + 2D + 1)\,y = 2e^{3x}$ is
a) $c_1e^{-x} + c_2^{e-x}$ b) $(c_1 + c_2x)e^{-2x}$
c) $(c_1\cos x + c_2\sin x)$ d) $(c_1 + c_2x)e^{-x}$

2) $\frac{1}{D^2}x^3$ is equal to
a) $e^x x^2$ b) $e^{-x}x^3$ c) $e^x\left(x^2 + \frac{x^3}{3}\right)$ d) $\frac{x^5}{20}$

3) On putting $x = e^z$, the differential equation $(x^2D^2 - 3xD + 4)y = 2x^2$ is transformed to
a) $(D^2 - 4D + 4)y = 2e^{2z}$ b) $(D^2 - 3D + 4)y = 2e^{2z}$
c) $(D^2 - 4D + 4)y = 2z^2$ d) $(D^2 - 3D + 4)y = 2z^2$

4) The value of the integral $\int_0^\infty e^{-st}\,\sin t\,dt$
a) $\frac{1}{s^2 + 1}$ b) $\frac{1}{s^2 - 1}$ c) $\frac{1}{s^2 + 4}$ d) None of these

P.T.O.

5) If L {f(t)} = F(s), then $L\left\{\frac{f(t)}{t}\right\} =$

a) $\int_0^\infty F(s)ds$ b) $\int_s^\infty F(s)ds$ c) $\int_s^\infty f(t)ds$ d) None of these

6) If $L^{-1}\{F(s)\} = f(t)$, then $L^{-1}\{F(s + a)\}=$

a) $e^{-at}L^{-1}\{F(s)\}$ b) $e^{at}L^{-1}\{F(s)\}$ c) $e^{-at}L^{-1}\{F(s/a)\}$ d) $t^{at}L^{-1}\{F(s)\}$

7) $L^{-1}\left\{\frac{6}{(s+2)^2+36}\right\} =$

a) $e^{2t}\cosh 6t$ b) $e^{-2t}\cosh 36t$ c) $e^{-2t}\sinh 6t$ d) $e^{-2t}\sin 6t$

8) Which of the following is Lagrange's form ?

a) $yz\frac{\partial z}{\partial x} + zx\frac{\partial z}{\partial y} = xy$ b) $\left(\frac{\partial z}{\partial x}\right)^2 + x\frac{\partial z}{\partial y} = y$

c) $\frac{\partial z}{\partial x}\frac{\partial z}{\partial y} = 1$ d) none of these

9) The inverse z transform of $\frac{z}{z-a}, |z| > a$ with $k \geq 0$

a) a^k b) a^{-k} c) a^{k+1} d) 1

10) Which of the following function cannot be express as Fourier series in $(0, 2\pi)$?

a) tan x b) e^x c) sin x d) none of these

11) In the interval (0, 1) the constant term in the half range cosine series of $f(x) = x - x^2$ is

a) $\frac{2}{3}$ b) $\frac{1}{3}$ c) $\frac{1}{6}$ d) $\frac{1}{12}$

12) The function $f(z) = x^2 - y^2 + aixy$ is analytic if

a) a = 0 b) a = 1 c) a = – 1 d) a = 2

13) If f(z) is analytic in and on a closed counter C then $\oint_C f(z)\,dz$ is

a) 0 b) $2\pi i$ c) 2π d) none of these

14) The value of $\int_C \bar{z}\,dz$ where C is the upper half of the circle r = 1 is

a) πi b) 2π c) 0 d) π

SLR-TJ – 344

Seat No.	

S.E. (Electrical) (Part – I) (New CBCS) Examination, 2017
ENGINEERING MATHEMATICS – III

Day and Date : Tuesday, 12-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
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SECTION – I

2. Solve **any three** of the following : **9**
   a) $(D^2 - 1)\, y = (1 + e^{-x})^2$
   b) $(D^3 + D)y = \cos x$
   c) $(D^2 + 2D + 3)y = x - x^2$
   d) $x^2 \dfrac{d^2y}{dx^2} - 2x \dfrac{dy}{dx} + 2y = x^{-1}$
   e) $(x + 2)^2 \dfrac{d^2y}{dx^2} - (x + 2) \dfrac{dy}{dx} + y = 3x + 4$

3. Solve **any three** of the following : **9**
   a) Find $L\{e^{4t} \sin^3 t\}$.
   b) Find $L\{te^{3t} \sin^3 t\}$.
   c) Find the Laplace Transform of $\dfrac{1 - \cos t}{t}$.
   d) Find inverse Laplace transform of by using convolution theorem $\dfrac{s}{(s^2 + 4)^2}$.
   e) Find inverse Laplace transform of $\log\left(1 + \dfrac{a^2}{s^2}\right)$.

4. Solve **any two** of the following : **10**

a) $(D^2 + 3D + 2)y = \sin e^x$

b) In LC circuit the charge Q on a plate of a condenser is given by $\frac{d^2Q}{dt^2} + \frac{Q}{CL} = \frac{E}{L}\cos\omega t$ $Q = Q_0$ & $i = i_0$ when t = 0. Prove that the charge at any time t is given by $Q = Q_0 \cos\omega t + \frac{i_0}{\omega}\sin\omega t + \frac{E_0}{2L\omega} t\sin\omega t$ where $\omega^2 = \frac{1}{LC}$.

c) Use Laplace Transforms to evaluate the differential equation $(D^2 - D - 2)y = 20 \sin 2t$ $y(0) = 1$, $y'(0) = 2$.

SECTION – II

5. Solve **any three** : **9**

a) Determine the constants a, b, c, d if $f(z) = x^2 + 2axy + by^2 + i(cx^2 + 2dxy + y^2)$ is analytic.

b) Evaluate the line integral $\int_0^{1+i} (x - y + ix^2)dz$ along the real axis from Z = 0 to Z = 1 and then along the line parallel to the imaginary axis from Z = 1 to Z = 1 + i.

c) Solve $z^2 (p^2 + xq^2) = x$.

d) Find the z transform of $\{ke^{-ak}\}$, $k \geq 0$.

e) Find Fourier expansion of $f(x) = x^2$, $-1 \leq x \leq 1$.

6. Solve **any three** : **9**

a) Solve $\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u$, by the method of separation of variables.

b) Solve $z^2 (p^2 + q^2) = x + y$.

c) Find the inverse z transform of $\frac{1}{(z-5)^3}$, $|z| > 5$.

d) Evaluate $\int \frac{\sin^6 z}{\left(z - \frac{\pi}{2}\right)^3} dz$ where c is the circle $|z| = 2$.

e) Obtain half range sine series for $f(x) = \begin{cases} x & 0 < x \le \frac{\pi}{2} \\ (\pi - x) & \frac{\pi}{2} < x < \pi \end{cases}$

Hence deduce that $\frac{\pi^2}{8} = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} +$

7. Solve **any two** : **10**

a) Solve $(x^2 - yz)\frac{\partial z}{\partial x} + (y^2 - zx)\frac{\partial z}{\partial y} = z^2 - xy$.

b) Find Fourier expansion of $f(x) = \sqrt{1 - \cos x}$ in $(0, 2\pi)$ and hence deduce that

$\frac{1}{2} = \sum_{n=1}^{\infty} \frac{1}{4n^2 - 1}$.

c) i) Find the z transform of $f(k) = k_{c_n}$, $k \ge n$ and

ii) Find the z transform and its ROC for the sequence $f(k) = \begin{cases} 3^k & k < 0 \\ 2^k & k \ge 0 \end{cases}$.

Set P

SLR-TJ – 344

Seat No.	

Set Q

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ENGINEERING MATHEMATICS – III

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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1) Which of the following is Lagrange's form ?

a) $yz\frac{\partial z}{\partial x} + zx\frac{\partial z}{\partial y} = xy$ b) $\left(\frac{\partial z}{\partial x}\right)^2 + x\frac{\partial z}{\partial y} = y$

c) $\frac{\partial z}{\partial x}\frac{\partial z}{\partial y} = 1$ d) none of these

2) The inverse z transform of $\frac{z}{z-a}, |z| > a$ with $k \geq 0$

a) a^k b) a^{-k} c) a^{k+1} d) 1

3) Which of the following function cannot be express as Fourier series in $(0, 2\pi)$?
a) tan x b) e^x c) sin x d) none of these

4) In the interval (0, 1) the constant term in the half range cosine series of $f(x) = x - x^2$ is

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P.T.O.

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SLR-TJ – 344

Seat No.	

S.E. (Electrical) (Part – I) (New CBCS) Examination, 2017
ENGINEERING MATHEMATICS – III

Day and Date : Tuesday, 12-12-2017 Marks : 56
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SECTION – I

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SECTION – II

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Hence deduce that $\frac{\pi^2}{8} = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} +$

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Set Q

SLR-TJ – 344

Seat No.	

Set **R**

S.E. (Electrical) (Part – I) (New CBCS) Examination, 2017
ENGINEERING MATHEMATICS – III

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) If L {f(t)} = F(s), then $L\left\{\frac{f(t)}{t}\right\} =$

a) $\int_0^\infty F(s)ds$ b) $\int_s^\infty F(s)ds$ c) $\int_s^\infty f(t)ds$ d) None of these

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P.T.O.

5) The inverse z transform of $\frac{z}{z-a}$, $|z| > a$ with $k \geq 0$

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Seat No.	

S.E. (Electrical) (Part – I) (New CBCS) Examination, 2017
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Set R

SLR-TJ – 344

Seat No.	

Set S

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Day and Date : Tuesday, 12-12-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

N.B. : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book on Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

3) ***All*** *questions are* ***compulsory****.*

4) Figures to the ***right*** *indicate* ***full*** *marks.*

5) ***Use*** *of calculator is* ***allowed****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Which of the following function cannot be express as Fourier series in $(0, 2\pi)$?
a) tan x b) e^x c) sin x d) none of these

2) In the interval (0, 1) the constant term in the half range cosine series of $f(x) = x - x^2$ is
a) $\frac{2}{3}$ b) $\frac{1}{3}$ c) $\frac{1}{6}$ d) $\frac{1}{12}$

3) The function $f(z) = x^2 - y^2 + aixy$ is analytic if
a) a = 0 b) a = 1 c) a = – 1 d) a = 2

4) If f(z) is analytic in and on a closed counter C then $\oint_C f(z)\,dz$ is
a) 0 b) $2\pi i$ c) 2π d) none of these

5) The value of $\int_C \bar{z}\,dz$ where C is the upper half of the circle r = 1 is
a) πi b) 2π c) 0 d) π

6) The complementary function of $(D^2 + 2D + 1)\,y = 2e^{3x}$ is
a) $c_1e^{-x} + c_2{}^{e-x}$ b) $(c_1 + c_2x)e^{-2x}$
c) $(c_1\cos x + c_2\sin x)$ d) $(c_1 + c_2x)e^{-x}$

P.T.O.

7) $\frac{1}{D^2}x^3$ is equal to

a) $e^x x^2$ b) $e^{-x}x^3$ c) $e^x\left(x^2+\frac{x^3}{3}\right)$ d) $\frac{x^5}{20}$

8) On putting $x = e^z$, the differential equation $(x^2D^2 - 3xD + 4)y = 2x^2$ is transformed to

a) $(D^2 - 4D + 4)y = 2e^{2z}$ b) $(D^2 - 3D + 4)y = 2e^{2z}$
c) $(D^2 - 4D + 4)y = 2z^2$ d) $(D^2 - 3D + 4)y = 2z^2$

9) The value of the integral $\int_0^\infty e^{-st}$ sintdt

a) $\frac{1}{s^2+1}$ b) $\frac{1}{s^2-1}$ c) $\frac{1}{s^2+4}$ d) None of these

10) If L {f(t)} = F(s), then $L\left\{\frac{f(t)}{t}\right\} =$

a) $\int_0^\infty F(s)ds$ b) $\int_s^\infty F(s)ds$ c) $\int_s^\infty f(t)ds$ d) None of these

11) If $L^{-1}\{F(s)\} = f(t)$, then $L^{-1}\{F(s + a)\}=$

a) $e^{-at}L^{-1}\{F(s)\}$ b) $e^{at}L^{-1}\{F(s)\}$ c) $e^{-at}L^{-1}\{F(s/a)\}$ d) $t^{at}L^{-1}\{F(s)\}$

12) $L^{-1}\left\{\frac{6}{(s+2)^2+36}\right\}=$

a) $e^{2t}\cosh 6t$ b) $e^{-2t}\cosh 36t$ c) $e^{-2t}\sinh 6t$ d) $e^{-2t}\sin 6t$

13) Which of the following is Lagrange's form ?

a) $yz\frac{\partial z}{\partial x}+zx\frac{\partial z}{\partial y}=xy$ b) $\left(\frac{\partial z}{\partial x}\right)^2+x\frac{\partial z}{\partial y}=y$

c) $\frac{\partial z}{\partial x}\frac{\partial z}{\partial y}=1$ d) none of these

14) The inverse z transform of $\frac{z}{z-a}$, $|z| > a$ with $k \geq 0$

a) a^k b) a^{-k} c) a^{k+1} d) 1

Seat No.	

S.E. (Electrical) (Part – I) (New CBCS) Examination, 2017
ENGINEERING MATHEMATICS – III

Day and Date : Tuesday, 12-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) ***Use*** *of calculator is* ***allowed****.*

SECTION – I

2. Solve **any three** of the following : **9**
   a) $(D^2 - 1)\, y = (1 + e^{-x})^2$
   b) $(D^3 + D)y = \cos x$
   c) $(D^2 + 2D + 3)y = x - x^2$
   d) $x^2 \dfrac{d^2y}{dx^2} - 2x \dfrac{dy}{dx} + 2y = x^{-1}$
   e) $(x + 2)^2 \dfrac{d^2y}{dx^2} - (x + 2) \dfrac{dy}{dx} + y = 3x + 4$

3. Solve **any three** of the following : **9**
   a) Find $L\{e^{4t} \sin^3 t\}$.
   b) Find $L\{te^{3t} \sin^3 t\}$.
   c) Find the Laplace Transform of $\dfrac{1 - \cos t}{t}$.
   d) Find inverse Laplace transform of by using convolution theorem $\dfrac{s}{(s^2 + 4)^2}$.
   e) Find inverse Laplace transform of $\log\left(1 + \dfrac{a^2}{s^2}\right)$.

4. Solve **any two** of the following : **10**

a) $(D^2 + 3D + 2)y = \text{sine}^x$

b) In LC circuit the charge Q on a plate of a condenser is given by $\frac{d^2Q}{dt^2} + \frac{Q}{CL} = \frac{E}{L}\cos\omega t$ $Q = Q_0$ & $i = i_0$ when t = 0. Prove that the charge at any time t is given by $Q = Q_0 \cos\omega t + \frac{i_0}{\omega}\sin\omega t + \frac{E_0}{2L\omega} t\sin\omega t$ where $\omega^2 = \frac{1}{LC}$.

c) Use Laplace Transforms to evaluate the differential equation $(D^2 - D - 2)y = 20 \sin 2t$ $y(0) = 1$, $y'(0) = 2$.

SECTION – II

5. Solve **any three** : **9**

a) Determine the constants a, b, c, d if $f(z) = x^2 + 2axy + by^2 + i(cx^2 + 2dxy + y^2)$ is analytic.

b) Evaluate the line integral $\int_0^{1+i} (x - y + ix^2)dz$ along the real axis from Z = 0 to Z = 1 and then along the line parallel to the imaginary axis from Z = 1 to Z = 1 + i.

c) Solve $z^2 (p^2 + xq^2) = x$.

d) Find the z transform of $\{ke^{-ak}\}$, $k \geq 0$.

e) Find Fourier expansion of $f(x) = x^2$, $-1 \leq x \leq 1$.

6. Solve **any three** : **9**

a) Solve $\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u$, by the method of separation of variables.

b) Solve $z^2 (p^2 + q^2) = x + y$.

c) Find the inverse z transform of $\frac{1}{(z-5)^3}$, $|z| > 5$.

d) Evaluate $\int \frac{\sin^6 z}{\left(z - \frac{\pi}{2}\right)^3} dz$ where c is the circle $|z| = 2$.

e) Obtain half range sine series for $f(x) = \begin{cases} x & 0 < x \le \frac{\pi}{2} \\ (\pi - x) & \frac{\pi}{2} < x < \pi \end{cases}$

Hence deduce that $\frac{\pi^2}{8} = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} +$

7. Solve **any two** : **10**

a) Solve $(x^2 - yz)\frac{\partial z}{\partial x} + (y^2 - zx)\frac{\partial z}{\partial y} = z^2 - xy$.

b) Find Fourier expansion of $f(x) = \sqrt{1 - \cos x}$ in $(0, 2\pi)$ and hence deduce that

$\frac{1}{2} = \sum_{n=1}^{\infty} \frac{1}{4n^2 - 1}$.

c) i) Find the z transform of $f(k) = k_{c_n}, \quad k \ge n$ and

ii) Find the z transform and its ROC for the sequence $f(k) = \begin{cases} 3^k & k < 0 \\ 2^k & k \ge 0 \end{cases}$.

Set S

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Seat No.	

Set **P**

S.E. (Electrical Engineering) (Part – I) (New) Examination, 2017
(CBCS)
ELECTRICAL MACHINES – I

Day and Date : Thursday, 14-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The function of commutator in D.C. generator is
   A) Increase the output voltage B) Reduce sparking of brushes
   C) Provide smoother output D) Convert the induced A.C. to D.C.

2) The main function of inter poles is to minimize _____ between the brushes and the commutator, when the d.c. machine is loaded.
   A) Friction B) Sparking C) Current D) Wear and tear

3) In a D.C. motor unidirectional torque is produced by
   A) Brushes B) Commutator C) End plates D) Both A) and B)

4) The critical resistance of the D.C. generator is the resistance of
   A) Armature B) Field C) Load D) Both A) and B)

5) D.C. motor changes electrical energy into
   A) Heat energy B) Kinetic energy
   C) Mechanical energy D) None of these

6) The main disadvantage of Hopkinson's test for finding efficiency of D.C. shunt motor is that it
   A) Requires full load power
   B) Ignores any change in iron loss
   C) Needs one motor and one generator
   D) Requires two identical machines

7) Swinburne's test cannot be used for
   A) Shunt motor
   B) Long shunt compound motor
   C) Short shunt compound motor
   D) Series motor
8) In D.C. motor back emf Eb is induced in
   A) Field winding B) Commutator
   C) Armature winding D) Damper winding
9) The ordinary efficiency of a given transformer is maximum when
   A) It runs at half full load
   B) When it runs at full load
   C) Its iron loss equals copper loss
   D) It is slightly overloaded
10) A transformer has negative voltage regulation when it's load power factor is
   A) Zero B) Unity C) Lagging D) Leading
11) The essential condition of parallel operation of two single phase transformer is that they should have the same
   A) Polarity B) KVA rating C) Voltage ratio D) % impedance
12) The all day efficiency of a transformer depends primarily on
   A) Its copper loss B) The amount of load
   C) The duration of load D) Both B) and C)
13) The main purpose of conducting S.C. test on transformer is to measure
   A) Copper loss B) Iron loss
   C) Total loss D) Insulation resistance
14) As compared to delta-delta bank, the capacity of the V-V bank of transformer is _____ percent.
   A) 57.7 B) 66.7 C) 50 D) 86.6

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Seat No.	

S.E. (Electrical Engineering) (Part – I) (New) Examination, 2017
(CBCS)
ELECTRICAL MACHINES – I

Day and Date : Thursday, 14-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Answer **any four** questions : **(4×3=12)**
   a) With neat figure explain the armature reaction and its effects.
   b) A 10 kW, 250 V, 6 pole, D.C. shunt generator runs at 1000 r.p.m. when delivering full load. The armature has 534 lap connected conductors. Full load copper loss is 640 watts. The brush drop is 1 volt. per brush. Determine the flux per pole. Neglect shunt current.
   c) Derive the torque equation of D.C. motor.
   d) With neat figure explain the three point starter for D.C. motor.
   e) A 250V, 4 pole, wave connected series motor has 782 conductors on its armature. It has armature and series field resistance of 0.75 ohm. The motor takes a current of 40A. Find its speed and the gross torque developed if it has a flux per pole of 25 milli webbers.
   f) With a neat figure explain the Swinburne's test on D.C. motor.

3. Answer **any two** questions : **(2×8=16)**
   a) With neat figures explain the speed control of D.C. shunt motor by :
      i) Flux control method.
      ii) Armature control method.
   b) A 250 V, shunt motor develops an output of 17.158 kW, when taking 20.2 kW. The field resistance is 50 ohm, and the armature resistance is 0.06 ohm. What is the efficiency and power input, when the output is 7.46 kW ?
   c) The Hopkinson's test on two similar D.C. Shunt machines gave the following full load data.

      Line voltage = 110 V, Line current = 48 A, Motor armature current = 230 A. Field currents are 3A and 3.5 A. The armature resistance of each machine is 0.035 ohm. Calculate the efficiency of each machine assuming brush contact drop of 1V per brush.

SECTION – II

4. Answer **any four** questions : **(4×3=12)**

a) Draw the vector diagram of a loaded transformer for resistive, inductive and capacitive load.

b) A single phase transformer with a ratio of 440/110 V takes a no load current of 5A at 0.2 p.f. lagging. If the secondary supplies a current of 120 A at a p.f. of 0.8 lagging, estimate the current taken by the primary.

c) With neat fig. explain how the Sumpner's test is conducted on transformer to determine the efficiency and regulation.

d) What are the losses occurring in a transformer ? How they are varying with the load ? How they can be minimized ?

e) A 100 KVA lighting transformer has a full load loss of 3 kW, the losses being equally divided between iron and copper. During a day the transformer operates on full load for 3 hrs., one half load for 4 hrs, the output being negligible for the remainder of the day. Calculate the all day efficiency.

f) Two transformers connected in open delta supply a 400 KVA balanced load operating at 0.866 p.f. lagging. The load voltage is 440 V. What is the (i) KVA supplied by each transformer. (ii) kW supplied by each transformer.

5. Answer **any two** questions : **(2×8=16)**

a) Explain how O.C. and S.C. tests are conducted on single phase transformer to determine the equivalent circuit parameters and efficiency.

b) Two single phase transformers with equal voltage ratios have impedance of (0.5+j3) ohm and (0.6+j10) ohm with respect to the secondary. If they operate in parallel, determine how they will share a load of 100 kW at 0.8 p.f. lagging.

c) What is auto transformer ? Derive an expression for it's saving in copper compared to 2-winding transformer.

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Seat No.	

Set **Q**

S.E. (Electrical Engineering) (Part – I) (New) Examination, 2017
(CBCS)
ELECTRICAL MACHINES – I

Day and Date : Thursday, 14-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) In D.C. motor back emf Eb is induced in

A) Field winding B) Commutator

C) Armature winding D) Damper winding

2) The ordinary efficiency of a given transformer is maximum when

A) It runs at half full load

B) When it runs at full load

C) Its iron loss equals copper loss

D) It is slightly overloaded

3) A transformer has negative voltage regulation when it's load power factor is

A) Zero B) Unity C) Lagging D) Leading

4) The essential condition of parallel operation of two single phase transformer is that they should have the same

A) Polarity B) KVA rating C) Voltage ratio D) % impedance

5) The all day efficiency of a transformer depends primarily on

A) Its copper loss B) The amount of load

C) The duration of load D) Both B) and C)

P.T.O.

6) The main purpose of conducting S.C. test on transformer is to measure
   A) Copper loss B) Iron loss
   C) Total loss D) Insulation resistance
7) As compared to delta-delta bank, the capacity of the V-V bank of transformer is _____ percent.
   A) 57.7 B) 66.7 C) 50 D) 86.6
8) The function of commutator in D.C. generator is
   A) Increase the output voltage B) Reduce sparking of brushes
   C) Provide smoother output D) Convert the induced A.C. to D.C.
9) The main function of inter poles is to minimize _____ between the brushes and the commutator, when the d.c. machine is loaded.
   A) Friction B) Sparking C) Current D) Wear and tear
10) In a D.C. motor unidirectional torque is produced by
   A) Brushes B) Commutator C) End plates D) Both A) and B)
11) The critical resistance of the D.C. generator is the resistance of
   A) Armature B) Field C) Load D) Both A) and B)
12) D.C. motor changes electrical energy into
   A) Heat energy B) Kinetic energy
   C) Mechanical energy D) None of these
13) The main disadvantage of Hopkinson's test for finding efficiency of D.C. shunt motor is that it
   A) Requires full load power
   B) Ignores any change in iron loss
   C) Needs one motor and one generator
   D) Requires two identical machines
14) Swinburne's test cannot be used for
   A) Shunt motor
   B) Long shunt compound motor
   C) Short shunt compound motor
   D) Series motor

Seat No.	

S.E. (Electrical Engineering) (Part – I) (New) Examination, 2017
(CBCS)
ELECTRICAL MACHINES – I

Day and Date : Thursday, 14-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Answer **any four** questions : **(4×3=12)**
   a) With neat figure explain the armature reaction and its effects.
   b) A 10 kW, 250 V, 6 pole, D.C. shunt generator runs at 1000 r.p.m. when delivering full load. The armature has 534 lap connected conductors. Full load copper loss is 640 watts. The brush drop is 1 volt. per brush. Determine the flux per pole. Neglect shunt current.
   c) Derive the torque equation of D.C. motor.
   d) With neat figure explain the three point starter for D.C. motor.
   e) A 250V, 4 pole, wave connected series motor has 782 conductors on its armature. It has armature and series field resistance of 0.75 ohm. The motor takes a current of 40A. Find its speed and the gross torque developed if it has a flux per pole of 25 milli webbers.
   f) With a neat figure explain the Swinburne's test on D.C. motor.

3. Answer **any two** questions : **(2×8=16)**
   a) With neat figures explain the speed control of D.C. shunt motor by :
      i) Flux control method.
      ii) Armature control method.
   b) A 250 V, shunt motor develops an output of 17.158 kW, when taking 20.2 kW. The field resistance is 50 ohm, and the armature resistance is 0.06 ohm. What is the efficiency and power input, when the output is 7.46 kW ?
   c) The Hopkinson's test on two similar D.C. Shunt machines gave the following full load data.

      Line voltage = 110 V, Line current = 48 A, Motor armature current = 230 A. Field currents are 3A and 3.5 A. The armature resistance of each machine is 0.035 ohm. Calculate the efficiency of each machine assuming brush contact drop of 1V per brush.

SECTION – II

4. Answer **any four** questions : **(4×3=12)**

a) Draw the vector diagram of a loaded transformer for resistive, inductive and capacitive load.

b) A single phase transformer with a ratio of 440/110 V takes a no load current of 5A at 0.2 p.f. lagging. If the secondary supplies a current of 120 A at a p.f. of 0.8 lagging, estimate the current taken by the primary.

c) With neat fig. explain how the Sumpner's test is conducted on transformer to determine the efficiency and regulation.

d) What are the losses occurring in a transformer ? How they are varying with the load ? How they can be minimized ?

e) A 100 KVA lighting transformer has a full load loss of 3 kW, the losses being equally divided between iron and copper. During a day the transformer operates on full load for 3 hrs., one half load for 4 hrs, the output being negligible for the remainder of the day. Calculate the all day efficiency.

f) Two transformers connected in open delta supply a 400 KVA balanced load operating at 0.866 p.f. lagging. The load voltage is 440 V. What is the (i) KVA supplied by each transformer. (ii) kW supplied by each transformer.

5. Answer **any two** questions : **(2×8=16)**

a) Explain how O.C. and S.C. tests are conducted on single phase transformer to determine the equivalent circuit parameters and efficiency.

b) Two single phase transformers with equal voltage ratios have impedance of (0.5+j3) ohm and (0.6+j10) ohm with respect to the secondary. If they operate in parallel, determine how they will share a load of 100 kW at 0.8 p.f. lagging.

c) What is auto transformer ? Derive an expression for it's saving in copper compared to 2-winding transformer.

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Seat No.	

Set **R**

S.E. (Electrical Engineering) (Part – I) (New) Examination, 2017
(CBCS)
ELECTRICAL MACHINES – I

Day and Date : Thursday, 14-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) D.C. motor changes electrical energy into
   A) Heat energy B) Kinetic energy
   C) Mechanical energy D) None of these

2) The main disadvantage of Hopkinson's test for finding efficiency of D.C. shunt motor is that it
   A) Requires full load power
   B) Ignores any change in iron loss
   C) Needs one motor and one generator
   D) Requires two identical machines

3) Swinburne's test cannot be used for
   A) Shunt motor
   B) Long shunt compound motor
   C) Short shunt compound motor
   D) Series motor

4) In D.C. motor back emf Eb is induced in
   A) Field winding B) Commutator
   C) Armature winding D) Damper winding

5) The ordinary efficiency of a given transformer is maximum when
   A) It runs at half full load
   B) When it runs at full load
   C) Its iron loss equals copper loss
   D) It is slightly overloaded
6) A transformer has negative voltage regulation when it's load power factor is
   A) Zero B) Unity C) Lagging D) Leading
7) The essential condition of parallel operation of two single phase transformer is that they should have the same
   A) Polarity B) KVA rating C) Voltage ratio D) % impedance
8) The all day efficiency of a transformer depends primarily on
   A) Its copper loss B) The amount of load
   C) The duration of load D) Both B) and C)
9) The main purpose of conducting S.C. test on transformer is to measure
   A) Copper loss B) Iron loss
   C) Total loss D) Insulation resistance
10) As compared to delta-delta bank, the capacity of the V-V bank of transformer is _____ percent.
   A) 57.7 B) 66.7 C) 50 D) 86.6
11) The function of commutator in D.C. generator is
   A) Increase the output voltage B) Reduce sparking of brushes
   C) Provide smoother output D) Convert the induced A.C. to D.C.
12) The main function of inter poles is to minimize _____ between the brushes and the commutator, when the d.c. machine is loaded.
   A) Friction B) Sparking C) Current D) Wear and tear
13) In a D.C. motor unidirectional torque is produced by
   A) Brushes B) Commutator C) End plates D) Both A) and B)
14) The critical resistance of the D.C. generator is the resistance of
   A) Armature B) Field C) Load D) Both A) and B)

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Seat No.	

S.E. (Electrical Engineering) (Part – I) (New) Examination, 2017
(CBCS)
ELECTRICAL MACHINES – I

Day and Date : Thursday, 14-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Answer **any four** questions : **(4×3=12)**
   a) With neat figure explain the armature reaction and its effects.
   b) A 10 kW, 250 V, 6 pole, D.C. shunt generator runs at 1000 r.p.m. when delivering full load. The armature has 534 lap connected conductors. Full load copper loss is 640 watts. The brush drop is 1 volt. per brush. Determine the flux per pole. Neglect shunt current.
   c) Derive the torque equation of D.C. motor.
   d) With neat figure explain the three point starter for D.C. motor.
   e) A 250V, 4 pole, wave connected series motor has 782 conductors on its armature. It has armature and series field resistance of 0.75 ohm. The motor takes a current of 40A. Find its speed and the gross torque developed if it has a flux per pole of 25 milli webbers.
   f) With a neat figure explain the Swinburne's test on D.C. motor.

3. Answer **any two** questions : **(2×8=16)**
   a) With neat figures explain the speed control of D.C. shunt motor by :
      i) Flux control method.
      ii) Armature control method.
   b) A 250 V, shunt motor develops an output of 17.158 kW, when taking 20.2 kW. The field resistance is 50 ohm, and the armature resistance is 0.06 ohm. What is the efficiency and power input, when the output is 7.46 kW ?
   c) The Hopkinson's test on two similar D.C. Shunt machines gave the following full load data.

      Line voltage = 110 V, Line current = 48 A, Motor armature current = 230 A. Field currents are 3A and 3.5 A. The armature resistance of each machine is 0.035 ohm. Calculate the efficiency of each machine assuming brush contact drop of 1V per brush.

SECTION – II

4. Answer **any four** questions : **(4×3=12)**

a) Draw the vector diagram of a loaded transformer for resistive, inductive and capacitive load.

b) A single phase transformer with a ratio of 440/110 V takes a no load current of 5A at 0.2 p.f. lagging. If the secondary supplies a current of 120 A at a p.f. of 0.8 lagging, estimate the current taken by the primary.

c) With neat fig. explain how the Sumpner's test is conducted on transformer to determine the efficiency and regulation.

d) What are the losses occurring in a transformer ? How they are varying with the load ? How they can be minimized ?

e) A 100 KVA lighting transformer has a full load loss of 3 kW, the losses being equally divided between iron and copper. During a day the transformer operates on full load for 3 hrs., one half load for 4 hrs, the output being negligible for the remainder of the day. Calculate the all day efficiency.

f) Two transformers connected in open delta supply a 400 KVA balanced load operating at 0.866 p.f. lagging. The load voltage is 440 V. What is the (i) KVA supplied by each transformer. (ii) kW supplied by each transformer.

5. Answer **any two** questions : **(2×8=16)**

a) Explain how O.C. and S.C. tests are conducted on single phase transformer to determine the equivalent circuit parameters and efficiency.

b) Two single phase transformers with equal voltage ratios have impedance of (0.5+j3) ohm and (0.6+j10) ohm with respect to the secondary. If they operate in parallel, determine how they will share a load of 100 kW at 0.8 p.f. lagging.

c) What is auto transformer ? Derive an expression for it's saving in copper compared to 2-winding transformer.

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SLR-TJ – 345

Seat No.	

Set **S**

S.E. (Electrical Engineering) (Part – I) (New) Examination, 2017
(CBCS)
ELECTRICAL MACHINES – I

Day and Date : Thursday, 14-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) A transformer has negative voltage regulation when it's load power factor is
   A) Zero B) Unity C) Lagging D) Leading

2) The essential condition of parallel operation of two single phase transformer is that they should have the same
   A) Polarity B) KVA rating C) Voltage ratio D) % impedance

3) The all day efficiency of a transformer depends primarily on
   A) Its copper loss B) The amount of load
   C) The duration of load D) Both B) and C)

4) The main purpose of conducting S.C. test on transformer is to measure
   A) Copper loss B) Iron loss
   C) Total loss D) Insulation resistance

5) As compared to delta-delta bank, the capacity of the V-V bank of transformer is _____ percent.
   A) 57.7 B) 66.7 C) 50 D) 86.6

6) The function of commutator in D.C. generator is
   A) Increase the output voltage B) Reduce sparking of brushes
   C) Provide smoother output D) Convert the induced A.C. to D.C.

7) The main function of inter poles is to minimize _____ between the brushes and the commutator, when the d.c. machine is loaded.
   A) Friction B) Sparking C) Current D) Wear and tear
8) In a D.C. motor unidirectional torque is produced by
   A) Brushes B) Commutator C) End plates D) Both A) and B)
9) The critical resistance of the D.C. generator is the resistance of
   A) Armature B) Field C) Load D) Both A) and B)
10) D.C. motor changes electrical energy into
   A) Heat energy B) Kinetic energy
   C) Mechanical energy D) None of these
11) The main disadvantage of Hopkinson's test for finding efficiency of D.C. shunt motor is that it
   A) Requires full load power
   B) Ignores any change in iron loss
   C) Needs one motor and one generator
   D) Requires two identical machines
12) Swinburne's test cannot be used for
   A) Shunt motor
   B) Long shunt compound motor
   C) Short shunt compound motor
   D) Series motor
13) In D.C. motor back emf Eb is induced in
   A) Field winding B) Commutator
   C) Armature winding D) Damper winding
14) The ordinary efficiency of a given transformer is maximum when
   A) It runs at half full load
   B) When it runs at full load
   C) Its iron loss equals copper loss
   D) It is slightly overloaded

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Seat No.	

S.E. (Electrical Engineering) (Part – I) (New) Examination, 2017
(CBCS)
ELECTRICAL MACHINES – I

Day and Date : Thursday, 14-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Answer **any four** questions : **(4×3=12)**
   a) With neat figure explain the armature reaction and its effects.
   b) A 10 kW, 250 V, 6 pole, D.C. shunt generator runs at 1000 r.p.m. when delivering full load. The armature has 534 lap connected conductors. Full load copper loss is 640 watts. The brush drop is 1 volt. per brush. Determine the flux per pole. Neglect shunt current.
   c) Derive the torque equation of D.C. motor.
   d) With neat figure explain the three point starter for D.C. motor.
   e) A 250V, 4 pole, wave connected series motor has 782 conductors on its armature. It has armature and series field resistance of 0.75 ohm. The motor takes a current of 40A. Find its speed and the gross torque developed if it has a flux per pole of 25 milli webbers.
   f) With a neat figure explain the Swinburne's test on D.C. motor.

3. Answer **any two** questions : **(2×8=16)**
   a) With neat figures explain the speed control of D.C. shunt motor by :
      i) Flux control method.
      ii) Armature control method.
   b) A 250 V, shunt motor develops an output of 17.158 kW, when taking 20.2 kW. The field resistance is 50 ohm, and the armature resistance is 0.06 ohm. What is the efficiency and power input, when the output is 7.46 kW ?
   c) The Hopkinson's test on two similar D.C. Shunt machines gave the following full load data.

      Line voltage = 110 V, Line current = 48 A, Motor armature current = 230 A. Field currents are 3A and 3.5 A. The armature resistance of each machine is 0.035 ohm. Calculate the efficiency of each machine assuming brush contact drop of 1V per brush.

SECTION – II

4. Answer **any four** questions : **(4×3=12)**

a) Draw the vector diagram of a loaded transformer for resistive, inductive and capacitive load.

b) A single phase transformer with a ratio of 440/110 V takes a no load current of 5A at 0.2 p.f. lagging. If the secondary supplies a current of 120 A at a p.f. of 0.8 lagging, estimate the current taken by the primary.

c) With neat fig. explain how the Sumpner's test is conducted on transformer to determine the efficiency and regulation.

d) What are the losses occurring in a transformer ? How they are varying with the load ? How they can be minimized ?

e) A 100 KVA lighting transformer has a full load loss of 3 kW, the losses being equally divided between iron and copper. During a day the transformer operates on full load for 3 hrs., one half load for 4 hrs, the output being negligible for the remainder of the day. Calculate the all day efficiency.

f) Two transformers connected in open delta supply a 400 KVA balanced load operating at 0.866 p.f. lagging. The load voltage is 440 V. What is the (i) KVA supplied by each transformer. (ii) kW supplied by each transformer.

5. Answer **any two** questions : **(2×8=16)**

a) Explain how O.C. and S.C. tests are conducted on single phase transformer to determine the equivalent circuit parameters and efficiency.

b) Two single phase transformers with equal voltage ratios have impedance of (0.5+j3) ohm and (0.6+j10) ohm with respect to the secondary. If they operate in parallel, determine how they will share a load of 100 kW at 0.8 p.f. lagging.

c) What is auto transformer ? Derive an expression for it's saving in copper compared to 2-winding transformer.

SLR-TJ – 346

Seat No.	

Set P

S.E. (Electrical Engineering) (Part – I) (New CBCS) Examination, 2017
ELECTRICAL MEASUREMENT & INSTRUMENTATION

Day and Date : Saturday, 16-12-2017 Total Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume the suitable data ***whenever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The reliability of the instrument refer to
   a) Measurement of changes due to temperature variations
   b) Degree to which repeatability continues to remain within specified limits
   c) The life of the instrument
   d) The extent to which the characteristics remain linear

2) The resolution of system refers to
   a) Smallest changing the measure and that can be measure
   b) True value of the input
   c) Retardation of response
   d) None of these

3) A 1 mA d'Arsonval movements has a resistance of 100. It is to be converted to a 10 V voltmeter. The value of multiplier resistance is
   a) 999 b) 9999 c) 9900 d) 990

4) Power consumption in PMMC instruments is typically about
   a) 0.25 W to 2 W b) 0.25 m W to 2 m W
   c) 25 μ W to 200 μ W d) None of the above

5) According to application, instruments are classified as
   a) Switch board b) Portable
   c) Both (a) and (b) d) Moving coil

6) Maxwell's inductance-capacitance bridge is used for measurement of inductance of
   a) Low Q coils
   b) Medium Q coils
   c) High Q coils
   d) Low and medium Q coils

7) Standardization of potentiometers is done in order that, they become
   a) Accurate
   b) Precise
   c) Accurate and direct reading
   d) Accurate and precise

8) The ratio of transformation in the case of potential transformers
   a) Increase with increase in power factor of secondary burden
   b) Remains constant irrespective of the power factor of secondary burden
   c) Decreases with increase in power factor of secondary burden
   d) None of the above

9) A Multimeter is used to measure
   a) Resistance
   b) Current
   c) Voltage
   d) All of the above

10) Digital instruments are those which
   a) Have numerical readout
   b) Use LED or LCD displays
   c) Have a circuitry of digital design
   d) Use deflection type meter movement

11) The burden type of current transformer is expressed in terms of
   a) Secondary winding current
   b) VA rating of transformer
   c) Voltage, current and pf of secondary winding circuit
   d) None of above

12) An aquadag is used in a CRO to collect
   a) Primary electrons
   b) Secondary emission electrons
   c) Both primary and secondary emission
   d) None of above

13) Time division multiplexing is used
   a) When data to be transmitted is slow changing
   b) When data to be transmitted has a small bandwidth
   c) When data to be transmitted is slow changing and has a low bandwidth
   d) None of the above

14) A vertical amplifier for a CRO can be designed for
   a) Only a high gain
   b) Only a broad bandwidth
   c) A constant gain times bandwidth product
   d) All of above

SLR-TJ – 346

Seat No.	

S.E. (Electrical Engineering) (Part – I) (New CBCS) Examination, 2017
ELECTRICAL MEASUREMENT & INSTRUMENTATION

Day and Date : Saturday, 16-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instruction** : Assume the suitable data **whenever** necessary.*

2. Solve **any four** : **(4×4=16)**
   1) Define the following static characteristics :
      a) Linearity
      b) Accuracy
      c) Repeatability
      d) Precision.
   2) Explain spring control method with neat sketch.
   3) With neat sketch explain laboratory type (Crompton's) potentiometer.
   4) Explain Weston frequency meter with neat diagram.
   5) Explain how megger used for measurement of insulation resistance.
   6) The two wattmeter are used measure power input to a 1.5 KV, 50 Hz, 3-phase motor running an full load as an efficiency of 85%. Their readings are 250 KW and 80 KW respectively.
      Calculate :
      a) Input
      b) Line Current
      c) Power factor
      d) Output.

3. Solve **any two** : **(6×2=12)**
   1) With neat sketch construction and operation of 1 Φ electrodynamometer power factor meter.
   2) Explain Hays bridge for measurement of unknown inductance with phasor diagram.

3) A bridge consist of following :

Arm ab : A choke coil having resistance R_1 and inductance L_1

Arm bc : A non-inductive resistance R_3

Arm cd : A mica capacitor C_4 in series with non-inductive resistance R_4

Arm da : A non-inductive resistance R_2

When this bridge is fed from source of 500 Hz, balance is obtained under following Conditions :

$R_2 = 2410\ \Omega$, $R_3 = 750\ \Omega$, $C_4 = 0.35\ \mu f$, $R_4 = 64.5\ \Omega$ and the series resistance of capacitor = $0.4\ \Omega$. Calculate resistance and inductances of choke coil. The supply is connected between a and c and detector between b and d.

4. Solve **any four** : **(4×4=16)**

a) Define the following terms as applied to instrument transformer.

i) Transformation Ratio

ii) Nominal Ratio

iii) Turns Ratio

iv) Burden of an Instrument Transformer.

b) Explain Electronic Frequency Counter.

c) Explain data acquisition system

d) Draw block diagram of Ramp type digital voltmeter and explain.

e) Explain with neat block diagram working of general purpose CRO.

5. Solve **any two** : **(2×6=12)**

a) Draw typical phasor diagram of current transformer. Derive equation for actual transformation ratio.

b) Show the internal structure of CRT and explain working.

c) Explain the working of XY recorders.

SLR-TJ – 346

Seat No.	

Set Q

S.E. (Electrical Engineering) (Part – I) (New CBCS) Examination, 2017
ELECTRICAL MEASUREMENT & INSTRUMENTATION

Day and Date : Saturday, 16-12-2017 Total Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume the suitable data ***whenever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The ratio of transformation in the case of potential transformers
   a) Increase with increase in power factor of secondary burden
   b) Remains constant irrespective of the power factor of secondary burden
   c) Decreases with increase in power factor of secondary burden
   d) None of the above

2) A Multimeter is used to measure
   a) Resistance
   b) Current
   c) Voltage
   d) All of the above

3) Digital instruments are those which
   a) Have numerical readout
   b) Use LED or LCD displays
   c) Have a circuitry of digital design
   d) Use deflection type meter movement

4) The burden type of current transformer is expressed in terms of
   a) Secondary winding current
   b) VA rating of transformer
   c) Voltage, current and pf of secondary winding circuit
   d) None of above

5) An aquadag is used in a CRO to collect
   a) Primary electrons
   b) Secondary emission electrons
   c) Both primary and secondary emission
   d) None of above

6) Time division multiplexing is used
   a) When data to be transmitted is slow changing
   b) When data to be transmitted has a small bandwidth
   c) When data to be transmitted is slow changing and has a low bandwidth
   d) None of the above

7) A vertical amplifier for a CRO can be designed for
   a) Only a high gain
   b) Only a broad bandwidth
   c) A constant gain times bandwidth product
   d) All of above

8) The reliability of the instrument refer to
   a) Measurement of changes due to temperature variations
   b) Degree to which repeatability continues to remain within specified limits
   c) The life of the instrument
   d) The extent to which the characteristics remain linear

9) The resolution of system refers to
   a) Smallest changing the measure and that can be measure
   b) True value of the input
   c) Retardation of response
   d) None of these

10) A 1 mA d'Arsonval movements has a resistance of 100. It is to be converted to a 10 V voltmeter. The value of multiplier resistance is
   a) 999 b) 9999 c) 9900 d) 990

11) Power consumption in PMMC instruments is typically about
   a) 0.25 W to 2 W b) 0.25 m W to 2 m W
   c) 25 μ W to 200 μ W d) None of the above

12) According to application, instruments are classified as
   a) Switch board b) Portable
   c) Both (a) and (b) d) Moving coil

13) Maxwell's inductance-capacitance bridge is used for measurement of inductance of
   a) Low Q coils b) Medium Q coils
   c) High Q coils d) Low and medium Q coils

14) Standardization of potentiometers is done in order that, they become
   a) Accurate b) Precise
   c) Accurate and direct reading d) Accurate and precise

Seat No.	

S.E. (Electrical Engineering) (Part – I) (New CBCS) Examination, 2017
ELECTRICAL MEASUREMENT & INSTRUMENTATION

Day and Date : Saturday, 16-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instruction** : Assume the suitable data **whenever** necessary.*

2. Solve **any four** : **(4×4=16)**
   1) Define the following static characteristics :
      a) Linearity
      b) Accuracy
      c) Repeatability
      d) Precision.
   2) Explain spring control method with neat sketch.
   3) With neat sketch explain laboratory type (Crompton's) potentiometer.
   4) Explain Weston frequency meter with neat diagram.
   5) Explain how megger used for measurement of insulation resistance.
   6) The two wattmeter are used measure power input to a 1.5 KV, 50 Hz, 3-phase motor running an full load as an efficiency of 85%. Their readings are 250 KW and 80 KW respectively.
      Calculate :
      a) Input
      b) Line Current
      c) Power factor
      d) Output.

3. Solve **any two** : **(6×2=12)**
   1) With neat sketch construction and operation of 1 Φ electrodynamometer power factor meter.
   2) Explain Hays bridge for measurement of unknown inductance with phasor diagram.

3) A bridge consist of following :

Arm ab : A choke coil having resistance R_1 and inductance L_1

Arm bc : A non-inductive resistance R_3

Arm cd : A mica capacitor C_4 in series with non-inductive resistance R_4

Arm da : A non-inductive resistance R_2

When this bridge is fed from source of 500 Hz, balance is obtained under following Conditions :

$R_2 = 2410\ \Omega$, $R_3 = 750\ \Omega$, $C_4 = 0.35\ \mu f$, $R_4 = 64.5\ \Omega$ and the series resistance of capacitor = $0.4\ \Omega$. Calculate resistance and inductances of choke coil. The supply is connected between a and c and detector between b and d.

4. Solve **any four** : **(4×4=16)**

a) Define the following terms as applied to instrument transformer.

i) Transformation Ratio

ii) Nominal Ratio

iii) Turns Ratio

iv) Burden of an Instrument Transformer.

b) Explain Electronic Frequency Counter.

c) Explain data acquisition system

d) Draw block diagram of Ramp type digital voltmeter and explain.

e) Explain with neat block diagram working of general purpose CRO.

5. Solve **any two** : **(2×6=12)**

a) Draw typical phasor diagram of current transformer. Derive equation for actual transformation ratio.

b) Show the internal structure of CRT and explain working.

c) Explain the working of XY recorders.

SLR-TJ – 346

Seat No.	

Set R

S.E. (Electrical Engineering) (Part – I) (New CBCS) Examination, 2017
ELECTRICAL MEASUREMENT & INSTRUMENTATION

Day and Date : Saturday, 16-12-2017 Total Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume the suitable data ***whenever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) According to application, instruments are classified as
   a) Switch board b) Portable
   c) Both (a) and (b) d) Moving coil

2) Maxwell's inductance-capacitance bridge is used for measurement of inductance of
   a) Low Q coils b) Medium Q coils
   c) High Q coils d) Low and medium Q coils

3) Standardization of potentiometers is done in order that, they become
   a) Accurate b) Precise
   c) Accurate and direct reading d) Accurate and precise

4) The ratio of transformation in the case of potential transformers
   a) Increase with increase in power factor of secondary burden
   b) Remains constant irrespective of the power factor of secondary burden
   c) Decreases with increase in power factor of secondary burden
   d) None of the above

5) A Multimeter is used to measure
   a) Resistance b) Current
   c) Voltage d) All of the above

6) Digital instruments are those which
   a) Have numerical readout
   b) Use LED or LCD displays
   c) Have a circuitry of digital design
   d) Use deflection type meter movement

7) The burden type of current transformer is expressed in terms of
   a) Secondary winding current
   b) VA rating of transformer
   c) Voltage, current and pf of secondary winding circuit
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8) An aquadag is used in a CRO to collect
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9) Time division multiplexing is used
   a) When data to be transmitted is slow changing
   b) When data to be transmitted has a small bandwidth
   c) When data to be transmitted is slow changing and has a low bandwidth
   d) None of the above

10) A vertical amplifier for a CRO can be designed for
   a) Only a high gain
   b) Only a broad bandwidth
   c) A constant gain times bandwidth product
   d) All of above

11) The reliability of the instrument refer to
   a) Measurement of changes due to temperature variations
   b) Degree to which repeatability continues to remain within specified limits
   c) The life of the instrument
   d) The extent to which the characteristics remain linear

12) The resolution of system refers to
   a) Smallest changing the measure and that can be measure
   b) True value of the input
   c) Retardation of response
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13) A 1 mA d'Arsonval movements has a resistance of 100. It is to be converted to a 10 V voltmeter. The value of multiplier resistance is
   a) 999 b) 9999 c) 9900 d) 990

14) Power consumption in PMMC instruments is typically about
   a) 0.25 W to 2 W b) 0.25 m W to 2 m W
   c) 25 μ W to 200 μ W d) None of the above

Seat No.	

S.E. (Electrical Engineering) (Part – I) (New CBCS) Examination, 2017
ELECTRICAL MEASUREMENT & INSTRUMENTATION

Day and Date : Saturday, 16-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instruction** : Assume the suitable data **whenever** necessary.*

2. Solve **any four** : **(4×4=16)**
   1) Define the following static characteristics :
      a) Linearity
      b) Accuracy
      c) Repeatability
      d) Precision.
   2) Explain spring control method with neat sketch.
   3) With neat sketch explain laboratory type (Crompton's) potentiometer.
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   5) Explain how megger used for measurement of insulation resistance.
   6) The two wattmeter are used measure power input to a 1.5 KV, 50 Hz, 3-phase motor running an full load as an efficiency of 85%. Their readings are 250 KW and 80 KW respectively.
      Calculate :
      a) Input
      b) Line Current
      c) Power factor
      d) Output.

3. Solve **any two** : **(6×2=12)**
   1) With neat sketch construction and operation of 1 Φ electrodynamometer power factor meter.
   2) Explain Hays bridge for measurement of unknown inductance with phasor diagram.

3) A bridge consist of following :

Arm ab : A choke coil having resistance R_1 and inductance L_1

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When this bridge is fed from source of 500 Hz, balance is obtained under following Conditions :

$R_2 = 2410\ \Omega$, $R_3 = 750\ \Omega$, $C_4 = 0.35\ \mu f$, $R_4 = 64.5\ \Omega$ and the series resistance of capacitor = $0.4\ \Omega$. Calculate resistance and inductances of choke coil. The supply is connected between a and c and detector between b and d.

4. Solve **any four** : **(4×4=16)**

a) Define the following terms as applied to instrument transformer.

i) Transformation Ratio

ii) Nominal Ratio

iii) Turns Ratio

iv) Burden of an Instrument Transformer.

b) Explain Electronic Frequency Counter.

c) Explain data acquisition system

d) Draw block diagram of Ramp type digital voltmeter and explain.

e) Explain with neat block diagram working of general purpose CRO.

5. Solve **any two** : **(2×6=12)**

a) Draw typical phasor diagram of current transformer. Derive equation for actual transformation ratio.

b) Show the internal structure of CRT and explain working.

c) Explain the working of XY recorders.

SLR-TJ – 346

Seat No.	

Set S

S.E. (Electrical Engineering) (Part – I) (New CBCS) Examination, 2017
ELECTRICAL MEASUREMENT & INSTRUMENTATION

Day and Date : Saturday, 16-12-2017 Total Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume the suitable data ***whenever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Digital instruments are those which
   a) Have numerical readout
   b) Use LED or LCD displays
   c) Have a circuitry of digital design
   d) Use deflection type meter movement

2) The burden type of current transformer is expressed in terms of
   a) Secondary winding current
   b) VA rating of transformer
   c) Voltage, current and pf of secondary winding circuit
   d) None of above

3) An aquadag is used in a CRO to collect
   a) Primary electrons
   b) Secondary emission electrons
   c) Both primary and secondary emission
   d) None of above

4) Time division multiplexing is used
   a) When data to be transmitted is slow changing
   b) When data to be transmitted has a small bandwidth
   c) When data to be transmitted is slow changing and has a low bandwidth
   d) None of the above

5) A vertical amplifier for a CRO can be designed for
   a) Only a high gain
   b) Only a broad bandwidth
   c) A constant gain times bandwidth product
   d) All of above

6) The reliability of the instrument refer to
   a) Measurement of changes due to temperature variations
   b) Degree to which repeatability continues to remain within specified limits
   c) The life of the instrument
   d) The extent to which the characteristics remain linear

7) The resolution of system refers to
   a) Smallest changing the measure and that can be measure
   b) True value of the input
   c) Retardation of response
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8) A 1 mA d'Arsonval movements has a resistance of 100. It is to be converted to a 10 V voltmeter. The value of multiplier resistance is
   a) 999 b) 9999 c) 9900 d) 990

9) Power consumption in PMMC instruments is typically about
   a) 0.25 W to 2 W b) 0.25 m W to 2 m W
   c) 25 μ W to 200 μ W d) None of the above

10) According to application, instruments are classified as
   a) Switch board b) Portable
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11) Maxwell's inductance-capacitance bridge is used for measurement of inductance of
   a) Low Q coils b) Medium Q coils
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   a) Accurate b) Precise
   c) Accurate and direct reading d) Accurate and precise

13) The ratio of transformation in the case of potential transformers
   a) Increase with increase in power factor of secondary burden
   b) Remains constant irrespective of the power factor of secondary burden
   c) Decreases with increase in power factor of secondary burden
   d) None of the above

14) A Multimeter is used to measure
   a) Resistance b) Current
   c) Voltage d) All of the above

Seat No.	

S.E. (Electrical Engineering) (Part – I) (New CBCS) Examination, 2017
ELECTRICAL MEASUREMENT & INSTRUMENTATION

Day and Date : Saturday, 16-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instruction** : Assume the suitable data **whenever** necessary.*

2. Solve **any four** : **(4×4=16)**
   1) Define the following static characteristics :
      a) Linearity
      b) Accuracy
      c) Repeatability
      d) Precision.
   2) Explain spring control method with neat sketch.
   3) With neat sketch explain laboratory type (Crompton's) potentiometer.
   4) Explain Weston frequency meter with neat diagram.
   5) Explain how megger used for measurement of insulation resistance.
   6) The two wattmeter are used measure power input to a 1.5 KV, 50 Hz, 3-phase motor running an full load as an efficiency of 85%. Their readings are 250 KW and 80 KW respectively.
      Calculate :
      a) Input
      b) Line Current
      c) Power factor
      d) Output.

3. Solve **any two** : **(6×2=12)**
   1) With neat sketch construction and operation of 1 Φ electrodynamometer power factor meter.
   2) Explain Hays bridge for measurement of unknown inductance with phasor diagram.

3) A bridge consist of following :

Arm ab : A choke coil having resistance R_1 and inductance L_1

Arm bc : A non-inductive resistance R_3

Arm cd : A mica capacitor C_4 in series with non-inductive resistance R_4

Arm da : A non-inductive resistance R_2

When this bridge is fed from source of 500 Hz, balance is obtained under following Conditions :

$R_2 = 2410\ \Omega$, $R_3 = 750\ \Omega$, $C_4 = 0.35\ \mu f$, $R_4 = 64.5\ \Omega$ and the series resistance of capacitor = $0.4\ \Omega$. Calculate resistance and inductances of choke coil. The supply is connected between a and c and detector between b and d.

4. Solve **any four** : **(4×4=16)**

a) Define the following terms as applied to instrument transformer.

i) Transformation Ratio

ii) Nominal Ratio

iii) Turns Ratio

iv) Burden of an Instrument Transformer.

b) Explain Electronic Frequency Counter.

c) Explain data acquisition system

d) Draw block diagram of Ramp type digital voltmeter and explain.

e) Explain with neat block diagram working of general purpose CRO.

5. Solve **any two** : **(2×6=12)**

a) Draw typical phasor diagram of current transformer. Derive equation for actual transformation ratio.

b) Show the internal structure of CRT and explain working.

c) Explain the working of XY recorders.

SLR-TJ – 347

Seat No.	

Set P

S.E. (Electrical) (Part – I) (New – CBCS) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Tuesday, 19-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

I. Choose the correct answer : **(14×1=14)**

1) Out of the following which is conventional source of energy
   a) Tidal power b) Geothermal energy
   c) Nuclear energy d) Wind power

2) Diversity factor is always
   a) Less than one b) Equal to one c) Above one d) None of them

3) A graphical representation between discharge and time is known as
   a) Hydrograph b) Hectograph c) Topograph d) Monograph

4) In hydro power plants
   a) Initial cost is low and operating cost is high
   b) Initial cost as well as operating costs are high
   c) Initial cost is high and operating cost is low
   d) Initial cost as well as operating cost is low

5) Which of the following enters the super heater of a boiler ?
   a) Cold water b) Hot water
   c) Wet steam d) Super-heated steam

6) Capacity factor of power station is
   a) Maximum demand/average demand
   b) Average demand on station/maximum demand on station
   c) Maximum installed capacity of station/average demand of station
   d) Average demand of station//maximum installed capacity of station

7) Live storage of coal in a power plant means
   a) Coal ready for combustion
   b) Preheated coal
   c) Storage of coal sufficient to meet 24 hour demand of the plant
   d) Coal in transit

8) Which of the following is not a part of diesel engine power plant ?
   a) Cooling tower b) Penstock c) Oil pump d) Strainer

9) Efficiency of gas turbine plant is nearly
   a) 80% b) 20% c) 50% d) 60%

10) An air filter is used in
   a) nuclear power plants b) steam power plants
   c) diesel engine power plants d) hydro-power plants

11) A gas turbine works on
   a) carnot cycle b) brayton cycle c) dual cycle d) rankine cycle

12) Which of the following material can be used as a moderator ?
   a) Graphite b) Heavy water c) Beryllium d) Any of the above

13) In which of the following power plant the availability of power is least reliable ?
   a) Solar power plant b) Wind energy
   c) Tidal power plant d) Geothermal power plant

14) Efficiency of BWR is nearly
   a) 32% b) 41% c) 30% d) 33%

SLR-TJ – 347

Seat No.	

S.E. (Electrical) (Part – I) (New – CBCS) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Tuesday, 19-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

II. Solve **any four** : **(4×4=16)**

a) Explain different types of conventional energy sources.

b) Explain the Hydrograph and flow duration curve Hydro Power Plant.

c) List the main equipment in a coal fired steam station.

d) Draw and explain Pelton wheel turbine.

e) Explain the economizers in thermal power plant.

III. Solve **any two** : **(2×6=12)**

a) Explain classification of hydro power plant.

b) What is function of nuclear reactor explain different component in nuclear reactor ?

c) Describe with neat sketch schematic arrangement of thermal power station.

SECTION – II

IV. Solve **any four** : **(4×4=16)**

a) Give the advantages and disadvantages of diesel power plant.

b) Draw and explain load curve and load duration curve.

c) Write a short note on tidal power generation.

d) What is the geothermal energy ? How can it be used for power generation ?

e) A generating station has a connected load of 43 MW and a maximum demand of 20 MW; the units generated being 61.5×10^6 per annum. Calculate :

i) the demand factor and

ii) load factor.

V. Solve **any two** : **(2×6=12)**

a) What is tariff ? Explain different types of tariff.

b) Explain with neat sketch solar thermal power plant.

c) With the help of neat sketch explain gas turbine power plant.

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Seat No.	

Set Q

S.E. (Electrical) (Part – I) (New – CBCS) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Tuesday, 19-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

I. Choose the correct answer : **(14×1=14)**

1) Which of the following is not a part of diesel engine power plant ?
   a) Cooling tower b) Penstock c) Oil pump d) Strainer
2) Efficiency of gas turbine plant is nearly
   a) 80% b) 20% c) 50% d) 60%
3) An air filter is used in
   a) nuclear power plants b) steam power plants
   c) diesel engine power plants d) hydro-power plants
4) A gas turbine works on
   a) carnot cycle b) brayton cycle c) dual cycle d) rankine cycle
5) Which of the following material can be used as a moderator ?
   a) Graphite b) Heavy water c) Beryllium d) Any of the above
6) In which of the following power plant the availability of power is least reliable ?
   a) Solar power plant b) Wind energy
   c) Tidal power plant d) Geothermal power plant
7) Efficiency of BWR is nearly
   a) 32% b) 41% c) 30% d) 33%
8) Out of the following which is conventional source of energy
   a) Tidal power b) Geothermal energy
   c) Nuclear energy d) Wind power

9) Diversity factor is always
   a) Less than one b) Equal to one c) Above one d) None of them
10) A graphical representation between discharge and time is known as
   a) Hydrograph b) Hectograph c) Topograph d) Monograph
11) In hydro power plants
   a) Initial cost is low and operating cost is high
   b) Initial cost as well as operating costs are high
   c) Initial cost is high and operating cost is low
   d) Initial cost as well as operating cost is low
12) Which of the following enters the super heater of a boiler ?
   a) Cold water b) Hot water
   c) Wet steam d) Super-heated steam
13) Capacity factor of power station is
   a) Maximum demand/average demand
   b) Average demand on station/maximum demand on station
   c) Maximum installed capacity of station/average demand of station
   d) Average demand of station//maximum installed capacity of station
14) Live storage of coal in a power plant means
   a) Coal ready for combustion
   b) Preheated coal
   c) Storage of coal sufficient to meet 24 hour demand of the plant
   d) Coal in transit

SLR-TJ – 347

Seat No.	

S.E. (Electrical) (Part – I) (New – CBCS) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Tuesday, 19-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

II. Solve **any four** : **(4×4=16)**

a) Explain different types of conventional energy sources.

b) Explain the Hydrograph and flow duration curve Hydro Power Plant.

c) List the main equipment in a coal fired steam station.

d) Draw and explain Pelton wheel turbine.

e) Explain the economizers in thermal power plant.

III. Solve **any two** : **(2×6=12)**

a) Explain classification of hydro power plant.

b) What is function of nuclear reactor explain different component in nuclear reactor ?

c) Describe with neat sketch schematic arrangement of thermal power station.

SECTION – II

IV. Solve **any four** : **(4×4=16)**

a) Give the advantages and disadvantages of diesel power plant.

b) Draw and explain load curve and load duration curve.

c) Write a short note on tidal power generation.

d) What is the geothermal energy ? How can it be used for power generation ?

e) A generating station has a connected load of 43 MW and a maximum demand of 20 MW; the units generated being 61.5×10^6 per annum. Calculate :

i) the demand factor and

ii) load factor.

V. Solve **any two** : **(2×6=12)**

a) What is tariff ? Explain different types of tariff.

b) Explain with neat sketch solar thermal power plant.

c) With the help of neat sketch explain gas turbine power plant.

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Seat No.	

Set R

S.E. (Electrical) (Part – I) (New – CBCS) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Tuesday, 19-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

I. Choose the correct answer : **(14×1=14)**

1) Which of the following enters the super heater of a boiler ?
   a) Cold water b) Hot water
   c) Wet steam d) Super-heated steam

2) Capacity factor of power station is
   a) Maximum demand/average demand
   b) Average demand on station/maximum demand on station
   c) Maximum installed capacity of station/average demand of station
   d) Average demand of station//maximum installed capacity of station

3) Live storage of coal in a power plant means
   a) Coal ready for combustion
   b) Preheated coal
   c) Storage of coal sufficient to meet 24 hour demand of the plant
   d) Coal in transit

4) Which of the following is not a part of diesel engine power plant ?
   a) Cooling tower b) Penstock c) Oil pump d) Strainer

5) Efficiency of gas turbine plant is nearly
   a) 80% b) 20% c) 50% d) 60%

6) An air filter is used in
   a) nuclear power plants b) steam power plants
   c) diesel engine power plants d) hydro-power plants

7) A gas turbine works on
   a) carnot cycle b) brayton cycle c) dual cycle d) rankine cycle
8) Which of the following material can be used as a moderator ?
   a) Graphite b) Heavy water c) Beryllium d) Any of the above
9) In which of the following power plant the availability of power is least reliable ?
   a) Solar power plant b) Wind energy
   c) Tidal power plant d) Geothermal power plant
10) Efficiency of BWR is nearly
   a) 32% b) 41% c) 30% d) 33%
11) Out of the following which is conventional source of energy
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12) Diversity factor is always
   a) Less than one b) Equal to one c) Above one d) None of them
13) A graphical representation between discharge and time is known as
   a) Hydrograph b) Hectograph c) Topograph d) Monograph
14) In hydro power plants
   a) Initial cost is low and operating cost is high
   b) Initial cost as well as operating costs are high
   c) Initial cost is high and operating cost is low
   d) Initial cost as well as operating cost is low

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Seat No.	

S.E. (Electrical) (Part – I) (New – CBCS) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Tuesday, 19-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

II. Solve **any four** : **(4×4=16)**

a) Explain different types of conventional energy sources.

b) Explain the Hydrograph and flow duration curve Hydro Power Plant.

c) List the main equipment in a coal fired steam station.

d) Draw and explain Pelton wheel turbine.

e) Explain the economizers in thermal power plant.

III. Solve **any two** : **(2×6=12)**

a) Explain classification of hydro power plant.

b) What is function of nuclear reactor explain different component in nuclear reactor ?

c) Describe with neat sketch schematic arrangement of thermal power station.

SECTION – II

IV. Solve **any four** : **(4×4=16)**

a) Give the advantages and disadvantages of diesel power plant.

b) Draw and explain load curve and load duration curve.

c) Write a short note on tidal power generation.

d) What is the geothermal energy ? How can it be used for power generation ?

e) A generating station has a connected load of 43 MW and a maximum demand of 20 MW; the units generated being 61.5×10^6 per annum. Calculate :

i) the demand factor and

ii) load factor.

V. Solve **any two** : **(2×6=12)**

a) What is tariff ? Explain different types of tariff.

b) Explain with neat sketch solar thermal power plant.

c) With the help of neat sketch explain gas turbine power plant.

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Seat No.	

Set S

S.E. (Electrical) (Part – I) (New – CBCS) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Tuesday, 19-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

I. Choose the correct answer : **(14×1=14)**

1) An air filter is used in
   a) nuclear power plants b) steam power plants
   c) diesel engine power plants d) hydro-power plants

2) A gas turbine works on
   a) carnot cycle b) brayton cycle c) dual cycle d) rankine cycle

3) Which of the following material can be used as a moderator ?
   a) Graphite b) Heavy water c) Beryllium d) Any of the above

4) In which of the following power plant the availability of power is least reliable ?
   a) Solar power plant b) Wind energy
   c) Tidal power plant d) Geothermal power plant

5) Efficiency of BWR is nearly
   a) 32% b) 41% c) 30% d) 33%

6) Out of the following which is conventional source of energy
   a) Tidal power b) Geothermal energy
   c) Nuclear energy d) Wind power

7) Diversity factor is always
   a) Less than one b) Equal to one c) Above one d) None of them

8) A graphical representation between discharge and time is known as
   a) Hydrograph b) Hectograph c) Topograph d) Monograph

9) In hydro power plants
   a) Initial cost is low and operating cost is high
   b) Initial cost as well as operating costs are high
   c) Initial cost is high and operating cost is low
   d) Initial cost as well as operating cost is low

10) Which of the following enters the super heater of a boiler ?
   a) Cold water
   b) Hot water
   c) Wet steam
   d) Super-heated steam

11) Capacity factor of power station is
   a) Maximum demand/average demand
   b) Average demand on station/maximum demand on station
   c) Maximum installed capacity of station/average demand of station
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12) Live storage of coal in a power plant means
   a) Coal ready for combustion
   b) Preheated coal
   c) Storage of coal sufficient to meet 24 hour demand of the plant
   d) Coal in transit

13) Which of the following is not a part of diesel engine power plant ?
   a) Cooling tower
   b) Penstock
   c) Oil pump
   d) Strainer

14) Efficiency of gas turbine plant is nearly
   a) 80%
   b) 20%
   c) 50%
   d) 60%

SLR-TJ – 347

Seat No.	

S.E. (Electrical) (Part – I) (New – CBCS) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Tuesday, 19-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

II. Solve **any four** : **(4×4=16)**

a) Explain different types of conventional energy sources.

b) Explain the Hydrograph and flow duration curve Hydro Power Plant.

c) List the main equipment in a coal fired steam station.

d) Draw and explain Pelton wheel turbine.

e) Explain the economizers in thermal power plant.

III. Solve **any two** : **(2×6=12)**

a) Explain classification of hydro power plant.

b) What is function of nuclear reactor explain different component in nuclear reactor ?

c) Describe with neat sketch schematic arrangement of thermal power station.

SECTION – II

IV. Solve **any four** : **(4×4=16)**

a) Give the advantages and disadvantages of diesel power plant.

b) Draw and explain load curve and load duration curve.

c) Write a short note on tidal power generation.

d) What is the geothermal energy ? How can it be used for power generation ?

e) A generating station has a connected load of 43 MW and a maximum demand of 20 MW; the units generated being 61.5×10^6 per annum. Calculate :

i) the demand factor and

ii) load factor.

V. Solve **any two** : **(2×6=12)**

a) What is tariff ? Explain different types of tariff.

b) Explain with neat sketch solar thermal power plant.

c) With the help of neat sketch explain gas turbine power plant.

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Seat No.	

Set P

S.E. (Electrical Engineering) (Part – I) (New CBCS) Examination, 2017
ELECTRONIC DEVICES AND CIRCUITS

Day and Date : Thursday, 21-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data if* ***necessary****.*
3) Figure to the ***right*** *indicates* ***full*** *marks.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct option : **(1×14=14)**

1) In Bipolar Junction Transistor doping concentration in Emitter (E), Base (B) and collector (C) is
A) E > C > B B) B > E > C C) C > B > E D) E > B > C

2) A transistor is said in quiescent condition when
A) It is unbiased B) No current flowing through it
C) No signal is given D) None of these

3) *A JFET* is also called _____ transistor.
A) Unipolar B) Uni junction
C) Bipolar D) None of these

4) Low frequency response of transistorized amplifier get affected by
A) C_C B) C_C and C_E
C) C_E D) Junction capacitances

5) A multistage amplifier consists of three stages. The voltage gains of three stages are 40dB, 60dB and 80dB. The overall gain in dB is
A) 110 B) 180 C) 105.46 D) 1054.6

6) Thermal runaway occurs when
   A) Collector is reverse biased
   B) Transistor is not biased
   C) Emitter is forward biased
   D) Junction capacitance is high

7) The parameter *hfe* is called _____ in *CE* arrangement with output shorted.
   A) Voltage gain
   B) Input impedance
   C) Current gain
   D) None of these

8) Which transformer you will choose for an electronic circuit which requires 100 mA rms current ?
   A) 150 mA
   B) 200 mA
   C) 250 mA
   D) 0.5 A

9) Which among the following filters is suitable for heavy load current ?
   A) L
   B) C
   C) CLC
   D) None

10) Negative feedback in an amplifier helps to
   A) Stabilize gain
   B) Increase bandwidth
   C) Both A) and B)
   D) None

11) Feedback signal for current feedback is
   A) Current
   B) Voltage
   C) Current in series with voltage
   D) None

12) In Wein Bridge oscillator circuit we can have _____ feedback.
   A) +ve
   B) –ve
   C) Both +ve and –ve
   D) Zero

13) The transformer coupled class A power amplifier has a efficiency of
   A) 25%
   B) 50%
   C) 78.5%
   D) 90%

14) An oscillator circuit using a quartz crystal has
   A) High-frequency stability
   B) Low-frequency stability
   C) Medium-frequency stability
   D) Multiple-frequency stability

_____

SLR-TJ – 348

Seat No.	

S.E. (Electrical Engineering) (Part – I) (New CBCS) Examination, 2017

ELECTRONIC DEVICES AND CIRCUITS

Day and Date : Thursday, 21-12-2017 Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*

2) ***Assume*** *suitable data if* ***necessary****.*

3) Figure to the ***right*** *indicates* ***full*** *marks.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Draw DC and AC equivalent circuit for single stage CE amplifier.

2) Derive the stability factor for voltage divider biasing circuit.

3) Draw hybrid model for BJT in CE, CC and CB configuration.

4) Draw and explain transfer characteristics of n-channel Enhancement MOSFET.

5) Explain in detail low frequency response of CE amplifier.

3. Solve **any two** : **(2×6=12)**

1) Explain with diagram working of common source and common drain JFET amplifier.

2) Explain in detail hybrid parameters from input output characteristics of BJT.

3) Design a single stage CE amplifier with Q (6V, 2mA), supply voltage of 12 V, stability factor is 5 and Lower cutoff frequency 20 Hz.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   a) Explain the technical features of LM723.
   b) With a neat diagram explain the LC filter and π filter. Also write expression for ripple for them.
   c) Explain the concept of cross-over distortion in case of power amplifiers.
   d) Explain positive feedback and derive an expression for it.
   e) Explain what is sampling and mixing in case of feedback amplifiers.
   f) With a neat diagram explain crystal oscillator which operates on f_s.

5. Attempt **any two** : **(6×2=12)**
   a) Design a unregulated power supply filer using LC filter for a output of 30 V and ripple 3%. Use current of 1 A and use center-tap transformer. Also calculate the value of bleeder resistance.
   b) With block diagram explain different feedback configuration.
   c) Draw the neat diagram of RC phase shift oscillator and derive the expression for frequency and condition for sustained oscillation.

SLR-TJ – 348

Seat No.	

Set Q

S.E. (Electrical Engineering) (Part – I) (New CBCS) Examination, 2017
ELECTRONIC DEVICES AND CIRCUITS

Day and Date : Thursday, 21-12-2017 Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*

2) ***Assume*** *suitable data if* ***necessary****.*

3) Figure to the ***right*** *indicates* ***full*** *marks.*

4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

5) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct option : **(1×14=14)**

1) Which transformer you will choose for an electronic circuit which requires 100 mA rms current ?

A) 150 mA B) 200 mA C) 250 mA D) 0.5 A

2) Which among the following filters is suitable for heavy load current ?

A) L B) C C) CLC D) None

3) Negative feedback in an amplifier helps to

A) Stabilize gain B) Increase bandwidth

C) Both A) and B) D) None

4) Feedback signal for current feedback is

A) Current B) Voltage

C) Current in series with voltage D) None

P.T.O.

5) In Wein Bridge oscillator circuit we can have _____ feedback.
A) +ve B) –ve
C) Both +ve and –ve D) Zero

6) The transformer coupled class A power amplifier has a efficiency of
A) 25% B) 50% C) 78.5% D) 90%

7) An oscillator circuit using a quartz crystal has
A) High-frequency stability B) Low-frequency stability
C) Medium-frequency stability D) Multiple-frequency stability

8) In Bipolar Junction Transistor doping concentration in Emitter (E), Base (B) and collector (C) is
A) E > C > B B) B > E > C C) C > B > E D) E > B > C

9) A transistor is said in quiescent condition when
A) It is unbiased B) No current flowing through it
C) No signal is given D) None of these

10) *A JFET* is also called _____ transistor.
A) Unipolar B) Uni junction
C) Bipolar D) None of these

11) Low frequency response of transistorized amplifier get affected by
A) C_C B) C_C and C_E
C) C_E D) Junction capacitances

12) A multistage amplifier consists of three stages. The voltage gains of three stages are 40dB, 60dB and 80dB. The overall gain in dB is
A) 110 B) 180 C) 105.46 D) 1054.6

13) Thermal runaway occurs when
A) Collector is reverse biased B) Transistor is not biased
C) Emitter is forward biased D) Junction capacitance is high

14) The parameter *hfe* is called _____ in *CE* arrangement with output shorted.
A) Voltage gain B) Input impedance
C) Current gain D) None of these

_____

SLR-TJ – 348

Seat No.	

S.E. (Electrical Engineering) (Part – I) (New CBCS) Examination, 2017

ELECTRONIC DEVICES AND CIRCUITS

Day and Date : Thursday, 21-12-2017 Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*

2) ***Assume*** *suitable data if* ***necessary****.*

3) Figure to the ***right*** *indicates* ***full*** *marks.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Draw DC and AC equivalent circuit for single stage CE amplifier.

2) Derive the stability factor for voltage divider biasing circuit.

3) Draw hybrid model for BJT in CE, CC and CB configuration.

4) Draw and explain transfer characteristics of n-channel Enhancement MOSFET.

5) Explain in detail low frequency response of CE amplifier.

3. Solve **any two** : **(2×6=12)**

1) Explain with diagram working of common source and common drain JFET amplifier.

2) Explain in detail hybrid parameters from input output characteristics of BJT.

3) Design a single stage CE amplifier with Q (6V, 2mA), supply voltage of 12 V, stability factor is 5 and Lower cutoff frequency 20 Hz.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   a) Explain the technical features of LM723.
   b) With a neat diagram explain the LC filter and π filter. Also write expression for ripple for them.
   c) Explain the concept of cross-over distortion in case of power amplifiers.
   d) Explain positive feedback and derive an expression for it.
   e) Explain what is sampling and mixing in case of feedback amplifiers.
   f) With a neat diagram explain crystal oscillator which operates on f_s.

5. Attempt **any two** : **(6×2=12)**
   a) Design a unregulated power supply filer using LC filter for a output of 30 V and ripple 3%. Use current of 1 A and use center-tap transformer. Also calculate the value of bleeder resistance.
   b) With block diagram explain different feedback configuration.
   c) Draw the neat diagram of RC phase shift oscillator and derive the expression for frequency and condition for sustained oscillation.

SLR-TJ – 348

Seat No.	

Set R

S.E. (Electrical Engineering) (Part – I) (New CBCS) Examination, 2017
ELECTRONIC DEVICES AND CIRCUITS

Day and Date : Thursday, 21-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data if* ***necessary****.*
3) Figure to the ***right*** *indicates* ***full*** *marks.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct option : **(1×14=14)**

1) A multistage amplifier consists of three stages. The voltage gains of three stages are 40dB, 60dB and 80dB. The overall gain in dB is
A) 110 B) 180 C) 105.46 D) 1054.6

2) Thermal runaway occurs when
A) Collector is reverse biased B) Transistor is not biased
C) Emitter is forward biased D) Junction capacitance is high

3) The parameter *hfe* is called _____ in *CE* arrangement with output shorted.
A) Voltage gain B) Input impedance
C) Current gain D) None of these

4) Which transformer you will choose for an electronic circuit which requires 100 mA rms current ?
A) 150 mA B) 200 mA C) 250 mA D) 0.5 A

5) Which among the following filters is suitable for heavy load current ?
A) L B) C C) CLC D) None

P.T.O.

6) Negative feedback in an amplifier helps to
   A) Stabilize gain
   B) Increase bandwidth
   C) Both A) and B)
   D) None

7) Feedback signal for current feedback is
   A) Current
   B) Voltage
   C) Current in series with voltage
   D) None

8) In Wein Bridge oscillator circuit we can have _____ feedback.
   A) +ve
   B) –ve
   C) Both +ve and –ve
   D) Zero

9) The transformer coupled class A power amplifier has a efficiency of
   A) 25%
   B) 50%
   C) 78.5%
   D) 90%

10) An oscillator circuit using a quartz crystal has
   A) High-frequency stability
   B) Low-frequency stability
   C) Medium-frequency stability
   D) Multiple-frequency stability

11) In Bipolar Junction Transistor doping concentration in Emitter (E), Base (B) and collector (C) is
   A) E > C > B
   B) B > E > C
   C) C > B > E
   D) E > B > C

12) A transistor is said in quiescent condition when
   A) It is unbiased
   B) No current flowing through it
   C) No signal is given
   D) None of these

13) *A JFET* is also called _____ transistor.
   A) Unipolar
   B) Uni junction
   C) Bipolar
   D) None of these

14) Low frequency response of transistorized amplifier get affected by
   A) C_C
   B) C_C and C_E
   C) C_E
   D) Junction capacitances

_____

SLR-TJ – 348

Seat No.	

S.E. (Electrical Engineering) (Part – I) (New CBCS) Examination, 2017

ELECTRONIC DEVICES AND CIRCUITS

Day and Date : Thursday, 21-12-2017 Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*

2) ***Assume*** *suitable data if* ***necessary****.*

3) Figure to the ***right*** *indicates* ***full*** *marks.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Draw DC and AC equivalent circuit for single stage CE amplifier.

2) Derive the stability factor for voltage divider biasing circuit.

3) Draw hybrid model for BJT in CE, CC and CB configuration.

4) Draw and explain transfer characteristics of n-channel Enhancement MOSFET.

5) Explain in detail low frequency response of CE amplifier.

3. Solve **any two** : **(2×6=12)**

1) Explain with diagram working of common source and common drain JFET amplifier.

2) Explain in detail hybrid parameters from input output characteristics of BJT.

3) Design a single stage CE amplifier with Q (6V, 2mA), supply voltage of 12 V, stability factor is 5 and Lower cutoff frequency 20 Hz.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   a) Explain the technical features of LM723.
   b) With a neat diagram explain the LC filter and π filter. Also write expression for ripple for them.
   c) Explain the concept of cross-over distortion in case of power amplifiers.
   d) Explain positive feedback and derive an expression for it.
   e) Explain what is sampling and mixing in case of feedback amplifiers.
   f) With a neat diagram explain crystal oscillator which operates on f_s.

5. Attempt **any two** : **(6×2=12)**
   a) Design a unregulated power supply filer using LC filter for a output of 30 V and ripple 3%. Use current of 1 A and use center-tap transformer. Also calculate the value of bleeder resistance.
   b) With block diagram explain different feedback configuration.
   c) Draw the neat diagram of RC phase shift oscillator and derive the expression for frequency and condition for sustained oscillation.

SLR-TJ – 348

Seat No.	

Set S

S.E. (Electrical Engineering) (Part – I) (New CBCS) Examination, 2017
ELECTRONIC DEVICES AND CIRCUITS

Day and Date : Thursday, 21-12-2017 Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*

2) ***Assume*** *suitable data if* ***necessary****.*

3) Figure to the ***right*** *indicates* ***full*** *marks.*

4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

5) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct option : **(1×14=14)**

1) Negative feedback in an amplifier helps to

A) Stabilize gain B) Increase bandwidth

C) Both A) and B) D) None

2) Feedback signal for current feedback is

A) Current B) Voltage

C) Current in series with voltage D) None

3) In Wein Bridge oscillator circuit we can have _____ feedback.

A) +ve B) –ve

C) Both +ve and –ve D) Zero

4) The transformer coupled class A power amplifier has a efficiency of

A) 25% B) 50% C) 78.5% D) 90%

P.T.O.

5) An oscillator circuit using a quartz crystal has
   A) High-frequency stability B) Low-frequency stability
   C) Medium-frequency stability D) Multiple-frequency stability

6) In Bipolar Junction Transistor doping concentration in Emitter (E), Base (B) and collector (C) is
   A) E > C > B B) B > E > C C) C > B > E D) E > B > C

7) A transistor is said in quiescent condition when
   A) It is unbiased B) No current flowing through it
   C) No signal is given D) None of these

8) *A JFET* is also called _____ transistor.
   A) Unipolar B) Uni junction
   C) Bipolar D) None of these

9) Low frequency response of transistorized amplifier get affected by
   A) C_C B) C_C and C_E
   C) C_E D) Junction capacitances

10) A multistage amplifier consists of three stages. The voltage gains of three stages are 40dB, 60dB and 80dB. The overall gain in dB is
   A) 110 B) 180 C) 105.46 D) 1054.6

11) Thermal runaway occurs when
   A) Collector is reverse biased B) Transistor is not biased
   C) Emitter is forward biased D) Junction capacitance is high

12) The parameter *hfe* is called _____ in *CE* arrangement with output shorted.
   A) Voltage gain B) Input impedance
   C) Current gain D) None of these

13) Which transformer you will choose for an electronic circuit which requires 100 mA rms current ?
   A) 150 mA B) 200 mA C) 250 mA D) 0.5 A

14) Which among the following filters is suitable for heavy load current ?
   A) L B) C C) CLC D) None

_____

SLR-TJ – 348

Seat No.	

S.E. (Electrical Engineering) (Part – I) (New CBCS) Examination, 2017

ELECTRONIC DEVICES AND CIRCUITS

Day and Date : Thursday, 21-12-2017 Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*

2) ***Assume*** *suitable data if* ***necessary****.*

3) Figure to the ***right*** *indicates* ***full*** *marks.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Draw DC and AC equivalent circuit for single stage CE amplifier.

2) Derive the stability factor for voltage divider biasing circuit.

3) Draw hybrid model for BJT in CE, CC and CB configuration.

4) Draw and explain transfer characteristics of n-channel Enhancement MOSFET.

5) Explain in detail low frequency response of CE amplifier.

3. Solve **any two** : **(2×6=12)**

1) Explain with diagram working of common source and common drain JFET amplifier.

2) Explain in detail hybrid parameters from input output characteristics of BJT.

3) Design a single stage CE amplifier with Q (6V, 2mA), supply voltage of 12 V, stability factor is 5 and Lower cutoff frequency 20 Hz.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   a) Explain the technical features of LM723.
   b) With a neat diagram explain the LC filter and π filter. Also write expression for ripple for them.
   c) Explain the concept of cross-over distortion in case of power amplifiers.
   d) Explain positive feedback and derive an expression for it.
   e) Explain what is sampling and mixing in case of feedback amplifiers.
   f) With a neat diagram explain crystal oscillator which operates on f_s.

5. Attempt **any two** : **(6×2=12)**
   a) Design a unregulated power supply filer using LC filter for a output of 30 V and ripple 3%. Use current of 1 A and use center-tap transformer. Also calculate the value of bleeder resistance.
   b) With block diagram explain different feedback configuration.
   c) Draw the neat diagram of RC phase shift oscillator and derive the expression for frequency and condition for sustained oscillation.

SLR-TJ – 349

Seat No.	

Set P

S.E. (Electrical) (Part – I) Examination, 2017
ENGINEERING MATHEMATICS – III (CGPA – Old)

Day and Date : Tuesday, 12-12-2017 Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

Instructions :
1) *Answer **any three** questions from **each** Section.*
2) ***Use** of non programmable **calculator** is **allowed**.*
3) *Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. **3**. **Each** question carries **one** mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) The complete solution of $(D^2 + 1)\, y = 0$ is
   a) $y = c_1e^x + c_2e^{-x}$
   b) $y = c_1 \cos x + c_2 \sin x$
   c) $y = (c_1 + c_2x)e^x$
   d) $y = (c_1 + c_2)e^x$

2) The P.I. of $(D^4 - m^4)y = \sin mx$ is
   a) $\frac{x}{4m^3}\cos mx$
   b) $\frac{-x}{4m^3}\cos mx$
   c) $\frac{x}{4m^3}\sin mx$
   d) $\frac{-x}{4m^3}\sin mx$

3) If $D = \frac{d}{dz}$ and z = log x, then the diff. equation $x\frac{d^2y}{dx^2} + 2\frac{dy}{dx} = 6x$ becomes
   a) $D(D - 1)\, y = 6e^z$
   b) $D(D - 1)\, y = 6e^{2z}$
   c) $D(D + 1)\, y = 6e^{2z}$
   d) $D\,(D + 1)\, y = 6e^z$

4) The solution of $\sqrt{p} + \sqrt{q} = 1$
   a) $z = ax + \left(1 - \sqrt{a}\right)^2 + c$
   b) $z = ax + by + c$
   c) $z = ax + \left(1 + \sqrt{a}\right)^2 + c$
   d) None of these

5) The solution of p + q = z is
   a) f(x + y, y + log z)
   b) f(xy, y log z)
   c) f(x – y, y – log z)
   d) None of these

P.T.O.

6) $L\left\{\int_0^t \sin 2u\, du\right\} =$

a) $\frac{2}{s^2+4}$ b) $\frac{2}{s(s^2+4)}$ c) $\frac{2}{s(s^2-4)}$ d) $\frac{2s}{s^2+4}$

7) $\int_0^\infty \frac{\sin t}{t}\, dt =$

a) π b) $\pi/2$ c) $\pi/4$ d) $\pi/3$

8) $L^{-1}\left\{\frac{1}{(s-4)^3}\right\}$ is

a) $e^{4t}\frac{t^2}{2}$ b) $e^{-4t}\frac{t^2}{2}$ c) $e^{4t}\frac{t^3}{6}$ d) $e^{-4t}\frac{t^3}{6}$

9) $\nabla \times \bar{r} = ?$

a) i + j + k b) 0 c) 3 d) $\sqrt{3}$

10) If $\bar{a}$ is a constant vector and $\bar{r} = xi + yj + zk$, then grad $(\bar{a}.\bar{r})$ is

a) $\bar{r}$ b) $2\bar{r}$ c) $\bar{a}$ d) $2\bar{a}$

11) Fourier expansion of an even function f(x) in $(-\pi, \pi)$ has

a) Sine terms b) Cosine terms

c) Both sine and cosine terms d) None of these

12) The period of cos x is

a) π b) 2π c) 3π d) $\frac{\pi}{3}$

13) If f(x) = x cos x in $(-\pi, \pi)$, then the value of a_n equal to

a) 0 b) $-\pi$ c) 2π d) $\frac{\pi}{2}$

14) If $x_k = 1,\ k \geq 0$ then $z\{x_k\} = ?$

a) $\frac{z}{z-1}$ b) $\frac{1}{z-1}$ c) $\frac{1}{(z-1)^2}$ d) $\frac{1}{1-z}$

SLR-TJ – 349

Seat No.	

S.E. (Electrical) (Part – I) Examination, 2017
ENGINEERING MATHEMATICS – III (CGPA – Old)

Day and Date : Tuesday, 12-12-2017 Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Answer **any three** questions from **each** Section.*
*2) **Use** of non programmable **calculator** is allowed.*

SECTION – I

2. 1) Solve $x^2 \frac{d^2y}{dx^2} - x\frac{dy}{dx} + 4y = \cos \log x.$ **3**

2) Solve $\left(D^4 - 1\right) y = \cos x \cosh x.$ **3**

3) Solve $(D^3 - 3D^2 + 3D - 1)\, y = x^{1/2}e^x$. **3**

3. 1) Solve $(p^3 + q^3) = 27z$. **3**

2) Solve $pq = xy^2, z^4$. **3**

3) Solve $\left(\frac{1}{z} - \frac{1}{y}\right) p + \left(\frac{1}{x} - \frac{1}{z}\right) q = \left(\frac{1}{y} - \frac{1}{x}\right).$ **3**

4. 1) Find $Z\{x_k\}$, where $\{x_k\} = c^k \cos \alpha k,\ k \geq 0$. **3**

2) Find $Z\{x_k\}$, where $\{x_k\} = k^2,\ k \geq 0$. **3**

3) Find $Z^{-1}\left\{\frac{1}{(z-a)^2}\right\}, |z| > |a|.$ **3**

5. 1) In an L – C circuit the charge q on a plate of a condenser is given by

$$\frac{d^2q}{dt^2} + \frac{q}{cL} = \frac{E_0}{L}\cos nt.$$

If $\omega^2 = \frac{1}{LC}$ and initially $q = q_0$ at $t = 0$ and the current is $i = i_0$ at $t = 0$ prove that charge at any time t is given by

$$q = q_0 \cos \omega t + \frac{i_0}{\omega}\sin \omega t + \frac{E-0}{2L\omega} t \sin \omega t.$$ **4**

2) Solve the P.D.E. $\frac{\partial u}{\partial x} - 2\frac{\partial u}{\partial t} = u$, by the method of separation of variables. **3**

3) Find the inverse z-transform of $\frac{z}{(z+a)}, |z| < a$. **3**

Set P

SECTION – II

6. 1) Find the inverse Laplace transform of $\tan^{-1}(2/s)\sin 4t$. **3**

2) Find the Laplace transform of $\int_0^t te^{-3t}\sin(4t)\,dt$. **3**

3) Evaluate by using Laplace transform $\int_0^\infty \left(\frac{e^{-t}-e^{-3t}}{t}\right)dt$. **3**

7. 1) Find the Fourier series for f(x) in $(0, 2\pi)$, $f(x)=\begin{cases} x, & \text{if } 0<x<\pi; \\ 2\pi - x, & \text{if } \pi<x<2\pi; \end{cases}$ **5**

2) Obtain half range cosine series for f(x) = x sin x in $(0, \pi)$. **4**

8. 1) Find the directional derivative $\phi = x^2y^2+y^2z^2+z^2x^2$ at (1, 1, –2) in the direction of the tangent to the curve $x = e^{-t}$, $y = 2\sin t + 1$, $z = (t - \cos t)$ at t = 0. **3**

2) Find the tangential and normal components of acceleration of a particle moving on the curve $x = t^3 + 1$, $y = t^2$ and $z = t$ at t = 1. **3**

3) Prove that $\nabla\cdot\left(\frac{\vec{a}\times\vec{b}}{r}\right)=0$. **3**

OR

Prove that $\vec{F}\cdot \text{cur}\vec{F}=0$ if $\vec{F}=(x+y+z)\,i+j-(x+y)\,k$. **3**

9. 1) Find the Fourier series of $f(x) = \pi - x^2$ in $(-\pi, \pi)$. **6**

2) Attempt **any one** : **4**

i) Find the inverse Laplace transform of $\frac{(s^2+2s+3)}{(s^2+2s+2)(s^2+2s+5)}$.

ii) Use Laplace transform to evaluate $\frac{d^2y}{dx^2}+2\frac{dy}{dx}-3y=0$. Give that when x = 0, $y = 3$, $\frac{dy}{dx}=4$.

SLR-TJ – 349

Seat No.	

Set Q

S.E. (Electrical) (Part – I) Examination, 2017
ENGINEERING MATHEMATICS – III (CGPA – Old)

Day and Date : Tuesday, 12-12-2017 Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

Instructions :
1) *Answer **any three** questions from **each** Section.*
2) ***Use** of non programmable **calculator** is **allowed**.*
3) *Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. **3**. **Each** question carries **one** mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) $L^{-1}\left\{\frac{1}{(s-4)^3}\right\}$ is

a) $e^{4t}\frac{t^2}{2}$ b) $e^{-4t}\frac{t^2}{2}$ c) $e^{4t}\frac{t^3}{6}$ d) $e^{-4t}\frac{t^3}{6}$

2) $\nabla \times \bar{r} = ?$

a) i + j + k b) 0 c) 3 d) $\sqrt{3}$

3) If $\bar{a}$ is a constant vector and $\bar{r} = xi + yj + zk$, then grad $(\bar{a}.\bar{r})$ is

a) $\bar{r}$ b) $2\bar{r}$ c) $\bar{a}$ d) $2\bar{a}$

4) Fourier expansion of an even function f(x) in $(-\pi, \pi)$ has

a) Sine terms b) Cosine terms
c) Both sine and cosine terms d) None of these

5) The period of cos x is

a) π b) 2π c) 3π d) $\frac{\pi}{3}$

6) If f(x) = x cos x in $(-\pi, \pi)$, then the value of a_n equal to

a) 0 b) $-\pi$ c) 2π d) $\frac{\pi}{2}$

P.T.O.

7) If $x_k = 1,\ k \geq 0$ then $z\{x_k\} = ?$

a) $\frac{z}{z-1}$ b) $\frac{1}{z-1}$ c) $\frac{1}{(z-1)^2}$ d) $\frac{1}{1-z}$

8) The complete solution of $(D^2 + 1)\, y = 0$ is

a) $y = c_1e^x + c_2e^{-x}$
b) $y = c_1 \cos x + c_2 \sin x$
c) $y = (c_1 + c_2x)e^x$
d) $y = (c_1 + c_2)e^x$

9) The P.I. of $(D^4 - m^4)y = \sin mx$ is

a) $\frac{x}{4m^3} \cos mx$ b) $\frac{-x}{4m^3} \cos mx$ c) $\frac{x}{4m^3} \sin mx$ d) $\frac{-x}{4m^3} \sin mx$

10) If $D = \frac{d}{dz}$ and z = log x, then the diff. equation $x\frac{d^2y}{dx^2} + 2\frac{dy}{dx} = 6x$ becomes

a) $D(D - 1)\, y = 6e^z$
b) $D(D - 1)\, y = 6e^{2z}$
c) $D(D + 1)\, y = 6e^{2z}$
d) $D\,(D + 1)\, y = 6e^z$

11) The solution of $\sqrt{p} + \sqrt{q} = 1$

a) $z = ax + \left(1 - \sqrt{a}\right)^2 + c$
b) $z = ax + by + c$
c) $z = ax + \left(1 + \sqrt{a}\right)^2 + c$
d) None of these

12) The solution of p + q = z is

a) f(x + y, y + log z)
b) f(xy, y log z)
c) f(x – y, y – log z)
d) None of these

13) $L\left\{\int_0^t \sin 2u\, du\right\} =$

a) $\frac{2}{s^2 + 4}$ b) $\frac{2}{s\left(s^2 + 4\right)}$ c) $\frac{2}{s\left(s^2 - 4\right)}$ d) $\frac{2s}{s^2 + 4}$

14) $\int_0^\infty \frac{\sin t}{t}\, dt =$

a) π b) $\pi/2$ c) $\pi/4$ d) $\pi/3$

SLR-TJ – 349

Seat No.	

S.E. (Electrical) (Part – I) Examination, 2017
ENGINEERING MATHEMATICS – III (CGPA – Old)

Day and Date : Tuesday, 12-12-2017 Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Answer **any three** questions from **each** Section.*
*2) **Use** of non programmable **calculator** is allowed.*

SECTION – I

2. 1) Solve $x^2 \frac{d^2y}{dx^2} - x\frac{dy}{dx} + 4y = \cos \log x.$ **3**

2) Solve $\left(D^4 - 1\right) y = \cos x \cosh x.$ **3**

3) Solve $(D^3 - 3D^2 + 3D - 1)\, y = x^{1/2}e^x.$ **3**

3. 1) Solve $(p^3 + q^3) = 27z.$ **3**

2) Solve $pq = xy^2, z^4.$ **3**

3) Solve $\left(\frac{1}{z} - \frac{1}{y}\right) p + \left(\frac{1}{x} - \frac{1}{z}\right) q = \left(\frac{1}{y} - \frac{1}{x}\right).$ **3**

4. 1) Find $Z\{x_k\}$, where $\{x_k\} = c^k \cos \alpha k,\ k \geq 0.$ **3**

2) Find $Z\{x_k\}$, where $\{x_k\} = k^2,\ k \geq 0.$ **3**

3) Find $Z^{-1}\left\{\frac{1}{(z-a)^2}\right\}, |z| > |a|.$ **3**

5. 1) In an L – C circuit the charge q on a plate of a condenser is given by

$$\frac{d^2q}{dt^2} + \frac{q}{cL} = \frac{E_0}{L}\cos nt.$$

If $\omega^2 = \frac{1}{LC}$ and initially $q = q_0$ at $t = 0$ and the current is $i = i_0$ at $t = 0$ prove that charge at any time t is given by

$$q = q_0 \cos \omega t + \frac{i_0}{\omega}\sin \omega t + \frac{E-0}{2L\omega} t \sin \omega t.$$ **4**

2) Solve the P.D.E. $\frac{\partial u}{\partial x} - 2\frac{\partial u}{\partial t} = u$, by the method of separation of variables. **3**

3) Find the inverse z-transform of $\frac{z}{(z+a)}, |z| < a$. **3**

Set Q

SECTION – II

6. 1) Find the inverse Laplace transform of $\tan^{-1}(2/s)\sin 4t$. **3**

2) Find the Laplace transform of $\int_0^t te^{-3t}\sin(4t)\,dt$. **3**

3) Evaluate by using Laplace transform $\int_0^\infty \left(\frac{e^{-t}-e^{-3t}}{t}\right)dt$. **3**

7. 1) Find the Fourier series for f(x) in $(0, 2\pi)$, $f(x)=\begin{cases} x, & \text{if } 0<x<\pi; \\ 2\pi - x, & \text{if } \pi<x<2\pi; \end{cases}$ **5**

2) Obtain half range cosine series for f(x) = x sin x in $(0, \pi)$. **4**

8. 1) Find the directional derivative $\phi = x^2y^2+y^2z^2+z^2x^2$ at (1, 1, –2) in the direction of the tangent to the curve $x = e^{-t}$, $y = 2\sin t + 1$, $z = (t - \cos t)$ at t = 0. **3**

2) Find the tangential and normal components of acceleration of a particle moving on the curve $x = t^3 + 1$, $y = t^2$ and $z = t$ at t = 1. **3**

3) Prove that $\nabla\cdot\left(\frac{\vec{a}\times\vec{b}}{r}\right)=0$. **3**

OR

Prove that $\vec{F}\cdot \text{cur}\vec{F}=0$ if $\vec{F}=(x+y+z)\,i+j-(x+y)\,k$. **3**

9. 1) Find the Fourier series of $f(x) = \pi - x^2$ in $(-\pi, \pi)$. **6**

2) Attempt **any one** : **4**

i) Find the inverse Laplace transform of $\frac{(s^2+2s+3)}{(s^2+2s+2)(s^2+2s+5)}$.

ii) Use Laplace transform to evaluate $\frac{d^2y}{dx^2}+2\frac{dy}{dx}-3y=0$. Give that when x = 0, $y = 3$, $\frac{dy}{dx}=4$.

SLR-TJ – 349

Seat No.	

Set R

S.E. (Electrical) (Part – I) Examination, 2017
ENGINEERING MATHEMATICS – III (CGPA – Old)

Day and Date : Tuesday, 12-12-2017 Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

Instructions :
1) *Answer **any three** questions from **each** Section.*
2) ***Use** of non programmable **calculator** is **allowed**.*
3) *Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. **3**. **Each** question carries **one** mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) The solution of p + q = z is

a) f(x + y, y + log z) b) f(xy, y log z)

c) f(x – y, y – log z) d) None of these

2) $L\left\{\int_0^t \sin 2u\, du\right\} =$

a) $\frac{2}{s^2+4}$ b) $\frac{2}{s(s^2+4)}$ c) $\frac{2}{s(s^2-4)}$ d) $\frac{2s}{s^2+4}$

3) $\int_0^\infty \frac{\sin t}{t}\, dt =$

a) π b) $\pi/2$ c) $\pi/4$ d) $\pi/3$

4) $L^{-1}\left\{\frac{1}{(s-4)^3}\right\}$ is

a) $e^{4t}\frac{t^2}{2}$ b) $e^{-4t}\frac{t^2}{2}$ c) $e^{4t}\frac{t^3}{6}$ d) $e^{-4t}\frac{t^3}{6}$

P.T.O.

5) $\nabla \times \bar{r} = ?$

a) $i + j + k$ b) 0 c) 3 d) $\sqrt{3}$

6) If $\bar{a}$ is a constant vector and $\bar{r} = xi + yj + zk$, then grad $(\bar{a}.\bar{r})$ is

a) $\bar{r}$ b) $2\bar{r}$ c) $\bar{a}$ d) $2\bar{a}$

7) Fourier expansion of an even function f(x) in $(-\pi, \pi)$ has

a) Sine terms b) Cosine terms
c) Both sine and cosine terms d) None of these

8) The period of cos x is

a) π b) 2π c) 3π d) $\frac{\pi}{3}$

9) If f(x) = x cos x in $(-\pi, \pi)$, then the value of a_n equal to

a) 0 b) $-\pi$ c) 2π d) $\frac{\pi}{2}$

10) If $x_k = 1,\ k \geq 0$ then $z\{x_k\} = ?$

a) $\frac{z}{z-1}$ b) $\frac{1}{z-1}$ c) $\frac{1}{(z-1)^2}$ d) $\frac{1}{1-z}$

11) The complete solution of $(D^2 + 1)\, y = 0$ is

a) $y = c_1e^x + c_2e^{-x}$ b) $y = c_1 \cos x + c_2 \sin x$
c) $y = (c_1 + c_2x)e^x$ d) $y = (c_1 + c_2)e^x$

12) The P.I. of $(D^4 - m^4)y = \sin mx$ is

a) $\frac{x}{4m^3} \cos mx$ b) $\frac{-x}{4m^3} \cos mx$ c) $\frac{x}{4m^3} \sin mx$ d) $\frac{-x}{4m^3} \sin mx$

13) If $D = \frac{d}{dz}$ and z = log x, then the diff. equation $x\frac{d^2y}{dx^2} + 2\frac{dy}{dx} = 6x$ becomes

a) $D(D - 1)\, y = 6e^z$ b) $D(D - 1)\, y = 6e^{2z}$
c) $D(D + 1)\, y = 6e^{2z}$ d) $D\,(D + 1)\, y = 6e^z$

14) The solution of $\sqrt{p} + \sqrt{q} = 1$

a) $z = ax + \left(1 - \sqrt{a}\right)^2 + c$ b) $z = ax + by + c$
c) $z = ax + \left(1 + \sqrt{a}\right)^2 + c$ d) None of these

SLR-TJ – 349

Seat No.	

S.E. (Electrical) (Part – I) Examination, 2017
ENGINEERING MATHEMATICS – III (CGPA – Old)

Day and Date : Tuesday, 12-12-2017 Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Answer **any three** questions from **each** Section.*
*2) **Use** of non programmable **calculator** is allowed.*

SECTION – I

2. 1) Solve $x^2 \frac{d^2y}{dx^2} - x\frac{dy}{dx} + 4y = \cos \log x.$ **3**

2) Solve $\left(D^4 - 1\right) y = \cos x \cosh x.$ **3**

3) Solve $(D^3 - 3D^2 + 3D - 1)\, y = x^{1/2}e^x.$ **3**

3. 1) Solve $(p^3 + q^3) = 27z.$ **3**

2) Solve $pq = xy^2, z^4.$ **3**

3) Solve $\left(\frac{1}{z} - \frac{1}{y}\right)p + \left(\frac{1}{x} - \frac{1}{z}\right)q = \left(\frac{1}{y} - \frac{1}{x}\right).$ **3**

4. 1) Find $Z\{x_k\}$, where $\{x_k\} = c^k \cos \alpha k,\ k \geq 0.$ **3**

2) Find $Z\{x_k\}$, where $\{x_k\} = k^2,\ k \geq 0.$ **3**

3) Find $Z^{-1}\left\{\frac{1}{(z-a)^2}\right\}, |z| > |a|.$ **3**

5. 1) In an L – C circuit the charge q on a plate of a condenser is given by

$$\frac{d^2q}{dt^2} + \frac{q}{cL} = \frac{E_0}{L}\cos nt.$$

If $\omega^2 = \frac{1}{LC}$ and initially $q = q_0$ at $t = 0$ and the current is $i = i_0$ at $t = 0$ prove that charge at any time t is given by

$$q = q_0 \cos \omega t + \frac{i_0}{\omega}\sin \omega t + \frac{E-0}{2L\omega} t \sin \omega t.$$ **4**

2) Solve the P.D.E. $\frac{\partial u}{\partial x} - 2\frac{\partial u}{\partial t} = u$, by the method of separation of variables. **3**

3) Find the inverse z-transform of $\frac{z}{(z+a)}, |z| < a$. **3**

Set R

SECTION – II

6. 1) Find the inverse Laplace transform of $\tan^{-1}(2/s)\sin 4t$. **3**

2) Find the Laplace transform of $\int_0^t te^{-3t}\sin(4t)\,dt$. **3**

3) Evaluate by using Laplace transform $\int_0^\infty \left(\frac{e^{-t}-e^{-3t}}{t}\right)dt$. **3**

7. 1) Find the Fourier series for f(x) in $(0, 2\pi)$, $f(x)=\begin{cases} x, & \text{if } 0<x<\pi; \\ 2\pi - x, & \text{if } \pi<x<2\pi; \end{cases}$ **5**

2) Obtain half range cosine series for f(x) = x sin x in $(0, \pi)$. **4**

8. 1) Find the directional derivative $\phi = x^2y^2+y^2z^2+z^2x^2$ at (1, 1, –2) in the direction of the tangent to the curve $x = e^{-t}$, $y = 2\sin t + 1$, $z = (t - \cos t)$ at t = 0. **3**

2) Find the tangential and normal components of acceleration of a particle moving on the curve $x = t^3 + 1$, $y = t^2$ and $z = t$ at t = 1. **3**

3) Prove that $\nabla\cdot\left(\frac{\vec{a}\times\vec{b}}{r}\right)=0$. **3**

OR

Prove that $\vec{F}\cdot \text{cur}\vec{F}=0$ if $\vec{F}=(x+y+z)\,i+j-(x+y)\,k$. **3**

9. 1) Find the Fourier series of $f(x) = \pi - x^2$ in $(-\pi, \pi)$. **6**

2) Attempt **any one** : **4**

i) Find the inverse Laplace transform of $\frac{(s^2+2s+3)}{(s^2+2s+2)(s^2+2s+5)}$.

ii) Use Laplace transform to evaluate $\frac{d^2y}{dx^2}+2\frac{dy}{dx}-3y=0$. Give that when x = 0, $y = 3$, $\frac{dy}{dx}=4$.

SLR-TJ – 349

Seat No.	

Set S

S.E. (Electrical) (Part – I) Examination, 2017
ENGINEERING MATHEMATICS – III (CGPA – Old)

Day and Date : Tuesday, 12-12-2017 Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

Instructions :
1) *Answer **any three** questions from **each** Section.*
2) ***Use** of non programmable **calculator** is **allowed**.*
3) *Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. **3**. **Each** question carries **one** mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) If $\bar{a}$ is a constant vector and $\bar{r} = xi + yj + zk$, then grad $(\bar{a}.\bar{r})$ is

a) $\bar{r}$ b) $2\bar{r}$ c) $\bar{a}$ d) $2\bar{a}$

2) Fourier expansion of an even function f(x) in $(-\pi, \pi)$ has

a) Sine terms b) Cosine terms
c) Both sine and cosine terms d) None of these

3) The period of cos x is

a) π b) 2π c) 3π d) $\frac{\pi}{3}$

4) If f(x) = x cos x in $(-\pi, \pi)$, then the value of a_n equal to

a) 0 b) $-\pi$ c) 2π d) $\frac{\pi}{2}$

5) If $x_k = 1,\ k \geq 0$ then $z\{x_k\} = ?$

a) $\frac{z}{z-1}$ b) $\frac{1}{z-1}$ c) $\frac{1}{(z-1)^2}$ d) $\frac{1}{1-z}$

6) The complete solution of $(D^2 + 1)\, y = 0$ is

a) $y = c_1e^x + c_2e^{-x}$ b) $y = c_1 \cos x + c_2 \sin x$
c) $y = (c_1 + c_2x)e^x$ d) $y = (c_1 + c_2)e^x$

P.T.O.

7) The P.I. of $(D^4 - m^4)y = \sin mx$ is

a) $\frac{x}{4m^3}\cos mx$ b) $\frac{-x}{4m^3}\cos mx$ c) $\frac{x}{4m^3}\sin mx$ d) $\frac{-x}{4m^3}\sin mx$

8) If $D = \frac{d}{dz}$ and z = log x, then the diff. equation $x\frac{d^2y}{dx^2} + 2\frac{dy}{dx} = 6x$ becomes

a) $D(D-1)\,y = 6e^z$
b) $D(D-1)\,y = 6e^{2z}$
c) $D(D+1)\,y = 6e^{2z}$
d) $D\,(D+1)\,y = 6e^z$

9) The solution of $\sqrt{p} + \sqrt{q} = 1$

a) $z = ax + \left(1 - \sqrt{a}\right)^2 + c$
b) $z = ax + by + c$
c) $z = ax + \left(1 + \sqrt{a}\right)^2 + c$
d) None of these

10) The solution of p + q = z is

a) f(x + y, y + log z)
b) f(xy, y log z)
c) f(x – y, y – log z)
d) None of these

11) $L\left\{\int_0^t \sin 2u\, du\right\} =$

a) $\frac{2}{s^2+4}$ b) $\frac{2}{s\left(s^2+4\right)}$ c) $\frac{2}{s\left(s^2-4\right)}$ d) $\frac{2s}{s^2+4}$

12) $\int_0^\infty \frac{\sin t}{t}\, dt =$

a) π b) $\pi/2$ c) $\pi/4$ d) $\pi/3$

13) $L^{-1}\left\{\frac{1}{(s-4)^3}\right\}$ is

a) $e^{4t}\frac{t^2}{2}$ b) $e^{-4t}\frac{t^2}{2}$ c) $e^{4t}\frac{t^3}{6}$ d) $e^{-4t}\frac{t^3}{6}$

14) $\nabla \times \bar{r} = ?$

a) i + j + k b) 0 c) 3 d) $\sqrt{3}$

SLR-TJ – 349

Seat No.	

S.E. (Electrical) (Part – I) Examination, 2017
ENGINEERING MATHEMATICS – III (CGPA – Old)

Day and Date : Tuesday, 12-12-2017 Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Answer **any three** questions from **each** Section.*
*2) **Use** of non programmable **calculator** is allowed.*

SECTION – I

2. 1) Solve $x^2 \frac{d^2y}{dx^2} - x\frac{dy}{dx} + 4y = \cos \log x.$ **3**

2) Solve $\left(D^4 - 1\right) y = \cos x \cosh x.$ **3**

3) Solve $(D^3 - 3D^2 + 3D - 1)\, y = x^{1/2}e^x$. **3**

3. 1) Solve $(p^3 + q^3) = 27z$. **3**

2) Solve $pq = xy^2, z^4$. **3**

3) Solve $\left(\frac{1}{z} - \frac{1}{y}\right) p + \left(\frac{1}{x} - \frac{1}{z}\right) q = \left(\frac{1}{y} - \frac{1}{x}\right).$ **3**

4. 1) Find $Z\{x_k\}$, where $\{x_k\} = c^k \cos \alpha k,\ k \geq 0$. **3**

2) Find $Z\{x_k\}$, where $\{x_k\} = k^2,\ k \geq 0$. **3**

3) Find $Z^{-1}\left\{\frac{1}{(z-a)^2}\right\}, |z| > |a|.$ **3**

5. 1) In an L – C circuit the charge q on a plate of a condenser is given by

$$\frac{d^2q}{dt^2} + \frac{q}{cL} = \frac{E_0}{L}\cos nt.$$

If $\omega^2 = \frac{1}{LC}$ and initially $q = q_0$ at $t = 0$ and the current is $i = i_0$ at $t = 0$ prove that charge at any time t is given by

$$q = q_0 \cos \omega t + \frac{i_0}{\omega}\sin \omega t + \frac{E-0}{2L\omega} t \sin \omega t.$$ **4**

2) Solve the P.D.E. $\frac{\partial u}{\partial x} - 2\frac{\partial u}{\partial t} = u$, by the method of separation of variables. **3**

3) Find the inverse z-transform of $\frac{z}{(z+a)}, |z| < a$. **3**

Set S

SECTION – II

6. 1) Find the inverse Laplace transform of $\tan^{-1}(2/s)\sin 4t$. **3**

2) Find the Laplace transform of $\int_0^t te^{-3t}\sin(4t)\,dt$. **3**

3) Evaluate by using Laplace transform $\int_0^\infty \left(\frac{e^{-t}-e^{-3t}}{t}\right)dt$. **3**

7. 1) Find the Fourier series for f(x) in $(0, 2\pi)$, $f(x)=\begin{cases} x, & \text{if } 0<x<\pi; \\ 2\pi - x, & \text{if } \pi<x<2\pi; \end{cases}$ **5**

2) Obtain half range cosine series for f(x) = x sin x in $(0, \pi)$. **4**

8. 1) Find the directional derivative $\phi = x^2y^2+y^2z^2+z^2x^2$ at (1, 1, –2) in the direction of the tangent to the curve $x = e^{-t}$, $y = 2\sin t + 1$, $z = (t - \cos t)$ at t = 0. **3**

2) Find the tangential and normal components of acceleration of a particle moving on the curve $x = t^3 + 1$, $y = t^2$ and $z = t$ at t = 1. **3**

3) Prove that $\nabla\cdot\left(\frac{\vec{a}\times\vec{b}}{r}\right)=0$. **3**

OR

Prove that $\vec{F}\cdot \text{cur}\vec{F}=0$ if $\vec{F}=(x+y+z)\,i+j-(x+y)\,k$. **3**

9. 1) Find the Fourier series of $f(x) = \pi - x^2$ in $(-\pi, \pi)$. **6**

2) Attempt **any one** : **4**

i) Find the inverse Laplace transform of $\frac{(s^2+2s+3)}{(s^2+2s+2)(s^2+2s+5)}$.

ii) Use Laplace transform to evaluate $\frac{d^2y}{dx^2}+2\frac{dy}{dx}-3y=0$. Give that when x = 0, $y = 3$, $\frac{dy}{dx}=4$.

SLR-TJ – 350

Seat No.	

Set P

S.E. (Electrical) (Part – I) (Old CGPA) Examination, 2017
ELECTRICAL MACHINE – I

Day and Date : Thursday, 14-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) In a DC series generator the electromagnetic torque developed is proportional to
   a) I_a b) I_a^2
   c) $\frac{1}{I_a}$ d) none of the above

2) The greatest percentage of heat loss in a dc machine is due to
   a) eddy current loss b) hysteresis loss
   c) copper loss d) friction loss

3) The shaft torque of a DC motor is less than its armature torque because of _____ losses.
   a) copper b) mechanical c) rotational d) iron

4) The most economical method of finding noload losses of a large DC machine is _____ test.
   a) Swinburne's test b) Hopkinson's test
   c) Retardation test d) None of the above

5) The nature of current flowing in the armature of the DC generator is
   a) AC b) DC
   c) pulsating d) DC superimposed on AC

6) In dc motor back emf induced in
   a) Field winding b) Commutator
   c) Armature winding d) Damper winding

7) Armature reaction in dc generator
   a) Increases pole flux b) Decreases pole flux
   c) Distort pole flux d) Both b and c

P.T.O.

8) The purpose of providing an iron core in a transformer is to
   a) Provide support to windings
   b) Reduce hysteresis loss
   c) Decrease the reluctance of the magnetic path
   d) Reduce eddy current losses

9) Power transformers are designed to have maximum efficiency at
   a) nearly full load
   b) 70 % full load
   c) 50 % full load
   d) no load

10) The transformer ratings are usually expressed in terms of
   a) volts
   b) amperes
   c) kW
   d) kVA

11) In power transformer
   a) Copper loss kept maximum
   b) Iron loss kept minimum
   c) Copper loss kept minimum
   d) None of above

12) In performing SC test on transformer
   a) LV is kept open
   b) HV is short-circuited
   c) LV is short-circuited
   d) none

13) If the load p.f. is 0.866, then the average p.f. of the V-V bank is
   a) 0.866
   b) 0.51
   c) 0.75
   d) 0.65

14) A transformer has R_2 secondary resistance, K is its transformation ratio and this resistance referred to primary will be
   a) $\frac{R_2}{K^2}$
   b) K^2R_1
   c) KR_1
   d) $KR_1{}^2$

SLR-TJ – 350

Seat No.	

S.E. (Electrical) (Part – I) (Old CGPA) Examination, 2017
ELECTRICAL MACHINE – I

Day and Date : Thursday, 14-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**
   1) Explain in detail the voltage builds up process in DC shunt generator.
   2) Derive expression for demagnetising ampere-turn per pole of armature reaction.
   3) Write a short notes on :
      a) Lap winding
      b) Wave winding
   4) Explain any two speed control methods of shunt motor.
   5) Derive the torque equation of DC motor.
   6) In a brake test the effective load on the branch pulley was 38.1 kg, the effective diameter of the pulley 63.5 cm and speed 12 rps. The motor took 49 A at 220 V. Calculate the output power and the efficiency at this load.

3. Attempt **any two** : **(6×2=12)**
   1) What is the necessity of starter ? Explain 3 point starter with neat diagram.
   2) What is meant by commutation ? Explain ideal commutation.
   3) A 250V dc shunt motor has armature resistance of 0.25 ohm, on load it takes an armature current of 50A and runs at 750 rpm. If the flux of motor is reduced by 10 % without changing the load torque, find the new speed of the motor ?

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   1) Explain ideal transformer. Also draw the phasor diagram and explain the ideal transformer on No-load.
   2) Draw the equivalent circuit of transformer referred to primary and explain each parameter.

3) Explain why transformer is called as constant flux machine.

4) Explain open delta connection of transformers.

5) Derive an expression for copper saving in auto-transformer.

6) 230/460 V transformer has a primary resistance of 0.2 ohm and reactance of 0.5 ohm and the corresponding values for the secondary are 0.75 and 1.8 ohms respectively. Find the secondary terminal voltage when supplying 10A, 0.8 PF lagging.

5. Attempt **any two** : **(6×2=12)**

1) What are the different connections used for three phase transformer ? Explain each in short with sketches.

2) Explain OC and SC test conducted on transformer.

3) A 3ϕ, 50 Hz, transformer has a Δ-connected primary and Y-connected secondary. The line voltages being 22000 V and 400 V respectively. The secondary has a Y connected balanced load at 0.8 pf. Lagging. The line current on the primary side is 5 A. Determine the current in each coil of the primary and in each secondary line. What is the power of the transformer in kW ?

SLR-TJ – 350

Seat No.	

Set Q

S.E. (Electrical) (Part – I) (Old CGPA) Examination, 2017
ELECTRICAL MACHINE – I

Day and Date : Thursday, 14-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The purpose of providing an iron core in a transformer is to
   a) Provide support to windings
   b) Reduce hysteresis loss
   c) Decrease the reluctance of the magnetic path
   d) Reduce eddy current losses

2) Power transformers are designed to have maximum efficiency at
   a) nearly full load b) 70 % full load
   c) 50 % full load d) no load

3) The transformer ratings are usually expressed in terms of
   a) volts b) amperes c) kW d) kVA

4) In power transformer
   a) Copper loss kept maximum b) Iron loss kept minimum
   c) Copper loss kept minimum d) None of above

5) In performing SC test on transformer
   a) LV is kept open b) HV is short-circuited
   c) LV is short-circuited d) none

6) If the load p.f. is 0.866, then the average p.f. of the V-V bank is
   a) 0.866 b) 0.51 c) 0.75 d) 0.65

7) A transformer has R_2 secondary resistance, K is its transformation ratio and this resistance referred to primary will be
   a) $\frac{R_2}{K^2}$ b) K^2R_1 c) KR_1 d) $KR_1{}^2$

P.T.O.

8) In a DC series generator the electromagnetic torque developed is proportional to
   a) I_a
   b) I_a^2
   c) $\frac{1}{I_a}$
   d) none of the above

9) The greatest percentage of heat loss in a dc machine is due to
   a) eddy current loss
   b) hysteresis loss
   c) copper loss
   d) friction loss

10) The shaft torque of a DC motor is less than its armature torque because of _____ losses.
   a) copper
   b) mechanical
   c) rotational
   d) iron

11) The most economical method of finding noload losses of a large DC machine is _____ test.
   a) Swinburne's test
   b) Hopkinson's test
   c) Retardation test
   d) None of the above

12) The nature of current flowing in the armature of the DC generator is
   a) AC
   b) DC
   c) pulsating
   d) DC superimposed on AC

13) In dc motor back emf induced in
   a) Field winding
   b) Commutator
   c) Armature winding
   d) Damper winding

14) Armature reaction in dc generator
   a) Increases pole flux
   b) Decreases pole flux
   c) Distort pole flux
   d) Both b and c

_____

SLR-TJ – 350

Seat No.	

S.E. (Electrical) (Part – I) (Old CGPA) Examination, 2017
ELECTRICAL MACHINE – I

Day and Date : Thursday, 14-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**
   1) Explain in detail the voltage builds up process in DC shunt generator.
   2) Derive expression for demagnetising ampere-turn per pole of armature reaction.
   3) Write a short notes on :
      a) Lap winding
      b) Wave winding
   4) Explain any two speed control methods of shunt motor.
   5) Derive the torque equation of DC motor.
   6) In a brake test the effective load on the branch pulley was 38.1 kg, the effective diameter of the pulley 63.5 cm and speed 12 rps. The motor took 49 A at 220 V. Calculate the output power and the efficiency at this load.

3. Attempt **any two** : **(6×2=12)**
   1) What is the necessity of starter ? Explain 3 point starter with neat diagram.
   2) What is meant by commutation ? Explain ideal commutation.
   3) A 250V dc shunt motor has armature resistance of 0.25 ohm, on load it takes an armature current of 50A and runs at 750 rpm. If the flux of motor is reduced by 10 % without changing the load torque, find the new speed of the motor ?

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   1) Explain ideal transformer. Also draw the phasor diagram and explain the ideal transformer on No-load.
   2) Draw the equivalent circuit of transformer referred to primary and explain each parameter.

3) Explain why transformer is called as constant flux machine.

4) Explain open delta connection of transformers.

5) Derive an expression for copper saving in auto-transformer.

6) 230/460 V transformer has a primary resistance of 0.2 ohm and reactance of 0.5 ohm and the corresponding values for the secondary are 0.75 and 1.8 ohms respectively. Find the secondary terminal voltage when supplying 10A, 0.8 PF lagging.

5. Attempt **any two** : **(6×2=12)**

1) What are the different connections used for three phase transformer ? Explain each in short with sketches.

2) Explain OC and SC test conducted on transformer.

3) A 3ϕ, 50 Hz, transformer has a Δ-connected primary and Y-connected secondary. The line voltages being 22000 V and 400 V respectively. The secondary has a Y connected balanced load at 0.8 pf. Lagging. The line current on the primary side is 5 A. Determine the current in each coil of the primary and in each secondary line. What is the power of the transformer in kW ?

SLR-TJ – 350

Seat No.	

Set R

S.E. (Electrical) (Part – I) (Old CGPA) Examination, 2017
ELECTRICAL MACHINE – I

Day and Date : Thursday, 14-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The nature of current flowing in the armature of the DC generator is
   a) AC b) DC
   c) pulsating d) DC superimposed on AC

2) In dc motor back emf induced in
   a) Field winding b) Commutator
   c) Armature winding d) Damper winding

3) Armature reaction in dc generator
   a) Increases pole flux b) Decreases pole flux
   c) Distort pole flux d) Both b and c

4) The purpose of providing an iron core in a transformer is to
   a) Provide support to windings
   b) Reduce hysteresis loss
   c) Decrease the reluctance of the magnetic path
   d) Reduce eddy current losses

5) Power transformers are designed to have maximum efficiency at
   a) nearly full load b) 70 % full load
   c) 50 % full load d) no load

6) The transformer ratings are usually expressed in terms of
   a) volts b) amperes c) kW d) kVA

7) In power transformer
   a) Copper loss kept maximum b) Iron loss kept minimum
   c) Copper loss kept minimum d) None of above

P.T.O.

8) In performing SC test on transformer
   a) LV is kept open
   b) HV is short-circuited
   c) LV is short-circuited
   d) none

9) If the load p.f. is 0.866, then the average p.f. of the V-V bank is
   a) 0.866
   b) 0.51
   c) 0.75
   d) 0.65

10) A transformer has R_2 secondary resistance, K is its transformation ratio and this resistance referred to primary will be
   a) $\frac{R_2}{K^2}$
   b) K^2R_1
   c) KR_1
   d) $KR_1{}^2$

11) In a DC series generator the electromagnetic torque developed is proportional to
   a) I_a
   b) $I_a{}^2$
   c) $\frac{1}{I_a}$
   d) none of the above

12) The greatest percentage of heat loss in a dc machine is due to
   a) eddy current loss
   b) hysteresis loss
   c) copper loss
   d) friction loss

13) The shaft torque of a DC motor is less than its armature torque because of _____ losses.
   a) copper
   b) mechanical
   c) rotational
   d) iron

14) The most economical method of finding noload losses of a large DC machine is _____ test.
   a) Swinburne's test
   b) Hopkinson's test
   c) Retardation test
   d) None of the above

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SLR-TJ – 350

Seat No.	

S.E. (Electrical) (Part – I) (Old CGPA) Examination, 2017
ELECTRICAL MACHINE – I

Day and Date : Thursday, 14-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**
   1) Explain in detail the voltage builds up process in DC shunt generator.
   2) Derive expression for demagnetising ampere-turn per pole of armature reaction.
   3) Write a short notes on :
      a) Lap winding
      b) Wave winding
   4) Explain any two speed control methods of shunt motor.
   5) Derive the torque equation of DC motor.
   6) In a brake test the effective load on the branch pulley was 38.1 kg, the effective diameter of the pulley 63.5 cm and speed 12 rps. The motor took 49 A at 220 V. Calculate the output power and the efficiency at this load.

3. Attempt **any two** : **(6×2=12)**
   1) What is the necessity of starter ? Explain 3 point starter with neat diagram.
   2) What is meant by commutation ? Explain ideal commutation.
   3) A 250V dc shunt motor has armature resistance of 0.25 ohm, on load it takes an armature current of 50A and runs at 750 rpm. If the flux of motor is reduced by 10 % without changing the load torque, find the new speed of the motor ?

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   1) Explain ideal transformer. Also draw the phasor diagram and explain the ideal transformer on No-load.
   2) Draw the equivalent circuit of transformer referred to primary and explain each parameter.

3) Explain why transformer is called as constant flux machine.

4) Explain open delta connection of transformers.

5) Derive an expression for copper saving in auto-transformer.

6) 230/460 V transformer has a primary resistance of 0.2 ohm and reactance of 0.5 ohm and the corresponding values for the secondary are 0.75 and 1.8 ohms respectively. Find the secondary terminal voltage when supplying 10A, 0.8 PF lagging.

5. Attempt **any two** : **(6×2=12)**

1) What are the different connections used for three phase transformer ? Explain each in short with sketches.

2) Explain OC and SC test conducted on transformer.

3) A 3ϕ, 50 Hz, transformer has a Δ-connected primary and Y-connected secondary. The line voltages being 22000 V and 400 V respectively. The secondary has a Y connected balanced load at 0.8 pf. Lagging. The line current on the primary side is 5 A. Determine the current in each coil of the primary and in each secondary line. What is the power of the transformer in kW ?

SLR-TJ – 350

Seat No.	

Set S

S.E. (Electrical) (Part – I) (Old CGPA) Examination, 2017
ELECTRICAL MACHINE – I

Day and Date : Thursday, 14-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The transformer ratings are usually expressed in terms of
a) volts b) amperes c) kW d) kVA

2) In power transformer
a) Copper loss kept maximum b) Iron loss kept minimum
c) Copper loss kept minimum d) None of above

3) In performing SC test on transformer
a) LV is kept open b) HV is short-circuited
c) LV is short-circuited d) none

4) If the load p.f. is 0.866, then the average p.f. of the V-V bank is
a) 0.866 b) 0.51 c) 0.75 d) 0.65

5) A transformer has R_2 secondary resistance, K is its transformation ratio and this resistance referred to primary will be
a) $\frac{R_2}{K^2}$ b) K^2R_1 c) KR_1 d) KR_1^2

6) In a DC series generator the electromagnetic torque developed is proportional to
a) I_a b) I_a^2
c) $\frac{1}{I_a}$ d) none of the above

7) The greatest percentage of heat loss in a dc machine is due to
a) eddy current loss b) hysteresis loss
c) copper loss d) friction loss

P.T.O.

8) The shaft torque of a DC motor is less than its armature torque because of _____ losses.
   a) copper b) mechanical c) rotational d) iron

9) The most economical method of finding noload losses of a large DC machine is _____ test.
   a) Swinburne's test b) Hopkinson's test
   c) Retardation test d) None of the above

10) The nature of current flowing in the armature of the DC generator is
   a) AC b) DC
   c) pulsating d) DC superimposed on AC

11) In dc motor back emf induced in
   a) Field winding b) Commutator
   c) Armature winding d) Damper winding

12) Armature reaction in dc generator
   a) Increases pole flux b) Decreases pole flux
   c) Distort pole flux d) Both b and c

13) The purpose of providing an iron core in a transformer is to
   a) Provide support to windings
   b) Reduce hysteresis loss
   c) Decrease the reluctance of the magnetic path
   d) Reduce eddy current losses

14) Power transformers are designed to have maximum efficiency at
   a) nearly full load b) 70 % full load
   c) 50 % full load d) no load

_____

SLR-TJ – 350

Seat No.	

S.E. (Electrical) (Part – I) (Old CGPA) Examination, 2017
ELECTRICAL MACHINE – I

Day and Date : Thursday, 14-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**
   1) Explain in detail the voltage builds up process in DC shunt generator.
   2) Derive expression for demagnetising ampere-turn per pole of armature reaction.
   3) Write a short notes on :
      a) Lap winding
      b) Wave winding
   4) Explain any two speed control methods of shunt motor.
   5) Derive the torque equation of DC motor.
   6) In a brake test the effective load on the branch pulley was 38.1 kg, the effective diameter of the pulley 63.5 cm and speed 12 rps. The motor took 49 A at 220 V. Calculate the output power and the efficiency at this load.

3. Attempt **any two** : **(6×2=12)**
   1) What is the necessity of starter ? Explain 3 point starter with neat diagram.
   2) What is meant by commutation ? Explain ideal commutation.
   3) A 250V dc shunt motor has armature resistance of 0.25 ohm, on load it takes an armature current of 50A and runs at 750 rpm. If the flux of motor is reduced by 10 % without changing the load torque, find the new speed of the motor ?

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   1) Explain ideal transformer. Also draw the phasor diagram and explain the ideal transformer on No-load.
   2) Draw the equivalent circuit of transformer referred to primary and explain each parameter.

3) Explain why transformer is called as constant flux machine.

4) Explain open delta connection of transformers.

5) Derive an expression for copper saving in auto-transformer.

6) 230/460 V transformer has a primary resistance of 0.2 ohm and reactance of 0.5 ohm and the corresponding values for the secondary are 0.75 and 1.8 ohms respectively. Find the secondary terminal voltage when supplying 10A, 0.8 PF lagging.

5. Attempt **any two** : **(6×2=12)**

1) What are the different connections used for three phase transformer ? Explain each in short with sketches.

2) Explain OC and SC test conducted on transformer.

3) A 3ϕ, 50 Hz, transformer has a Δ-connected primary and Y-connected secondary. The line voltages being 22000 V and 400 V respectively. The secondary has a Y connected balanced load at 0.8 pf. Lagging. The line current on the primary side is 5 A. Determine the current in each coil of the primary and in each secondary line. What is the power of the transformer in kW ?

SLR-TJ – 351

Seat No.	

Set **P**

S.E. (Electrical Engineering) (Part – I) (Old) (CGPA) Examination, 2017
ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day and Date : Saturday, 16-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) The moving iron voltmeter indicate
   a) The same value for d.c. and a.c. voltage
   b) Lower value for a.c. voltage than for corresponding d.c. voltages
   c) Higher values for a.c. voltages than for corresponding d.c. voltages
   d) None of the above

2) In a Kelvin's double bridge two sets of readings are taken when measuring a low resistance, one with the current in one direction and the other with direction of current reversed. This is done to
   a) Eliminate the effect of contact resistance
   b) Eliminate the effect of resistance of leads
   c) Correct for changes in battery voltage
   d) Eliminate the effect of thermo-electric emfs

3) Standardization of potentiometers is done in order that, they become
   a) Accurate b) Precise
   c) Accurate and direct reading d) Accurate and precise

4) A PMMC meter has an internal resistance 200 Ω and the required for its full scale deflection is 50 μ A. The meter is capable of measuring, on its own a maximum voltage of
   a) 5 mv b) 10 mv c) 5 μ A d) 10 μ A

5) Phosphorous material is used for display in CRT for
   a) Photographic application b) General purpose application
   c) Television application d) All of the above

6) A wheat stone bridge can not be used for precision measurement because errors are introduced into it on account of
   a) Resistance of connecting leads
   b) Thermoelectric emfs
   c) Contacts resistance
   d) All of the above

7) A d'arsonval galvanometer, an iron core is usually between the permanent magnet pole faces. This is used to so that
   a) Flux density in the air gap becomes high thereby a large deflecting torque is produced
   b) The effect of stray magnetic fields is reduced
   c) Moment of inertia of moving parts becomes smaller
   d) None of the above

8) The value of resistance of an earthing electrode depends upon
   a) Shape and material of electrode
   b) Depth to which electrode is driven into earth
   c) Specific resistance of soil
   d) All of the above

9) The burden of CT can be expressed in terms of
   a) Secondary winding current
   b) VA rating of transformer
   c) Voltage, current and power factor of secondary circuit
   d) None of the above

10) In a CRT focusing anode is located
   a) Between pre-accelerating and accelerating anode
   b) After accelerating anode
   c) Before pre-accelerating anode
   d) None of the above

11) Induction type single phase energy meters measure electric energy in
   a) kW
   b) Wh
   c) kWh
   d) VAR

12) A potentiometer may be used for
   a) Measurement of resistance
   b) Measurement of current
   c) Calibration of voltmeter
   d) All of the above

13) The household energy meter is
   a) An indicating instrument
   b) A recording instrument
   c) An integrating instrument
   d) None of the above

14) The pointer of an indicating instrument should be
   a) Very light
   b) Very heavy
   c) Both a) and b)
   d) Neither a) nor b)

SLR-TJ – 351

Seat No.	

S.E. (Electrical Engineering) (Part – I) (Old) (CGPA) Examination, 2017
ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day and Date : Saturday, 16-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   a) Explain the following terms :
      a) repeatability
      b) dead zone
      c) resolution
      d) static error
   b) Write a short on synchroscope.
   c) Explain with neat diagram, working of three phase electrodynamometer power factor meter.
   d) Explain essential forces required in analog instruments.
   e) Explain neat diagram and working of MI instruments.
   f) Inductance of 25A EMMC ammeter changes uniformly at the rate of 0.0035 μH/degree. The spring constant is 10^{-6} Nm/degree. Determine angular deflection at full scale.

3. Attempt **any two** : **(6×2=12)**
   a) Explain Maxwell inductance capacitance bridge for the measurement of inductance and also draw the phasor diagram at balance condition.
   b) Explain construction and working of Crompton's potentiometer.

OR

   b) The inductance of moving iron ammeter with a full scale deflection of 90° at 1.5 A. is given by the expression $L = (200 + 40\theta - 4\theta^2 - \theta^3)$ μH where θ is deflection in radian from zero position. Estimate angular deflection of pointer for a current of 1.0 A.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   a) Draw the block diagram of DSO and explain each block.

   b) Explain digital measurement of time period.

   c) Why secondary of CT should not be kept open ?

   d) Describe the working of integrating type digital voltmeter.

   e) Explain working of digital frequency meter with block diagram.

   f) Explain turns compensation technique.

5. Attempt **any two** : **(6×2=12)**

   a) Draw the phasor diagram and equivalent circuit diagram of PT. Also derive the expression for actual ratio and phase angle error.

   b) Explain with neat diagram, working of ramp type digital voltmeter.

   c) Explain Electronic counter and its mode of operation.

SLR-TJ – 351

Seat No.	

Set **Q**

S.E. (Electrical Engineering) (Part – I) (Old) (CGPA) Examination, 2017
ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day and Date : Saturday, 16-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) The value of resistance of an earthing electrode depends upon
   a) Shape and material of electrode
   b) Depth to which electrode is driven into earth
   c) Specific resistance of soil
   d) All of the above

2) The burden of CT can be expressed in terms of
   a) Secondary winding current
   b) VA rating of transformer
   c) Voltage, current and power factor of secondary circuit
   d) None of the above

3) In a CRT focusing anode is located
   a) Between pre-accelerating and accelerating anode
   b) After accelerating anode
   c) Before pre-accelerating anode
   d) None of the above

4) Induction type single phase energy meters measure electric energy in
   a) kW b) Wh c) kWh d) VAR

5) A potentiometer may be used for
   a) Measurement of resistance b) Measurement of current
   c) Calibration of voltmeter d) All of the above

6) The household energy meter is
   a) An indicating instrument b) A recording instrument
   c) An integrating instrument d) None of the above

P.T.O.

7) The pointer of an indicating instrument should be
   a) Very light
   b) Very heavy
   c) Both a) and b)
   d) Neither a) nor b)

8) The moving iron voltmeter indicate
   a) The same value for d.c. and a.c. voltage
   b) Lower value for a.c. voltage than for corresponding d.c. voltages
   c) Higher values for a.c. voltages than for corresponding d.c. voltages
   d) None of the above

9) In a Kelvin's double bridge two sets of readings are taken when measuring a low resistance, one with the current in one direction and the other with direction of current reversed. This is done to
   a) Eliminate the effect of contact resistance
   b) Eliminate the effect of resistance of leads
   c) Correct for changes in battery voltage
   d) Eliminate the effect of thermo-electric emfs

10) Standardization of potentiometers is done in order that, they become
   a) Accurate
   b) Precise
   c) Accurate and direct reading
   d) Accurate and precise

11) A PMMC meter has an internal resistance 200 Ω and the required for its full scale deflection is 50 μ A. The meter is capable of measuring, on its own a maximum voltage of
   a) 5 mv
   b) 10 mv
   c) 5 μ A
   d) 10 μ A

12) Phosphorous material is used for display in CRT for
   a) Photographic application
   b) General purpose application
   c) Television application
   d) All of the above

13) A wheat stone bridge can not be used for precision measurement because errors are introduced into it on account of
   a) Resistance of connecting leads
   b) Thermoelectric emfs
   c) Contacts resistance
   d) All of the above

14) A d'arsonval galvanometer, an iron core is usually between the permanent magnet pole faces. This is used to so that
   a) Flux density in the air gap becomes high thereby a large deflecting torque is produced
   b) The effect of stray magnetic fields is reduced
   c) Moment of inertia of moving parts becomes smaller
   d) None of the above

SLR-TJ – 351

Seat No.	

S.E. (Electrical Engineering) (Part – I) (Old) (CGPA) Examination, 2017
ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day and Date : Saturday, 16-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   a) Explain the following terms :
      a) repeatability
      b) dead zone
      c) resolution
      d) static error
   b) Write a short on synchroscope.
   c) Explain with neat diagram, working of three phase electrodynamometer power factor meter.
   d) Explain essential forces required in analog instruments.
   e) Explain neat diagram and working of MI instruments.
   f) Inductance of 25A EMMC ammeter changes uniformly at the rate of 0.0035 μH/degree. The spring constant is 10^{-6} Nm/degree. Determine angular deflection at full scale.

3. Attempt **any two** : **(6×2=12)**
   a) Explain Maxwell inductance capacitance bridge for the measurement of inductance and also draw the phasor diagram at balance condition.
   b) Explain construction and working of Crompton's potentiometer.

OR

   b) The inductance of moving iron ammeter with a full scale deflection of 90° at 1.5 A. is given by the expression $L = (200 + 40\theta - 4\theta^2 - \theta^3)$ μH where θ is deflection in radian from zero position. Estimate angular deflection of pointer for a current of 1.0 A.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   a) Draw the block diagram of DSO and explain each block.
   b) Explain digital measurement of time period.
   c) Why secondary of CT should not be kept open ?
   d) Describe the working of integrating type digital voltmeter.
   e) Explain working of digital frequency meter with block diagram.
   f) Explain turns compensation technique.

5. Attempt **any two** : **(6×2=12)**
   a) Draw the phasor diagram and equivalent circuit diagram of PT. Also derive the expression for actual ratio and phase angle error.
   b) Explain with neat diagram, working of ramp type digital voltmeter.
   c) Explain Electronic counter and its mode of operation.

SLR-TJ – 351

Seat No.	

Set **R**

S.E. (Electrical Engineering) (Part – I) (Old) (CGPA) Examination, 2017
ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day and Date : Saturday, 16-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) Phosphorous material is used for display in CRT for
   a) Photographic application b) General purpose application
   c) Television application d) All of the above

2) A wheat stone bridge can not be used for precision measurement because errors are introduced into it on account of
   a) Resistance of connecting leads b) Thermoelectric emfs
   c) Contacts resistance d) All of the above

3) A d'arsonval galvanometer, an iron core is usually between the permanent magnet pole faces. This is used to so that
   a) Flux density in the air gap becomes high thereby a large deflecting torque is produced
   b) The effect of stray magnetic fields is reduced
   c) Moment of inertia of moving parts becomes smaller
   d) None of the above

4) The value of resistance of an earthing electrode depends upon
   a) Shape and material of electrode
   b) Depth to which electrode is driven into earth
   c) Specific resistance of soil
   d) All of the above

5) The burden of CT can be expressed in terms of
   a) Secondary winding current
   b) VA rating of transformer
   c) Voltage, current and power factor of secondary circuit
   d) None of the above

6) In a CRT focusing anode is located
   a) Between pre-accelerating and accelerating anode
   b) After accelerating anode
   c) Before pre-accelerating anode
   d) None of the above

7) Induction type single phase energy meters measure electric energy in
   a) kW b) Wh c) kWh d) VAR

8) A potentiometer may be used for
   a) Measurement of resistance b) Measurement of current
   c) Calibration of voltmeter d) All of the above

9) The household energy meter is
   a) An indicating instrument b) A recording instrument
   c) An integrating instrument d) None of the above

10) The pointer of an indicating instrument should be
   a) Very light b) Very heavy
   c) Both a) and b) d) Neither a) nor b)

11) The moving iron voltmeter indicate
   a) The same value for d.c. and a.c. voltage
   b) Lower value for a.c. voltage than for corresponding d.c. voltages
   c) Higher values for a.c. voltages than for corresponding d.c. voltages
   d) None of the above

12) In a Kelvin's double bridge two sets of readings are taken when measuring a low resistance, one with the current in one direction and the other with direction of current reversed. This is done to
   a) Eliminate the effect of contact resistance
   b) Eliminate the effect of resistance of leads
   c) Correct for changes in battery voltage
   d) Eliminate the effect of thermo-electric emfs

13) Standardization of potentiometers is done in order that, they become
   a) Accurate b) Precise
   c) Accurate and direct reading d) Accurate and precise

14) A PMMC meter has an internal resistance 200 Ω and the required for its full scale deflection is 50 μ A. The meter is capable of measuring, on its own a maximum voltage of
   a) 5 mv b) 10 mv c) 5 μ A d) 10 μ A

Seat No.	

S.E. (Electrical Engineering) (Part – I) (Old) (CGPA) Examination, 2017
ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day and Date : Saturday, 16-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   a) Explain the following terms :
      a) repeatability
      b) dead zone
      c) resolution
      d) static error
   b) Write a short on synchroscope.
   c) Explain with neat diagram, working of three phase electrodynamometer power factor meter.
   d) Explain essential forces required in analog instruments.
   e) Explain neat diagram and working of MI instruments.
   f) Inductance of 25A EMMC ammeter changes uniformly at the rate of 0.0035 μH/degree. The spring constant is 10^{-6} Nm/degree. Determine angular deflection at full scale.

3. Attempt **any two** : **(6×2=12)**
   a) Explain Maxwell inductance capacitance bridge for the measurement of inductance and also draw the phasor diagram at balance condition.
   b) Explain construction and working of Crompton's potentiometer.

OR

   b) The inductance of moving iron ammeter with a full scale deflection of 90° at 1.5 A. is given by the expression $L = (200 + 40\theta - 4\theta^2 - \theta^3)$ μH where θ is deflection in radian from zero position. Estimate angular deflection of pointer for a current of 1.0 A.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   a) Draw the block diagram of DSO and explain each block.
   b) Explain digital measurement of time period.
   c) Why secondary of CT should not be kept open ?
   d) Describe the working of integrating type digital voltmeter.
   e) Explain working of digital frequency meter with block diagram.
   f) Explain turns compensation technique.

5. Attempt **any two** : **(6×2=12)**
   a) Draw the phasor diagram and equivalent circuit diagram of PT. Also derive the expression for actual ratio and phase angle error.
   b) Explain with neat diagram, working of ramp type digital voltmeter.
   c) Explain Electronic counter and its mode of operation.

SLR-TJ – 351

Seat No.	

Set **S**

S.E. (Electrical Engineering) (Part – I) (Old) (CGPA) Examination, 2017
ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day and Date : Saturday, 16-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) In a CRT focusing anode is located
   a) Between pre-accelerating and accelerating anode
   b) After accelerating anode
   c) Before pre-accelerating anode
   d) None of the above

2) Induction type single phase energy meters measure electric energy in
   a) kW b) Wh
   c) kWh d) VAR

3) A potentiometer may be used for
   a) Measurement of resistance b) Measurement of current
   c) Calibration of voltmeter d) All of the above

4) The household energy meter is
   a) An indicating instrument b) A recording instrument
   c) An integrating instrument d) None of the above

5) The pointer of an indicating instrument should be
   a) Very light b) Very heavy
   c) Both a) and b) d) Neither a) nor b)

6) The moving iron voltmeter indicate
   a) The same value for d.c. and a.c. voltage
   b) Lower value for a.c. voltage than for corresponding d.c. voltages
   c) Higher values for a.c. voltages than for corresponding d.c. voltages
   d) None of the above

7) In a Kelvin's double bridge two sets of readings are taken when measuring a low resistance, one with the current in one direction and the other with direction of current reversed. This is done to
   a) Eliminate the effect of contact resistance
   b) Eliminate the effect of resistance of leads
   c) Correct for changes in battery voltage
   d) Eliminate the effect of thermo-electric emfs

8) Standardization of potentiometers is done in order that, they become
   a) Accurate
   b) Precise
   c) Accurate and direct reading
   d) Accurate and precise

9) A PMMC meter has an internal resistance 200 Ω and the required for its full scale deflection is 50 μ A. The meter is capable of measuring, on its own a maximum voltage of
   a) 5 mv
   b) 10 mv
   c) 5 μ A
   d) 10 μ A

10) Phosphorous material is used for display in CRT for
   a) Photographic application
   b) General purpose application
   c) Television application
   d) All of the above

11) A wheat stone bridge can not be used for precision measurement because errors are introduced into it on account of
   a) Resistance of connecting leads
   b) Thermoelectric emfs
   c) Contacts resistance
   d) All of the above

12) A d'arsonval galvanometer, an iron core is usually between the permanent magnet pole faces. This is used to so that
   a) Flux density in the air gap becomes high thereby a large deflecting torque is produced
   b) The effect of stray magnetic fields is reduced
   c) Moment of inertia of moving parts becomes smaller
   d) None of the above

13) The value of resistance of an earthing electrode depends upon
   a) Shape and material of electrode
   b) Depth to which electrode is driven into earth
   c) Specific resistance of soil
   d) All of the above

14) The burden of CT can be expressed in terms of
   a) Secondary winding current
   b) VA rating of transformer
   c) Voltage, current and power factor of secondary circuit
   d) None of the above

Seat No.	

S.E. (Electrical Engineering) (Part – I) (Old) (CGPA) Examination, 2017
ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day and Date : Saturday, 16-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   a) Explain the following terms :
      a) repeatability
      b) dead zone
      c) resolution
      d) static error
   b) Write a short on synchroscope.
   c) Explain with neat diagram, working of three phase electrodynamometer power factor meter.
   d) Explain essential forces required in analog instruments.
   e) Explain neat diagram and working of MI instruments.
   f) Inductance of 25A EMMC ammeter changes uniformly at the rate of 0.0035 μH/degree. The spring constant is 10^{-6} Nm/degree. Determine angular deflection at full scale.

3. Attempt **any two** : **(6×2=12)**
   a) Explain Maxwell inductance capacitance bridge for the measurement of inductance and also draw the phasor diagram at balance condition.
   b) Explain construction and working of Crompton's potentiometer.

OR

   b) The inductance of moving iron ammeter with a full scale deflection of 90° at 1.5 A. is given by the expression $L = (200 + 40\theta - 4\theta^2 - \theta^3)$ μH where θ is deflection in radian from zero position. Estimate angular deflection of pointer for a current of 1.0 A.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   a) Draw the block diagram of DSO and explain each block.
   b) Explain digital measurement of time period.
   c) Why secondary of CT should not be kept open ?
   d) Describe the working of integrating type digital voltmeter.
   e) Explain working of digital frequency meter with block diagram.
   f) Explain turns compensation technique.

5. Attempt **any two** : **(6×2=12)**
   a) Draw the phasor diagram and equivalent circuit diagram of PT. Also derive the expression for actual ratio and phase angle error.
   b) Explain with neat diagram, working of ramp type digital voltmeter.
   c) Explain Electronic counter and its mode of operation.

SLR-TJ – 352

Seat No.	

Set P

S.E. (Electrical) (Part – I) (Old-CGPA) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Tuesday, 19-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***Assume*** *suitable data if* ***necessary*** *and mention* ***it clearly****.*
2) Figures to the right indicate ***full*** *marks.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

I. Choose the correct answers : **(14×1=14)**

1) Power plants using coal work closely on known which of the following cycle ?
   a) Otto cycle b) Brayton cycle
   c) Binary vapour cycle d) Rankine cycle

2) Load factor is always
   a) Less than one b) Equal to one
   c) Above one d) None of them

3) A graphical representation between discharge and time is known as
   a) Hydrograph b) Hectograph
   c) Topography d) Monograph

4) Cost of operation of which plant is least ?
   a) Gas turbine plant b) Thermal power plant
   c) Nuclear power plant d) Hydroelectric plant

5) A 100 MW thermal power-plant will consume nearly how many tonnes of coal in one hour ?
   a) 50 tonnes b) 150 tonnes c) 1500 tonnes d) 15,000 tonnes

6) Demand factor is always
   a) Less than one b) Equal to one
   c) Above one d) None of them

P.T.O.

7) In a super-heater
   a) Pressure rises, temperature drops
   b) Pressure rises, temperature remains constant
   c) Pressure remains constant and temperature rises
   d) Both pressure and temperature remains constant

8) 1 atomic mass unit is equal to
   a) 1.66×10^{-27} kg
   b) 1.66×10^{-25} kg
   c) 1.66×10^{-17} kg
   d) 1.66×10^{-10} kg

9) A gas turbine works on
   a) Carnot cycle
   b) Brayton cycle
   c) Dual cycle
   d) Rankine cycle

10) Geothermal energy is
   a) a renewable energy resource
   b) alternative energy source
   c) inexhaustible energy source
   d) any of the above

11) Which auxiliary of gas turbine consumes most of the power ?
   a) burner
   b) combustion chamber
   c) compressor
   d) fuel pump

12) An air filter is used in
   a) Nuclear power plants
   b) Steam power plants
   c) Diesel engine power plants
   d) Hydro-power plants

13) Which of the following material can be used as a moderator ?
   a) graphite b) heavy water c) beryllium d) any of the above

14) Tidal energy mainly makes use of
   a) kinetic energy of water
   b) potential energy of water
   c) both kinetic as well as potential energy of water
   d) none of the above

SLR-TJ – 352

Seat No.	

S.E. (Electrical) (Part – I) (Old-CGPA) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Tuesday, 19-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data if* ***necessary*** *and mention* ***it clearly****.*
3) Figures to the right indicate ***full*** *marks.*

SECTION – I

II. Solve **any four** : **(4×4=16)**

a) Explain different types of non-conventional energy sources.

b) Explain Economics of Small Hydro Schemes.

c) What are advantages and disadvantages of thermal power plant ?

d) Explain structure of power industry.

e) A generating station has the following daily load cycle :

Time (Hours)	0 – 6	6 – 10	10 – 12	12 – 16	16 – 20	20 – 24
Load (MW)	40	50	60	50	70	40

Draw the load curve and find :

i) maximum demand

ii) units generated per day.

III. Solve **any two** : **(2×6=12)**

a) Explain pelton wheel and Francis turbine.

b) Explain different types of Tariff.

c) Draw a typical lay out of a steam power plant and explain.

SECTION – II

IV. Solve **any four** : **(4×4=16)**

a) Explain open loop gas turbine power plant.

b) Write a short note on tidal power generation.

c) Give the advantages and disadvantages of Wind Energy.

d) Explain the essential factors which influence the choice of site for a Nuclear power plant.

e) Explain Nuclear Fission reaction.

V. Solve **any two** : **(2×6=12)**

a) Explain layout of the solar thermal power plant.

b) Give the advantages, disadvantages and fields of application of diesel power plant.

c) Explain BWR and AGR.

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Seat No.	

Set Q

S.E. (Electrical) (Part – I) (Old-CGPA) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Tuesday, 19-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***Assume*** *suitable data if* ***necessary*** *and mention* ***it clearly****.*
2) Figures to the right indicate ***full*** *marks.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

I. Choose the correct answers : **(14×1=14)**

1) 1 atomic mass unit is equal to
   a) 1.66×10^{-27} kg b) 1.66×10^{-25} kg
   c) 1.66×10^{-17} kg d) 1.66×10^{-10} kg

2) A gas turbine works on
   a) Carnot cycle b) Brayton cycle
   c) Dual cycle d) Rankine cycle

3) Geothermal energy is
   a) a renewable energy resource b) alternative energy source
   c) inexhaustible energy source d) any of the above

4) Which auxiliary of gas turbine consumes most of the power ?
   a) burner b) combustion chamber
   c) compressor d) fuel pump

5) An air filter is used in
   a) Nuclear power plants b) Steam power plants
   c) Diesel engine power plants d) Hydro-power plants

6) Which of the following material can be used as a moderator ?
   a) graphite b) heavy water
   c) beryllium d) any of the above

P.T.O.

7) Tidal energy mainly makes use of
   a) kinetic energy of water
   b) potential energy of water
   c) both kinetic as well as potential energy of water
   d) none of the above

8) Power plants using coal work closely on known which of the following cycle ?
   a) Otto cycle b) Brayton cycle
   c) Binary vapour cycle d) Rankine cycle

9) Load factor is always
   a) Less than one b) Equal to one
   c) Above one d) None of them

10) A graphical representation between discharge and time is known as
   a) Hydrograph b) Hectograph
   c) Topography d) Monograph

11) Cost of operation of which plant is least ?
   a) Gas turbine plant b) Thermal power plant
   c) Nuclear power plant d) Hydroelectric plant

12) A 100 MW thermal power-plant will consume nearly how many tonnes of coal in one hour ?
   a) 50 tonnes b) 150 tonnes c) 1500 tonnes d) 15,000 tonnes

13) Demand factor is always
   a) Less than one b) Equal to one
   c) Above one d) None of them

14) In a super-heater
   a) Pressure rises, temperature drops
   b) Pressure rises, temperature remains constant
   c) Pressure remains constant and temperature rises
   d) Both pressure and temperature remains constant

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Seat No.	

S.E. (Electrical) (Part – I) (Old-CGPA) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Tuesday, 19-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data if* ***necessary*** *and mention* ***it clearly****.*
3) Figures to the right indicate ***full*** *marks.*

SECTION – I

II. Solve **any four** : **(4×4=16)**

a) Explain different types of non-conventional energy sources.

b) Explain Economics of Small Hydro Schemes.

c) What are advantages and disadvantages of thermal power plant ?

d) Explain structure of power industry.

e) A generating station has the following daily load cycle :

Time (Hours)	0 – 6	6 – 10	10 – 12	12 – 16	16 – 20	20 – 24
Load (MW)	40	50	60	50	70	40

Draw the load curve and find :

i) maximum demand

ii) units generated per day.

III. Solve **any two** : **(2×6=12)**

a) Explain pelton wheel and Francis turbine.

b) Explain different types of Tariff.

c) Draw a typical lay out of a steam power plant and explain.

SECTION – II

IV. Solve **any four** : **(4×4=16)**

a) Explain open loop gas turbine power plant.

b) Write a short note on tidal power generation.

c) Give the advantages and disadvantages of Wind Energy.

d) Explain the essential factors which influence the choice of site for a Nuclear power plant.

e) Explain Nuclear Fission reaction.

V. Solve **any two** : **(2×6=12)**

a) Explain layout of the solar thermal power plant.

b) Give the advantages, disadvantages and fields of application of diesel power plant.

c) Explain BWR and AGR.

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Seat No.	

Set R

S.E. (Electrical) (Part – I) (Old-CGPA) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Tuesday, 19-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***Assume*** *suitable data if* ***necessary*** *and mention* ***it clearly****.*
2) Figures to the right indicate ***full*** *marks.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

I. Choose the correct answers : **(14×1=14)**

1) A 100 MW thermal power-plant will consume nearly how many tonnes of coal in one hour ?
   a) 50 tonnes b) 150 tonnes
   c) 1500 tonnes d) 15,000 tonnes

2) Demand factor is always
   a) Less than one b) Equal to one
   c) Above one d) None of them

3) In a super-heater
   a) Pressure rises, temperature drops
   b) Pressure rises, temperature remains constant
   c) Pressure remains constant and temperature rises
   d) Both pressure and temperature remains constant

4) 1 atomic mass unit is equal to
   a) 1.66×10^{-27} kg b) 1.66×10^{-25} kg
   c) 1.66×10^{-17} kg d) 1.66×10^{-10} kg

5) A gas turbine works on
   a) Carnot cycle b) Brayton cycle
   c) Dual cycle d) Rankine cycle

P.T.O.

6) Geothermal energy is
   a) a renewable energy resource
   b) alternative energy source
   c) inexhaustible energy source
   d) any of the above

7) Which auxiliary of gas turbine consumes most of the power ?
   a) burner
   b) combustion chamber
   c) compressor
   d) fuel pump

8) An air filter is used in
   a) Nuclear power plants
   b) Steam power plants
   c) Diesel engine power plants
   d) Hydro-power plants

9) Which of the following material can be used as a moderator ?
   a) graphite
   b) heavy water
   c) beryllium
   d) any of the above

10) Tidal energy mainly makes use of
   a) kinetic energy of water
   b) potential energy of water
   c) both kinetic as well as potential energy of water
   d) none of the above

11) Power plants using coal work closely on known which of the following cycle ?
   a) Otto cycle
   b) Brayton cycle
   c) Binary vapour cycle
   d) Rankine cycle

12) Load factor is always
   a) Less than one
   b) Equal to one
   c) Above one
   d) None of them

13) A graphical representation between discharge and time is known as
   a) Hydrograph
   b) Hectograph
   c) Topography
   d) Monograph

14) Cost of operation of which plant is least ?
   a) Gas turbine plant
   b) Thermal power plant
   c) Nuclear power plant
   d) Hydroelectric plant

SLR-TJ – 352

Seat No.	

S.E. (Electrical) (Part – I) (Old-CGPA) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Tuesday, 19-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data if* ***necessary*** *and mention* ***it clearly****.*
3) Figures to the right indicate ***full*** *marks.*

SECTION – I

II. Solve **any four** : **(4×4=16)**

a) Explain different types of non-conventional energy sources.

b) Explain Economics of Small Hydro Schemes.

c) What are advantages and disadvantages of thermal power plant ?

d) Explain structure of power industry.

e) A generating station has the following daily load cycle :

Time (Hours)	0 – 6	6 – 10	10 – 12	12 – 16	16 – 20	20 – 24
Load (MW)	40	50	60	50	70	40

Draw the load curve and find :

i) maximum demand

ii) units generated per day.

III. Solve **any two** : **(2×6=12)**

a) Explain pelton wheel and Francis turbine.

b) Explain different types of Tariff.

c) Draw a typical lay out of a steam power plant and explain.

SECTION – II

IV. Solve **any four** : **(4×4=16)**

a) Explain open loop gas turbine power plant.

b) Write a short note on tidal power generation.

c) Give the advantages and disadvantages of Wind Energy.

d) Explain the essential factors which influence the choice of site for a Nuclear power plant.

e) Explain Nuclear Fission reaction.

V. Solve **any two** : **(2×6=12)**

a) Explain layout of the solar thermal power plant.

b) Give the advantages, disadvantages and fields of application of diesel power plant.

c) Explain BWR and AGR.

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Seat No.	

Set S

S.E. (Electrical) (Part – I) (Old-CGPA) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Tuesday, 19-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***Assume*** *suitable data if* ***necessary*** *and mention* ***it clearly****.*
2) Figures to the right indicate ***full*** *marks.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

I. Choose the correct answers : **(14×1=14)**

1) Geothermal energy is
   a) a renewable energy resource b) alternative energy source
   c) inexhaustible energy source d) any of the above

2) Which auxiliary of gas turbine consumes most of the power ?
   a) burner b) combustion chamber
   c) compressor d) fuel pump

3) An air filter is used in
   a) Nuclear power plants b) Steam power plants
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4) Which of the following material can be used as a moderator ?
   a) graphite b) heavy water c) beryllium d) any of the above

5) Tidal energy mainly makes use of
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6) Power plants using coal work closely on known which of the following cycle ?
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P.T.O.

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10) A 100 MW thermal power-plant will consume nearly how many tonnes of coal in one hour ?
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   a) Less than one
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12) In a super-heater
   a) Pressure rises, temperature drops
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13) 1 atomic mass unit is equal to
   a) 1.66×10^{-27} kg
   b) 1.66×10^{-25} kg
   c) 1.66×10^{-17} kg
   d) 1.66×10^{-10} kg

14) A gas turbine works on
   a) Carnot cycle
   b) Brayton cycle
   c) Dual cycle
   d) Rankine cycle

SLR-TJ – 352

Seat No.	

S.E. (Electrical) (Part – I) (Old-CGPA) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Tuesday, 19-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data if* ***necessary*** *and mention* ***it clearly****.*
3) Figures to the right indicate ***full*** *marks.*

SECTION – I

II. Solve **any four** : **(4×4=16)**

a) Explain different types of non-conventional energy sources.

b) Explain Economics of Small Hydro Schemes.

c) What are advantages and disadvantages of thermal power plant ?

d) Explain structure of power industry.

e) A generating station has the following daily load cycle :

Time (Hours)	0 – 6	6 – 10	10 – 12	12 – 16	16 – 20	20 – 24
Load (MW)	40	50	60	50	70	40

Draw the load curve and find :

i) maximum demand

ii) units generated per day.

III. Solve **any two** : **(2×6=12)**

a) Explain pelton wheel and Francis turbine.

b) Explain different types of Tariff.

c) Draw a typical lay out of a steam power plant and explain.

SECTION – II

IV. Solve **any four** : **(4×4=16)**

a) Explain open loop gas turbine power plant.

b) Write a short note on tidal power generation.

c) Give the advantages and disadvantages of Wind Energy.

d) Explain the essential factors which influence the choice of site for a Nuclear power plant.

e) Explain Nuclear Fission reaction.

V. Solve **any two** : **(2×6=12)**

a) Explain layout of the solar thermal power plant.

b) Give the advantages, disadvantages and fields of application of diesel power plant.

c) Explain BWR and AGR.

SLR-TJ – 353

Seat No.	

Set P

S.E. (Electrical Engg.) (Part – I) (Old CGPA) Examination, 2017
ELECTRONIC DEVICES AND CIRCUITS

Day and Date : Thursday, 21-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Note : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page****.*
3) ***All*** *questions are* ***compulsory****.*
4) Figures to ***right*** *indicate* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) For faithful amplification by a transistor circuit, the value of V_{BE} should be _____ for silicon transistor.
   a) 0V b) 0.01V
   c) above 0.7V d) between 0V and 0.1V

2) The operating point is also called the
   a) Cut off point b) Quiescent point
   c) Saturation point d) None of above

3) The purpose of coupling capacitor in a transistor amplifier is to
   a) Increase the output impedance of the Transistor
   b) Protect the Transistor
   c) Pass AC and block DC
   d) Provide Biasing

4) The input control parameter of JFET is
   a) Gate voltage b) Source voltage
   c) Drain voltage d) Gate current

5) If the gate of JFET is made less negative, the width of the conducting channel
   a) remains the same b) is decreased
   c) is increased d) none of the above

6) If the operating point changes, the h-parameter of the transistor
   a) also changes b) do not change
   c) may or may not change d) none of above

P.T.O.

7) The transistor biasing represents _____ conditions.
   a) a.c. b) d.c.
   c) both a.c. and d.c. d) none of above

8) What is the minimum frequency at which a crystal will oscillate ?
   a) seventh harmonic b) third harmonic
   c) fundamental d) second harmonic

9) The feedback signal in a(n) _____ oscillator is derived from a capacitive voltage divider in the LC circuit.
   a) Harltey b) Colpitts c) Armstrong d) None of these

10) In order to start up, a feedback oscillator requires
   a) negative feedback less than 1
   b) positive feedback greater than 1
   c) unity feedback equal to 1
   d) no feedback

11) Which of the following is required for oscillation ?
   a) The phase shift around the feedback network must be 180°
   b) $\beta_A > 1$
   c) Both $\beta_A > 1$ and the phase shift around the feedback network must be 180°
   d) none of these

12) Which type of power amplifier is biased for operation at less than 180° of the cycle ?
   a) Class A b) Class B or Class AB
   c) Class B d) Class C

13) Class AB operation is _____ operation.
   a) similar to class A b) similar to class B
   c) similar to class C d) none of these

14) When UJT is used for thyristor gate signal, the output of UJT is
   a) sine wave b) square wave
   c) sawtooth wave d) both (a) and (c)

_____

SLR-TJ – 353

Seat No.	

S.E. (Electrical Engg.) (Part – I) (Old CGPA) Examination, 2017
ELECTRONIC DEVICES AND CIRCUITS

Day and Date : Thursday, 21-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*

2. Attempt **any four**. **(4×4=16)**
   a) Draw and explain Fixed Base Bias method of transistor Biasing. What is its need ?
   b) Draw and explain BJT as an amplifier in CE arrangement.
   c) Draw AC and DC equivalent circuit Diagram for common Emitter.
   d) What do you understand by h-parameter ? How you will measure h-parameters of linear circuit ?
   e) Explain the need of Bias Compensation.
   f) Draw and explain common source JFET amplifier.

3. a) Explain construction and working of JFET. **6**
   b) Draw and explain operation of single stage RC coupled BJT amplifier with its advantages and disadvantages. **6**

   OR

   b) What are the types of coupling ? Explain direct coupling and its advantages for BJT amplifier. **6**

4. Attempt **any four**. **(4×4=16)**
   a) Compare capacitor and inductor filter.
   b) Derive the expression for ripple factor of inductive filter.
   c) Explain Class B power amplifier.
   d) Explain current shunt and voltage shunt feedback used in amplifier.
   e) Write a short note on crystal oscillator.
   f) Derive an expression for the gain of an negative voltage feedback amplifier.

5. Attempt **any two**. **(2×6=12)**
   a) Derive the expression of efficiency for Class B power amplifier and explain harmonic distortion.
   b) Explain UJT relaxation oscillator. Derive the expression for frequency of oscillation.
   c) Explain RC oscillator. Derive the expression for the frequency of oscillation.

Set P

Set P

SLR-TJ – 353

Seat No.	

Set Q

S.E. (Electrical Engg.) (Part – I) (Old CGPA) Examination, 2017
ELECTRONIC DEVICES AND CIRCUITS

Day and Date : Thursday, 21-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Note : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page****.*
3) ***All*** *questions are* ***compulsory****.*
4) Figures to ***right*** *indicate* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) What is the minimum frequency at which a crystal will oscillate ?
a) seventh harmonic b) third harmonic
c) fundamental d) second harmonic

2) The feedback signal in a(n) _____ oscillator is derived from a capacitive voltage divider in the LC circuit.
a) Harltey b) Colpitts c) Armstrong d) None of these

3) In order to start up, a feedback oscillator requires
a) negative feedback less than 1
b) positive feedback greater than 1
c) unity feedback equal to 1
d) no feedback

4) Which of the following is required for oscillation ?
a) The phase shift around the feedback network must be 180°
b) $\beta_A > 1$
c) Both $\beta_A > 1$ and the phase shift around the feedback network must be 180°
d) none of these

5) Which type of power amplifier is biased for operation at less than 180° of the cycle ?
a) Class A b) Class B or Class AB
c) Class B d) Class C

P.T.O.

6) Class AB operation is _____ operation.
   a) similar to class A
   b) similar to class B
   c) similar to class C
   d) none of these

7) When UJT is used for thyristor gate signal, the output of UJT is
   a) sine wave
   b) square wave
   c) sawtooth wave
   d) both (a) and (c)

8) For faithful amplification by a transistor circuit, the value of V_{BE} should be _____ for silicon transistor.
   a) 0V
   b) 0.01V
   c) above 0.7V
   d) between 0V and 0.1V

9) The operating point is also called the
   a) Cut off point
   b) Quiescent point
   c) Saturation point
   d) None of above

10) The purpose of coupling capacitor in a transistor amplifier is to
   a) Increase the output impedance of the Transistor
   b) Protect the Transistor
   c) Pass AC and block DC
   d) Provide Biasing

11) The input control parameter of JFET is
   a) Gate voltage
   b) Source voltage
   c) Drain voltage
   d) Gate current

12) If the gate of JFET is made less negative, the width of the conducting channel
   a) remains the same
   b) is decreased
   c) is increased
   d) none of the above

13) If the operating point changes, the h-parameter of the transistor
   a) also changes
   b) do not change
   c) may or may not change
   d) none of above

14) The transistor biasing represents _____ conditions.
   a) a.c.
   b) d.c.
   c) both a.c. and d.c.
   d) none of above

_____

SLR-TJ – 353

Seat No.	

S.E. (Electrical Engg.) (Part – I) (Old CGPA) Examination, 2017
ELECTRONIC DEVICES AND CIRCUITS

Day and Date : Thursday, 21-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*

2. Attempt **any four**. **(4×4=16)**
   a) Draw and explain Fixed Base Bias method of transistor Biasing. What is its need ?
   b) Draw and explain BJT as an amplifier in CE arrangement.
   c) Draw AC and DC equivalent circuit Diagram for common Emitter.
   d) What do you understand by h-parameter ? How you will measure h-parameters of linear circuit ?
   e) Explain the need of Bias Compensation.
   f) Draw and explain common source JFET amplifier.

3. a) Explain construction and working of JFET. **6**
   b) Draw and explain operation of single stage RC coupled BJT amplifier with its advantages and disadvantages. **6**

   OR

   b) What are the types of coupling ? Explain direct coupling and its advantages for BJT amplifier. **6**

4. Attempt **any four**. **(4×4=16)**
   a) Compare capacitor and inductor filter.
   b) Derive the expression for ripple factor of inductive filter.
   c) Explain Class B power amplifier.
   d) Explain current shunt and voltage shunt feedback used in amplifier.
   e) Write a short note on crystal oscillator.
   f) Derive an expression for the gain of an negative voltage feedback amplifier.

5. Attempt **any two**. **(2×6=12)**
   a) Derive the expression of efficiency for Class B power amplifier and explain harmonic distortion.
   b) Explain UJT relaxation oscillator. Derive the expression for frequency of oscillation.
   c) Explain RC oscillator. Derive the expression for the frequency of oscillation.

Set Q

Set Q

SLR-TJ – 353

Seat No.	

Set R

S.E. (Electrical Engg.) (Part – I) (Old CGPA) Examination, 2017
ELECTRONIC DEVICES AND CIRCUITS

Day and Date : Thursday, 21-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Note : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page****.*
3) ***All*** *questions are* ***compulsory****.*
4) Figures to ***right*** *indicate* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) If the gate of JFET is made less negative, the width of the conducting channel
   a) remains the same b) is decreased
   c) is increased d) none of the above

2) If the operating point changes, the h-parameter of the transistor
   a) also changes b) do not change
   c) may or may not change d) none of above

3) The transistor biasing represents _____ conditions.
   a) a.c. b) d.c.
   c) both a.c. and d.c. d) none of above

4) What is the minimum frequency at which a crystal will oscillate ?
   a) seventh harmonic b) third harmonic
   c) fundamental d) second harmonic

5) The feedback signal in a(n) _____ oscillator is derived from a capacitive voltage divider in the LC circuit.
   a) Harltey b) Colpitts c) Armstrong d) None of these

6) In order to start up, a feedback oscillator requires
   a) negative feedback less than 1
   b) positive feedback greater than 1
   c) unity feedback equal to 1
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P.T.O.

7) Which of the following is required for oscillation ?
   a) The phase shift around the feedback network must be 180°
   b) $\beta_A > 1$
   c) Both $\beta_A > 1$ and the phase shift around the feedback network must be 180°
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8) Which type of power amplifier is biased for operation at less than 180° of the cycle ?
   a) Class A
   b) Class B or Class AB
   c) Class B
   d) Class C

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   a) 0V
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12) The operating point is also called the
   a) Cut off point
   b) Quiescent point
   c) Saturation point
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13) The purpose of coupling capacitor in a transistor amplifier is to
   a) Increase the output impedance of the Transistor
   b) Protect the Transistor
   c) Pass AC and block DC
   d) Provide Biasing

14) The input control parameter of JFET is
   a) Gate voltage
   b) Source voltage
   c) Drain voltage
   d) Gate current

_____

SLR-TJ – 353

Seat No.	

S.E. (Electrical Engg.) (Part – I) (Old CGPA) Examination, 2017
ELECTRONIC DEVICES AND CIRCUITS

Day and Date : Thursday, 21-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*

2. Attempt **any four**. **(4×4=16)**
   a) Draw and explain Fixed Base Bias method of transistor Biasing. What is its need ?
   b) Draw and explain BJT as an amplifier in CE arrangement.
   c) Draw AC and DC equivalent circuit Diagram for common Emitter.
   d) What do you understand by h-parameter ? How you will measure h-parameters of linear circuit ?
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   b) Draw and explain operation of single stage RC coupled BJT amplifier with its advantages and disadvantages. **6**

   OR

   b) What are the types of coupling ? Explain direct coupling and its advantages for BJT amplifier. **6**

4. Attempt **any four**. **(4×4=16)**
   a) Compare capacitor and inductor filter.
   b) Derive the expression for ripple factor of inductive filter.
   c) Explain Class B power amplifier.
   d) Explain current shunt and voltage shunt feedback used in amplifier.
   e) Write a short note on crystal oscillator.
   f) Derive an expression for the gain of an negative voltage feedback amplifier.

5. Attempt **any two**. **(2×6=12)**
   a) Derive the expression of efficiency for Class B power amplifier and explain harmonic distortion.
   b) Explain UJT relaxation oscillator. Derive the expression for frequency of oscillation.
   c) Explain RC oscillator. Derive the expression for the frequency of oscillation.

Set R

Set R

SLR-TJ – 353

Seat No.	

Set S

S.E. (Electrical Engg.) (Part – I) (Old CGPA) Examination, 2017
ELECTRONIC DEVICES AND CIRCUITS

Day and Date : Thursday, 21-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Note : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page****.*
3) ***All*** *questions are* ***compulsory****.*
4) Figures to ***right*** *indicate* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) In order to start up, a feedback oscillator requires
   a) negative feedback less than 1
   b) positive feedback greater than 1
   c) unity feedback equal to 1
   d) no feedback

2) Which of the following is required for oscillation ?
   a) The phase shift around the feedback network must be 180°
   b) $\beta_A > 1$
   c) Both $\beta_A > 1$ and the phase shift around the feedback network must be 180°
   d) none of these

3) Which type of power amplifier is biased for operation at less than 180° of the cycle ?
   a) Class A b) Class B or Class AB
   c) Class B d) Class C

4) Class AB operation is _____ operation.
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5) When UJT is used for thyristor gate signal, the output of UJT is
   a) sine wave b) square wave
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P.T.O.

6) For faithful amplification by a transistor circuit, the value of V_{BE} should be _____ for silicon transistor.
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12) The transistor biasing represents _____ conditions.
   a) a.c.
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   a) Harltey
   b) Colpitts
   c) Armstrong
   d) None of these

_____

SLR-TJ – 353

Seat No.	

S.E. (Electrical Engg.) (Part – I) (Old CGPA) Examination, 2017
ELECTRONIC DEVICES AND CIRCUITS

Day and Date : Thursday, 21-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*

2. Attempt **any four**. **(4×4=16)**
   a) Draw and explain Fixed Base Bias method of transistor Biasing. What is its need ?
   b) Draw and explain BJT as an amplifier in CE arrangement.
   c) Draw AC and DC equivalent circuit Diagram for common Emitter.
   d) What do you understand by h-parameter ? How you will measure h-parameters of linear circuit ?
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3. a) Explain construction and working of JFET. **6**
   b) Draw and explain operation of single stage RC coupled BJT amplifier with its advantages and disadvantages. **6**

   OR

   b) What are the types of coupling ? Explain direct coupling and its advantages for BJT amplifier. **6**

4. Attempt **any four**. **(4×4=16)**
   a) Compare capacitor and inductor filter.
   b) Derive the expression for ripple factor of inductive filter.
   c) Explain Class B power amplifier.
   d) Explain current shunt and voltage shunt feedback used in amplifier.
   e) Write a short note on crystal oscillator.
   f) Derive an expression for the gain of an negative voltage feedback amplifier.

5. Attempt **any two**. **(2×6=12)**
   a) Derive the expression of efficiency for Class B power amplifier and explain harmonic distortion.
   b) Explain UJT relaxation oscillator. Derive the expression for frequency of oscillation.
   c) Explain RC oscillator. Derive the expression for the frequency of oscillation.

Set S

Set S

SLR-TJ – 354

Seat No.	

Set P

S.E. (Electrical) (Part – I) (Old) Examination, 2017
DATA STRUCTURE

Day and Date : Tuesday, 28-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) A single character input from the keyboard can be obtained by using the function
a) printf( ) b) scanf ( ) c) putchar ( ) d) getchar ( )

2) For implementing recursive function the data structure used is
a) queue b) stack c) linked list d) tree

3) Which of the following data structure is linear data structure ?
a) Trees b) Graphs c) Arrays d) None of above

4) Direct or random access of elements is not possible in
a) Linked list b) Array c) String d) None of these

5) Which header file is used for input output function ?
a) ALLOC.H b) STDLIB.H c) CONIO.H d) STDIO.H

6) Which data structure is needed to convert infix notation to postfix notation ?
a) Branch b) Queue c) Tree d) Stack

7) The function used to read a character from a file that has been opened in read mode is
a) putc b) getc c) getchar d) putchar

8) The result of evaluating the following postfix expression is
5, 7, 9, ∗, +, 4, 9, 3, /, +, –
a) 50 b) 65 c) 61 d) 69

9) An empty list is the one which has no
a) nodes b) data
c) both a) and b) above d) address

P.T.O.

10) Which of the following types of expressions do not require precedence rules for evaluation ?
   a) Fully parenthesised infix expression
   b) Postfix expression
   c) Partially parenthesised infix expression
   d) More than one of the above

11) If the elements “A”, “B”, “C” and “D” are placed in a queue and are deleted one at a time, in what order will they be removed ?
   a) ABCD b) DCBA c) DCAB d) BCAD

12) If the number of records to be sorted is small, then _____ sorting can be efficient.
   a) Merge b) Heap c) Selection d) Bubble

13) The linear list of element in which delete can be done from one end and insertion can takes place only at the other end is known as
   a) Queue b) Stack c) Tree d) Graph

14) Which of the following operations is performed more efficiently by doubly linked list than by singly linked list ?
   a) Deleting a node whose location is given
   b) Searching of an unsorted list for a given item
   c) Inverting a node after the node with given location
   d) Traversing a list to process each node

15) Hashing collision resolution techniques are
   a) Huffman coding, linear hashing b) Bucket addressing, Huffman coding
   c) Chaining, Huffman coding d) Chaining, Bucket addressing

16) Which of the following is the correct operator to compare two variables ?
   a) := b) equal c) == d) None of above

17) What is the return type of the function with prototype : “int func(char x, float v, double t);”
   a) char b) int c) float d) double

18) What character ends all strings ?
   a) ‘.’ b) ‘ ’ c) ‘\0’ d) ‘\n’

19) A circular queue is implemented using an array of size 10. The array index starts with 0, front is 6 and rear is 9. The insertion of next element takes place at the array index
   a) 0 b) 7 c) 9 d) 10

20) Which properly declares a variable of struct foo ?
   a) struct foo; b) foo var; c) foo; d) int foo;

_____

SLR-TJ – 354

Seat No.	

S.E. (Electrical) (Part – I) (Old) Examination, 2017
DATA STRUCTURE

Day and Date : Tuesday, 28-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) Define the Data structure. Explain its types.
   2) Explain the concept of abstract data type with example.
   3) Write a note on function and type of function.
   4) Explain stack with its basic operations.
   5) Explain any five file handling functions in C.

3. Write a program in C to implement Stack. **10**

   OR

   Explain structure and union with suitable example. State difference.

4. Write a short note (**any 2**) : **10**
   1) Malloc( ) and Calloc( ) in C.
   2) Pointers.
   3) Recursive function.

SECTION – II

5. Solve **any four** : **(5×4=20)**
   1) Explain binary search with example.
   2) Write a note on Linked list as a data structure.
   3) Write the functions in 'C' language to implement queue using array to perform following operations.
      1) Enqueue 2) Dequeue.
   4) Explain Collision in Hashing ? What is solution to avoid collision ?
   5) What is circular queue ? Explain with diagram.

Set P

6. Solve : **10**

What is Hashing function ? What are desirable properties of a good Hash function ?

OR

Explain Linear probing and Daisy chaining methods in detail.

7. Solve **any one** : **10**

1) Write a program to represent singly linked list using dynamic variables.

2) Write a note on **any one** :
   a) Selection sort.
   b) Quick sort.

SLR-TJ – 354

Seat No.	

Set Q

S.E. (Electrical) (Part – I) (Old) Examination, 2017
DATA STRUCTURE

Day and Date : Tuesday, 28-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Which of the following is the correct operator to compare two variables ?
a) := b) equal c) == d) None of above

2) What is the return type of the function with prototype : "int func(char x, float v, double t);"
a) char b) int c) float d) double

3) What character ends all strings ?
a) '.' b) ' ' c) '\0' d) '\n'

4) A circular queue is implemented using an array of size 10. The array index starts with 0, front is 6 and rear is 9. The insertion of next element takes place at the array index
a) 0 b) 7 c) 9 d) 10

5) Which properly declares a variable of struct foo ?
a) struct foo; b) foo var; c) foo; d) int foo;

6) A single character input from the keyboard can be obtained by using the function
a) printf( ) b) scanf ( ) c) putchar ( ) d) getchar ( )

7) For implementing recursive function the data structure used is
a) queue b) stack c) linked list d) tree

8) Which of the following data structure is linear data structure ?
a) Trees b) Graphs c) Arrays d) None of above

9) Direct or random access of elements is not possible in
a) Linked list b) Array c) String d) None of these

P.T.O.

10) Which header file is used for input output function ?
a) ALLOC.H b) STDLIB.H c) CONIO.H d) STDIO.H

11) Which data structure is needed to convert infix notation to postfix notation ?
a) Branch b) Queue c) Tree d) Stack

12) The function used to read a character from a file that has been opened in read mode is
a) putc b) getc c) getchar d) putchar

13) The result of evaluating the following postfix expression is
5, 7, 9, ∗, +, 4, 9, 3, /, +, –
a) 50 b) 65 c) 61 d) 69

14) An empty list is the one which has no
a) nodes b) data
c) both a) and b) above d) address

15) Which of the following types of expressions do not require precedence rules for evaluation ?
a) Fully parenthesised infix expression
b) Postfix expression
c) Partially parenthesised infix expression
d) More than one of the above

16) If the elements “A”, “B”, “C” and “D” are placed in a queue and are deleted one at a time, in what order will they be removed ?
a) ABCD b) DCBA c) DCAB d) BCAD

17) If the number of records to be sorted is small, then _____ sorting can be efficient.
a) Merge b) Heap c) Selection d) Bubble

18) The linear list of element in which delete can be done from one end and insertion can takes place only at the other end is known as
a) Queue b) Stack c) Tree d) Graph

19) Which of the following operations is performed more efficiently by doubly linked list than by singly linked list ?
a) Deleting a node whose location is given
b) Searching of an unsorted list for a given item
c) Inverting a node after the node with given location
d) Traversing a list to process each node

20) Hashing collision resolution techniques are
a) Huffman coding, linear hashing b) Bucket addressing, Huffman coding
c) Chaining, Huffman coding d) Chaining, Bucket addressing

_____

SLR-TJ – 354

Seat No.	

S.E. (Electrical) (Part – I) (Old) Examination, 2017
DATA STRUCTURE

Day and Date : Tuesday, 28-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) Define the Data structure. Explain its types.
   2) Explain the concept of abstract data type with example.
   3) Write a note on function and type of function.
   4) Explain stack with its basic operations.
   5) Explain any five file handling functions in C.

3. Write a program in C to implement Stack. **10**

   OR

   Explain structure and union with suitable example. State difference.

4. Write a short note (**any 2**) : **10**
   1) Malloc( ) and Calloc( ) in C.
   2) Pointers.
   3) Recursive function.

SECTION – II

5. Solve **any four** : **(5×4=20)**
   1) Explain binary search with example.
   2) Write a note on Linked list as a data structure.
   3) Write the functions in 'C' language to implement queue using array to perform following operations.
      1) Enqueue 2) Dequeue.
   4) Explain Collision in Hashing ? What is solution to avoid collision ?
   5) What is circular queue ? Explain with diagram.

Set Q

6. Solve : **10**

What is Hashing function ? What are desirable properties of a good Hash function ?

OR

Explain Linear probing and Daisy chaining methods in detail.

7. Solve **any one** : **10**

1) Write a program to represent singly linked list using dynamic variables.

2) Write a note on **any one** :
   a) Selection sort.
   b) Quick sort.

SLR-TJ – 354

Seat No.	

Set R

S.E. (Electrical) (Part – I) (Old) Examination, 2017
DATA STRUCTURE

Day and Date : Tuesday, 28-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) If the elements "A", "B", "C" and "D" are placed in a queue and are deleted one at a time, in what order will they be removed ?
a) ABCD b) DCBA c) DCAB d) BCAD

2) If the number of records to be sorted is small, then _____ sorting can be efficient.
a) Merge b) Heap c) Selection d) Bubble

3) The linear list of element in which delete can be done from one end and insertion can takes place only at the other end is known as
a) Queue b) Stack c) Tree d) Graph

4) Which of the following operations is performed more efficiently by doubly linked list than by singly linked list ?
a) Deleting a node whose location is given
b) Searching of an unsorted list for a given item
c) Inverting a node after the node with given location
d) Traversing a list to process each node

5) Hashing collision resolution techniques are
a) Huffman coding, linear hashing b) Bucket addressing, Huffman coding
c) Chaining, Huffman coding d) Chaining, Bucket addressing

6) Which of the following is the correct operator to compare two variables ?
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7) What is the return type of the function with prototype : "int func(char x, float v, double t);"
a) char b) int c) float d) double

P.T.O.

8) What character ends all strings ?
a) '.' b) ' ' c) '\0' d) '\n'

9) A circular queue is implemented using an array of size 10. The array index starts with 0, front is 6 and rear is 9. The insertion of next element takes place at the array index
a) 0 b) 7 c) 9 d) 10

10) Which properly declares a variable of struct foo ?
a) struct foo; b) foo var; c) foo; d) int foo;

11) A single character input from the keyboard can be obtained by using the function
a) printf( ) b) scanf ( ) c) putchar ( ) d) getchar ( )

12) For implementing recursive function the data structure used is
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13) Which of the following data structure is linear data structure ?
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14) Direct or random access of elements is not possible in
a) Linked list b) Array c) String d) None of these

15) Which header file is used for input output function ?
a) ALLOC.H b) STDLIB.H c) CONIO.H d) STDIO.H

16) Which data structure is needed to convert infix notation to postfix notation ?
a) Branch b) Queue c) Tree d) Stack

17) The function used to read a character from a file that has been opened in read mode is
a) putc b) getc c) getchar d) putchar

18) The result of evaluating the following postfix expression is
5, 7, 9, ∗, +, 4, 9, 3, /, +, –
a) 50 b) 65 c) 61 d) 69

19) An empty list is the one which has no
a) nodes b) data
c) both a) and b) above d) address

20) Which of the following types of expressions do not require precedence rules for evaluation ?
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b) Postfix expression
c) Partially parenthesised infix expression
d) More than one of the above

SLR-TJ – 354

Seat No.	

S.E. (Electrical) (Part – I) (Old) Examination, 2017
DATA STRUCTURE

Day and Date : Tuesday, 28-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) Define the Data structure. Explain its types.
   2) Explain the concept of abstract data type with example.
   3) Write a note on function and type of function.
   4) Explain stack with its basic operations.
   5) Explain any five file handling functions in C.

3. Write a program in C to implement Stack. **10**

   OR

   Explain structure and union with suitable example. State difference.

4. Write a short note (**any 2**) : **10**
   1) Malloc( ) and Calloc( ) in C.
   2) Pointers.
   3) Recursive function.

SECTION – II

5. Solve **any four** : **(5×4=20)**
   1) Explain binary search with example.
   2) Write a note on Linked list as a data structure.
   3) Write the functions in 'C' language to implement queue using array to perform following operations.
      1) Enqueue 2) Dequeue.
   4) Explain Collision in Hashing ? What is solution to avoid collision ?
   5) What is circular queue ? Explain with diagram.

Set R

6. Solve : **10**

What is Hashing function ? What are desirable properties of a good Hash function ?

OR

Explain Linear probing and Daisy chaining methods in detail.

7. Solve **any one** : **10**

1) Write a program to represent singly linked list using dynamic variables.

2) Write a note on **any one** :
   a) Selection sort.
   b) Quick sort.

SLR-TJ – 354

Seat No.	

Set S

S.E. (Electrical) (Part – I) (Old) Examination, 2017
DATA STRUCTURE

Day and Date : Tuesday, 28-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Which data structure is needed to convert infix notation to postfix notation ?
a) Branch b) Queue c) Tree d) Stack

2) The function used to read a character from a file that has been opened in read mode is
a) putc b) getc c) getchar d) putchar

3) The result of evaluating the following postfix expression is
5, 7, 9, ∗, +, 4, 9, 3, /, +, –
a) 50 b) 65 c) 61 d) 69

4) An empty list is the one which has no
a) nodes b) data
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5) Which of the following types of expressions do not require precedence rules for evaluation ?
a) Fully parenthesised infix expression
b) Postfix expression
c) Partially parenthesised infix expression
d) More than one of the above

6) If the elements "A", "B", "C" and "D" are placed in a queue and are deleted one at a time, in what order will they be removed ?
a) ABCD b) DCBA c) DCAB d) BCAD

7) If the number of records to be sorted is small, then _____ sorting can be efficient.
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8) The linear list of element in which delete can be done from one end and insertion can takes place only at the other end is known as
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11) Which of the following is the correct operator to compare two variables ?
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12) What is the return type of the function with prototype : "int func(char x, float v, double t);"
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13) What character ends all strings ?
   a) '.' b) ' ' c) '\0' d) '\n'

14) A circular queue is implemented using an array of size 10. The array index starts with 0, front is 6 and rear is 9. The insertion of next element takes place at the array index
   a) 0 b) 7 c) 9 d) 10

15) Which properly declares a variable of struct foo ?
   a) struct foo; b) foo var; c) foo; d) int foo;

16) A single character input from the keyboard can be obtained by using the function
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18) Which of the following data structure is linear data structure ?
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   a) ALLOC.H b) STDLIB.H c) CONIO.H d) STDIO.H

SLR-TJ – 354

Seat No.	

S.E. (Electrical) (Part – I) (Old) Examination, 2017
DATA STRUCTURE

Day and Date : Tuesday, 28-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) Define the Data structure. Explain its types.
   2) Explain the concept of abstract data type with example.
   3) Write a note on function and type of function.
   4) Explain stack with its basic operations.
   5) Explain any five file handling functions in C.

3. Write a program in C to implement Stack. **10**

   OR

   Explain structure and union with suitable example. State difference.

4. Write a short note (**any 2**) : **10**
   1) Malloc( ) and Calloc( ) in C.
   2) Pointers.
   3) Recursive function.

SECTION – II

5. Solve **any four** : **(5×4=20)**
   1) Explain binary search with example.
   2) Write a note on Linked list as a data structure.
   3) Write the functions in 'C' language to implement queue using array to perform following operations.
      1) Enqueue 2) Dequeue.
   4) Explain Collision in Hashing ? What is solution to avoid collision ?
   5) What is circular queue ? Explain with diagram.

Set S

6. Solve : **10**

What is Hashing function ? What are desirable properties of a good Hash function ?

OR

Explain Linear probing and Daisy chaining methods in detail.

7. Solve **any one** : **10**

1) Write a program to represent singly linked list using dynamic variables.

2) Write a note on **any one** :
   a) Selection sort.
   b) Quick sort.

SLR-TJ – 355

Seat No.	

Set P

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
NUMERICAL METHODS AND COMPUTER PROGRAMMING

Day and Date : Tuesday, 21-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

N. B. *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

3) ***Use*** *of calculator is* ***allowed****.*

4) Figures to the ***right*** *indicate* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) The order of convergence of Newton-Raphson method is
a) 1 b) 0 c) 3 d) 2

2) The positive real root of the equation $x^3 - x - 11 = 0$ lies between
a) 0 and 1 b) 2 and 3 c) 1 and 2 d) 3 and 4

3) If a function f(x) contains some other functions such as trignometric, logarithmic, exponential then f(x) = 0 is called
a) Linear equation b) Algebraic equation
c) Quadratic equation d) Transcendental equation

4) By Gauss elimination method solution of $x + y = 2$ and $2x + 3y = 5$ is
a) 0, 2 b) – 1, 3 c) 1, 1 d) – 2, 3

5) In solving simultaneous linear equations which of the following method is iterative.
a) Factorization b) Gauss-Jordan
c) Gauss-Elimination d) Gauss-Jacobi

6) If $y = x^2$, then the first divided difference of the argument 2 and 3 is
a) 3 b) 0 c) 1 d) 5

7) To fit the straight line y = mx + c to n observations the normal equations are

a) $\sum y = n\sum x + \sum cm, \sum xy = c\sum x^2 + c\sum n$

b) $\sum y = m\sum x + nc, \sum xy = m\sum x^2 + c\sum x$

c) $\sum y = c\sum x + m\sum n, \sum xy = c\sum x^2 + m\sum x$

d) None of these

8) To apply Simpson's one-third rule the number of subintervals must be

a) even b) odd c) multiple of 3 d) any

9) If I_1 and I_2 represent approximate value of $I = \int_a^b f(x)\,dx$ obtained by trapezoidal rule by taking the spacing for x as h, h/2 then by Romberg's method $I =$

a) $I_1 + \left[\frac{I_1 + I_2}{3}\right]$ b) $I_2 + \left[\frac{I_1 + I_2}{3}\right]$ c) $I_2 - \left[\frac{I_1 + I_2}{3}\right]$ d) $I_2 + \left[\frac{I_2 - I_1}{3}\right]$

10) The process of evaluating a definite integral from a set of tabulated values of f(x) is called

a) Interpolation b) Numerical differentiation

c) Numerical integration d) Extrapolation

11) LU decomposition of matrix is possible for

a) Only invertible matrix b) Only singular matrix

c) Any square matrix d) Any ordered matrix

12) The eigen value that can be obtained by using power method is

a) Largest b) Smallest c) Integer d) Complex

13) The partial differential equation $x\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ is parabolic if

a) $x > 0$ b) $x < 0$ c) $x \neq 0$ d) $x = 0$

14) Which of the following is not the method of numerical solution of ordinary differential equation ?

a) Taylors series method b) Runge-Kutta method

c) Crank-Nicolson method d) Picards method

SLR-TJ – 355

Seat No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
NUMERICAL METHODS AND COMPUTER PROGRAMMING

Day and Date : Tuesday, 21-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

N. B. : *1) Attempt **any three** questions from **each** Section.*
*2) **Use** of calculator is **allowed**.*
*3) Figures to **right** indicate **full** marks.*

SECTION – I

2. a) Evaluate $x^3 - 2x - 5 = 0$ correct to four decimal places using second method (Perform 3 iterations). **3**

b) Find root of the equation $\sin x = \frac{1}{x}$ between (1, 1.5) by using bisection method upto 3 iterations. **3**

c) Find the root of $x^4 - x = 10$ correct to four decimal places by Newton-Raphson method. **3**

3. a) Use Jacobi's method to solve system of equations **3**

$8x - 3y + 2z = 20$

$4x + 11y - z = 33$

$6x + 3y + 12z = 35$. (Perform 4 iterations)

b) Apply crouts-triangular method to solve. **6**

$x + 5y + z = 14,$

$2x + y + 3z = 13,$

$3x + y + 4z = 17.$

4. a) Fit a straight line $y = a + bx$ to following data : **3**

x :	5	10	15	20	25
y :	15	19	23	26	30

b) By using least square method fit a parabola $y = a + bx + cx^2$ to following data : **3**

x :	1	2	3	4	5
y :	5	12	26	60	97

c) Using Newtons divided difference interpolation find the missing term in the following table : **3**

x :	1	2	4	5	6
y :	14	15	5	–	9

5. a) Obtain cubic spline in the interval (2, 3) from following data : **5**

x :	1	2	3	4	5
y :	1	0	1	0	1

b) Apply Lin Bairstows method to find quadratic factor of equation $x^3 - 4x^2 + 5x - 2$. **5**

SECTION – II

6. a) Evaluate $\int_0^1 e^x$ by using Simpsons $\left(\frac{1}{3}\right)^{rd}$ and $\left(\frac{3}{8}\right)^{th}$ rule. **5**

b) Use Romberg's method to compute $\int_0^1 \frac{1}{1+x^2}\,dx$, correct to four decimal places. **5**

7. a) Find the largest eigen value and corresponding eigen vector of the matrix. **5**

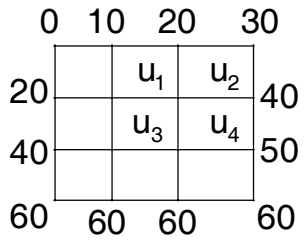
$\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$ using power method. Take $\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$ as initial eigen vector. (Perform 5 iterations)

b) Using Jacobi's method find eigen values and eigen vector of matrix

$\begin{bmatrix} 1 & \sqrt{2} & 2 \\ \sqrt{2} & 3 & \sqrt{2} \\ 2 & \sqrt{2} & 1 \end{bmatrix}$. **4**

8. a) Apply Runge Kutta method to find approximate value of $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ with $y(0) = 1$ at $x = 0.2$ take $h = 0.2$. **3**

b) Solve $u_{xx} + u_{yy} = 0$ for following square mesh with boundary conditions. **6**



9. a) Compute $\int_0^6 \frac{1}{1+x} dx$ by using trapezoidal rule. **3**

b) Use Crank-Nicolson method to solve $u_{xx} = 16\, u_t$, $0 < x < 1$, $t \geq 0$.

$u(x, 0) = 0$, $u(0, t) = 0$, $u(1, t) = 100\, t$.

Compute u for one step in t by taking $h = 1/4$. **3**

c) Find 1st and 2nd derivative of y at x = 1.1 **3**

x :	1	1.2	1.4	1.6	1.8	2
y :	0	0.128	0.544	1.296	2.432	4

Set P

SLR-TJ – 355

Seat No.	

Set Q

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
NUMERICAL METHODS AND COMPUTER PROGRAMMING

Day and Date : Tuesday, 21-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

N. B. *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

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4) Figures to the ***right*** *indicate* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) To apply Simpson's one-third rule the number of subintervals must be
   a) even b) odd c) multiple of 3 d) any

2) If I_1 and I_2 represent approximate value of $I = \int_a^b f(x)\,dx$ obtained by trapezoidal rule by taking the spacing for x as h, h/2 then by Romberg's method $I =$
   a) $I_1 + \left[\frac{I_1 + I_2}{3}\right]$ b) $I_2 + \left[\frac{I_1 + I_2}{3}\right]$ c) $I_2 - \left[\frac{I_1 + I_2}{3}\right]$ d) $I_2 + \left[\frac{I_2 - I_1}{3}\right]$

3) The process of evaluating a definite integral from a set of tabulated values of f(x) is called
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   c) Numerical integration d) Extrapolation

4) LU decomposition of matrix is possible for
   a) Only invertible matrix b) Only singular matrix
   c) Any square matrix d) Any ordered matrix

5) The eigen value that can be obtained by using power method is
   a) Largest b) Smallest c) Integer d) Complex

P.T.O.

6) The partial differential equation $x\frac{\partial^2 u}{\partial x^2}+\frac{\partial^2 u}{\partial y^2}=0$ is parabolic if

a) $x > 0$ b) $x < 0$ c) $x \neq 0$ d) $x = 0$

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a) 1 b) 0 c) 3 d) 2

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SLR-TJ – 355

Seat No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
NUMERICAL METHODS AND COMPUTER PROGRAMMING

Day and Date : Tuesday, 21-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

N. B. *: 1) Attempt **any three** questions from **each** Section.*
*2) **Use** of calculator is **allowed**.*
*3) Figures to **right** indicate **full** marks.*

SECTION – I

2. a) Evaluate $x^3 - 2x - 5 = 0$ correct to four decimal places using second method (Perform 3 iterations). **3**

b) Find root of the equation $\sin x = \frac{1}{x}$ between (1, 1.5) by using bisection method upto 3 iterations. **3**

c) Find the root of $x^4 - x = 10$ correct to four decimal places by Newton-Raphson method. **3**

3. a) Use Jacobi's method to solve system of equations **3**

$8x - 3y + 2z = 20$

$4x + 11y - z = 33$

$6x + 3y + 12z = 35$. (Perform 4 iterations)

b) Apply crouts-triangular method to solve. **6**

$x + 5y + z = 14,$

$2x + y + 3z = 13,$

$3x + y + 4z = 17.$

4. a) Fit a straight line $y = a + bx$ to following data : **3**

x :	5	10	15	20	25
y :	15	19	23	26	30

b) By using least square method fit a parabola $y = a + bx + cx^2$ to following data : **3**

x :	1	2	3	4	5
y :	5	12	26	60	97

c) Using Newtons divided difference interpolation find the missing term in the following table : **3**

x :	1	2	4	5	6
y :	14	15	5	–	9

5. a) Obtain cubic spline in the interval (2, 3) from following data : **5**

x :	1	2	3	4	5
y :	1	0	1	0	1

b) Apply Lin Bairstows method to find quadratic factor of equation $x^3 - 4x^2 + 5x - 2$. **5**

SECTION – II

6. a) Evaluate $\int_0^1 e^x$ by using Simpsons $\left(\frac{1}{3}\right)^{rd}$ and $\left(\frac{3}{8}\right)^{th}$ rule. **5**

b) Use Romberg's method to compute $\int_0^1 \frac{1}{1+x^2}\,dx$, correct to four decimal places. **5**

7. a) Find the largest eigen value and corresponding eigen vector of the matrix. **5**

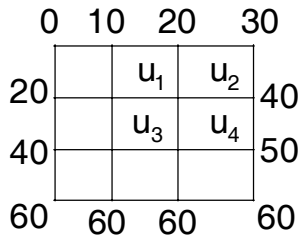
$\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$ using power method. Take $\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$ as initial eigen vector. (Perform 5 iterations)

b) Using Jacobi's method find eigen values and eigen vector of matrix

$\begin{bmatrix} 1 & \sqrt{2} & 2 \\ \sqrt{2} & 3 & \sqrt{2} \\ 2 & \sqrt{2} & 1 \end{bmatrix}$. **4**

8. a) Apply Runge Kutta method to find approximate value of $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ with $y(0) = 1$ at $x = 0.2$ take $h = 0.2$. **3**

b) Solve $u_{xx} + u_{yy} = 0$ for following square mesh with boundary conditions. **6**



9. a) Compute $\int_0^6 \frac{1}{1+x} dx$ by using trapezoidal rule. **3**

b) Use Crank-Nicolson method to solve $u_{xx} = 16\, u_t$, $0 < x < 1$, $t \geq 0$.

$u(x, 0) = 0$, $u(0, t) = 0$, $u(1, t) = 100\, t$.

Compute u for one step in t by taking $h = 1/4$. **3**

c) Find 1st and 2nd derivative of y at x = 1.1 **3**

x :	1	1.2	1.4	1.6	1.8	2
y :	0	0.128	0.544	1.296	2.432	4

Set Q

SLR-TJ – 355

Seat No.	

Set R

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
NUMERICAL METHODS AND COMPUTER PROGRAMMING

Day and Date : Tuesday, 21-11-2017 Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

N. B. *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

3) ***Use*** *of calculator is* ***allowed****.*

4) Figures to the ***right*** *indicate* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) In solving simultaneous linear equations which of the following method is iterative.
   a) Factorization b) Gauss-Jordan
   c) Gauss-Elimination d) Gauss-Jacobi

2) If $y = x^2$, then the first divided difference of the argument 2 and 3 is
   a) 3 b) 0 c) 1 d) 5

3) To fit the straight line y = mx + c to n observations the normal equations are
   a) $\sum y = n\sum x + \sum cm, \sum xy = c\sum x^2 + c\sum n$
   b) $\sum y = m\sum x + nc, \sum xy = m\sum x^2 + c\sum x$
   c) $\sum y = c\sum x + m\sum n, \sum xy = c\sum x^2 + m\sum x$
   d) None of these

4) To apply Simpson's one-third rule the number of subintervals must be
   a) even b) odd
   c) multiple of 3 d) any

P.T.O.

5) If I_1 and I_2 represent approximate value of $I = \int_a^b f(x)\,dx$ obtained by trapezoidal rule by taking the spacing for x as h, h/2 then by Romberg's method $I =$

a) $I_1 + \left[\frac{I_1 + I_2}{3}\right]$ b) $I_2 + \left[\frac{I_1 + I_2}{3}\right]$ c) $I_2 - \left[\frac{I_1 + I_2}{3}\right]$ d) $I_2 + \left[\frac{I_2 - I_1}{3}\right]$

6) The process of evaluating a definite integral from a set of tabulated values of f(x) is called
a) Interpolation b) Numerical differentiation
c) Numerical integration d) Extrapolation

7) LU decomposition of matrix is possible for
a) Only invertible matrix b) Only singular matrix
c) Any square matrix d) Any ordered matrix

8) The eigen value that can be obtained by using power method is
a) Largest b) Smallest c) Integer d) Complex

9) The partial differential equation $x\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ is parabolic if
a) $x > 0$ b) $x < 0$ c) $x \neq 0$ d) $x = 0$

10) Which of the following is not the method of numerical solution of ordinary differential equation ?
a) Taylors series method b) Runge-Kutta method
c) Crank-Nicolson method d) Picards method

11) The order of convergence of Newton-Raphson method is
a) 1 b) 0 c) 3 d) 2

12) The positive real root of the equation $x^3 - x - 11 = 0$ lies between
a) 0 and 1 b) 2 and 3 c) 1 and 2 d) 3 and 4

13) If a function f(x) contains some other functions such as trignometric, logarithmic, exponential then f(x) = 0 is called
a) Linear equation b) Algebraic equation
c) Quadratic equation d) Transcendental equation

14) By Gauss elimination method solution of x + y = 2 and 2x + 3y = 5 is
a) 0, 2 b) – 1, 3 c) 1, 1 d) – 2, 3

SLR-TJ – 355

Seat No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
NUMERICAL METHODS AND COMPUTER PROGRAMMING

Day and Date : Tuesday, 21-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

N. B. : *1) Attempt **any three** questions from **each** Section.*
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SECTION – I

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SECTION – II

6. a) Evaluate $\int_0^1 e^x$ by using Simpsons $\left(\frac{1}{3}\right)^{rd}$ and $\left(\frac{3}{8}\right)^{th}$ rule. **5**

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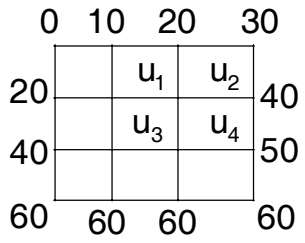

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Set R

SLR-TJ – 355

Seat No.	

Set S

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
NUMERICAL METHODS AND COMPUTER PROGRAMMING

Day and Date : Tuesday, 21-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) The process of evaluating a definite integral from a set of tabulated values of f(x) is called
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P.T.O.

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SLR-TJ – 355

Seat No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
NUMERICAL METHODS AND COMPUTER PROGRAMMING

Day and Date : Tuesday, 21-11-2017 Marks : 56
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SECTION – I

2. a) Evaluate $x^3 - 2x - 5 = 0$ correct to four decimal places using second method (Perform 3 iterations). **3**

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SECTION – II

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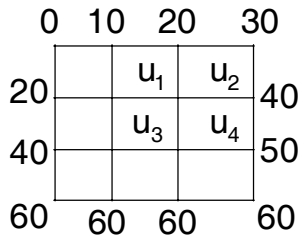

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c) Find 1st and 2nd derivative of y at x = 1.1 **3**

x :	1	1.2	1.4	1.6	1.8	2
y :	0	0.128	0.544	1.296	2.432	4

Set S

SLR-TJ – 356

Seat No.	

Set P

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELECTRICAL MACHINES – II

Day and Date : Wednesday, 22-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Multiple choice questions : **(1×14=14)**

1) An induction motor is
   a) self-starting with zero torque b) self-starting with high torque
   c) self-starting with low torque d) non-self starting

2) DOL starting of induction motor is usually restricted to
   a) low horsepower motors b) variable speed motors
   c) high horsepower motors d) high speed motors

3) The crawling occurs in the induction motor due to
   a) low supply voltage
   b) imbalance in supply voltage
   c) harmonics developed in motor
   d) can occur because of wither low voltage and imbalance in supply voltage

4) A double cage induction motor has
   a) two series windings in stator
   b) two series windings in rotor
   c) two parallel windings in rotor
   d) none of above

5) The deep bar of double cage rotor are employed to
   a) increase starting torque
   b) improve efficiency
   c) increase pull out torque
   d) reduce rotor core loss

6) The principle of operation of a 3-phase. Induction motor is most similar to that of a
   a) synchronous motor
   b) repulsion-start induction motor
   c) transformer with a shorted secondary
   d) capacitor-start, induction-run motor

7) In a 3-phase induction motor, the relative speed of stator flux with respect to _____ is zero.
   a) stator winding
   b) rotor
   c) rotor flux
   d) space

8) In a I.M. if air gap is increased _____
   a) Windage losses will be more
   b) Bearing friction will reduce
   c) Copper loss will reduce
   d) The power factor will be low

9) In split phase motor
   a) Main winding has high resistance and high reactance
   b) Main winding has low resistance and high reactance
   c) Main winding has low resistance and low reactance
   d) None of above

10) Blocked rotor test is conducted at
   a) High voltage
   b) Rated current
   c) High current
   d) Rated voltage

11) The speed of SCIM can be controlled by all of the following except
   a) Changing supply frequency
   b) Changing number of poles
   c) Changing winding resistance
   d) Reducing supply voltage

12) Short circuit test on an I.M. can not be used to determine
   a) Windage losses
   b) Cu losses
   c) Transformation ratio
   d) Power scale of circle diagram

13) The efficiency of shaded pole motor is in the range
   a) 80% to 95%
   b) 70% to 80%
   c) 50% to 70%
   d) 5% to 35%

14) Rotor rheostat control method of speed control is used for
   a) SCIM only
   b) Slip ring I.M. only
   c) Both a) and b)
   d) None of above

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Seat No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELECTRICAL MACHINES – II

Day and Date : Wednesday, 22-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**
   A) Explain how rotating magnetic field is produced when three phase supply is given to stator winding of three phase IM.
   B) In a double cage induction motor if the outer cage has an impedance at standstill of (2 + j1) ohm, determine the slip at which the two cages develop equal torques if the inner cage has an impedance of (0.5 + j 3.5) ohm at standstill.
   C) With neat sketch explain star delta starter for three phase induction motor.
   D) A three phase slip-ring induction motor gives a reading of 60V across slip rings when at rest with normal stator voltage applied. The rotor is star connected and has an impedance of (0.8 + j6) ohm per phase. Find the rotor current when the machine is
      a) at standstill with the slip-rings joined to a star connected starter with a phase impedance of (4 + j3) ohm.
      b) running normally with a 5% slip.
   E) Give the constructional details of three phase IM with suitable sketches.
   F) A 50 Hz, 8-pole, I.M. has full-load slip of 2%. The rotor resistance/phase = 0.01 ; ohm and standstill reactance/phase = 0.1 ohm. Find the ratio of maximum to full-load torque and speed at which the maximum torque occurs.

3. Solve the following : **(2×6=12)**
   A) At standstill, the equivalent resistance/phase of the inner and outer cages of a double-cage rotor as referred to stator are (0.4 + j2) and (2 + j0.4) ohm respectively. Calculate the ratio of torques produced by the two cages :
      i) at standstill
      ii) at 5% slip.

B) Determine the suitable auto transformation ratio for starting a 3ph induction motor with line current not exceeding 3 times the full load current. The short circuit current is 5 times the full load current and full load slip is 5%. Estimate the starting torque in terms of full load torque.

OR

B) With neat sketch explain :
1) DOL starter
2) Auto transformer starter.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) With neat circuit diagram and vector diagram explain capacitor start single phase I.M.

b) Explain effect of load on power factor of a 3-Ø I.M.

c) Describe any one method used for speed control of 3-Ø I.M.

d) Show that backward slip Sb = (2-S) where S is forward slip. Draw equivalent circuit of rotor.

e) Explain induction motor as an induction generator and its limitations.

5. Attempt **any two** : **(6×2=12)**

a) Explain no load and blocked rotor tests of single phase I.M. in detail.

b) The result of no load and blocked rotor test on 400 V, 36.8 KW, 50 Hz 3-Ø, 4-pole I.M. are as under, No load test : 400 V, 30 A, 1800 W.

blocked rotor test : 110 V, 80A, 4000 W. The motor has star connected stator having resistance of 0.1 Ω/phase. Draw the circle diagram and calculate :

1) Full load current
2) Full load power factor
3) Full load speed
4) Full load torque
5) Full load efficiency
6) Starting torque
7) Maximum torque
8) Maximum output power.

c) Draw equivalent circuit of single phase induction motor on double revolving field theory basis.

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Seat No.	

Set Q

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELECTRICAL MACHINES – II

Day and Date : Wednesday, 22-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Multiple choice questions : **(1×14=14)**

1) In a I.M. if air gap is increased _____
   a) Windage losses will be more b) Bearing friction will reduce
   c) Copper loss will reduce d) The power factor will be low

2) In split phase motor
   a) Main winding has high resistance and high reactance
   b) Main winding has low resistance and high reactance
   c) Main winding has low resistance and low reactance
   d) None of above

3) Blocked rotor test is conducted at
   a) High voltage b) Rated current
   c) High current d) Rated voltage

4) The speed of SCIM can be controlled by all of the following except
   a) Changing supply frequency
   b) Changing number of poles
   c) Changing winding resistance
   d) Reducing supply voltage

5) Short circuit test on an I.M. can not be used to determine
   a) Windage losses b) Cu losses
   c) Transformation ratio d) Power scale of circle diagram

6) The efficiency of shaded pole motor is in the range
   a) 80% to 95% b) 70% to 80%
   c) 50% to 70% d) 5% to 35%

P.T.O.

7) Rotor rheostat control method of speed control is used for
   a) SCIM only
   b) Slip ring I.M. only
   c) Both a) and b)
   d) None of above

8) An induction motor is
   a) self-starting with zero torque
   b) self-starting with high torque
   c) self-starting with low torque
   d) non-self starting

9) DOL starting of induction motor is usually restricted to
   a) low horsepower motors
   b) variable speed motors
   c) high horsepower motors
   d) high speed motors

10) The crawling occurs in the induction motor due to
   a) low supply voltage
   b) imbalance in supply voltage
   c) harmonics developed in motor
   d) can occur because of wither low voltage and imbalance in supply voltage

11) A double cage induction motor has
   a) two series windings in stator
   b) two series windings in rotor
   c) two parallel windings in rotor
   d) none of above

12) The deep bar of double cage rotor are employed to
   a) increase starting torque
   b) improve efficiency
   c) increase pull out torque
   d) reduce rotor core loss

13) The principle of operation of a 3-phase. Induction motor is most similar to that of a
   a) synchronous motor
   b) repulsion-start induction motor
   c) transformer with a shorted secondary
   d) capacitor-start, induction-run motor

14) In a 3-phase induction motor, the relative speed of stator flux with respect to _____ is zero.
   a) stator winding
   b) rotor
   c) rotor flux
   d) space

_____

SLR-TJ – 356

Seat No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELECTRICAL MACHINES – II

Day and Date : Wednesday, 22-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**
   A) Explain how rotating magnetic field is produced when three phase supply is given to stator winding of three phase IM.
   B) In a double cage induction motor if the outer cage has an impedance at standstill of (2 + j1) ohm, determine the slip at which the two cages develop equal torques if the inner cage has an impedance of (0.5 + j 3.5) ohm at standstill.
   C) With neat sketch explain star delta starter for three phase induction motor.
   D) A three phase slip-ring induction motor gives a reading of 60V across slip rings when at rest with normal stator voltage applied. The rotor is star connected and has an impedance of (0.8 + j6) ohm per phase. Find the rotor current when the machine is
      a) at standstill with the slip-rings joined to a star connected starter with a phase impedance of (4 + j3) ohm.
      b) running normally with a 5% slip.
   E) Give the constructional details of three phase IM with suitable sketches.
   F) A 50 Hz, 8-pole, I.M. has full-load slip of 2%. The rotor resistance/phase = 0.01 ; ohm and standstill reactance/phase = 0.1 ohm. Find the ratio of maximum to full-load torque and speed at which the maximum torque occurs.

3. Solve the following : **(2×6=12)**
   A) At standstill, the equivalent resistance/phase of the inner and outer cages of a double-cage rotor as referred to stator are (0.4 + j2) and (2 + j0.4) ohm respectively. Calculate the ratio of torques produced by the two cages :
      i) at standstill
      ii) at 5% slip.

B) Determine the suitable auto transformation ratio for starting a 3ph induction motor with line current not exceeding 3 times the full load current. The short circuit current is 5 times the full load current and full load slip is 5%. Estimate the starting torque in terms of full load torque.

OR

B) With neat sketch explain :
1) DOL starter
2) Auto transformer starter.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) With neat circuit diagram and vector diagram explain capacitor start single phase I.M.

b) Explain effect of load on power factor of a 3-Ø I.M.

c) Describe any one method used for speed control of 3-Ø I.M.

d) Show that backward slip Sb = (2-S) where S is forward slip. Draw equivalent circuit of rotor.

e) Explain induction motor as an induction generator and its limitations.

5. Attempt **any two** : **(6×2=12)**

a) Explain no load and blocked rotor tests of single phase I.M. in detail.

b) The result of no load and blocked rotor test on 400 V, 36.8 KW, 50 Hz 3-Ø, 4-pole I.M. are as under, No load test : 400 V, 30 A, 1800 W.

blocked rotor test : 110 V, 80A, 4000 W. The motor has star connected stator having resistance of 0.1 Ω/phase. Draw the circle diagram and calculate :

1) Full load current
2) Full load power factor
3) Full load speed
4) Full load torque
5) Full load efficiency
6) Starting torque
7) Maximum torque
8) Maximum output power.

c) Draw equivalent circuit of single phase induction motor on double revolving field theory basis.

SLR-TJ – 356

Seat No.	

Set R

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELECTRICAL MACHINES – II

Day and Date : Wednesday, 22-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Multiple choice questions : **(1×14=14)**

1) The deep bar of double cage rotor are employed to
   a) increase starting torque
   b) improve efficiency
   c) increase pull out torque
   d) reduce rotor core loss

2) The principle of operation of a 3-phase. Induction motor is most similar to that of a
   a) synchronous motor
   b) repulsion-start induction motor
   c) transformer with a shorted secondary
   d) capacitor-start, induction-run motor

3) In a 3-phase induction motor, the relative speed of stator flux with respect to _____ is zero.
   a) stator winding b) rotor
   c) rotor flux d) space

4) In a I.M. if air gap is increased _____
   a) Windage losses will be more
   b) Bearing friction will reduce
   c) Copper loss will reduce
   d) The power factor will be low

5) In split phase motor
   a) Main winding has high resistance and high reactance
   b) Main winding has low resistance and high reactance
   c) Main winding has low resistance and low reactance
   d) None of above

6) Blocked rotor test is conducted at
   a) High voltage
   b) Rated current
   c) High current
   d) Rated voltage

7) The speed of SCIM can be controlled by all of the following except
   a) Changing supply frequency
   b) Changing number of poles
   c) Changing winding resistance
   d) Reducing supply voltage

8) Short circuit test on an I.M. can not be used to determine
   a) Windage losses
   b) Cu losses
   c) Transformation ratio
   d) Power scale of circle diagram

9) The efficiency of shaded pole motor is in the range
   a) 80% to 95%
   b) 70% to 80%
   c) 50% to 70%
   d) 5% to 35%

10) Rotor rheostat control method of speed control is used for
   a) SCIM only
   b) Slip ring I.M. only
   c) Both a) and b)
   d) None of above

11) An induction motor is
   a) self-starting with zero torque
   b) self-starting with high torque
   c) self-starting with low torque
   d) non-self starting

12) DOL starting of induction motor is usually restricted to
   a) low horsepower motors
   b) variable speed motors
   c) high horsepower motors
   d) high speed motors

13) The crawling occurs in the induction motor due to
   a) low supply voltage
   b) imbalance in supply voltage
   c) harmonics developed in motor
   d) can occur because of wither low voltage and imbalance in supply voltage

14) A double cage induction motor has
   a) two series windings in stator
   b) two series windings in rotor
   c) two parallel windings in rotor
   d) none of above

SLR-TJ – 356

Seat No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELECTRICAL MACHINES – II

Day and Date : Wednesday, 22-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**
   A) Explain how rotating magnetic field is produced when three phase supply is given to stator winding of three phase IM.
   B) In a double cage induction motor if the outer cage has an impedance at standstill of (2 + j1) ohm, determine the slip at which the two cages develop equal torques if the inner cage has an impedance of (0.5 + j 3.5) ohm at standstill.
   C) With neat sketch explain star delta starter for three phase induction motor.
   D) A three phase slip-ring induction motor gives a reading of 60V across slip rings when at rest with normal stator voltage applied. The rotor is star connected and has an impedance of (0.8 + j6) ohm per phase. Find the rotor current when the machine is
      a) at standstill with the slip-rings joined to a star connected starter with a phase impedance of (4 + j3) ohm.
      b) running normally with a 5% slip.
   E) Give the constructional details of three phase IM with suitable sketches.
   F) A 50 Hz, 8-pole, I.M. has full-load slip of 2%. The rotor resistance/phase = 0.01 ; ohm and standstill reactance/phase = 0.1 ohm. Find the ratio of maximum to full-load torque and speed at which the maximum torque occurs.

3. Solve the following : **(2×6=12)**
   A) At standstill, the equivalent resistance/phase of the inner and outer cages of a double-cage rotor as referred to stator are (0.4 + j2) and (2 + j0.4) ohm respectively. Calculate the ratio of torques produced by the two cages :
      i) at standstill
      ii) at 5% slip.

B) Determine the suitable auto transformation ratio for starting a 3ph induction motor with line current not exceeding 3 times the full load current. The short circuit current is 5 times the full load current and full load slip is 5%. Estimate the starting torque in terms of full load torque.

OR

B) With neat sketch explain :
1) DOL starter
2) Auto transformer starter.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) With neat circuit diagram and vector diagram explain capacitor start single phase I.M.

b) Explain effect of load on power factor of a 3-Ø I.M.

c) Describe any one method used for speed control of 3-Ø I.M.

d) Show that backward slip Sb = (2-S) where S is forward slip. Draw equivalent circuit of rotor.

e) Explain induction motor as an induction generator and its limitations.

5. Attempt **any two** : **(6×2=12)**

a) Explain no load and blocked rotor tests of single phase I.M. in detail.

b) The result of no load and blocked rotor test on 400 V, 36.8 KW, 50 Hz 3-Ø, 4-pole I.M. are as under, No load test : 400 V, 30 A, 1800 W.

blocked rotor test : 110 V, 80A, 4000 W. The motor has star connected stator having resistance of 0.1 Ω/phase. Draw the circle diagram and calculate :

1) Full load current
2) Full load power factor
3) Full load speed
4) Full load torque
5) Full load efficiency
6) Starting torque
7) Maximum torque
8) Maximum output power.

c) Draw equivalent circuit of single phase induction motor on double revolving field theory basis.

SLR-TJ – 356

Seat No.	

Set S

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELECTRICAL MACHINES – II

Day and Date : Wednesday, 22-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Multiple choice questions : **(1×14=14)**

1) Blocked rotor test is conducted at
   a) High voltage b) Rated current
   c) High current d) Rated voltage

2) The speed of SCIM can be controlled by all of the following except
   a) Changing supply frequency
   b) Changing number of poles
   c) Changing winding resistance
   d) Reducing supply voltage

3) Short circuit test on an I.M. can not be used to determine
   a) Windage losses b) Cu losses
   c) Transformation ratio d) Power scale of circle diagram

4) The efficiency of shaded pole motor is in the range
   a) 80% to 95% b) 70% to 80%
   c) 50% to 70% d) 5% to 35%

5) Rotor rheostat control method of speed control is used for
   a) SCIM only b) Slip ring I.M. only
   c) Both a) and b) d) None of above

6) An induction motor is
   a) self-starting with zero torque b) self-starting with high torque
   c) self-starting with low torque d) non-self starting

7) DOL starting of induction motor is usually restricted to
   a) low horsepower motors
   b) variable speed motors
   c) high horsepower motors
   d) high speed motors

8) The crawling occurs in the induction motor due to
   a) low supply voltage
   b) imbalance in supply voltage
   c) harmonics developed in motor
   d) can occur because of wither low voltage and imbalance in supply voltage

9) A double cage induction motor has
   a) two series windings in stator
   b) two series windings in rotor
   c) two parallel windings in rotor
   d) none of above

10) The deep bar of double cage rotor are employed to
    a) increase starting torque
    b) improve efficiency
    c) increase pull out torque
    d) reduce rotor core loss

11) The principle of operation of a 3-phase. Induction motor is most similar to that of a
    a) synchronous motor
    b) repulsion-start induction motor
    c) transformer with a shorted secondary
    d) capacitor-start, induction-run motor

12) In a 3-phase induction motor, the relative speed of stator flux with respect to _____ is zero.
    a) stator winding
    b) rotor
    c) rotor flux
    d) space

13) In a I.M. if air gap is increased _____
    a) Windage losses will be more
    b) Bearing friction will reduce
    c) Copper loss will reduce
    d) The power factor will be low

14) In split phase motor
    a) Main winding has high resistance and high reactance
    b) Main winding has low resistance and high reactance
    c) Main winding has low resistance and low reactance
    d) None of above

_____

SLR-TJ – 356

Seat No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELECTRICAL MACHINES – II

Day and Date : Wednesday, 22-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**
   A) Explain how rotating magnetic field is produced when three phase supply is given to stator winding of three phase IM.
   B) In a double cage induction motor if the outer cage has an impedance at standstill of (2 + j1) ohm, determine the slip at which the two cages develop equal torques if the inner cage has an impedance of (0.5 + j 3.5) ohm at standstill.
   C) With neat sketch explain star delta starter for three phase induction motor.
   D) A three phase slip-ring induction motor gives a reading of 60V across slip rings when at rest with normal stator voltage applied. The rotor is star connected and has an impedance of (0.8 + j6) ohm per phase. Find the rotor current when the machine is
      a) at standstill with the slip-rings joined to a star connected starter with a phase impedance of (4 + j3) ohm.
      b) running normally with a 5% slip.
   E) Give the constructional details of three phase IM with suitable sketches.
   F) A 50 Hz, 8-pole, I.M. has full-load slip of 2%. The rotor resistance/phase = 0.01 ; ohm and standstill reactance/phase = 0.1 ohm. Find the ratio of maximum to full-load torque and speed at which the maximum torque occurs.

3. Solve the following : **(2×6=12)**
   A) At standstill, the equivalent resistance/phase of the inner and outer cages of a double-cage rotor as referred to stator are (0.4 + j2) and (2 + j0.4) ohm respectively. Calculate the ratio of torques produced by the two cages :
      i) at standstill
      ii) at 5% slip.

B) Determine the suitable auto transformation ratio for starting a 3ph induction motor with line current not exceeding 3 times the full load current. The short circuit current is 5 times the full load current and full load slip is 5%. Estimate the starting torque in terms of full load torque.

OR

B) With neat sketch explain :
1) DOL starter
2) Auto transformer starter.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) With neat circuit diagram and vector diagram explain capacitor start single phase I.M.

b) Explain effect of load on power factor of a 3-Ø I.M.

c) Describe any one method used for speed control of 3-Ø I.M.

d) Show that backward slip Sb = (2-S) where S is forward slip. Draw equivalent circuit of rotor.

e) Explain induction motor as an induction generator and its limitations.

5. Attempt **any two** : **(6×2=12)**

a) Explain no load and blocked rotor tests of single phase I.M. in detail.

b) The result of no load and blocked rotor test on 400 V, 36.8 KW, 50 Hz 3-Ø, 4-pole I.M. are as under, No load test : 400 V, 30 A, 1800 W.

blocked rotor test : 110 V, 80A, 4000 W. The motor has star connected stator having resistance of 0.1 Ω/phase. Draw the circle diagram and calculate :

1) Full load current
2) Full load power factor
3) Full load speed
4) Full load torque
5) Full load efficiency
6) Starting torque
7) Maximum torque
8) Maximum output power.

c) Draw equivalent circuit of single phase induction motor on double revolving field theory basis.

SLR-TJ – 357

Seat No.	

Set **P**

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELEMENTS OF POWER SYSTEM

Day and Date : Thursday, 23-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

I. Choose the correct answer : **(1×14=14)**

1) The inductance of transmission line is minimum when
   A) GMD is high
   B) GMR is high
   C) Both GMD and GMR are high
   D) GMD is low and GMR high

2) The function of steel wire in a ACSR conductor is
   A) To take care of surges
   B) To prevent corona
   C) To reduce inductance and hence improve power factor
   D) To provide additional mechanical strength

3) In high voltage transmission lines the top most conductor is
   A) Earth conductor B) Y-phase conductor
   C) B-phase conductor D) R-phase conductor

4) For 11 kV line the inductance per km per phase will be of the order of
   A) 1H B) 0.1 H C) 1 mH D) 0.1 mH

5) Which of the following protects the underground cable against mechanical injury ?
   A) Armouring B) Bedding C) Sheath D) None of these

6) The relative permittivity of rubber is in between
   A) 0.5 and 1 B) 2 and 3 C) 5 and 8 D) 10 and 15

7) Current density is constant on
   A) Feeder B) Distributor
   C) Service mains D) All of these

8) If 3000 kW power is to be transmitted over a distance of 30 km, the desirable transmission voltage will be
   A) 11 kV B) 33 kV C) 66 kV D) 132 kV

9) The permissible voltage variation in transmission and distribution system is
   A) $\pm$ 0.1% B) $\pm$ 1% C) $\pm$10% D) $\pm$ 25%

10) The voltage of transmission can be regulated by
   A) Use of tap changing transformers
   B) Switching in shunt capacitors at the receiving end during heavy loads
   C) Use of series capacitors to neutralize the effect of series reactance
   D) None of the above methods

11) The most economic voltage for transmitting given power over a known distance by overhead transmission line is approximately
   A) 3.6 kV/km B) 1.6 kV/km C) 2.6 kV/km D) 3.6 kVkm

12) String efficiency is given by
   A) (voltage across the string)/((numbers of discs on the string) × (voltage across disc nearest to the conductor))
   B) ((voltage across the string) × (numbers of discs on the string))/(voltage across disc nearest to the conductor)
   C) ((voltage across disc nearest to the conductor) × (numbers of discs on the string))/(voltage across the string)
   D) (voltage across disc nearest to the conductor)/((numbers of discs on the string) × (voltage across the string))

13) GMR is
   A) 0.7788 r B) 0.8877 r C) 7788 r D) 8877 r

14) In case the height of transmission tower is increased
   A) The line capacitance and inductance will not change
   B) The line capacitance will decrease but line inductance will decrease
   C) The line capacitance will decrease and line inductance will increase
   D) The line capacitance will decrease but line inductance will remain unaltered

SLR-TJ – 357

Seat No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELEMENTS OF POWER SYSTEM

Day and Date : Thursday, 23-11-2017 Max. Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

II. Attempt **any four**. **(4×4=16)**

1) State and explain Kelvin's law.
2) Explain phenomenon of corona. Write advantages and disadvantages.
3) Define string efficiency. Explain methods of improving string efficiency.
4) A d.c. 3-wire system is to be converted into a 3-phase, 4-wire system by adding a fourth wire equal in X-section to each outer of the d.c. system. If the percentage power loss and voltage at the consumer's terminals are to be the same in the two cases, find the extra power at unity power factor that can be supplied by the a.c. system. Assume loads to be balanced.
5) Draw and explain the construction of cable with all layers.

III. Attempt **any two**. **(6×2=12)**

1) What is meant by sag ? Derive an expression for sag in a transmission line having equal level of supports and unequal level of supports.
2) A 2-wire feeder carries a constant current of 250 A throughout the year. The portion of capital cost which is proportional to area of X-section is Rs. 5 per kg of copper conductor. The interest and depreciation total 10% per annum and the cost of energy is 5P per kWh. Find the most economical area of X-section of the conductor. Given that the density of copper is 8.93 gm/cm^3 and its specific resistance is $1.73 \times 10^{-8}\ \Omega$ m.
3) In a 33 kV overhead line, there are three units in the string of insulators. If the capacitance between each insulator pin and earth is 11% of self-capacitance of each insulator, find (i) the distribution of voltage over 3 insulators and (ii) string efficiency.

IV. Attempt **any four**. **(4×4=16)**

1) Derive an expression for voltage regulation and efficiency of Medium transmission line consider end condenser along with the equivalent circuit and phasor diagram.
2) Derive the generalized circuit constants for medium line using nominal T-method.
3) Explain belted cables and screened cables.
4) Explain the concept of self GMD and Mutual GMD.
5) Draw and describe the uniformly loaded distributor fed at one end in DC system with a point of minimum potential, maximum and minimum voltage drops.

V. Attempt **any two**. **(6×2=12)**

1) Derive an expression for voltage regulation and efficiency of Medium transmission line consider nominal π method along with the equivalent circuit and phasor diagram.
2) Derive the expression for inductance of 1-ph two wire line.
3) A 3-phase, 50-Hz overhead transmission line 100 km long has the following constants :

   Resistance/km/phase = 0.1 Ω

   Inductive reactance/km/phase = 0.2 Ω

   Capacitive susceptance/km/phase = 0.04×10^{-4} siemen.

   Determine :

   i) The sending end current
   ii) Sending end voltage
   iii) Sending end power factor and
   iv) Transmission efficiency when supplying a balanced load of 10000 kW at 66 kV, p.f.0.8 lagging. Use nominal T-method.

SLR-TJ – 357

Seat No.	

Set **Q**

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELEMENTS OF POWER SYSTEM

Day and Date : Thursday, 23-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

I. Choose the correct answer : **(1×14=14)**

1) If 3000 kW power is to be transmitted over a distance of 30 km, the desirable transmission voltage will be
   A) 11 kV B) 33 kV C) 66 kV D) 132 kV

2) The permissible voltage variation in transmission and distribution system is
   A) $\pm$ 0.1% B) $\pm$ 1% C) $\pm$ 10% D) $\pm$ 25%

3) The voltage of transmission can be regulated by
   A) Use of tap changing transformers
   B) Switching in shunt capacitors at the receiving end during heavy loads
   C) Use of series capacitors to neutralize the effect of series reactance
   D) None of the above methods

4) The most economic voltage for transmitting given power over a known distance by overhead transmission line is approximately
   A) 3.6 kV/km B) 1.6 kV/km C) 2.6 kV/km D) 3.6 kVkm

5) String efficiency is given by
   A) (voltage across the string)/((numbers of discs on the string) × (voltage across disc nearest to the conductor))
   B) ((voltage across the string) × (numbers of discs on the string))/(voltage across disc nearest to the conductor)
   C) ((voltage across disc nearest to the conductor) × (numbers of discs on the string))/(voltage across the string)
   D) (voltage across disc nearest to the conductor)/((numbers of discs on the string) × (voltage across the string))

6) GMR is
   A) 0.7788 r B) 0.8877 r C) 7788 r D) 8877 r

7) In case the height of transmission tower is increased
   A) The line capacitance and inductance will not change
   B) The line capacitance will decrease but line inductance will decrease
   C) The line capacitance will decrease and line inductance will increase
   D) The line capacitance will decrease but line inductance will remain unaltered

8) The inductance of transmission line is minimum when
   A) GMD is high
   B) GMR is high
   C) Both GMD and GMR are high
   D) GMD is low and GMR high

9) The function of steel wire in a ACSR conductor is
   A) To take care of surges
   B) To prevent corona
   C) To reduce inductance and hence improve power factor
   D) To provide additional mechanical strength

10) In high voltage transmission lines the top most conductor is
   A) Earth conductor B) Y-phase conductor
   C) B-phase conductor D) R-phase conductor

11) For 11 kV line the inductance per km per phase will be of the order of
   A) 1H B) 0.1 H C) 1 mH D) 0.1 mH

12) Which of the following protects the underground cable against mechanical injury ?
   A) Armouring B) Bedding C) Sheath D) None of these

13) The relative permittivity of rubber is in between
   A) 0.5 and 1 B) 2 and 3 C) 5 and 8 D) 10 and 15

14) Current density is constant on
   A) Feeder B) Distributor
   C) Service mains D) All of these

Seat No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELEMENTS OF POWER SYSTEM

Day and Date : Thursday, 23-11-2017 Max. Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

II. Attempt **any four**. **(4×4=16)**

1) State and explain Kelvin's law.
2) Explain phenomenon of corona. Write advantages and disadvantages.
3) Define string efficiency. Explain methods of improving string efficiency.
4) A d.c. 3-wire system is to be converted into a 3-phase, 4-wire system by adding a fourth wire equal in X-section to each outer of the d.c. system. If the percentage power loss and voltage at the consumer's terminals are to be the same in the two cases, find the extra power at unity power factor that can be supplied by the a.c. system. Assume loads to be balanced.
5) Draw and explain the construction of cable with all layers.

III. Attempt **any two**. **(6×2=12)**

1) What is meant by sag ? Derive an expression for sag in a transmission line having equal level of supports and unequal level of supports.
2) A 2-wire feeder carries a constant current of 250 A throughout the year. The portion of capital cost which is proportional to area of X-section is Rs. 5 per kg of copper conductor. The interest and depreciation total 10% per annum and the cost of energy is 5P per kWh. Find the most economical area of X-section of the conductor. Given that the density of copper is 8.93 gm/cm^3 and its specific resistance is $1.73 \times 10^{-8}\ \Omega$ m.
3) In a 33 kV overhead line, there are three units in the string of insulators. If the capacitance between each insulator pin and earth is 11% of self-capacitance of each insulator, find (i) the distribution of voltage over 3 insulators and (ii) string efficiency.

IV. Attempt **any four**. **(4×4=16)**

1) Derive an expression for voltage regulation and efficiency of Medium transmission line consider end condenser along with the equivalent circuit and phasor diagram.
2) Derive the generalized circuit constants for medium line using nominal T-method.
3) Explain belted cables and screened cables.
4) Explain the concept of self GMD and Mutual GMD.
5) Draw and describe the uniformly loaded distributor fed at one end in DC system with a point of minimum potential, maximum and minimum voltage drops.

V. Attempt **any two**. **(6×2=12)**

1) Derive an expression for voltage regulation and efficiency of Medium transmission line consider nominal π method along with the equivalent circuit and phasor diagram.
2) Derive the expression for inductance of 1-ph two wire line.
3) A 3-phase, 50-Hz overhead transmission line 100 km long has the following constants :

   Resistance/km/phase = 0.1 Ω

   Inductive reactance/km/phase = 0.2 Ω

   Capacitive susceptance/km/phase = 0.04×10^{-4} siemen.

   Determine :

   i) The sending end current
   ii) Sending end voltage
   iii) Sending end power factor and
   iv) Transmission efficiency when supplying a balanced load of 10000 kW at 66 kV, p.f.0.8 lagging. Use nominal T-method.

SLR-TJ – 357

Seat No.	

Set **R**

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELEMENTS OF POWER SYSTEM

Day and Date : Thursday, 23-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

I. Choose the correct answer : **(1×14=14)**

1) Which of the following protects the underground cable against mechanical injury ?
   A) Armouring B) Bedding C) Sheath D) None of these

2) The relative permittivity of rubber is in between
   A) 0.5 and 1 B) 2 and 3 C) 5 and 8 D) 10 and 15

3) Current density is constant on
   A) Feeder B) Distributor
   C) Service mains D) All of these

4) If 3000 kW power is to be transmitted over a distance of 30 km, the desirable transmission voltage will be
   A) 11 kV B) 33 kV C) 66 kV D) 132 kV

5) The permissible voltage variation in transmission and distribution system is
   A) $\pm$ 0.1% B) $\pm$ 1% C) $\pm$ 10% D) $\pm$ 25%

6) The voltage of transmission can be regulated by
   A) Use of tap changing transformers
   B) Switching in shunt capacitors at the receiving end during heavy loads
   C) Use of series capacitors to neutralize the effect of series reactance
   D) None of the above methods

7) The most economic voltage for transmitting given power over a known distance by overhead transmission line is approximately
   A) 3.6 kV/km B) 1.6 kV/km C) 2.6 kV/km D) 3.6 kVkm

8) String efficiency is given by
   A) (voltage across the string)/((numbers of discs on the string) × (voltage across disc nearest to the conductor))
   B) ((voltage across the string) × (numbers of discs on the string))/(voltage across disc nearest to the conductor)
   C) ((voltage across disc nearest to the conductor) × (numbers of discs on the string))/(voltage across the string)
   D) (voltage across disc nearest to the conductor)/((numbers of discs on the string) × (voltage across the string))

9) GMR is
   A) 0.7788 r B) 0.8877 r C) 7788 r D) 8877 r

10) In case the height of transmission tower is increased
   A) The line capacitance and inductance will not change
   B) The line capacitance will decrease but line inductance will decrease
   C) The line capacitance will decrease and line inductance will increase
   D) The line capacitance will decrease but line inductance will remain unaltered

11) The inductance of transmission line is minimum when
   A) GMD is high
   B) GMR is high
   C) Both GMD and GMR are high
   D) GMD is low and GMR high

12) The function of steel wire in a ACSR conductor is
   A) To take care of surges
   B) To prevent corona
   C) To reduce inductance and hence improve power factor
   D) To provide additional mechanical strength

13) In high voltage transmission lines the top most conductor is
   A) Earth conductor B) Y-phase conductor
   C) B-phase conductor D) R-phase conductor

14) For 11 kV line the inductance per km per phase will be of the order of
   A) 1H B) 0.1 H C) 1 mH D) 0.1 mH

Seat No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELEMENTS OF POWER SYSTEM

Day and Date : Thursday, 23-11-2017 Max. Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

II. Attempt **any four**. **(4×4=16)**

1) State and explain Kelvin's law.
2) Explain phenomenon of corona. Write advantages and disadvantages.
3) Define string efficiency. Explain methods of improving string efficiency.
4) A d.c. 3-wire system is to be converted into a 3-phase, 4-wire system by adding a fourth wire equal in X-section to each outer of the d.c. system. If the percentage power loss and voltage at the consumer's terminals are to be the same in the two cases, find the extra power at unity power factor that can be supplied by the a.c. system. Assume loads to be balanced.
5) Draw and explain the construction of cable with all layers.

III. Attempt **any two**. **(6×2=12)**

1) What is meant by sag ? Derive an expression for sag in a transmission line having equal level of supports and unequal level of supports.
2) A 2-wire feeder carries a constant current of 250 A throughout the year. The portion of capital cost which is proportional to area of X-section is Rs. 5 per kg of copper conductor. The interest and depreciation total 10% per annum and the cost of energy is 5P per kWh. Find the most economical area of X-section of the conductor. Given that the density of copper is 8.93 gm/cm^3 and its specific resistance is $1.73 \times 10^{-8}\ \Omega$ m.
3) In a 33 kV overhead line, there are three units in the string of insulators. If the capacitance between each insulator pin and earth is 11% of self-capacitance of each insulator, find (i) the distribution of voltage over 3 insulators and (ii) string efficiency.

IV. Attempt **any four**. **(4×4=16)**

1) Derive an expression for voltage regulation and efficiency of Medium transmission line consider end condenser along with the equivalent circuit and phasor diagram.
2) Derive the generalized circuit constants for medium line using nominal T-method.
3) Explain belted cables and screened cables.
4) Explain the concept of self GMD and Mutual GMD.
5) Draw and describe the uniformly loaded distributor fed at one end in DC system with a point of minimum potential, maximum and minimum voltage drops.

V. Attempt **any two**. **(6×2=12)**

1) Derive an expression for voltage regulation and efficiency of Medium transmission line consider nominal π method along with the equivalent circuit and phasor diagram.
2) Derive the expression for inductance of 1-ph two wire line.
3) A 3-phase, 50-Hz overhead transmission line 100 km long has the following constants :

   Resistance/km/phase = 0.1 Ω

   Inductive reactance/km/phase = 0.2 Ω

   Capacitive susceptance/km/phase = 0.04×10^{-4} siemen.

   Determine :

   i) The sending end current
   ii) Sending end voltage
   iii) Sending end power factor and
   iv) Transmission efficiency when supplying a balanced load of 10000 kW at 66 kV, p.f.0.8 lagging. Use nominal T-method.

SLR-TJ – 357

Seat No.	

Set **S**

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELEMENTS OF POWER SYSTEM

Day and Date : Thursday, 23-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

I. Choose the correct answer : **(1×14=14)**

1) The voltage of transmission can be regulated by
   A) Use of tap changing transformers
   B) Switching in shunt capacitors at the receiving end during heavy loads
   C) Use of series capacitors to neutralize the effect of series reactance
   D) None of the above methods

2) The most economic voltage for transmitting given power over a known distance by overhead transmission line is approximately
   A) 3.6 kV/km B) 1.6 kV/km C) 2.6 kV/km D) 3.6 kVkm

3) String efficiency is given by
   A) (voltage across the string)/((numbers of discs on the string) × (voltage across disc nearest to the conductor))
   B) ((voltage across the string) × (numbers of discs on the string))/(voltage across disc nearest to the conductor)
   C) ((voltage across disc nearest to the conductor) × (numbers of discs on the string))/(voltage across the string)
   D) (voltage across disc nearest to the conductor)/((numbers of discs on the string) × (voltage across the string))

4) GMR is
   A) 0.7788 r B) 0.8877 r C) 7788 r D) 8877 r

5) In case the height of transmission tower is increased
   A) The line capacitance and inductance will not change
   B) The line capacitance will decrease but line inductance will decrease
   C) The line capacitance will decrease and line inductance will increase
   D) The line capacitance will decrease but line inductance will remain unaltered

6) The inductance of transmission line is minimum when
   A) GMD is high
   B) GMR is high
   C) Both GMD and GMR are high
   D) GMD is low and GMR high

7) The function of steel wire in a ACSR conductor is
   A) To take care of surges
   B) To prevent corona
   C) To reduce inductance and hence improve power factor
   D) To provide additional mechanical strength

8) In high voltage transmission lines the top most conductor is
   A) Earth conductor B) Y-phase conductor
   C) B-phase conductor D) R-phase conductor

9) For 11 kV line the inductance per km per phase will be of the order of
   A) 1H B) 0.1 H C) 1 mH D) 0.1 mH

10) Which of the following protects the underground cable against mechanical injury ?
   A) Armouring B) Bedding C) Sheath D) None of these

11) The relative permittivity of rubber is in between
   A) 0.5 and 1 B) 2 and 3 C) 5 and 8 D) 10 and 15

12) Current density is constant on
   A) Feeder B) Distributor
   C) Service mains D) All of these

13) If 3000 kW power is to be transmitted over a distance of 30 km, the desirable transmission voltage will be
   A) 11 kV B) 33 kV C) 66 kV D) 132 kV

14) The permissible voltage variation in transmission and distribution system is
   A) $\pm$ 0.1% B) $\pm$ 1% C) $\pm$10% D) $\pm$ 25%

Seat No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELEMENTS OF POWER SYSTEM

Day and Date : Thursday, 23-11-2017 Max. Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

II. Attempt **any four**. **(4×4=16)**

1) State and explain Kelvin's law.
2) Explain phenomenon of corona. Write advantages and disadvantages.
3) Define string efficiency. Explain methods of improving string efficiency.
4) A d.c. 3-wire system is to be converted into a 3-phase, 4-wire system by adding a fourth wire equal in X-section to each outer of the d.c. system. If the percentage power loss and voltage at the consumer's terminals are to be the same in the two cases, find the extra power at unity power factor that can be supplied by the a.c. system. Assume loads to be balanced.
5) Draw and explain the construction of cable with all layers.

III. Attempt **any two**. **(6×2=12)**

1) What is meant by sag ? Derive an expression for sag in a transmission line having equal level of supports and unequal level of supports.
2) A 2-wire feeder carries a constant current of 250 A throughout the year. The portion of capital cost which is proportional to area of X-section is Rs. 5 per kg of copper conductor. The interest and depreciation total 10% per annum and the cost of energy is 5P per kWh. Find the most economical area of X-section of the conductor. Given that the density of copper is 8.93 gm/cm^3 and its specific resistance is $1.73 \times 10^{-8}\ \Omega$ m.
3) In a 33 kV overhead line, there are three units in the string of insulators. If the capacitance between each insulator pin and earth is 11% of self-capacitance of each insulator, find (i) the distribution of voltage over 3 insulators and (ii) string efficiency.

IV. Attempt **any four**. **(4×4=16)**

1) Derive an expression for voltage regulation and efficiency of Medium transmission line consider end condenser along with the equivalent circuit and phasor diagram.
2) Derive the generalized circuit constants for medium line using nominal T-method.
3) Explain belted cables and screened cables.
4) Explain the concept of self GMD and Mutual GMD.
5) Draw and describe the uniformly loaded distributor fed at one end in DC system with a point of minimum potential, maximum and minimum voltage drops.

V. Attempt **any two**. **(6×2=12)**

1) Derive an expression for voltage regulation and efficiency of Medium transmission line consider nominal π method along with the equivalent circuit and phasor diagram.
2) Derive the expression for inductance of 1-ph two wire line.
3) A 3-phase, 50-Hz overhead transmission line 100 km long has the following constants :

   Resistance/km/phase = 0.1 Ω

   Inductive reactance/km/phase = 0.2 Ω

   Capacitive susceptance/km/phase = 0.04×10^{-4} siemen.

   Determine :

   i) The sending end current
   ii) Sending end voltage
   iii) Sending end power factor and
   iv) Transmission efficiency when supplying a balanced load of 10000 kW at 66 kV, p.f.0.8 lagging. Use nominal T-method.

SLR-TJ – 358

Seat No.	

Set P

S.E. (Electrical Engg.) (Part – II) (CGPA) Examination, 2017
ANALOG AND DIGITAL INTEGRATED CIRCUITS

Day and Date : Friday, 24-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book on Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Figure to ***right*** *indicate* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

SECTION – I

1. Choose the correct answer : **(7×1=7)**

1) When a step input is given to an op-amp integrator, the output will be
a) A ramp b) A rectangular wave
c) Sinusoidal wave d) Triangular wave with Dc bias

2) A Non inverting closed loop op amp circuit generally has a gain factor.
a) Less than one b) Greater than one
c) Zero d) Equal to one

3) If ground is applied to the (+) terminal of an inverting op-amp the (–) terminal will
a) Not need an input resistor b) Have high reverse current
c) Be virtual ground d) Not invert the signal

4) The ideal op-amp has
a) Ri = ∞, A = ∞, Ro = 0 b) Ri = 0, A = ∞, Ro = 0
c) Ri = ∞, A = ∞, Ro = ∞ d) Ri = 0, A = ∞, Ro = ∞

5) How many op-amp are required for implantation of equation Vo = Vi ?
a) 4 b) 3 c) 2 d) 1

6) A Voltage follower
a) Has unity gain of 1 b) Has no feedback resistor
c) Is non inverting d) All of these

P.T.O.

7) A differential amplifier
   a) Is part of an op-amp
   b) Has one input and one output
   c) Has two outputs
   d) Both a) and c)

SECTION – II

(7×1=7)

8) The BCD counter is also called as _____ counter.
   a) Binary
   b) Decade
   c) Full modulus
   d) Divide by 10

9) The logic gate which produces a zero output when one or both of the inputs are one is called _____ gate.
   a) AND
   b) OR
   c) NAND
   d) NOR

10) The one's complement of 10111001 is
   a) 01000111
   b) 01000110
   c) 11000110
   d) 10101010

11) The output of combinational circuit depends upon
   a) Present input only
   b) Past input only
   c) Both present and past inputs
   d) None of these

12) If two J-K flip flop are connected and held as a single input, then circuit is
   a) S-R flip flop
   b) T flip flop
   c) D flip flop
   d) Not a flip flop

13) A Modulus 2 Johnson counter requires minimum of
   a) 10 flip flop
   b) 6 flip flop
   c) 12 flip flop
   d) 2 flip flop

14) A digital circuit that can count clock pulse is called as
   a) Latch
   b) Counter
   c) Shift register
   d) Trigger

_____

SLR-TJ – 358

Seat No.	

S.E. (Electrical Engg.) (Part – II) (CGPA) Examination, 2017
ANALOG AND DIGITAL INTEGRATED CIRCUITS

Day and Date : Friday, 24-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figure to ***right*** *indicate* ***full*** *marks.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Draw and explain block diagram of operational amplifier.
   2) With neat circuit diagram explain working of subtractor.
   3) Determine the output voltage for non-inverting amplifier using 741, Rf = 10 KΩ , R = 1KΩ and input supplied 10 mV and 3 V, also comment on the output.
   4) Explain DC analysis of differential amplifier (DIBO).
   5) Draw and explain instrumentation amplifier.

3. Solve **any two** : **(2×6=12)**
   1) Derive voltage gain, input resistance and output resistance for voltage shunt feedback op-amp.
   2) Explain working of Practical Integrator with frequency response.
   3) The IC 741 having following parameters is connected as non inverting amplifier with R_1 = 1 kΩ and R_F = 10 KΩ A = 200000, Ri = 2 MΩ , Ro = 75 Ω , fo = 5 Hz, Supply voltage = + – 15 V, Output voltage swing = + – 13 V. Compute the values of A_F, Ri_F, Ro_F, f_F and V_{OOT}.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Implement the following using NOR gate ΠM (1, 3, 7, 11, 15) d (0, 2, 5).

   2) Obtain canonical sum of product form of the equation Y(A, B) = A + B.

   3) Explain 4 bit ring counter.

   4) With truth table explain operation of SR flip flop.

   5) Implement following using 4 : 1 MUX f(P, Q, R) = $\sum$ m (1, 3, 5, 6).

5. Solve **any two** : **(2×6=12)**

   1) Explain multiplexing and demultiplexing. Name the IC that are used as multiplexer and demultiplexer. Obtain an XOR gate using 2 : 1 multiplexer.

   2) Design 2 bit synchronous counter using T flip flop.

   3) Explain operation of JK flip flop and How race around condition can be eliminated.

SLR-TJ – 358

Seat No.	

Set Q

S.E. (Electrical Engg.) (Part – II) (CGPA) Examination, 2017
ANALOG AND DIGITAL INTEGRATED CIRCUITS

Day and Date : Friday, 24-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book on Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Figure to ***right*** *indicate* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

SECTION – I

1. Choose the correct answer : **(7×1=7)**

1) The ideal op-amp has
a) Ri = ∞, A = ∞, Ro = 0 b) Ri = 0, A = ∞, Ro = 0
c) Ri = ∞, A = ∞, Ro = ∞ d) Ri = 0, A = ∞, Ro = ∞

2) How many op-amp are required for implantation of equation Vo = Vi ?
a) 4 b) 3 c) 2 d) 1

3) A Voltage follower
a) Has unity gain of 1 b) Has no feedback resistor
c) Is non inverting d) All of these

4) A differential amplifier
a) Is part of an op-amp b) Has one input and one output
c) Has two outputs d) Both a) and c)

5) When a step input is given to an op-amp integrator, the output will be
a) A ramp b) A rectangular wave
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6) A Non inverting closed loop op amp circuit generally has a gain factor.
a) Less than one b) Greater than one
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7) If ground is applied to the (+) terminal of an inverting op-amp the (–) terminal will
   a) Not need an input resistor
   b) Have high reverse current
   c) Be virtual ground
   d) Not invert the signal

SECTION – II

(7×1=7)

8) If two J-K flip flop are connected and held as a single input, then circuit is
   a) S-R flip flop
   b) T flip flop
   c) D flip flop
   d) Not a flip flop

9) A Modulus 2 Johnson counter requires minimum of
   a) 10 flip flop
   b) 6 flip flop
   c) 12 flip flop
   d) 2 flip flop

10) A digital circuit that can count clock pulse is called as
   a) Latch
   b) Counter
   c) Shift register
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11) The BCD counter is also called as _____ counter.
   a) Binary
   b) Decade
   c) Full modulus
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12) The logic gate which produces a zero output when one or both of the inputs are one is called _____ gate.
   a) AND
   b) OR
   c) NAND
   d) NOR

13) The one's complement of 10111001 is
   a) 01000111
   b) 01000110
   c) 11000110
   d) 10101010

14) The output of combinational circuit depends upon
   a) Present input only
   b) Past input only
   c) Both present and past inputs
   d) None of these

_____

SLR-TJ – 358

Seat No.	

S.E. (Electrical Engg.) (Part – II) (CGPA) Examination, 2017
ANALOG AND DIGITAL INTEGRATED CIRCUITS

Day and Date : Friday, 24-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figure to ***right*** *indicate* ***full*** *marks.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Draw and explain block diagram of operational amplifier.
   2) With neat circuit diagram explain working of subtractor.
   3) Determine the output voltage for non-inverting amplifier using 741, Rf = 10 KΩ , R = 1KΩ and input supplied 10 mV and 3 V, also comment on the output.
   4) Explain DC analysis of differential amplifier (DIBO).
   5) Draw and explain instrumentation amplifier.

3. Solve **any two** : **(2×6=12)**
   1) Derive voltage gain, input resistance and output resistance for voltage shunt feedback op-amp.
   2) Explain working of Practical Integrator with frequency response.
   3) The IC 741 having following parameters is connected as non inverting amplifier with R_1 = 1 kΩ and R_F = 10 KΩ A = 200000, Ri = 2 MΩ , Ro = 75 Ω , fo = 5 Hz, Supply voltage = + – 15 V, Output voltage swing = + – 13 V. Compute the values of A_F, Ri_F, Ro_F, f_F and V_{OOT}.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Implement the following using NOR gate ΠM (1, 3, 7, 11, 15) d (0, 2, 5).

   2) Obtain canonical sum of product form of the equation Y(A, B) = A + B.

   3) Explain 4 bit ring counter.

   4) With truth table explain operation of SR flip flop.

   5) Implement following using 4 : 1 MUX f(P, Q, R) = $\sum$ m (1, 3, 5, 6).

5. Solve **any two** : **(2×6=12)**

   1) Explain multiplexing and demultiplexing. Name the IC that are used as multiplexer and demultiplexer. Obtain an XOR gate using 2 : 1 multiplexer.

   2) Design 2 bit synchronous counter using T flip flop.

   3) Explain operation of JK flip flop and How race around condition can be eliminated.

SLR-TJ – 358

Seat No.	

Set R

S.E. (Electrical Engg.) (Part – II) (CGPA) Examination, 2017
ANALOG AND DIGITAL INTEGRATED CIRCUITS

Day and Date : Friday, 24-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book on Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Figure to ***right*** *indicate* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

SECTION – I

1. Choose the correct answer : **(7×1=7)**

1) A Voltage follower
   a) Has unity gain of 1 b) Has no feedback resistor
   c) Is non inverting d) All of these

2) A differential amplifier
   a) Is part of an op-amp b) Has one input and one output
   c) Has two outputs d) Both a) and c)

3) When a step input is given to an op-amp integrator, the output will be
   a) A ramp b) A rectangular wave
   c) Sinusoidal wave d) Triangular wave with Dc bias

4) A Non inverting closed loop op amp circuit generally has a gain factor.
   a) Less than one b) Greater than one
   c) Zero d) Equal to one

5) If ground is applied to the (+) terminal of an inverting op-amp the (–) terminal will
   a) Not need an input resistor b) Have high reverse current
   c) Be virtual ground d) Not invert the signal

6) The ideal op-amp has
   a) Ri = ∞, A = ∞, Ro = 0
   b) Ri = 0, A = ∞, Ro = 0
   c) Ri = ∞, A = ∞, Ro = ∞
   d) Ri = 0, A = ∞, Ro = ∞

7) How many op-amp are required for implantation of equation Vo = Vi ?
   a) 4
   b) 3
   c) 2
   d) 1

SECTION – II

(7×1=7)

8) The output of combinational circuit depends upon
   a) Present input only
   b) Past input only
   c) Both present and past inputs
   d) None of these

9) If two J-K flip flop are connected and held as a single input, then circuit is
   a) S-R flip flop
   b) T flip flop
   c) D flip flop
   d) Not a flip flop

10) A Modulus 2 Johnson counter requires minimum of
   a) 10 flip flop
   b) 6 flip flop
   c) 12 flip flop
   d) 2 flip flop

11) A digital circuit that can count clock pulse is called as
   a) Latch
   b) Counter
   c) Shift register
   d) Trigger

12) The BCD counter is also called as _____ counter.
   a) Binary
   b) Decade
   c) Full modulus
   d) Divide by 10

13) The logic gate which produces a zero output when one or both of the inputs are one is called _____ gate.
   a) AND
   b) OR
   c) NAND
   d) NOR

14) The one's complement of 10111001 is
   a) 01000111
   b) 01000110
   c) 11000110
   d) 10101010

SLR-TJ – 358

Seat No.	

S.E. (Electrical Engg.) (Part – II) (CGPA) Examination, 2017
ANALOG AND DIGITAL INTEGRATED CIRCUITS

Day and Date : Friday, 24-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figure to ***right*** *indicate* ***full*** *marks.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Draw and explain block diagram of operational amplifier.
   2) With neat circuit diagram explain working of subtractor.
   3) Determine the output voltage for non-inverting amplifier using 741, Rf = 10 KΩ , R = 1KΩ and input supplied 10 mV and 3 V, also comment on the output.
   4) Explain DC analysis of differential amplifier (DIBO).
   5) Draw and explain instrumentation amplifier.

3. Solve **any two** : **(2×6=12)**
   1) Derive voltage gain, input resistance and output resistance for voltage shunt feedback op-amp.
   2) Explain working of Practical Integrator with frequency response.
   3) The IC 741 having following parameters is connected as non inverting amplifier with R_1 = 1 kΩ and R_F = 10 KΩ A = 200000, Ri = 2 MΩ , Ro = 75 Ω , fo = 5 Hz, Supply voltage = + – 15 V, Output voltage swing = + – 13 V. Compute the values of A_F, Ri_F, Ro_F, f_F and V_{OOT}.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Implement the following using NOR gate ΠM (1, 3, 7, 11, 15) d (0, 2, 5).

   2) Obtain canonical sum of product form of the equation Y(A, B) = A + B.

   3) Explain 4 bit ring counter.

   4) With truth table explain operation of SR flip flop.

   5) Implement following using 4 : 1 MUX f(P, Q, R) = $\sum$ m (1, 3, 5, 6).

5. Solve **any two** : **(2×6=12)**

   1) Explain multiplexing and demultiplexing. Name the IC that are used as multiplexer and demultiplexer. Obtain an XOR gate using 2 : 1 multiplexer.

   2) Design 2 bit synchronous counter using T flip flop.

   3) Explain operation of JK flip flop and How race around condition can be eliminated.

SLR-TJ – 358

Seat No.	

Set S

S.E. (Electrical Engg.) (Part – II) (CGPA) Examination, 2017
ANALOG AND DIGITAL INTEGRATED CIRCUITS

Day and Date : Friday, 24-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book on Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

SECTION – I

1. Choose the correct answer : **(7×1=7)**

1) How many op-amp are required for implantation of equation Vo = Vi ?
a) 4 b) 3 c) 2 d) 1

2) A Voltage follower
a) Has unity gain of 1 b) Has no feedback resistor
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a) Is part of an op-amp b) Has one input and one output
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6) If ground is applied to the (+) terminal of an inverting op-amp the (–) terminal will
a) Not need an input resistor b) Have high reverse current
c) Be virtual ground d) Not invert the signal

P.T.O.

7) The ideal op-amp has
   a) Ri = ∞, A = ∞, Ro = 0
   b) Ri = 0, A = ∞, Ro = 0
   c) Ri = ∞, A = ∞, Ro = ∞
   d) Ri = 0, A = ∞, Ro = ∞

SECTION – II

(7×1=7)

8) The one's complement of 10111001 is
   a) 01000111
   b) 01000110
   c) 11000110
   d) 10101010

9) The output of combinational circuit depends upon
   a) Present input only
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   a) S-R flip flop
   b) T flip flop
   c) D flip flop
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11) A Modulus 2 Johnson counter requires minimum of
   a) 10 flip flop
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   d) 2 flip flop

12) A digital circuit that can count clock pulse is called as
   a) Latch
   b) Counter
   c) Shift register
   d) Trigger

13) The BCD counter is also called as _____ counter.
   a) Binary
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   a) AND
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   c) NAND
   d) NOR

_____

SLR-TJ – 358

Seat No.	

S.E. (Electrical Engg.) (Part – II) (CGPA) Examination, 2017
ANALOG AND DIGITAL INTEGRATED CIRCUITS

Day and Date : Friday, 24-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
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SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Draw and explain block diagram of operational amplifier.
   2) With neat circuit diagram explain working of subtractor.
   3) Determine the output voltage for non-inverting amplifier using 741, Rf = 10 KΩ , R = 1KΩ and input supplied 10 mV and 3 V, also comment on the output.
   4) Explain DC analysis of differential amplifier (DIBO).
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3. Solve **any two** : **(2×6=12)**
   1) Derive voltage gain, input resistance and output resistance for voltage shunt feedback op-amp.
   2) Explain working of Practical Integrator with frequency response.
   3) The IC 741 having following parameters is connected as non inverting amplifier with R_1 = 1 kΩ and R_F = 10 KΩ A = 200000, Ri = 2 MΩ , Ro = 75 Ω , fo = 5 Hz, Supply voltage = + – 15 V, Output voltage swing = + – 13 V. Compute the values of A_F, Ri_F, Ro_F, f_F and V_{OOT}.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Implement the following using NOR gate ΠM (1, 3, 7, 11, 15) d (0, 2, 5).

   2) Obtain canonical sum of product form of the equation Y(A, B) = A + B.

   3) Explain 4 bit ring counter.

   4) With truth table explain operation of SR flip flop.

   5) Implement following using 4 : 1 MUX f(P, Q, R) = $\sum$ m (1, 3, 5, 6).

5. Solve **any two** : **(2×6=12)**

   1) Explain multiplexing and demultiplexing. Name the IC that are used as multiplexer and demultiplexer. Obtain an XOR gate using 2 : 1 multiplexer.

   2) Design 2 bit synchronous counter using T flip flop.

   3) Explain operation of JK flip flop and How race around condition can be eliminated.

SLR-TJ – 359

Seat No.	

Set P

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
NETWORK ANALYSIS

Day and Date : Saturday, 25-11-2017 Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) If one of the resistors in a parallel circuit is removed, what happens to the total resistance ?
   a) Decreases b) Increases
   c) Remain constant d) Exactly doubled

2) The tie-set schedule gives the relation between
   a) Branch current and link currents
   b) Branch voltages and link currents
   c) Branch currents and link voltages
   d) None of the above

3) A practical voltage source consists of
   a) An ideal voltage source in series with an internal resistance
   b) An ideal voltage source in parallel with an internal resistance
   c) Both a) and b)
   d) None

4) Three equal resistances of 3 Ω are connected in star. What is the resistance in one of the arm in an equivalent delta circuit ?
   a) 10 Ω b) 3 Ω c) 9 Ω d) 27 Ω

P.T.O.

5) When the superposition theorem is applied to any circuit, the dependent voltage sources in that circuit is always

a) Opened b) Shorted c) Active d) None

6) A circuit consist of two resistances, R1 and R2, in parallel. The total current passing through the circuit is T_T. The current passing through R1 is

a) $I_T R1/R1 + R2$ b) $I_T(R1 + R2)/R1$

c) $I_T R2/R1 + R2$ d) $I_T R1 + R2/R2$

7) The nodal method of circuit analysis is based on

a) KVL and Ohm's Law b) KCL and Ohm's Law

c) KCL and KVL d) KCL, KVL and Ohm's Law

8) When a unit impulse voltage is applied to an inductor if 1H, the energy supplied by the source is

a) ∞ b) 1 Joule c) 1/2 Joule d) 0

9) In electric circuits transient currents are associated with

a) Resistors b) Inductors c) Capacitors d) Both a) and c)

10) The Laplace transform of integral function f(t) is

a) 1/s F(s) b) sF(s) – f(0) c) F(s) – f(0) d) f'(0)

11) Laplace transform of unit ramp function is

a) 1 b) s c) 1/s d) $1/s^2$

12) For a two port network to be reciprocal

a) $Z_{12} = Z_{22}$ b) $Y_{11} = Y_{22}$

c) $h_{22} = h_{12} + h_{21}$ d) AD – BC = 0

13) In electric circuits transient circuit analysis the particular solution gives _____ response.

a) Transient b) Steady state

c) Neither d) Both b) and c)

14) A two port network is symmetrical if

a) $Z_{12}Z_{22} - Z_{12}Z_{21} = 1$ b) AD – BC = 0

c) $h_{11}h_{22} - h_{12}h_{21}$ d) $y_{11}y_{22} - y_{12}y_{12}$

SLR-TJ – 359

Seat No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
NETWORK ANALYSIS

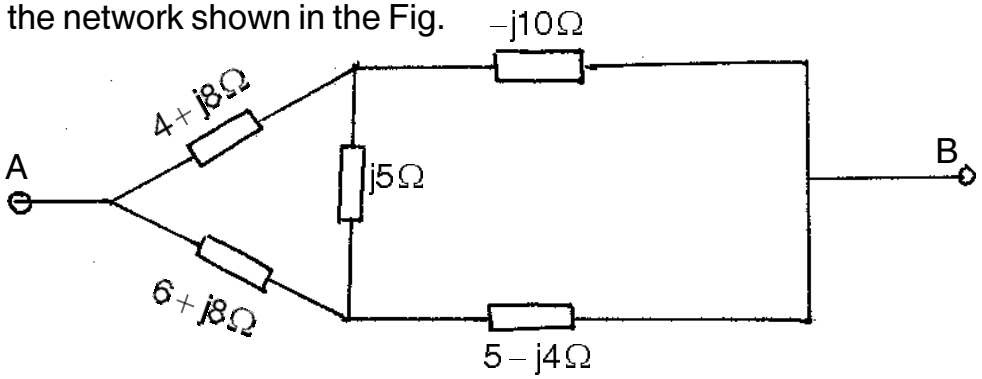
Day and Date : Saturday, 25-11-2017 Max. Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

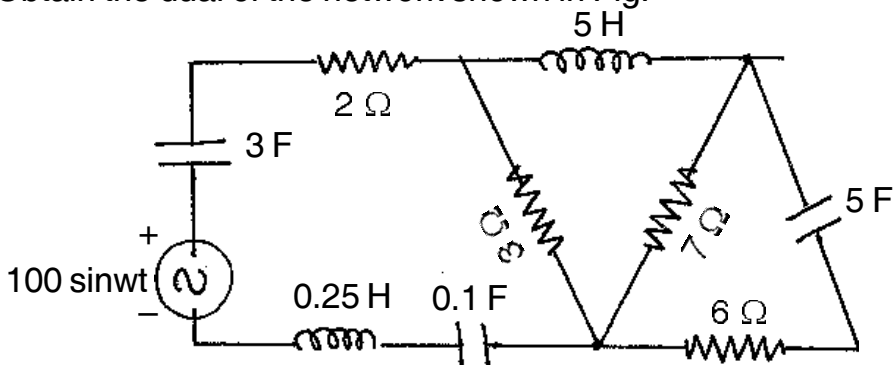
SECTION – I

2. Solve **any three** : **(3×4=12)**

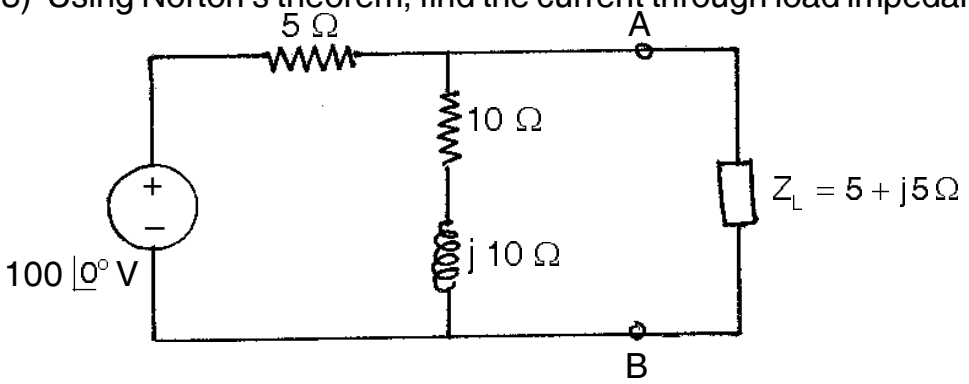
1) Calculate the equivalent impedance as viewed through the terminals A – B of the network shown in the Fig.



2) Obtain the dual of the network shown in Fig.



3) Using Norton's theorem, find the current through load impedance Z_L.



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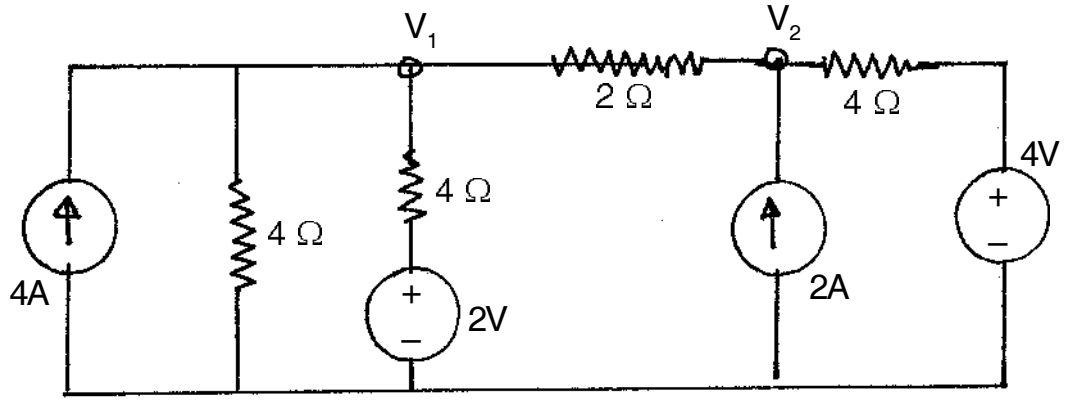
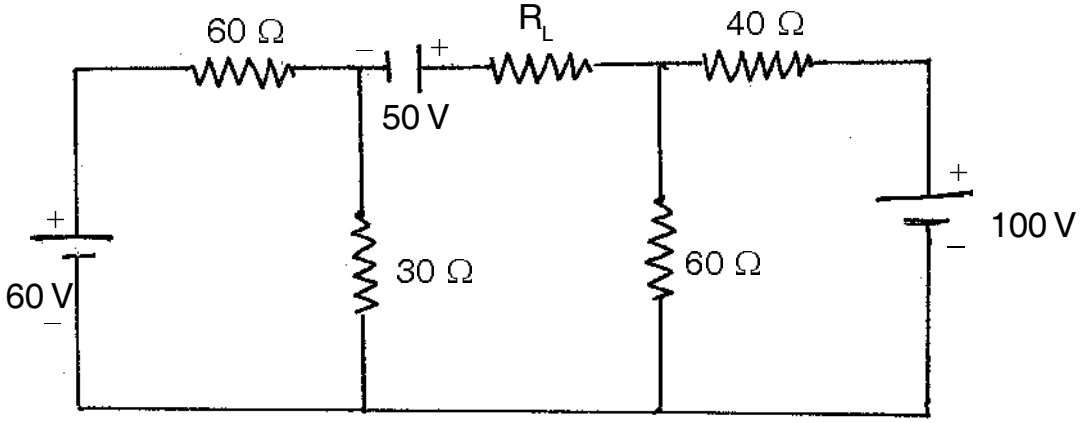
4) Using source transformation, find V1 and V2 in the circuit shown in the Fig.

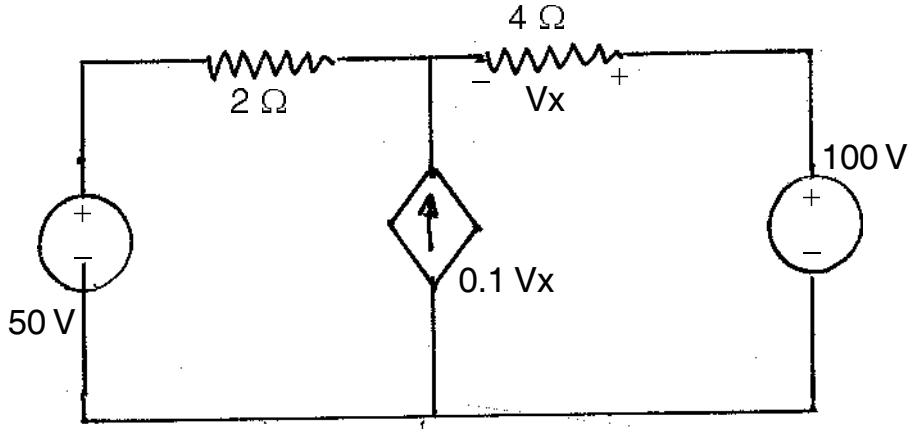


3. Solve **any two** : **(8×2=16)**

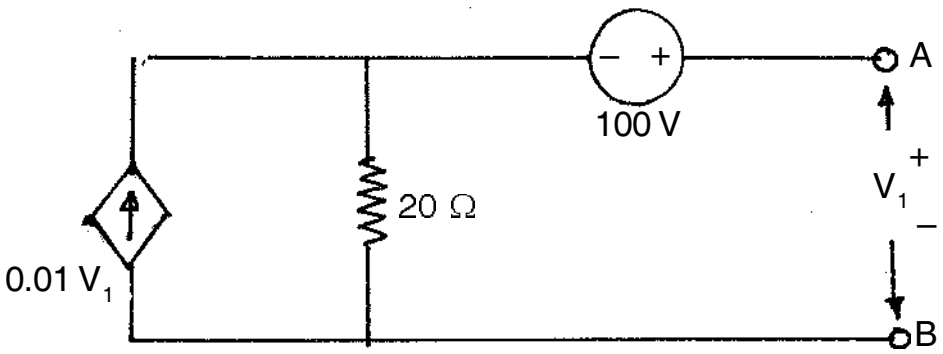
1) Find the value of R_L for maximum power transfer and maximum power for the Fig.



2) Use superposition theorem to evaluate Vx in the circuit of Fig.



3) Find the Thevenin's and Norton's equivalent for the circuit of Fig. across terminals AB.

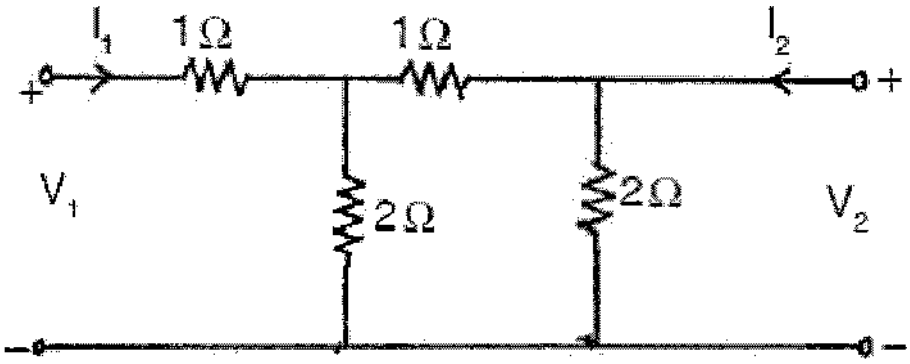


SECTION – II

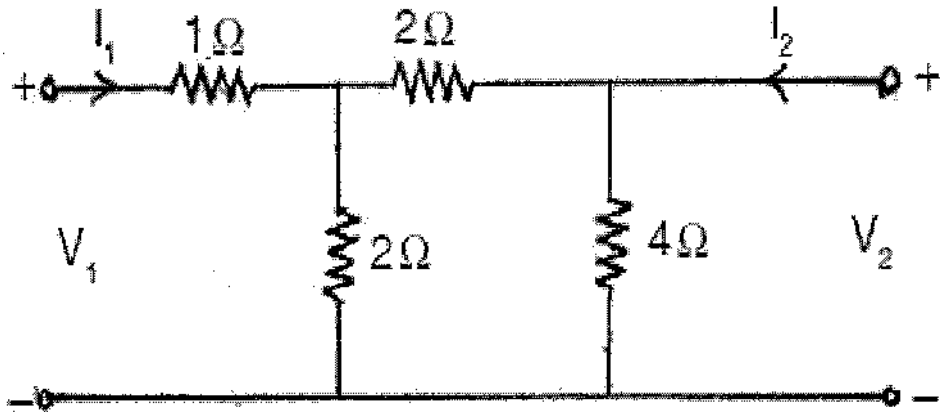
4. Answer **any four** questions : **(4×3=12)**

a) State the initial conditions for resistor, inductor and capacitor.

b) Obtain the ABCD parameters for the network shown below :

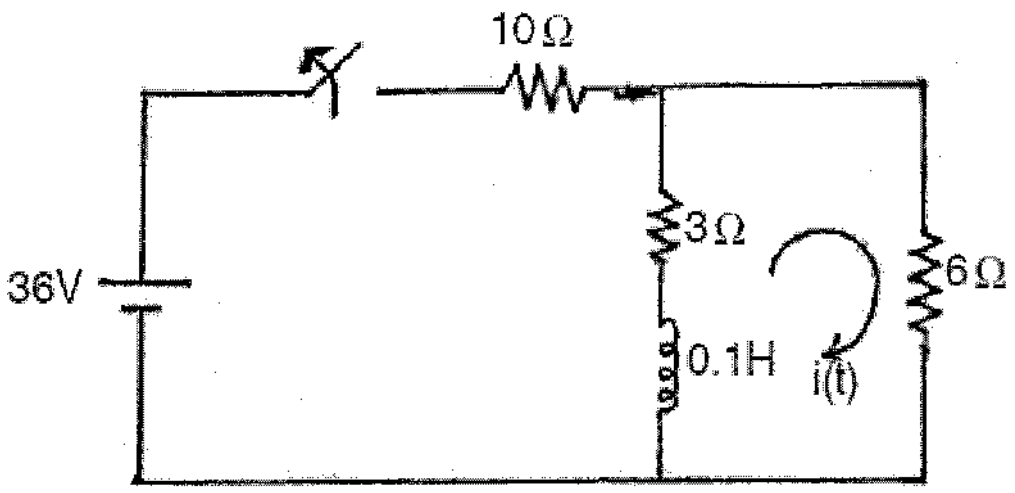


c) Determine hybrid parameters for the network shown below :



d) Prove the condition A = D for symmetry of a two port network.

e) In the network shown below, the switch is opened at t = 0. Find i(t) using Laplace transform.



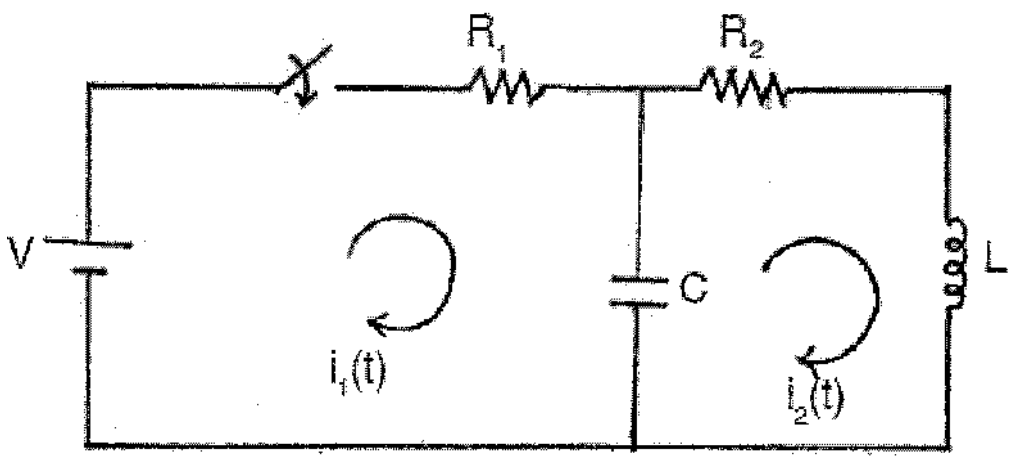
5. Answer **any two** questions : **(2×8=16)**

a) Derive Z parameters in terms of ABCD parameters and hybrid parameters.

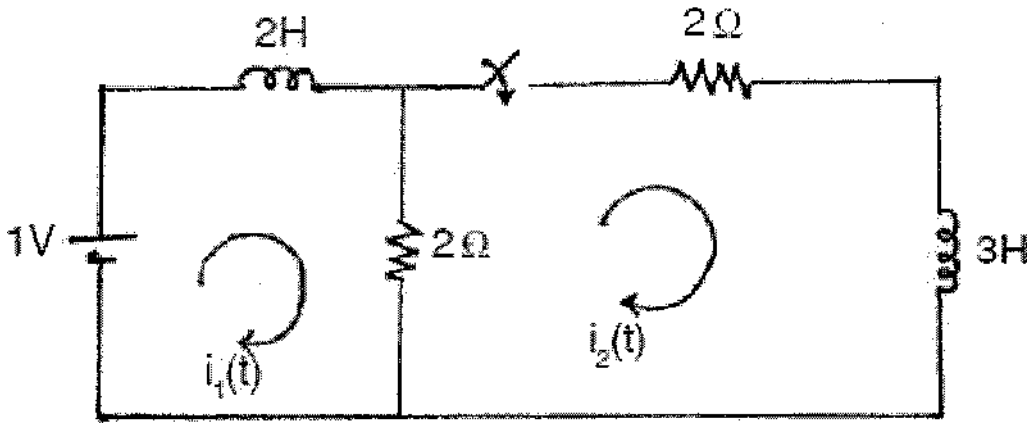
b) In the network shown below, assuming all initial conditions as zero.

Find $i_1(O^+)$, $i_2(O^+)$

$\frac{di_1}{dt}(O^+)$, $\frac{di_2}{dt}(O^+)$, $\frac{d^2i_1}{dt^2}(O^+)$ and $\frac{d^2i_2}{dt^2}(O^+)$.



c) In the network shown below, switch is closed at t = 0, the steady state being reached before t = 0. Determine current through inductor of 3 H using Laplace Transform.



Set P

SLR-TJ – 359

Seat No.	

Set Q

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
NETWORK ANALYSIS

Day and Date : Saturday, 25-11-2017 Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

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Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) When a unit impulse voltage is applied to an inductor if 1H, the energy supplied by the source is

a) ∞ b) 1 Joule c) 1/2 Joule d) 0

2) In electric circuits transient currents are associated with

a) Resistors b) Inductors

c) Capacitors d) Both a) and c)

3) The Laplace transform of integral function f(t) is

a) 1/s F(s) b) sF(s) – f(0)

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P.T.O.

7) A two port network is symmetrical if
   a) $Z_{12}Z_{22} - Z_{12}Z_{21} = 1$
   b) $AD - BC = 0$
   c) $h_{11}h_{22} - h_{12}h_{21}$
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8) If one of the resistors in a parallel circuit is removed, what happens to the total resistance ?
   a) Decreases
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   b) 3 Ω
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12) When the superposition theorem is applied to any circuit, the dependent voltage sources in that circuit is always
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   b) Shorted
   c) Active
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13) A circuit consist of two resistances, R1 and R2, in parallel. The total current passing through the circuit is T_T. The current passing through R1 is
   a) $I_T R1/R1 + R2$
   b) $I_T(R1 + R2)/R1$
   c) $I_T R2/R1 + R2$
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14) The nodal method of circuit analysis is based on
   a) KVL and Ohm's Law
   b) KCL and Ohm's Law
   c) KCL and KVL
   d) KCL, KVL and Ohm's Law

SLR-TJ – 359

Seat No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
NETWORK ANALYSIS

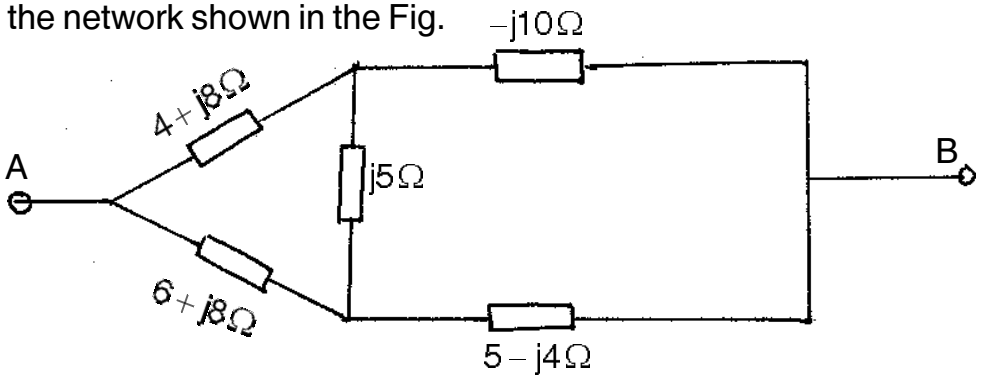
Day and Date : Saturday, 25-11-2017 Max. Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

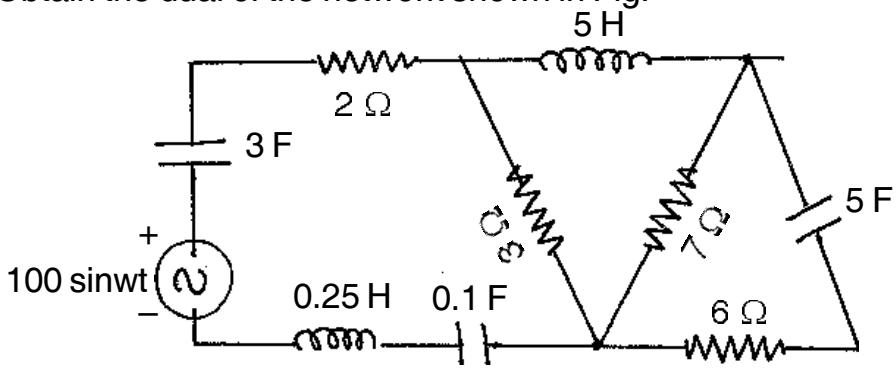
SECTION – I

2. Solve **any three** : **(3×4=12)**

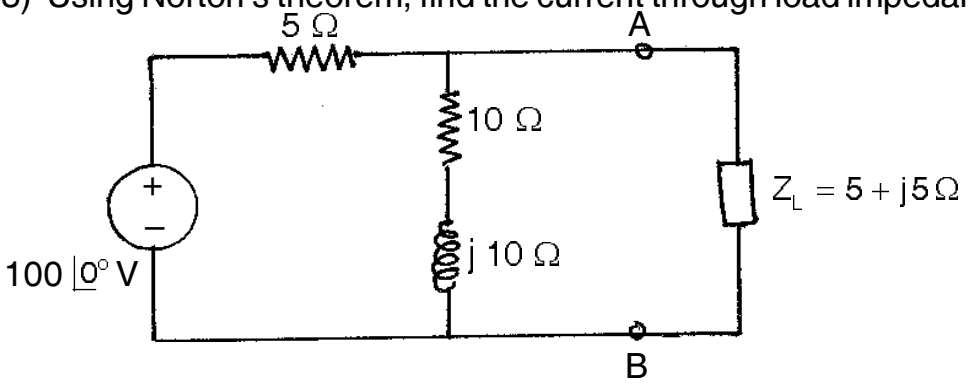
1) Calculate the equivalent impedance as viewed through the terminals A – B of the network shown in the Fig.



2) Obtain the dual of the network shown in Fig.

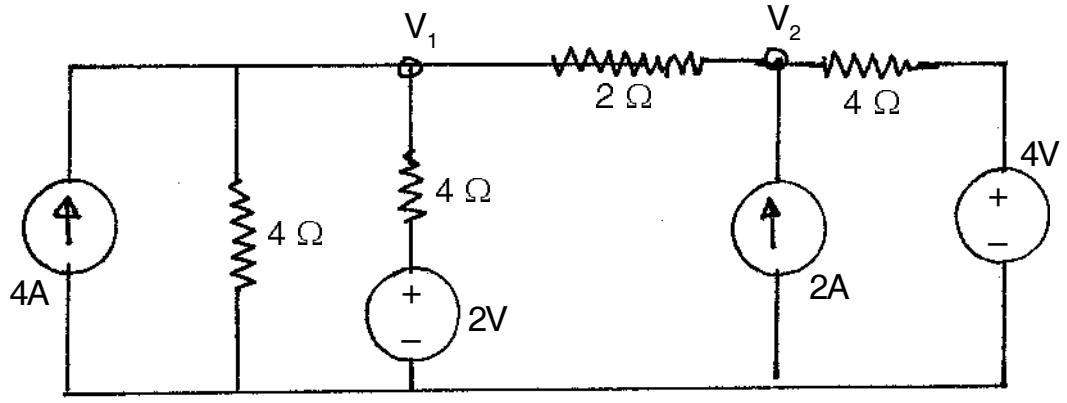


3) Using Norton's theorem, find the current through load impedance Z_L.



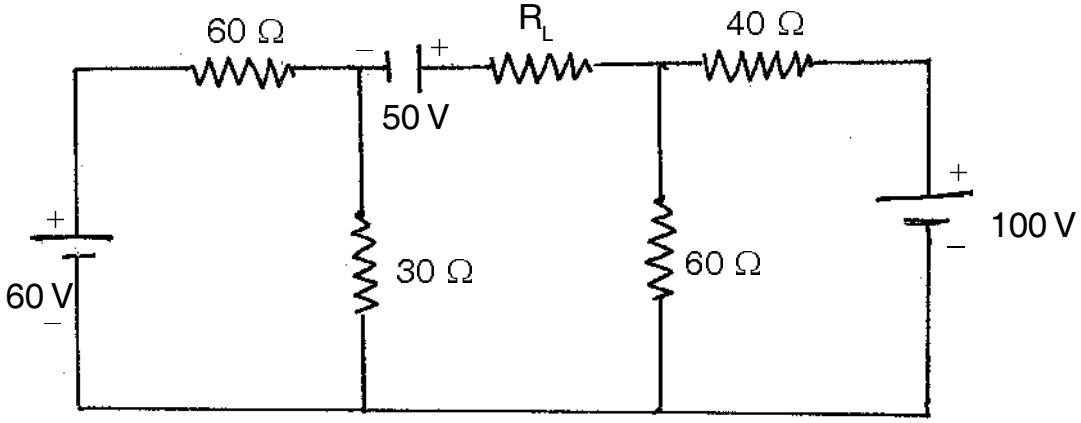
Set Q

4) Using source transformation, find V1 and V2 in the circuit shown in the Fig.

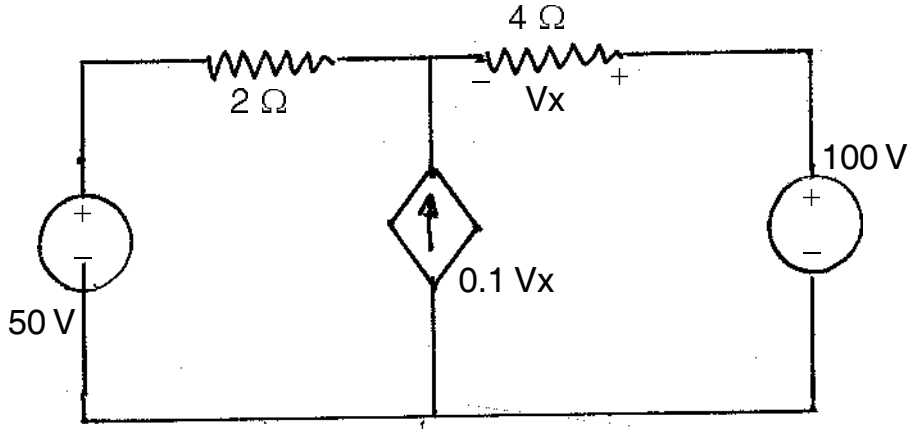


3. Solve **any two** : **(8×2=16)**

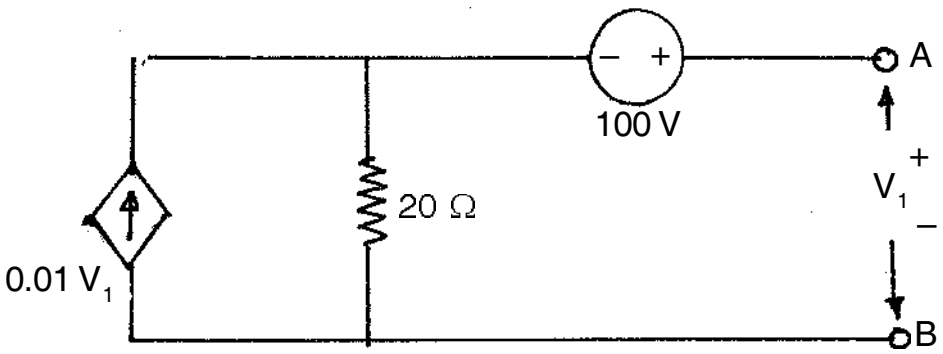
1) Find the value of R_L for maximum power transfer and maximum power for the Fig.



2) Use superposition theorem to evaluate Vx in the circuit of Fig.



3) Find the Thevenin's and Norton's equivalent for the circuit of Fig. across terminals AB.

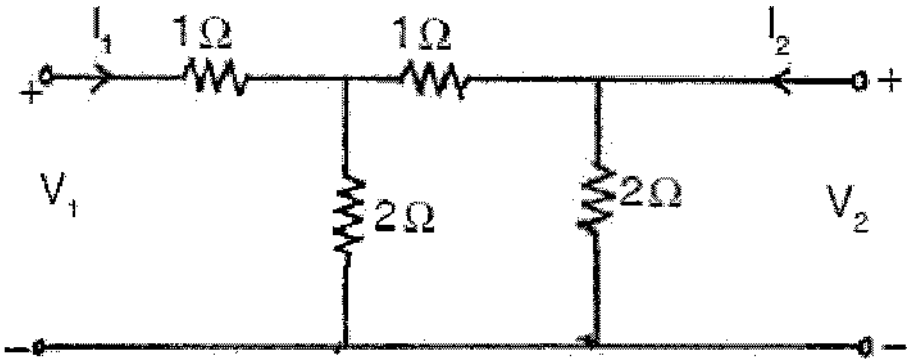


SECTION – II

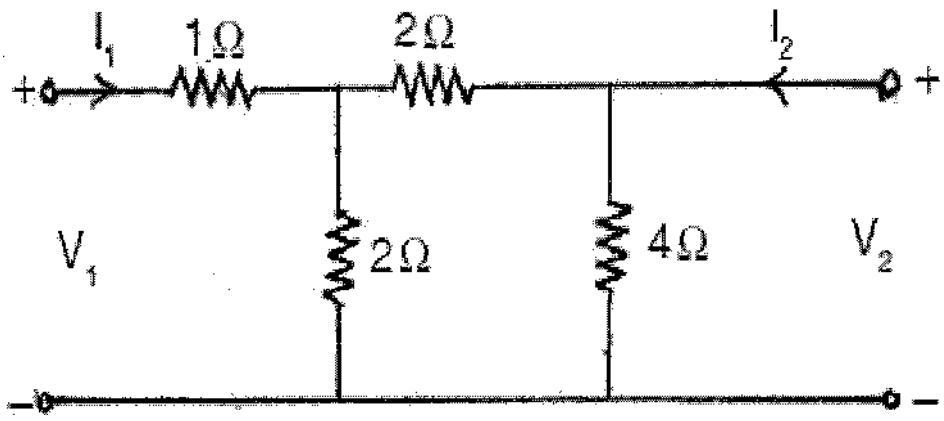
4. Answer **any four** questions : **(4×3=12)**

a) State the initial conditions for resistor, inductor and capacitor.

b) Obtain the ABCD parameters for the network shown below :

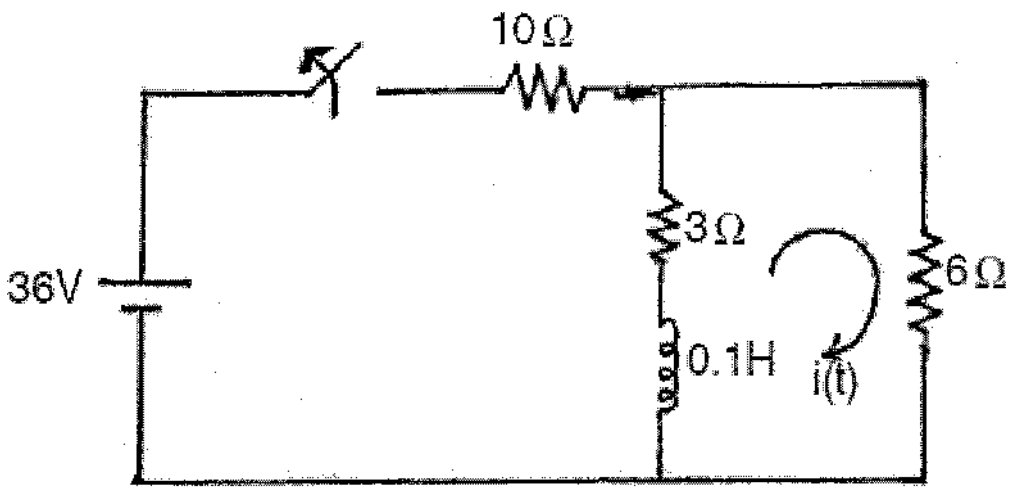


c) Determine hybrid parameters for the network shown below :



d) Prove the condition A = D for symmetry of a two port network.

e) In the network shown below, the switch is opened at t = 0. Find i(t) using Laplace transform.



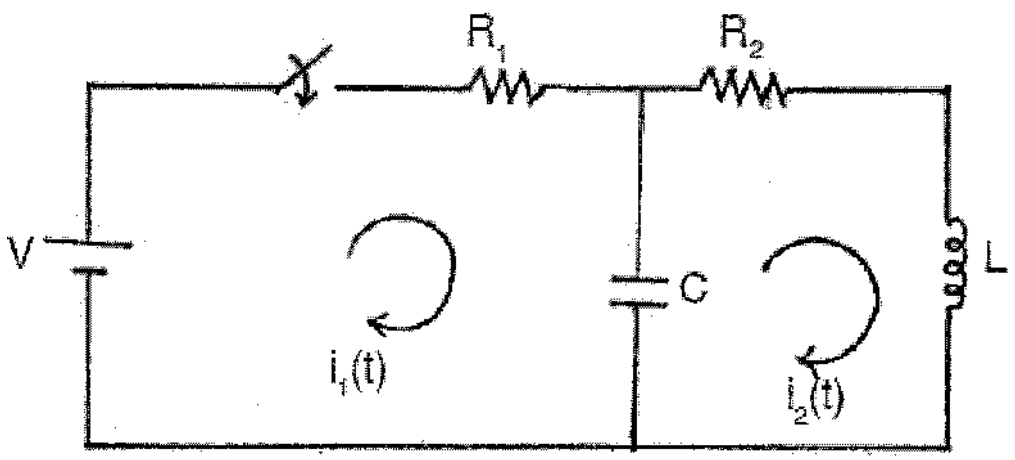
5. Answer **any two** questions : **(2×8=16)**

a) Derive Z parameters in terms of ABCD parameters and hybrid parameters.

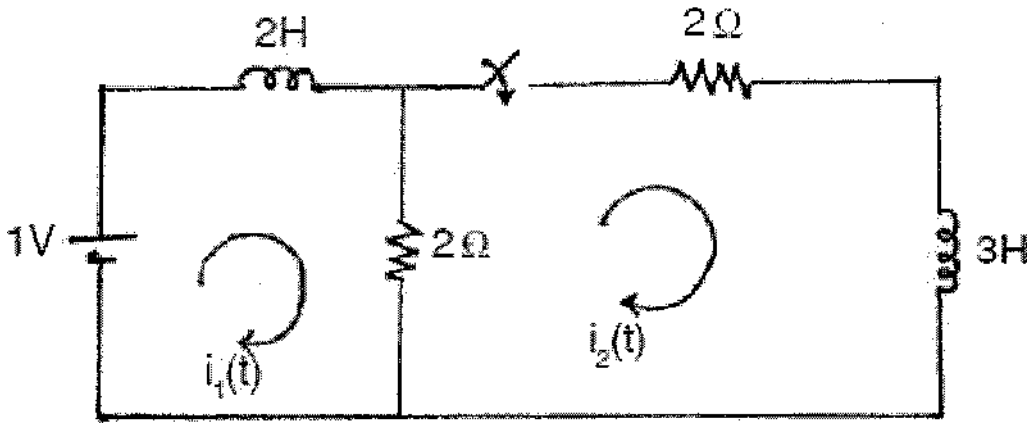
b) In the network shown below, assuming all initial conditions as zero.

Find $i_1(O^+)$, $i_2(O^+)$

$\frac{di_1}{dt}(O^+)$, $\frac{di_2}{dt}(O^+)$, $\frac{d^2i_1}{dt^2}(O^+)$ and $\frac{d^2i_2}{dt^2}(O^+)$.



c) In the network shown below, switch is closed at t = 0, the steady state being reached before t = 0. Determine current through inductor of 3 H using Laplace Transform.



Set Q

SLR-TJ – 359

Seat No.	

Set R

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
NETWORK ANALYSIS

Day and Date : Saturday, 25-11-2017 Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) When the superposition theorem is applied to any circuit, the dependent voltage sources in that circuit is always

a) Opened b) Shorted c) Active d) None

2) A circuit consist of two resistances, R1 and R2, in parallel. The total current passing through the circuit is T_T. The current passing through R1 is

a) I_TR1/R1 + R2 b) I_T(R1 + R2)/R1

c) I_TR2/R1 + R2 d) I_TR1 + R2/R2

3) The nodal method of circuit analysis is based on

a) KVL and Ohm's Law b) KCL and Ohm's Law

c) KCL and KVL d) KCL, KVL and Ohm's Law

4) When a unit impulse voltage is applied to an inductor if 1H, the energy supplied by the source is

a) ∞ b) 1 Joule c) 1/2 Joule d) 0

5) In electric circuits transient currents are associated with

a) Resistors b) Inductors

c) Capacitors d) Both a) and c)

6) The Laplace transform of integral function f(t) is
   a) 1/s F(s) b) sF(s) – f(0) c) F(s) – f(0) d) f'(0)

7) Laplace transform of unit ramp function is
   a) 1 b) s c) 1/s d) $1/s^2$

8) For a two port network to be reciprocal
   a) $Z_{12} = Z_{22}$ b) $Y_{11} = Y_{22}$
   c) $h_{22} = h_{12} + h_{21}$ d) AD – BC = 0

9) In electric circuits transient circuit analysis the particular solution gives _____ response.
   a) Transient b) Steady state c) Neither d) Both b) and c)

10) A two port network is symmetrical if
   a) $Z_{12}Z_{22} - Z_{12}Z_{21} = 1$ b) AD – BC = 0
   c) $h_{11}h_{22} - h_{12}h_{21}$ d) $y_{11}y_{22} - y_{12}y_{12}$

11) If one of the resistors in a parallel circuit is removed, what happens to the total resistance ?
   a) Decreases b) Increases
   c) Remain constant d) Exactly doubled

12) The tie-set schedule gives the relation between
   a) Branch current and link currents
   b) Branch voltages and link currents
   c) Branch currents and link voltages
   d) None of the above

13) A practical voltage source consists of
   a) An ideal voltage source in series with an internal resistance
   b) An ideal voltage source in parallel with an internal resistance
   c) Both a) and b)
   d) None

14) Three equal resistances of 3 Ω are connected in star. What is the resistance in one of the arm in an equivalent delta circuit ?
   a) 10 Ω b) 3 Ω c) 9 Ω d) 27 Ω

SLR-TJ – 359

Seat No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
NETWORK ANALYSIS

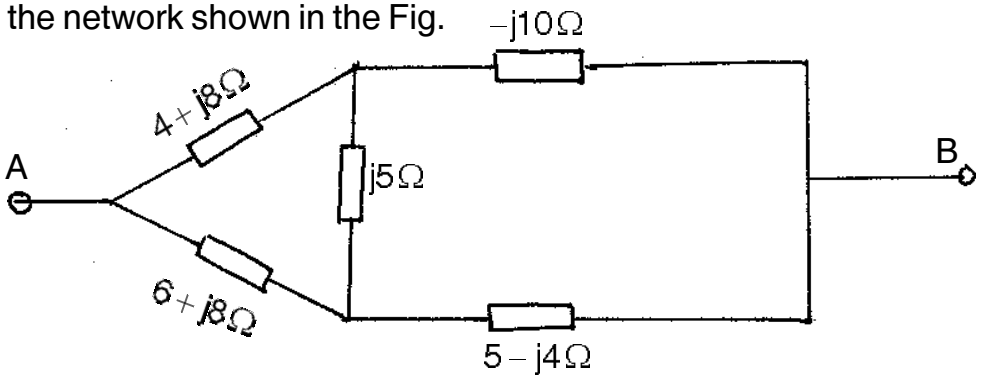
Day and Date : Saturday, 25-11-2017 Max. Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

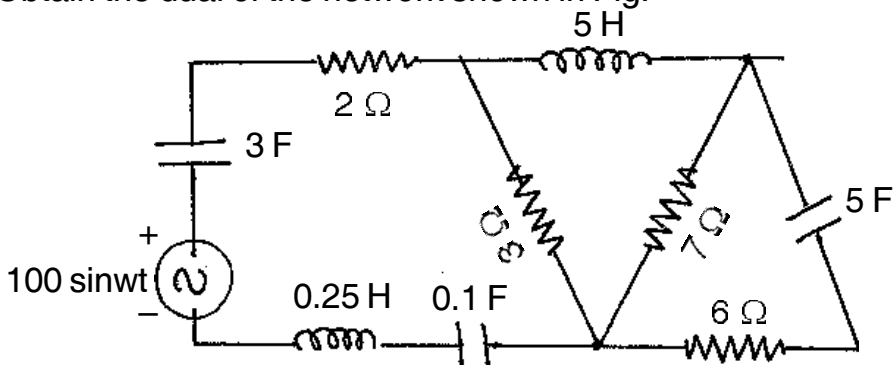
SECTION – I

2. Solve **any three** : **(3×4=12)**

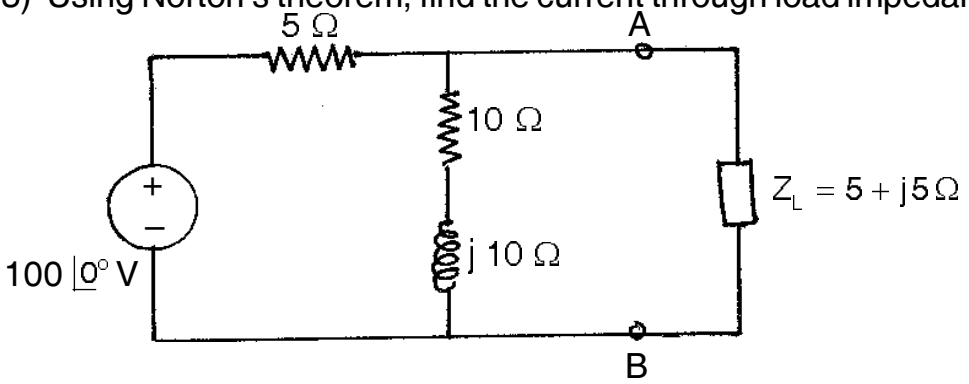
1) Calculate the equivalent impedance as viewed through the terminals A – B of the network shown in the Fig.



2) Obtain the dual of the network shown in Fig.

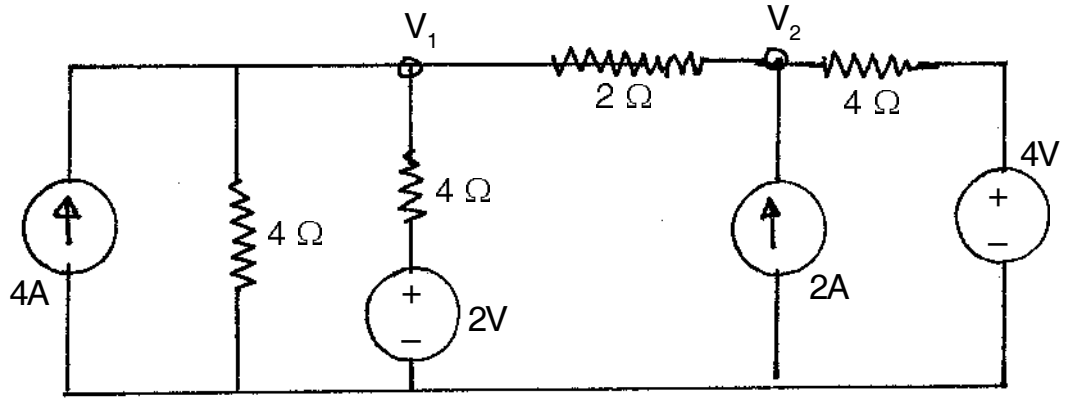


3) Using Norton's theorem, find the current through load impedance Z_L.



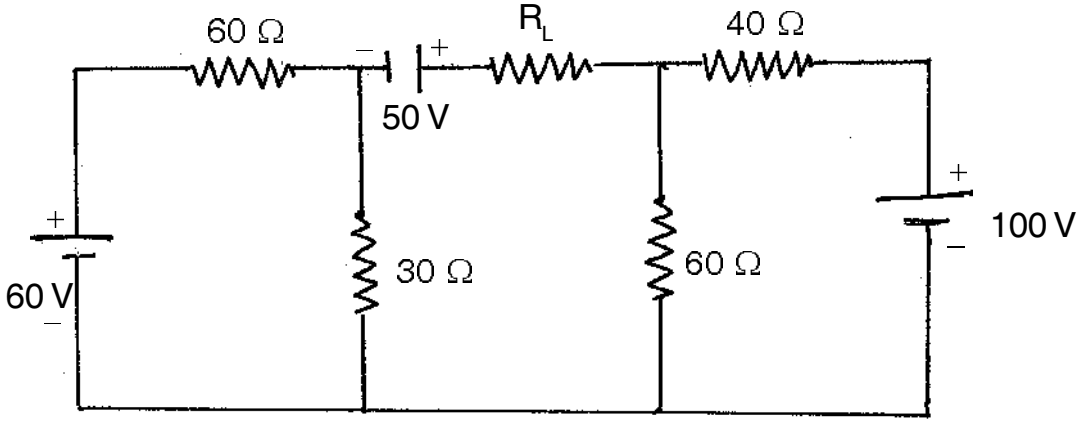
Set R

4) Using source transformation, find V1 and V2 in the circuit shown in the Fig.

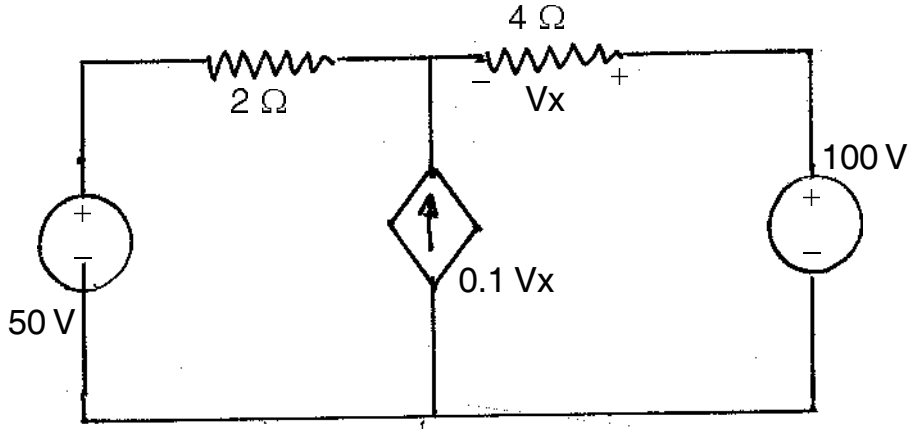


3. Solve **any two** : **(8×2=16)**

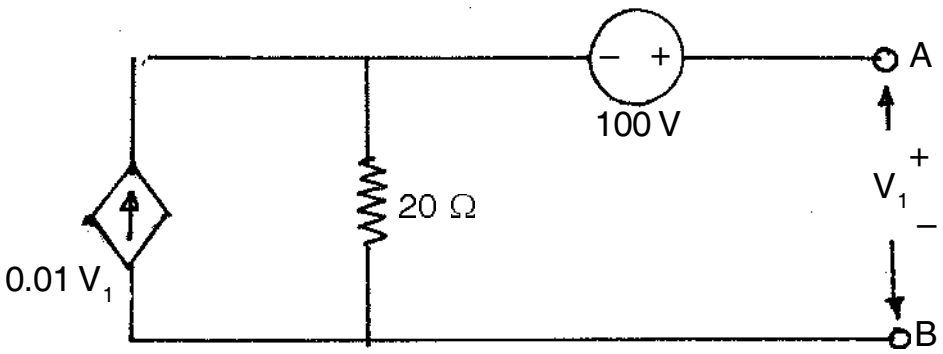
1) Find the value of R_L for maximum power transfer and maximum power for the Fig.



2) Use superposition theorem to evaluate Vx in the circuit of Fig.



3) Find the Thevenin's and Norton's equivalent for the circuit of Fig. across terminals AB.

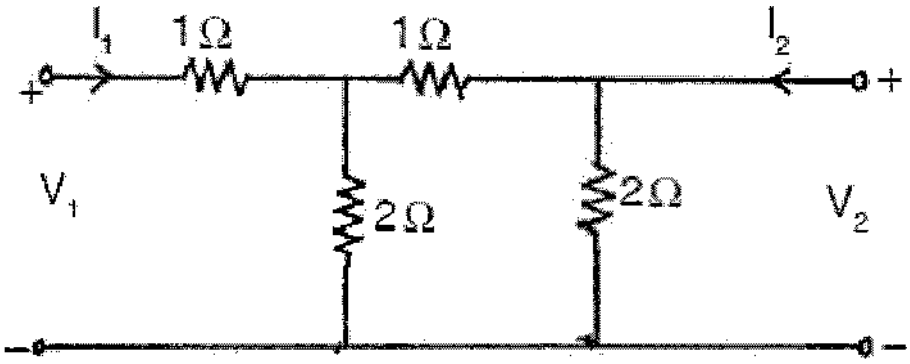


SECTION – II

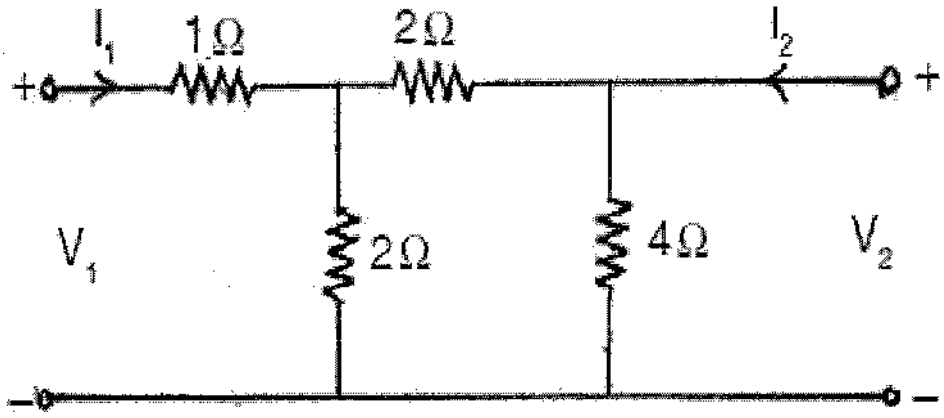
4. Answer **any four** questions : **(4×3=12)**

a) State the initial conditions for resistor, inductor and capacitor.

b) Obtain the ABCD parameters for the network shown below :

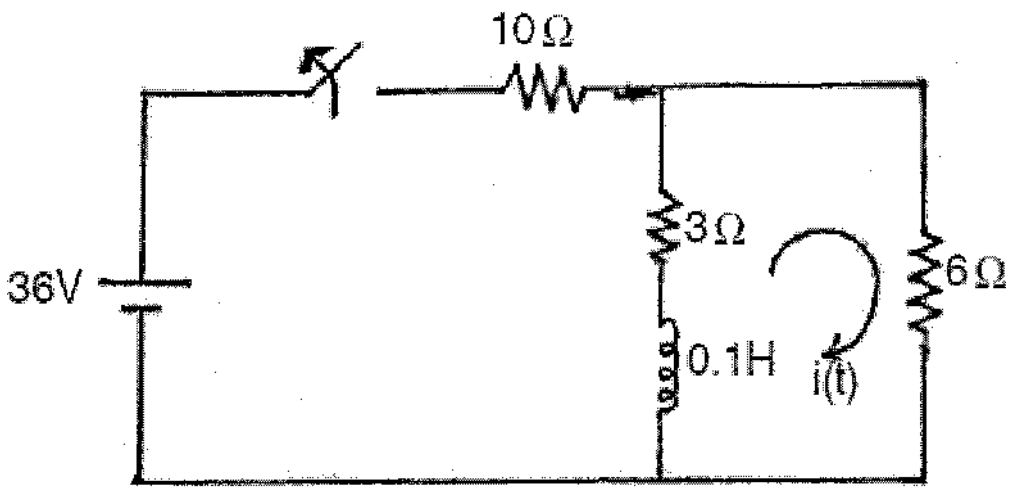


c) Determine hybrid parameters for the network shown below :



d) Prove the condition A = D for symmetry of a two port network.

e) In the network shown below, the switch is opened at t = 0. Find i(t) using Laplace transform.



5. Answer **any two** questions : **(2×8=16)**

a) Derive Z parameters in terms of ABCD parameters and hybrid parameters.

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Find $i_1(O^+)$, $i_2(O^+)$

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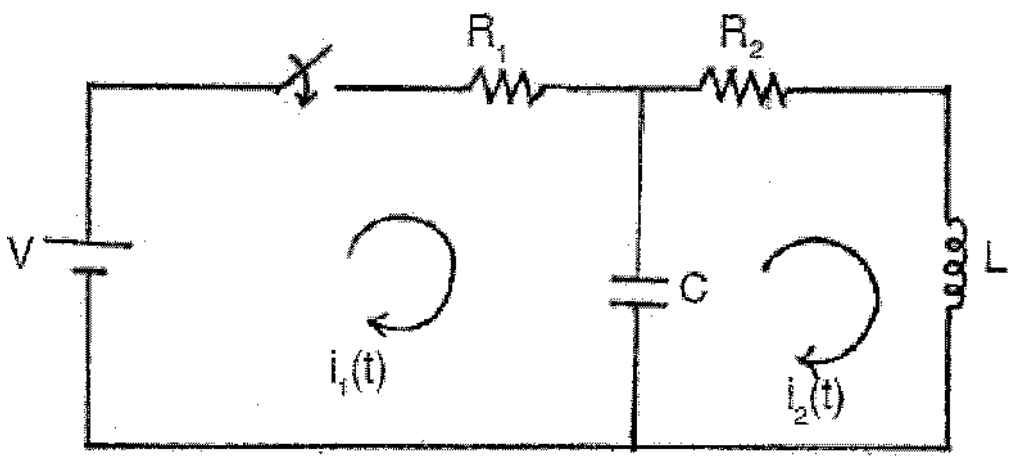

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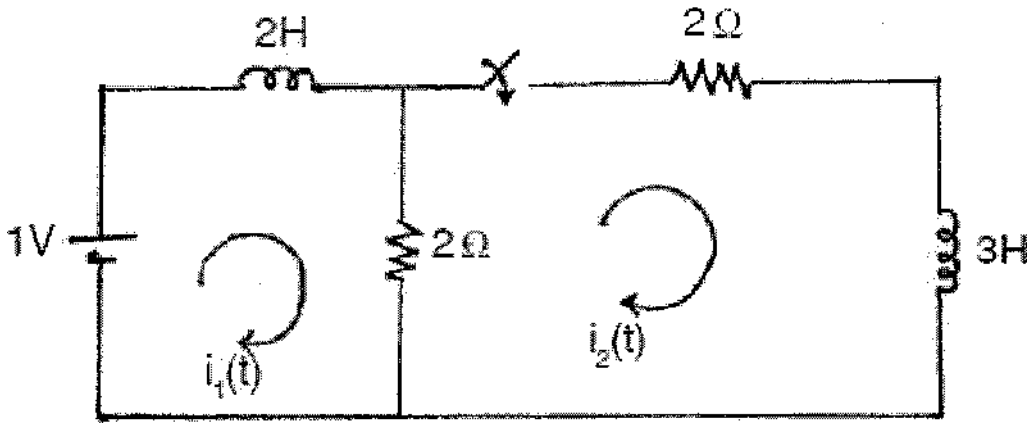

Set R

SLR-TJ – 359

Seat No.	

Set S

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
NETWORK ANALYSIS

Day and Date : Saturday, 25-11-2017 Max. Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

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Duration : 30 Minutes Marks : 14

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1) The Laplace transform of integral function f(t) is

a) 1/s F(s) b) sF(s) – f(0) c) F(s) – f(0) d) f'(0)

2) Laplace transform of unit ramp function is

a) 1 b) s c) 1/s d) $1/s^2$

3) For a two port network to be reciprocal

a) $Z_{12} = Z_{22}$ b) $Y_{11} = Y_{22}$

c) $h_{22} = h_{12} + h_{21}$ d) AD – BC = 0

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6) If one of the resistors in a parallel circuit is removed, what happens to the total resistance ?

a) Decreases b) Increases

c) Remain constant d) Exactly doubled

P.T.O.

7) The tie-set schedule gives the relation between
   a) Branch current and link currents
   b) Branch voltages and link currents
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   a) An ideal voltage source in series with an internal resistance
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10) When the superposition theorem is applied to any circuit, the dependent voltage sources in that circuit is always
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12) The nodal method of circuit analysis is based on
   a) KVL and Ohm's Law b) KCL and Ohm's Law
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SLR-TJ – 359

Seat No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017
NETWORK ANALYSIS

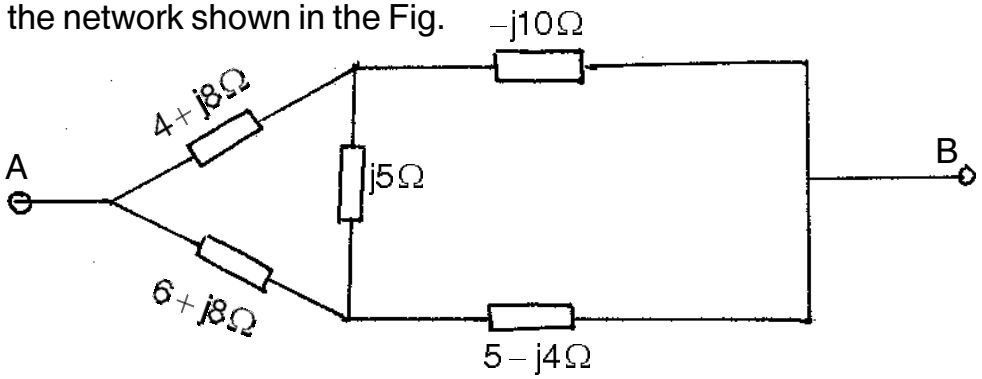
Day and Date : Saturday, 25-11-2017 Max. Marks : 56

Time : 3.00 p.m. to 6.00 p.m.

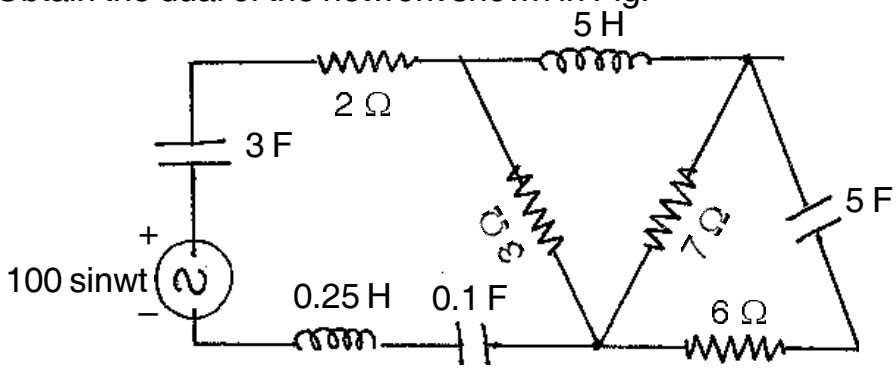
SECTION – I

2. Solve **any three** : **(3×4=12)**

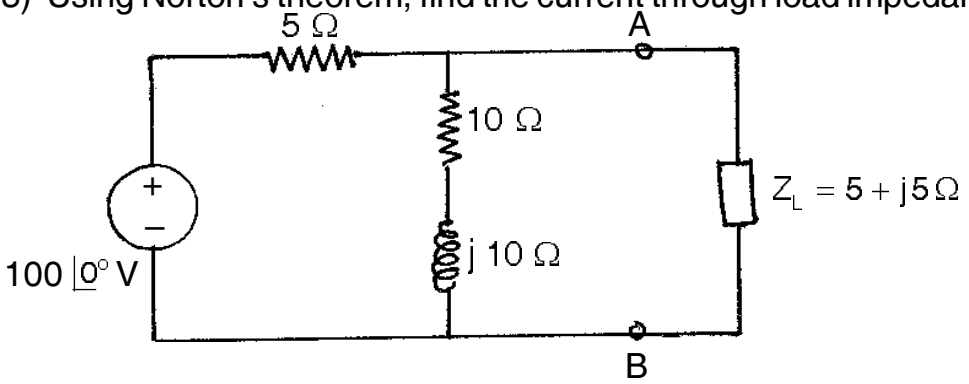
1) Calculate the equivalent impedance as viewed through the terminals A – B of the network shown in the Fig.



2) Obtain the dual of the network shown in Fig.

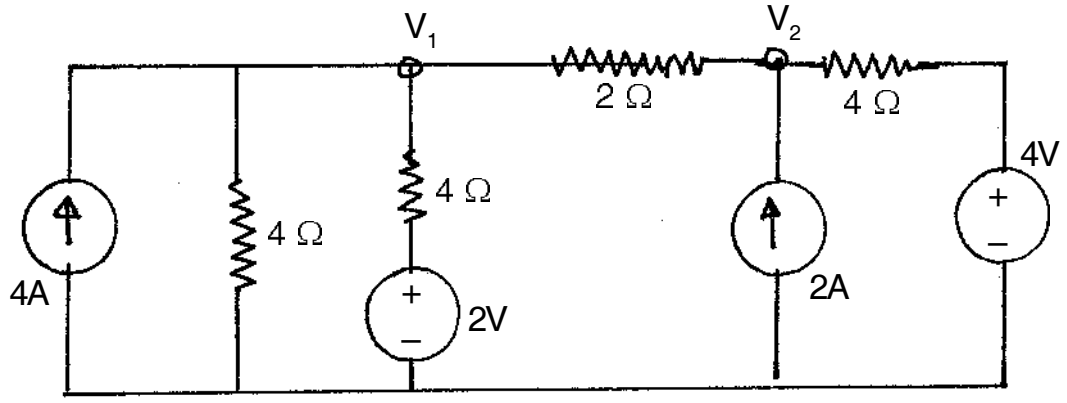


3) Using Norton's theorem, find the current through load impedance Z_L.



Set S

4) Using source transformation, find V1 and V2 in the circuit shown in the Fig.



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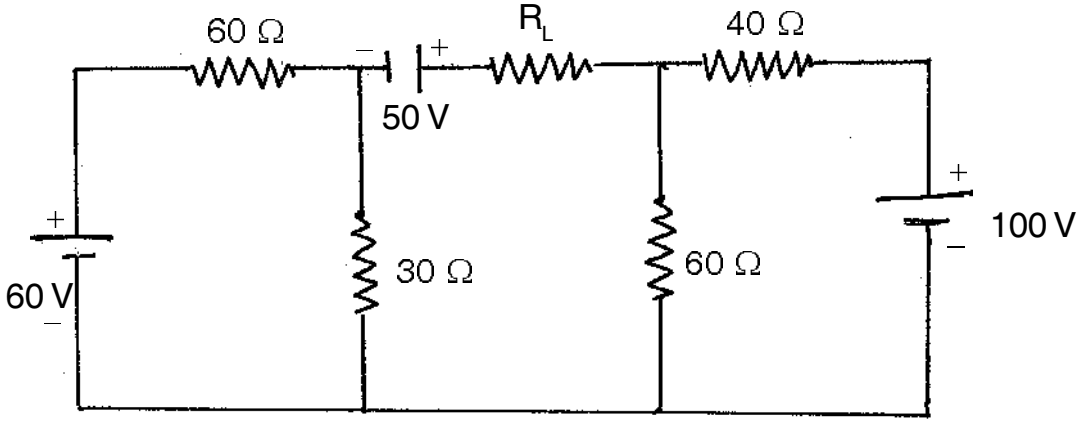
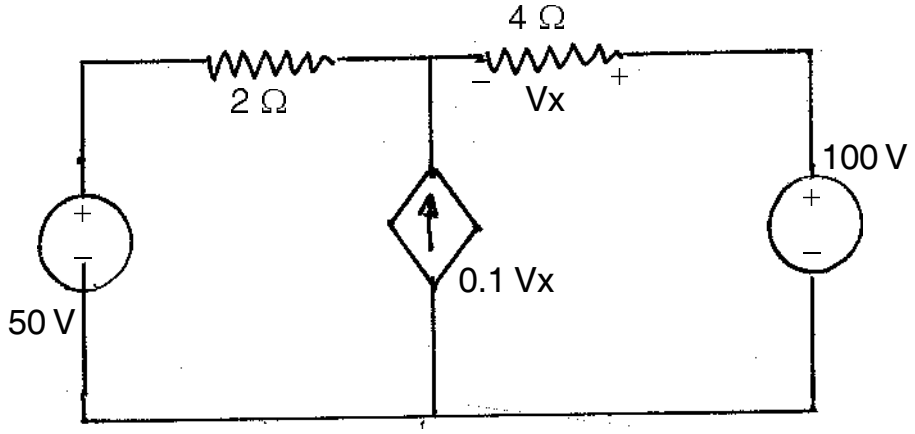


2) Use superposition theorem to evaluate Vx in the circuit of Fig.



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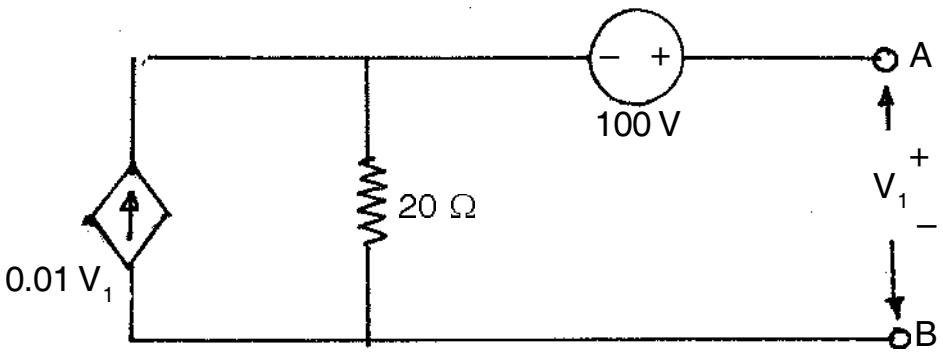
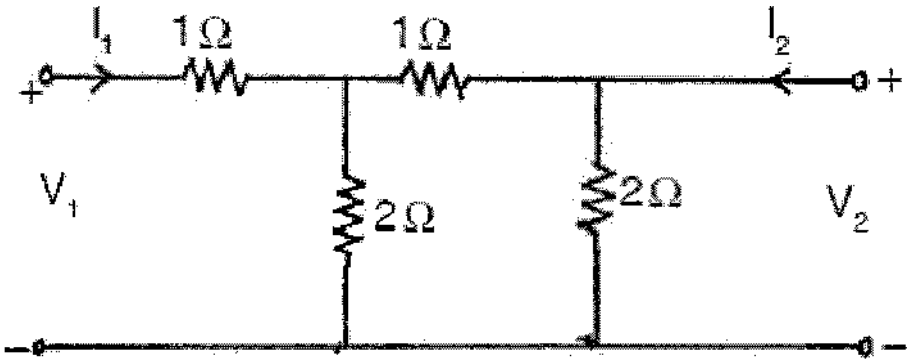


SECTION – II

4. Answer **any four** questions : **(4×3=12)**

a) State the initial conditions for resistor, inductor and capacitor.

b) Obtain the ABCD parameters for the network shown below :



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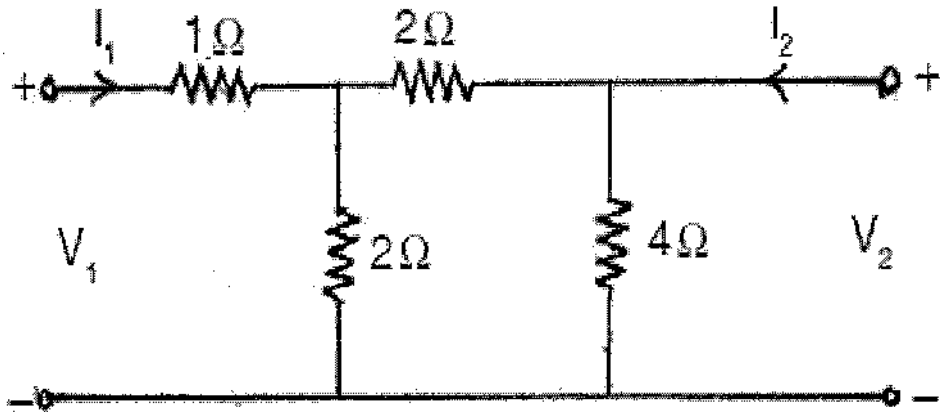
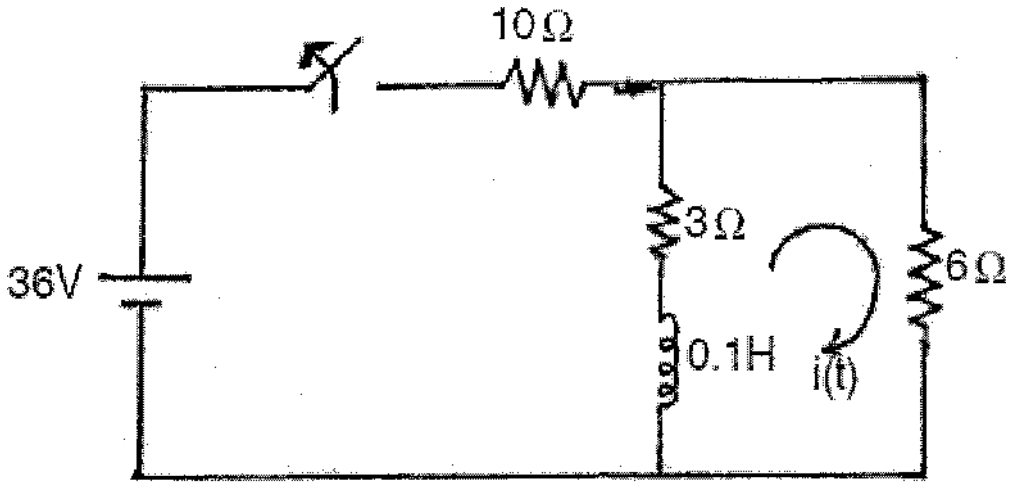


d) Prove the condition A = D for symmetry of a two port network.

e) In the network shown below, the switch is opened at t = 0. Find i(t) using Laplace transform.



5. Answer **any two** questions : **(2×8=16)**

a) Derive Z parameters in terms of ABCD parameters and hybrid parameters.

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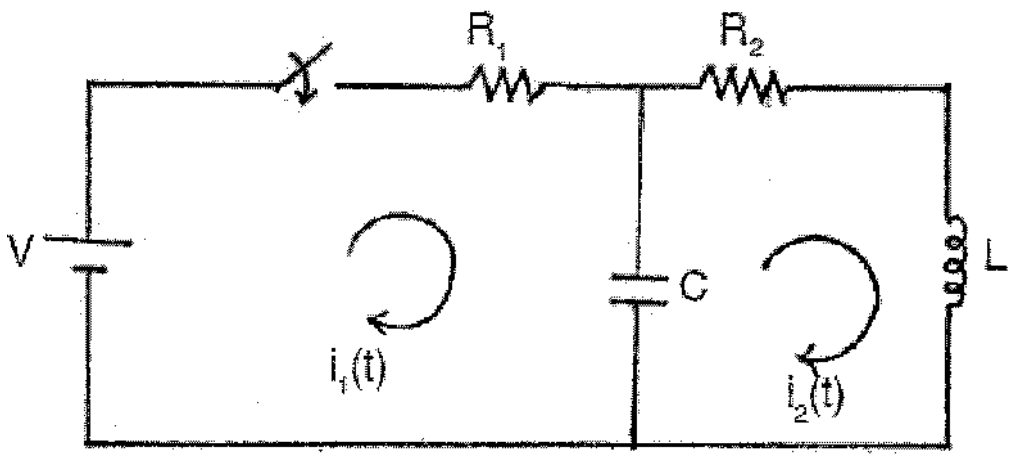
Find $i_1(O^+)$, $i_2(O^+)$

$\frac{di_1}{dt}(O^+)$, $\frac{di_2}{dt}(O^+)$, $\frac{d^2i_1}{dt^2}(O^+)$ and $\frac{d^2i_2}{dt^2}(O^+)$.



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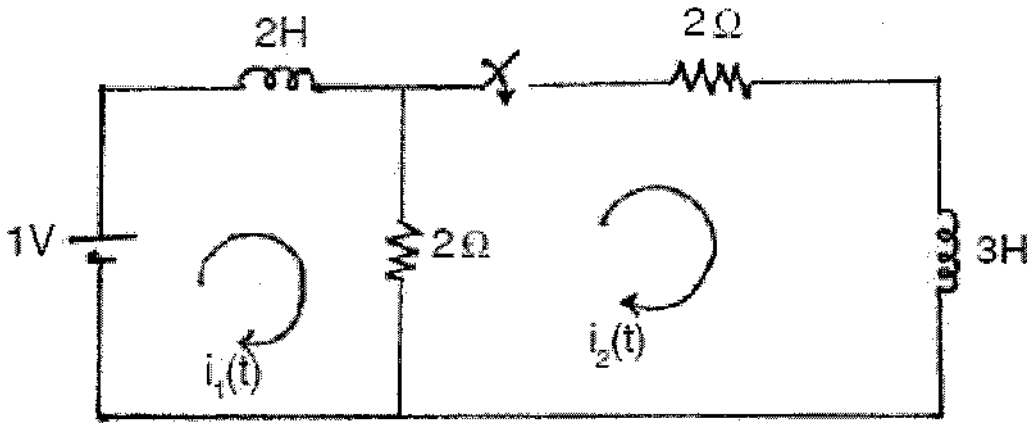


Set S

SLR-TJ – 360

Seat No.	

Set P

S.E. (Electrical) (Part – II) (Old) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 28-11-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3. Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) ***All*** *questions are* ***compulsory****.*
4) Make suitable assumptions ***if necessary****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) If average power of the signal satisfies the condition $0 < p < \infty$ is called _____ signal.
   a) Energy b) Power
   c) Neither energy nor power d) Both energy and power

2) Which of the following is static system ?
   a) $y(t) = x(t) + 1$ b) $y(t) = x(t^2)$ c) $y(t) = x(t - 2)$ d) $y(t) = x(-t)$

3) Which of the following is causal system ?
   a) $y(t) = x(1 - t)$ b) $y(t) = x(t^2)$ c) $y(t) = x(t - 5)$ d) $y(t) = x(t + 5)$

4) The convolution of $x(n) = \{1\ 1\ 1\}$ and $h(n) = \{1\ 2\ 2\ 1\}$ is
   a) {1 3 5 5 3 1} b) {1 3 5 5} c) {1 2 3 5 6} d) {1 2 2 2 1}

5) Any signal x(t) can be represented as
   a) $x_e(t) + x_0(t)$ b) $x_e(t) - x_0(t)$ c) $x_e(t)/x_0(t)$ d) $x_e(t).x_0(t)$

6) The time period of $x(t) = \cos(50\ \pi t)$ is
   a) 25π b) 1/25
   c) $\pi/2$ d) None of the above

7) When the system has poles outside the unit circle in z-domain, then system is
   a) Stable b) Unstable c) Cant' say d) None of these

8) Sampling a signal is equivalent to multiplying it with a _____ function.
   a) Sync b) Train of impulse
   c) Atrain of sync d) Rectangular window

P.T.O.

9) Which signal is non-causal ?
a) $x(t) = 0, t < 0$ b) $x(t) = 0, t > 0$ c) $x(t) = 1, t > -2$ d) None

10) The Fourier transform of u(t) is
a) 1/jw b) 1/(1 + jw) c) jw d) $\pi\delta(w) + (1/jw)$

11) The z-transform of $(0.5)^n u(n)$ is
a) $\frac{z}{z-0.5}$ b) $\frac{1}{z-1}$ c) 1 d) $\frac{1}{z}$

12) The Fourier transform of a triangular pulse is a _____ function.
a) Sine b) Cosine c) $(\text{Sinc})^2$ d) Rectangular

13) A signal $x(t) = \cos(100\pi t)$ has Nyquist sampling rate as
a) 50 Hz b) 25 Hz c) 100 Hz d) 200 Hz

14) The Laplace transform of unit impulse function as
a) 1 b) 1/s c) 1/(s + 1) d) $1/s^2$

15) If x(n) = u(n) then ROC is
a) Entire z-plane, except z = 0
b) Entire z-plane, except $z = \infty$
c) Entire z-plane
d) Entire z-plane, except z = 0 and $z = \infty$

16) The time shifting property of Fourier transform can be expressed as
a) $x(t + t_0) \leftrightarrow e^{-jwto} X(W)$ b) $x(t - t_0) \leftrightarrow e^{-jwto} X(W)$
c) $x(t - t_0) \leftrightarrow X(W - W_0)$ d) None of these

17) If x(n) exist only for $n \geq 0$ then it is called as _____ sequence.
a) Unilateral b) Bilateral c) Both a) and b) d) None

18) With $\delta(t)$ as unit impulse sequence, $x(t) \,.\, \delta(t - t_0)$ is
a) $x(t) \,.\, \delta(t)$ b) $x(t_0)$
c) $x(t_0) \,.\, \delta(t - t_0)$ d) $x(t - t_0)$

19) If x(t) is an odd signal then
a) x(–t) is even b) $x^2(-t)$ is even
c) $x^2(-t)$ is odd d) $x^2(t)$ is odd

20) In order to get original signal from sampled signal it is necessary to use
a) Low pass filter b) High pass filter
c) Band pass filter d) Band stop filter

SLR-TJ – 360

Seat No.	

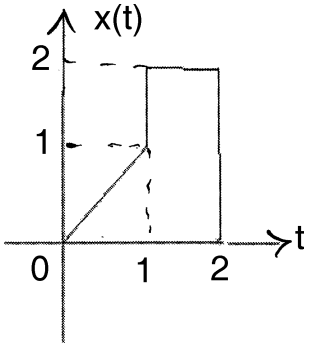
S.E. (Electrical) (Part – II) (Old) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 28-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

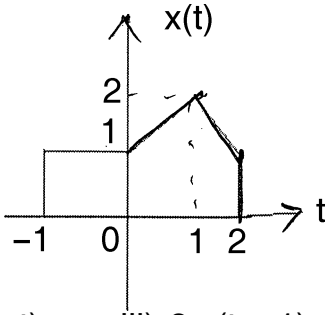
Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***if necessary****.*

SECTION – I

2. Attempt **any four** : **(4×5=20)**
   1) Which of the following signals are causal or non-causal ?
      i) $x(t) = e^{3t}\, u(t)$ ii) $x(t) = u(5 - t)$
   2) Determine fundamental period of following signals :
      i) $x(n) = 2\cos 5n + 6\sin 2n$
      ii) $x(t) = \cos(6\pi t) + 3\sin(2\pi t)$
   3) Find Laplace transform of the signal $x(t) = e^{-5t}\, u(t)$.
   4) Prove the linearity property of Laplace transform.
   5) Find even and odd part of given signal.



3. A) A continuous time signal x(t) is shown below. Sketch the following transformations : **10**



i) $x(t - 2)$ ii) $x(1 - t)$ iii) $3x(t + 1)$ iv) $x(t/2)$ v) $x(3t)$

B) Perform the convolution of following signals : **10**

$x(t) = e^{-5t}\, u(t)$ and $h(t) = u(t)$

OR

B) Obtain Laplace transform of $x(t) = e^{-at} \sin w_0 t\, u(t)$. **10**

SECTION – II

4. Attempt **any four** : **(4×5=20)**

1) Find z-transform of signal $x(n) = (0.5)^n\, u(n) + (0.3)^n\, u(n)$.

2) Find DFT of the signal $x(n) = (1\ 2\ 1\ 2)$.

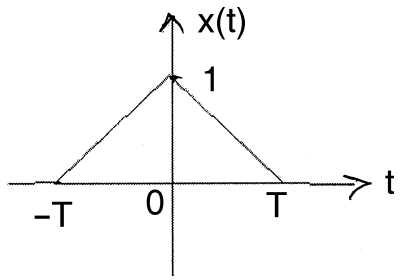
3) Explain sampling theorem.

4) The analog signal x(t) is given as $x(t) = 2\cos 500\pi t + 3\sin 700\pi t$. Find Nyquist sampling rate.

5) Find Fourier transform of signum function.

5. Attempt **any two** : **(2×10=20)**

1) Find Fourier transform of signal shown below :



2) Find inverse z-transform of

$$X(Z) = \frac{3 + 2z^{-1} + z^{-2}}{1 - 3z^{-1} + 2z^{-2}}$$

using power series method.

3) Find inverse z-transform of

$$X(Z) = \frac{0.3 + z}{0.125 + 0.75z + z^2}$$

using partial fraction expansion method.

SLR-TJ – 360

Seat No.	

Set Q

S.E. (Electrical) (Part – II) (Old) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 28-11-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3. Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) ***All*** *questions are* ***compulsory****.*
4) Make suitable assumptions ***if necessary****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) The time shifting property of Fourier transform can be expressed as
   a) $x(t + t_0) \leftrightarrow e^{-jwto} X(W)$ b) $x(t - t_0) \leftrightarrow e^{-jwto} X(W)$
   c) $x(t - t_0) \leftrightarrow X(W - W_0)$ d) None of these

2) If x(n) exist only for $n \geq 0$ then it is called as _____ sequence.
   a) Unilateral b) Bilateral c) Both a) and b) d) None

3) With $\delta(t)$ as unit impulse sequence, $x(t) . \delta(t - t_0)$ is
   a) $x(t) . \delta(t)$ b) $x(t_0)$
   c) $x(t_0) . \delta(t - t_0)$ d) $x(t - t_0)$

4) If x(t) is an odd signal then
   a) x(–t) is even b) $x^2(-t)$ is even
   c) $x^2(-t)$ is odd d) $x^2(t)$ is odd

5) In order to get original signal from sampled signal it is necessary to use
   a) Low pass filter b) High pass filter
   c) Band pass filter d) Band stop filter

6) If average power of the signal satisfies the condition $0 < p < \infty$ is called _____ signal.
   a) Energy b) Power
   c) Neither energy nor power d) Both energy and power

P.T.O.

7) Which of the following is static system ?
a) $y(t) = x(t) + 1$ b) $y(t) = x(t^2)$ c) $y(t) = x(t - 2)$ d) $y(t) = x(-t)$

8) Which of the following is causal system ?
a) $y(t) = x(1 - t)$ b) $y(t) = x(t^2)$ c) $y(t) = x(t - 5)$ d) $y(t) = x(t + 5)$

9) The convolution of $x(n) = \{1\ 1\ 1\}$ and $h(n) = \{1\ 2\ 2\ 1\}$ is
a) {1 3 5 5 3 1} b) {1 3 5 5} c) {1 2 3 5 6} d) {1 2 2 2 1}

10) Any signal x(t) can be represented as
a) $x_e(t) + x_0(t)$ b) $x_e(t) - x_0(t)$ c) $x_e(t)/x_0(t)$ d) $x_e(t).x_0(t)$

11) The time period of $x(t) = \cos(50\ \pi t)$ is
a) 25π b) 1/25
c) $\pi/2$ d) None of the above

12) When the system has poles outside the unit circle in z-domain, then system is
a) Stable b) Unstable c) Cant' say d) None of these

13) Sampling a signal is equivalent to multiplying it with a _____ function.
a) Sync b) Train of impulse
c) Atrain of sync d) Rectangular window

14) Which signal is non-causal ?
a) $x(t) = 0, t < 0$ b) $x(t) = 0, t > 0$ c) $x(t) = 1, t > -2$ d) None

15) The Fourier transform of u(t) is
a) 1/jw b) 1/(1 + jw) c) jw d) $\pi\delta(w) + (1/jw)$

16) The z-transform of $(0.5)^n u(n)$ is
a) $\frac{z}{z-0.5}$ b) $\frac{1}{z-1}$ c) 1 d) $\frac{1}{z}$

17) The Fourier transform of a triangular pulse is a _____ function.
a) Sine b) Cosine c) $(\text{Sinc})^2$ d) Rectangular

18) A signal $x(t) = \cos(100\pi t)$ has Nyquist sampling rate as
a) 50 Hz b) 25 Hz c) 100 Hz d) 200 Hz

19) The Laplace transform of unit impulse function as
a) 1 b) 1/s c) 1/(s + 1) d) $1/s^2$

20) If x(n) = u(n) then ROC is
a) Entire z-plane, except z = 0
b) Entire z-plane, except $z = \infty$
c) Entire z-plane
d) Entire z-plane, except z = 0 and $z = \infty$

SLR-TJ – 360

Seat No.	

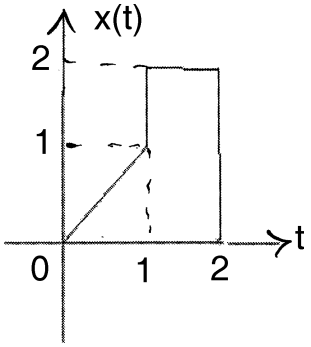
S.E. (Electrical) (Part – II) (Old) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 28-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

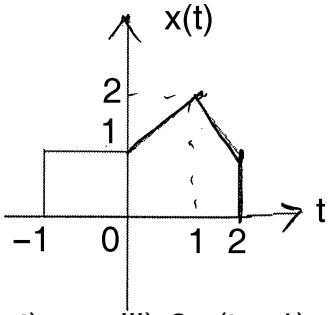
Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***if necessary****.*

SECTION – I

2. Attempt **any four** : **(4×5=20)**
   1) Which of the following signals are causal or non-causal ?
      i) $x(t) = e^{3t}\, u(t)$ ii) $x(t) = u(5 - t)$
   2) Determine fundamental period of following signals :
      i) $x(n) = 2\cos 5n + 6\sin 2n$
      ii) $x(t) = \cos(6\pi t) + 3\sin(2\pi t)$
   3) Find Laplace transform of the signal $x(t) = e^{-5t}\, u(t)$.
   4) Prove the linearity property of Laplace transform.
   5) Find even and odd part of given signal.



3. A) A continuous time signal x(t) is shown below. Sketch the following transformations : **10**



i) $x(t - 2)$ ii) $x(1 - t)$ iii) $3x(t + 1)$ iv) $x(t/2)$ v) $x(3t)$

B) Perform the convolution of following signals : **10**

$x(t) = e^{-5t}\, u(t)$ and $h(t) = u(t)$

OR

B) Obtain Laplace transform of $x(t) = e^{-at} \sin w_0 t\, u(t)$. **10**

SECTION – II

4. Attempt **any four** : **(4×5=20)**

1) Find z-transform of signal $x(n) = (0.5)^n\, u(n) + (0.3)^n\, u(n)$.

2) Find DFT of the signal $x(n) = (1\ 2\ 1\ 2)$.

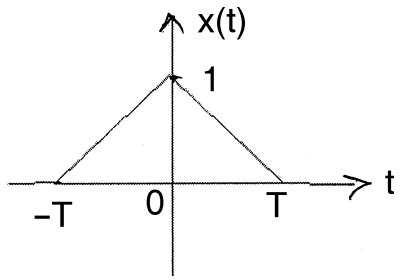
3) Explain sampling theorem.

4) The analog signal x(t) is given as $x(t) = 2\cos 500\pi t + 3\sin 700\pi t$. Find Nyquist sampling rate.

5) Find Fourier transform of signum function.

5. Attempt **any two** : **(2×10=20)**

1) Find Fourier transform of signal shown below :



2) Find inverse z-transform of

$$X(Z) = \frac{3 + 2z^{-1} + z^{-2}}{1 - 3z^{-1} + 2z^{-2}}$$

using power series method.

3) Find inverse z-transform of

$$X(Z) = \frac{0.3 + z}{0.125 + 0.75z + z^2}$$

using partial fraction expansion method.

SLR-TJ – 360

Seat No.	

Set R

S.E. (Electrical) (Part – II) (Old) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 28-11-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) ***All*** *questions are* ***compulsory****.*
4) Make suitable assumptions ***if necessary****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) The z-transform of $(0.5)^n u(n)$ is

a) $\frac{z}{z-0.5}$ b) $\frac{1}{z-1}$ c) 1 d) $\frac{1}{z}$

2) The Fourier transform of a triangular pulse is a _____ function.
a) Sine b) Cosine c) $(\text{Sinc})^2$ d) Rectangular

3) A signal $x(t) = \cos(100\pi t)$ has Nyquist sampling rate as
a) 50 Hz b) 25 Hz c) 100 Hz d) 200 Hz

4) The Laplace transform of unit impulse function as
a) 1 b) 1/s c) 1/(s + 1) d) $1/s^2$

5) If x(n) = u(n) then ROC is
a) Entire z-plane, except z = 0
b) Entire z-plane, except $z = \infty$
c) Entire z-plane
d) Entire z-plane, except z = 0 and $z = \infty$

6) The time shifting property of Fourier transform can be expressed as
a) $x(t + t_0) \leftrightarrow e^{-jwto} X(W)$ b) $x(t - t_0) \leftrightarrow e^{-jwto} X(W)$
c) $x(t - t_0) \leftrightarrow X(W - W_0)$ d) None of these

7) If x(n) exist only for $n \geq 0$ then it is called as _____ sequence.
a) Unilateral b) Bilateral c) Both a) and b) d) None

P.T.O.

8) With $\delta(t)$ as unit impulse sequence, $x(t) \cdot \delta(t - t_0)$ is
   a) $x(t) \cdot \delta(t)$ b) $x(t_0)$
   c) $x(t_0) \cdot \delta(t - t_0)$ d) $x(t - t_0)$
9) If x(t) is an odd signal then
   a) x(–t) is even b) $x^2(-t)$ is even
   c) $x^2(-t)$ is odd d) $x^2(t)$ is odd
10) In order to get original signal from sampled signal it is necessary to use
   a) Low pass filter b) High pass filter
   c) Band pass filter d) Band stop filter
11) If average power of the signal satisfies the condition $0 < p < \infty$ is called _____ signal.
   a) Energy b) Power
   c) Neither energy nor power d) Both energy and power
12) Which of the following is static system ?
   a) $y(t) = x(t) + 1$ b) $y(t) = x(t^2)$ c) $y(t) = x(t - 2)$ d) $y(t) = x(-t)$
13) Which of the following is causal system ?
   a) $y(t) = x(1 - t)$ b) $y(t) = x(t^2)$ c) $y(t) = x(t - 5)$ d) $y(t) = x(t + 5)$
14) The convolution of x(n) = {1 1 1} and h(n) = { 1 2 2 1} is
   a) {1 3 5 5 3 1} b) {1 3 5 5} c) {1 2 3 5 6} d) {1 2 2 2 1}
15) Any signal x(t) can be represented as
   a) $x_e(t) + x_0(t)$ b) $x_e(t) - x_0(t)$ c) $x_e(t)/x_0(t)$ d) $x_e(t).x_0(t)$
16) The time period of $x(t) = \cos(50\pi t)$ is
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17) When the system has poles outside the unit circle in z-domain, then system is
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18) Sampling a signal is equivalent to multiplying it with a _____ function.
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   c) Atrain of sync d) Rectangular window
19) Which signal is non-causal ?
   a) $x(t) = 0, t < 0$ b) $x(t) = 0, t > 0$ c) $x(t) = 1, t > -2$ d) None
20) The Fourier transform of u(t) is
   a) 1/jw b) 1/(1 + jw) c) jw d) $\pi\delta(w) + (1/jw)$

_____

SLR-TJ – 360

Seat No.	

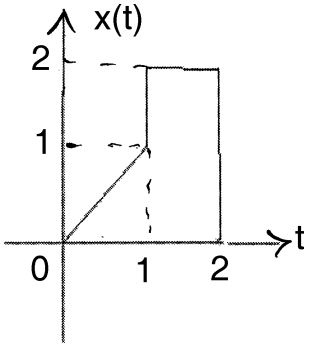
S.E. (Electrical) (Part – II) (Old) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 28-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

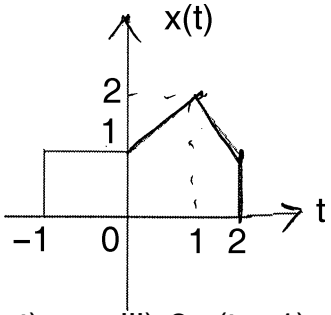
Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***if necessary****.*

SECTION – I

2. Attempt **any four** : **(4×5=20)**
   1) Which of the following signals are causal or non-causal ?
      i) $x(t) = e^{3t}\, u(t)$ ii) $x(t) = u(5 - t)$
   2) Determine fundamental period of following signals :
      i) $x(n) = 2\cos 5n + 6\sin 2n$
      ii) $x(t) = \cos(6\pi t) + 3\sin(2\pi t)$
   3) Find Laplace transform of the signal $x(t) = e^{-5t}\, u(t)$.
   4) Prove the linearity property of Laplace transform.
   5) Find even and odd part of given signal.



3. A) A continuous time signal x(t) is shown below. Sketch the following transformations : **10**



i) $x(t - 2)$ ii) $x(1 - t)$ iii) $3x(t + 1)$ iv) $x(t/2)$ v) $x(3t)$

B) Perform the convolution of following signals : **10**

$x(t) = e^{-5t}\, u(t)$ and $h(t) = u(t)$

OR

B) Obtain Laplace transform of $x(t) = e^{-at} \sin w_0 t\, u(t)$. **10**

SECTION – II

4. Attempt **any four** : **(4×5=20)**

1) Find z-transform of signal $x(n) = (0.5)^n\, u(n) + (0.3)^n\, u(n)$.

2) Find DFT of the signal $x(n) = (1\ 2\ 1\ 2)$.

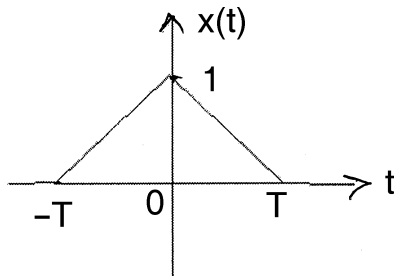
3) Explain sampling theorem.

4) The analog signal x(t) is given as $x(t) = 2\cos 500\pi t + 3\sin 700\pi t$. Find Nyquist sampling rate.

5) Find Fourier transform of signum function.

5. Attempt **any two** : **(2×10=20)**

1) Find Fourier transform of signal shown below :



2) Find inverse z-transform of

$$X(Z) = \frac{3 + 2z^{-1} + z^{-2}}{1 - 3z^{-1} + 2z^{-2}}$$

using power series method.

3) Find inverse z-transform of

$$X(Z) = \frac{0.3 + z}{0.125 + 0.75z + z^2}$$

using partial fraction expansion method.

SLR-TJ – 360

Seat No.	

Set **S**

S.E. (Electrical) (Part – II) (Old) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 28-11-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3. Each*** *question carries* ***one*** *mark.*
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3) ***All*** *questions are* ***compulsory****.*
4) Make suitable assumptions ***if necessary****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) The time period of x(t) = cos(50 π t) is
   a) 25π b) 1/25
   c) π/2 d) None of the above

2) When the system has poles outside the unit circle in z-domain, then system is
   a) Stable b) Unstable c) Cant' say d) None of these

3) Sampling a signal is equivalent to multiplying it with a _____ function.
   a) Sync b) Train of impulse
   c) Atrain of sync d) Rectangular window

4) Which signal is non-causal ?
   a) x(t) = 0, t < 0 b) x(t) = 0, t > 0 c) x(t) = 1, t > – 2 d) None

5) The Fourier transform of u(t) is
   a) 1/jw b) 1/(1 + jw) c) jw d) $\pi\delta(w) + (1/jw)$

6) The z-transform of $(0.5)^n u(n)$ is
   a) $\frac{z}{z-0.5}$ b) $\frac{1}{z-1}$ c) 1 d) $\frac{1}{z}$

7) The Fourier transform of a triangular pulse is a _____ function.
   a) Sine b) Cosine c) $(\text{Sinc})^2$ d) Rectangular

8) A signal x(t) = cos(100 π t) has Nyquist sampling rate as
   a) 50 Hz b) 25 Hz c) 100 Hz d) 200 Hz

P.T.O.

9) The Laplace transform of unit impulse function as
a) 1 b) 1/s c) 1/(s + 1) d) $1/s^2$

10) If x(n) = u(n) then ROC is
a) Entire z-plane, except z = 0
b) Entire z-plane, except z = ∞
c) Entire z-plane
d) Entire z-plane, except z = 0 and z = ∞

11) The time shifting property of Fourier transform can be expressed as
a) $x(t + t_0) \leftrightarrow e^{-jwto} X(W)$ b) $x(t - t_0) \leftrightarrow e^{-jwto} X(W)$
c) $x(t - t_0) \leftrightarrow X(W - W_0)$ d) None of these

12) If x(n) exist only for $n \geq 0$ then it is called as _____ sequence.
a) Unilateral b) Bilateral c) Both a) and b) d) None

13) With $\delta(t)$ as unit impulse sequence, $x(t) \,.\, \delta(t - t_0)$ is
a) $x(t) \,.\, \delta(t)$ b) $x(t_0)$
c) $x(t_0) \,.\, \delta(t - t_0)$ d) $x(t - t_0)$

14) If x(t) is an odd signal then
a) x(–t) is even b) $x^2(-t)$ is even
c) $x^2(-t)$ is odd d) $x^2(t)$ is odd

15) In order to get original signal from sampled signal it is necessary to use
a) Low pass filter b) High pass filter
c) Band pass filter d) Band stop filter

16) If average power of the signal satisfies the condition $0 < p < \infty$ is called _____ signal.
a) Energy b) Power
c) Neither energy nor power d) Both energy and power

17) Which of the following is static system ?
a) y(t) = x(t) + 1 b) $y(t) = x(t^2)$ c) y(t) = x(t – 2) d) y(t) = x(– t)

18) Which of the following is causal system ?
a) y(t) = x(1 – t) b) $y(t) = x(t^2)$ c) y(t) = x(t – 5) d) y(t) = x(t + 5)

19) The convolution of x(n) = {1 1 1} and h(n) = { 1 2 2 1} is
a) {1 3 5 5 3 1} b) {1 3 5 5} c) {1 2 3 5 6} d) {1 2 2 2 1}

20) Any signal x(t) can be represented as
a) $x_e(t) + x_0(t)$ b) $x_e(t) - x_0(t)$ c) $x_e(t)/x_0(t)$ d) $x_e(t).x_0(t)$

_____

SLR-TJ – 360

Seat No.	

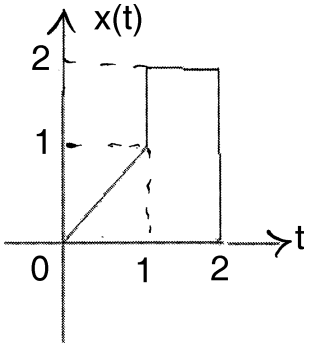
S.E. (Electrical) (Part – II) (Old) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 28-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

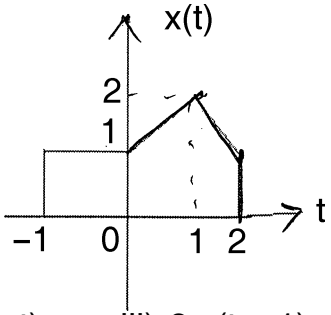
Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***if necessary****.*

SECTION – I

2. Attempt **any four** : **(4×5=20)**
   1) Which of the following signals are causal or non-causal ?
      i) $x(t) = e^{3t}\, u(t)$ ii) $x(t) = u(5 - t)$
   2) Determine fundamental period of following signals :
      i) $x(n) = 2\cos 5n + 6\sin 2n$
      ii) $x(t) = \cos(6\pi t) + 3\sin(2\pi t)$
   3) Find Laplace transform of the signal $x(t) = e^{-5t}\, u(t)$.
   4) Prove the linearity property of Laplace transform.
   5) Find even and odd part of given signal.



3. A) A continuous time signal x(t) is shown below. Sketch the following transformations : **10**



i) $x(t - 2)$ ii) $x(1 - t)$ iii) $3x(t + 1)$ iv) $x(t/2)$ v) $x(3t)$

B) Perform the convolution of following signals : **10**

$x(t) = e^{-5t}\, u(t)$ and $h(t) = u(t)$

OR

B) Obtain Laplace transform of $x(t) = e^{-at} \sin w_0 t\, u(t)$. **10**

SECTION – II

4. Attempt **any four** : **(4×5=20)**

1) Find z-transform of signal $x(n) = (0.5)^n\, u(n) + (0.3)^n\, u(n)$.

2) Find DFT of the signal $x(n) = (1\ 2\ 1\ 2)$.

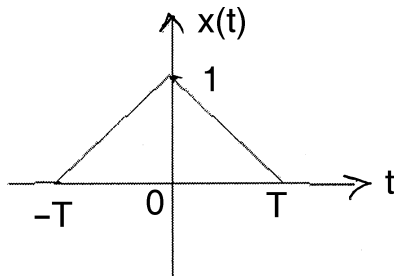
3) Explain sampling theorem.

4) The analog signal x(t) is given as $x(t) = 2\cos 500\pi t + 3\sin 700\pi t$. Find Nyquist sampling rate.

5) Find Fourier transform of signum function.

5. Attempt **any two** : **(2×10=20)**

1) Find Fourier transform of signal shown below :



2) Find inverse z-transform of

$$X(Z) = \frac{3 + 2z^{-1} + z^{-2}}{1 - 3z^{-1} + 2z^{-2}}$$

using power series method.

3) Find inverse z-transform of

$$X(Z) = \frac{0.3 + z}{0.125 + 0.75z + z^2}$$

using partial fraction expansion method.

SLR-TJ – 361

Seat No.	

Set P

S.E. (Electrical) (Part – II) (Old) Examination, 2017
COMPUTER PROGRAMMING C++

Day and Date : Thursday, 30-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer. **(20×1=20)**

1) Which one is not a correct variable type in C++ ?
A) float B) real C) int D) double

2) Which operation is used as Logical 'AND' ?
A) Operator-& B) Operator-|| C) Operator-&& D) Operator+

3) A C++ code line ends with
A) A Semicolon(;) B) A Full stop(.) C) A Comma (,) D) A Slash (/)

4) In C++ program, inline functions are expanded during
A) Run time B) Compile time C) Debug time D) Coding time

5) Preprocessor Directives starts with
A) @ B) # C) $ D) &

6) Which one is compile time polymorphism ?
A) Function overloading B) Operator overloading
C) Compiler overloading D) Virtual functions

7) Default constructor has _____ arguments.
A) No argument B) One argument
C) Two argument D) None of these

8) 'cin' is an
A) Class B) Object C) Package D) Namespace

9) C++ does not supports the following
A) Multilevel inheritance B) Hierarchical inheritance
C) Hybrid inheritance D) None of the above

10) How many number of arguments can a destructor of a class receives ?
A) 0 B) 1
C) 2 D) None of the above

11) Which of the following correctly declares an array ?
A) int array[10]; B) int array;
C) array{10}; D) array array[10];

12) While overloading binary operators using member function, it requires _____ argument/s.
A) Zero B) One C) Two D) Three

13) An operator function is created using _____ keyword.
A) iterator B) allocator C) constructor D) operator

14) Scope resolution operator is used
A) to resolve the scope of global variables only
B) to resolve the scope of functions of the classes only
C) to resolve scope of global variables as well as functions of the classes
D) none of these

15) Private members of the class are not inheritable.
A) True B) False

16) In Multipath inheritance, in order to remove duplicate set of records in child class, we _____
A) Write virtual function in parent classes
B) Write virtual functions is base class
C) Make base class as virtual base class
D) All of these

17) Which of the following are member dereferencing operators in CPP ?
1. * 2. ::
3. ->* 4. ::* 5. ->
A) Only 1, 3, 4 B) Only 1 and 5 C) Only 3 and 4 D) Only 3, 4, 5

18) 'this' is used in C++ as
A) Structure B) Union C) Operator D) Pointer

19) A virtual function that has no definition within the base class is called
A) Pure virtual function B) Pure static function
C) Pure const function D) Friend function

20) If a class contains pure virtual function, then it is termed as
A) Virtual class B) Sealed class
C) Pure local class D) Abstract class

_____

SLR-TJ – 361

Seat No.	

S.E. (Electrical) (Part – II) (Old) Examination, 2017
COMPUTER PROGRAMMING C++

Day and Date : Thursday, 30-11-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Write a note on **any four** of the following : **20**
   a) Features of C++.
   b) Preprocessor directives.
   c) Structures in C++.
   d) Inline functions.
   e) Write a program using class and objects for multiplication of two integer numbers.
   f) Write a program for addition of two complex numbers. Create two objects using constructors.

3. Answer **any two** : **20**
   a) Write in detail about operators in C++.
   b) Explain in detail about destructors in C++.
   c) Explain the concepts of function overloading with example.

SECTION – II

4. Attempt **any four** of the following : **20**
   a) Write a note on array of objects.
   b) Lists the rules for overloading the operators.
   c) Explain in short derived class constructors.
   d) What is meant by private and public inheritance ?
   e) Write a short note on this pointer.

5. Answer **any two** : **20**
   a) Write a program for overloading binary + operator.
   b) Explain detail types of inheritance.
   c) Write a detailed note on friend function with example.

Set P

Set P

SLR-TJ – 361

Seat No.	

Set Q

S.E. (Electrical) (Part – II) (Old) Examination, 2017
COMPUTER PROGRAMMING C++

Day and Date : Thursday, 30-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer. **(20×1=20)**

1) In Multipath inheritance, in order to remove duplicate set of records in child class, we _____
   A) Write virtual function in parent classes
   B) Write virtual functions is base class
   C) Make base class as virtual base class
   D) All of these

2) Which of the following are member dereferencing operators in CPP ?
   1. * 2. ::
   3. ->* 4. ::* 5. ->
   A) Only 1, 3, 4 B) Only 1 and 5 C) Only 3 and 4 D) Only 3, 4, 5

3) 'this' is used in C++ as
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4) A virtual function that has no definition within the base class is called
   A) Pure virtual function B) Pure static function
   C) Pure const function D) Friend function

5) If a class contains pure virtual function, then it is termed as
   A) Virtual class B) Sealed class
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6) Which one is not a correct variable type in C++ ?
   A) float B) real C) int D) double

7) Which operation is used as Logical 'AND' ?
   A) Operator-& B) Operator-|| C) Operator-&& D) Operator+

8) A C++ code line ends with
A) A Semicolon(;) B) A Full stop(.) C) A Comma (,) D) A Slash (/)

9) In C++ program, inline functions are expanded during
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11) Which one is compile time polymorphism ?
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12) Default constructor has _____ arguments.
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C) Two argument D) None of these

13) 'cin' is an
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14) C++ does not supports the following
A) Multilevel inheritance B) Hierarchical inheritance
C) Hybrid inheritance D) None of the above

15) How many number of arguments can a destructor of a class receives ?
A) 0 B) 1
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16) Which of the following correctly declares an array ?
A) int array[10]; B) int array;
C) array{10}; D) array array[10];

17) While overloading binary operators using member function, it requires _____ argument/s.
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18) An operator function is created using _____ keyword.
A) iterator B) allocator C) constructor D) operator

19) Scope resolution operator is used
A) to resolve the scope of global variables only
B) to resolve the scope of functions of the classes only
C) to resolve scope of global variables as well as functions of the classes
D) none of these

20) Private members of the class are not inheritable.
A) True B) False

SLR-TJ – 361

Seat No.	

S.E. (Electrical) (Part – II) (Old) Examination, 2017
COMPUTER PROGRAMMING C++

Day and Date : Thursday, 30-11-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Write a note on **any four** of the following : **20**
   a) Features of C++.
   b) Preprocessor directives.
   c) Structures in C++.
   d) Inline functions.
   e) Write a program using class and objects for multiplication of two integer numbers.
   f) Write a program for addition of two complex numbers. Create two objects using constructors.

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   a) Write in detail about operators in C++.
   b) Explain in detail about destructors in C++.
   c) Explain the concepts of function overloading with example.

SECTION – II

4. Attempt **any four** of the following : **20**
   a) Write a note on array of objects.
   b) Lists the rules for overloading the operators.
   c) Explain in short derived class constructors.
   d) What is meant by private and public inheritance ?
   e) Write a short note on this pointer.

5. Answer **any two** : **20**
   a) Write a program for overloading binary + operator.
   b) Explain detail types of inheritance.
   c) Write a detailed note on friend function with example.

Set Q

SLR-TJ – 361

Seat No.	

Set R

S.E. (Electrical) (Part – II) (Old) Examination, 2017
COMPUTER PROGRAMMING C++

Day and Date : Thursday, 30-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer. **(20×1=20)**

1) Which of the following correctly declares an array ?
   A) int array[10]; B) int array;
   C) array{10}; D) array array[10];

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1. * 2. ::
3. ->* 4. ::* 5. ->
A) Only 1, 3, 4 B) Only 1 and 5 C) Only 3 and 4 D) Only 3, 4, 5

8) 'this' is used in C++ as
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12) Which operation is used as Logical 'AND' ?
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13) A C++ code line ends with
A) A Semicolon(;) B) A Full stop(.) C) A Comma (,) D) A Slash (/)

14) In C++ program, inline functions are expanded during
A) Run time B) Compile time C) Debug time D) Coding time

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A) 0 B) 1
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SLR-TJ – 361

Seat No.	

S.E. (Electrical) (Part – II) (Old) Examination, 2017
COMPUTER PROGRAMMING C++

Day and Date : Thursday, 30-11-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Write a note on **any four** of the following : **20**
   a) Features of C++.
   b) Preprocessor directives.
   c) Structures in C++.
   d) Inline functions.
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   f) Write a program for addition of two complex numbers. Create two objects using constructors.

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SECTION – II

4. Attempt **any four** of the following : **20**
   a) Write a note on array of objects.
   b) Lists the rules for overloading the operators.
   c) Explain in short derived class constructors.
   d) What is meant by private and public inheritance ?
   e) Write a short note on this pointer.

5. Answer **any two** : **20**
   a) Write a program for overloading binary + operator.
   b) Explain detail types of inheritance.
   c) Write a detailed note on friend function with example.

Set R

SLR-TJ – 361

Seat No.	

Set S

S.E. (Electrical) (Part – II) (Old) Examination, 2017
COMPUTER PROGRAMMING C++

Day and Date : Thursday, 30-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer. **(20×1=20)**

1) Which one is compile time polymorphism ?
A) Function overloading B) Operator overloading
C) Compiler overloading D) Virtual functions

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9) Scope resolution operator is used
   A) to resolve the scope of global variables only
   B) to resolve the scope of functions of the classes only
   C) to resolve scope of global variables as well as functions of the classes
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11) In Multipath inheritance, in order to remove duplicate set of records in child class, we _____
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   C) Make base class as virtual base class
   D) All of these

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   1. * 2. ::
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   A) Only 1, 3, 4 B) Only 1 and 5 C) Only 3 and 4 D) Only 3, 4, 5

13) 'this' is used in C++ as
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14) A virtual function that has no definition within the base class is called
   A) Pure virtual function B) Pure static function
   C) Pure const function D) Friend function

15) If a class contains pure virtual function, then it is termed as
   A) Virtual class B) Sealed class
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17) Which operation is used as Logical 'AND' ?
   A) Operator-& B) Operator-|| C) Operator-&& D) Operator+

18) A C++ code line ends with
   A) A Semicolon(;) B) A Full stop(.) C) A Comma (,) D) A Slash (/)

19) In C++ program, inline functions are expanded during
   A) Run time B) Compile time C) Debug time D) Coding time

20) Preprocessor Directives starts with
   A) @ B) # C) $ D) &

SLR-TJ – 361

Seat No.	

S.E. (Electrical) (Part – II) (Old) Examination, 2017
COMPUTER PROGRAMMING C++

Day and Date : Thursday, 30-11-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Write a note on **any four** of the following : **20**
   a) Features of C++.
   b) Preprocessor directives.
   c) Structures in C++.
   d) Inline functions.
   e) Write a program using class and objects for multiplication of two integer numbers.
   f) Write a program for addition of two complex numbers. Create two objects using constructors.

3. Answer **any two** : **20**
   a) Write in detail about operators in C++.
   b) Explain in detail about destructors in C++.
   c) Explain the concepts of function overloading with example.

SECTION – II

4. Attempt **any four** of the following : **20**
   a) Write a note on array of objects.
   b) Lists the rules for overloading the operators.
   c) Explain in short derived class constructors.
   d) What is meant by private and public inheritance ?
   e) Write a short note on this pointer.

5. Answer **any two** : **20**
   a) Write a program for overloading binary + operator.
   b) Explain detail types of inheritance.
   c) Write a detailed note on friend function with example.

Set S

SLR-TJ – 362

Seat No.	

Set P

T.E. (Electrical Engineering) (Part– I) (CGPA) Examination, 2017
POWER SYSTEM ANALYSIS

Day and Date : Wednesday, 29-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00. p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data if ***necessary****.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Objective questions : **14**

1) The per unit value of any quantity is defined as _____

a) (The actual value in any units) × (The base value in the same units)

b) $\frac{\text{The actual value in any units}}{\text{The base value in the same units}}$

c) $\frac{\text{The base value in the any units}}{\text{The actual value in same units}}$

d) $\frac{1}{\text{The actual value in the same units}}$

2) Percentage value is _____ times per unit value.
a) 100 b) 1/100 c) 10 d) 1/10

3) The per unit impedance of a circuit element is 0.40. If the base kV and base MVA are halved, then the new value of per unit impedance of the circuit element will be _____
a) 0.40 b) 0.80 c) 0.20 d) 0.004

4) Normally Z_{bus} Matrix is a
a) Null matrix b) Sparse matrix c) Full matrix d) Unity matrix

5) Which among these quantities are to be determined in slack bus ?
a) P and Q b) Q and |V| c) |V| and δ d) Q and δ

6) In a power system the maximum numbers of buses are _____
a) PV buses b) Slack buses
c) PQ buses d) Any of the above

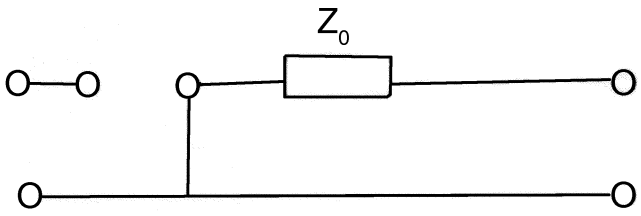
P.T.O.

7) Which one of the following is correct ?

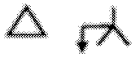
a) $X_d'' = X_d' = X_d$ b) $X_d'' < X_d' < X_d$

c) $X_d'' = \frac{X_d}{2}$ d) $X_d' = \frac{X_d}{2}$

8) Below figure shows the zero sequence network of transformer. Transformer connections are _____



The transformers T_1 and T_2 are connected as :

a) b) c)  d)

9) Which of the following results in a symmetrical fault ?
   a) Single line to ground fault b) Phase to phase fault
   c) All the three phases to earth fault d) Two phase to earth

10) In case of single line to ground fault _____
   a) All sequence networks are connected in parallel
   b) All sequence networks are connected in series
   c) Positive and negative sequence networks are connected in parallel
   d) Zero and negative sequence networks are connected in series

11) Zero sequence fault current is absent when fault is
   a) Single line to ground fault b) Line to line fault
   c) Double line to ground fault d) None of the above

12) If the torque angle keeps on increasing with time, then the system is
   a) Unstable b) Stable
   c) Marginally stable d) None of the above

13) Which of the following method/s can be used to improve the stability of the system ?
   a) Use of double circuit line b) Series compensation of line
   c) Use of bundled conductors d) All of the above

14) In an extra high voltage transmission line ; earth wire is provided to protect the line against _____
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   c) Corona effect d) Ensure fault voltages

_____

SLR-TJ – 362

Seat No.	

T.E. (Electrical Engineering) (Part– I) (CGPA) Examination, 2017
POWER SYSTEM ANALYSIS

Day and Date : Wednesday, 29-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00. p.m.

Instructions *:* *1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data if ***necessary****.*

SECTION – I

2. Solve **any four** : **(4×3=12)**

a) Explain a transient on a transmission line.

b) Express the representation of synchronous machine model in pu (per unit) system.

c) Fig. shows a generator feeding two motors— through transformers and line. The ratings and reactances are as under

Generator – 100 MVA, 11 kV, 3ϕ, x = 20%

Transformer – T_1 – 3ϕ, 100 MVA, 11/132 kV, x = 5%

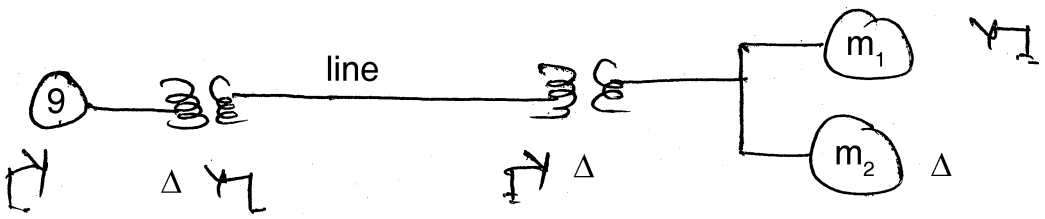
Transformer – T_2 – bank of three 1ϕ transformers, each rated at 35 MVA, 66/11 kV x = 4x

Motor m_1 = 40 MVA, 3ϕ, 10 kV, x = 20x

Motor m_2 = 60 MVA, 3ϕ, 11 kV, x = 15%.

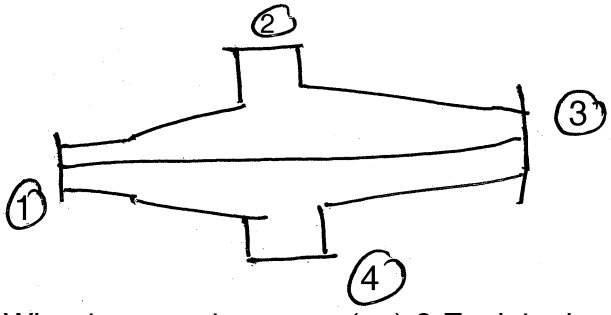
The line reactance is 80Ω.

Select suitable base values. Draw reactance diagram. Indicate pu reactances on the diagram.



d) Determine x bus as shown in fig.

line	Z in pu
1 – 2	0.25 + j1.00
1 – 3	0.20 + j 0.8
1 – 4	0.30 + j 1.2
2 – 3	0.20 + j 0.8
3 – 4	0.15 + j 0.6



e) What is per unit system (pu) ? Explain the advantages of pu system.

3. a) A synchronous generator feeds bus – 1 of a system. A power network feeds bus – 2 of the system. Buses – 1 and 2 are connected through a transformer and a x^n line. Per unit reactances of the various compounds are
Gen^r – (connected to BB 1) = 0.25
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The power network can be represented by a generator with a reactance (unknown in series)
With the generator on no load and with 1.0 pu voltage at each bus under operating condition. A 3ϕ short circuit occurring on bus 1. Causes a current of 5.0 pu to flow into the fault. Determine the equivalent reactance of the power system network. **8**

b) Write a short note on selection of circuit breaker. **8**

OR

b) Write a computation calculation algorithmic method of Gauss Seidel methods. **8**

SECTION – II

4. Solve **any four** : **(4×3=12)**

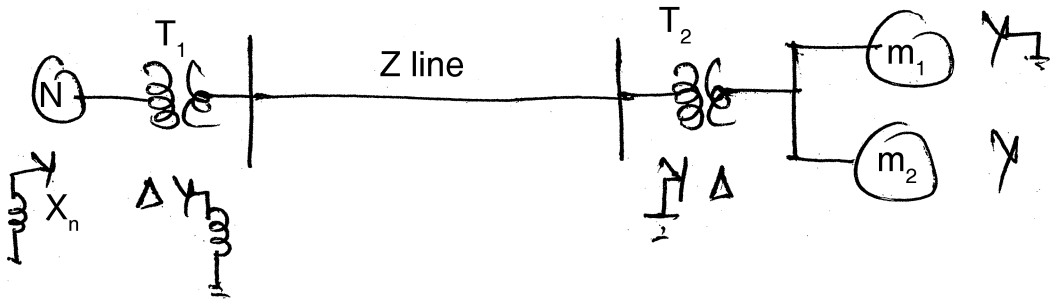
a) Explain the phenomena of lightening. Give the names of different types of lighting arresters.

b) Derive an inter connection of sequence network for a LG fault.

c) The line current in a 3ϕ system are $I_a = 5\angle 60^\circ$, $I_b = 5\angle -60^\circ$ and $I_e = 0$ A. Find the symmetrical components.

d) Explain how an unbalanced set of 3ϕ voltages can be represented by three set of symmetrical components.

e) Draw the zero sequence diagram of the following power system n/w.

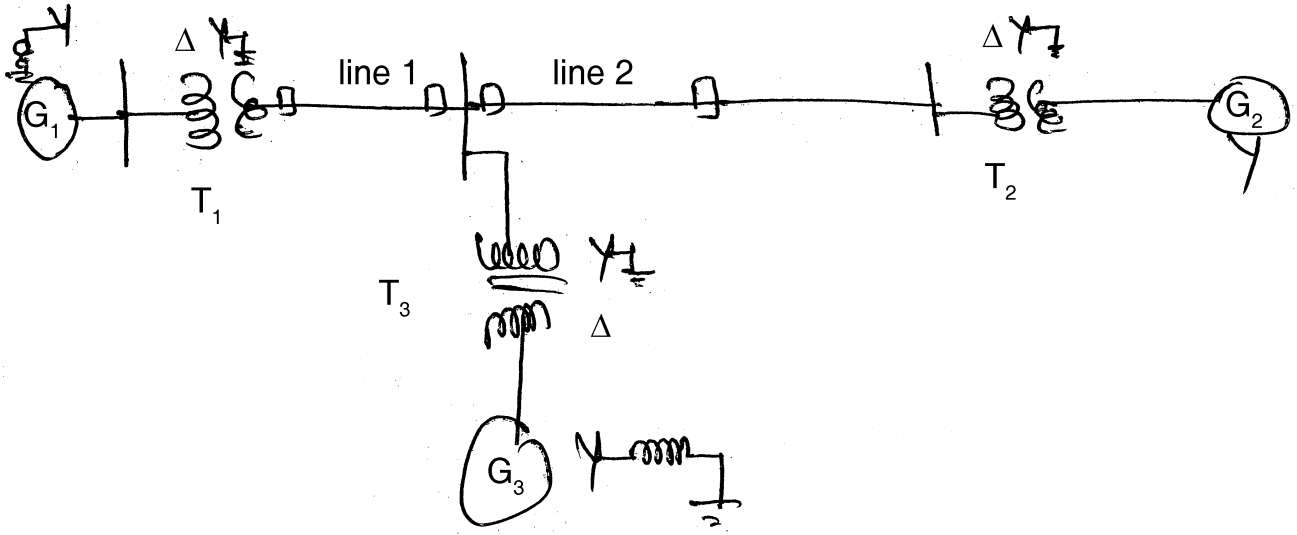


5. Solve **any two** : **(8×2=16)**

a) Draw a diagram showing inter connection of sequence n/w for double line to ground fault. Derive an expression for the currents and voltage.

b) Determine the fault current in each phase following a double line to ground fault occurs at the terminals of star connected systems synchronous machine is operating initially at no load open circuit voltage of 1.0 pu. The +ve, –ve and zero sequence reactance of generator are respectively j0.35, j0.25 and j0.20 and its star point is isolated from ground.

c) For the power system shown in figure draw +ve, –ve and zero sequence networks.



Set P

SLR-TJ – 362

Seat No.	

Set Q

T.E. (Electrical Engineering) (Part– I) (CGPA) Examination, 2017
POWER SYSTEM ANALYSIS

Day and Date : Wednesday, 29-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00. p.m.

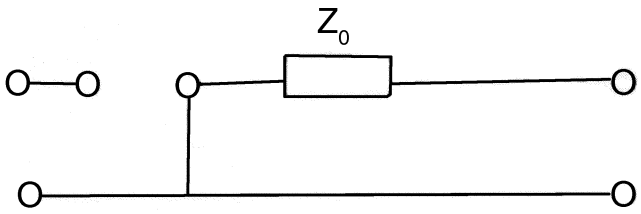
Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data if ***necessary****.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Objective questions : **14**

1) Below figure shows the zero sequence network of transformer. Transformer connections are _____



The transformers T_1 and T_2 are connected as :

a) b) c) d)

2) Which of the following results in a symmetrical fault ?
   a) Single line to ground fault b) Phase to phase fault
   c) All the three phases to earth fault d) Two phase to earth

3) In case of single line to ground fault _____
   a) All sequence networks are connected in parallel
   b) All sequence networks are connected in series
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4) Zero sequence fault current is absent when fault is
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5) If the torque angle keeps on increasing with time, then the system is
   a) Unstable
   b) Stable
   c) Marginally stable
   d) None of the above

6) Which of the following method/s can be used to improve the stability of the system ?
   a) Use of double circuit line
   b) Series compensation of line
   c) Use of bundled conductors
   d) All of the above

7) In an extra high voltage transmission line ; earth wire is provided to protect the line against _____
   a) Switching surge
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   c) Corona effect
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8) The per unit value of any quantity is defined as _____
   a) (The actual value in any units) × (The base value in the same units)
   b) $\frac{\text{The actual value in any units}}{\text{The base value in the same units}}$
   c) $\frac{\text{The base value in the any units}}{\text{The actual value in same units}}$
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9) Percentage value is _____ times per unit value.
   a) 100
   b) 1/100
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10) The per unit impedance of a circuit element is 0.40. If the base kV and base MVA are halved, then the new value of per unit impedance of the circuit element will be _____
   a) 0.40
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12) Which among these quantities are to be determined in slack bus ?
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13) In a power system the maximum numbers of buses are _____
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14) Which one of the following is correct ?
   a) $X_d'' = X_d' = X_d$
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SLR-TJ – 362

Seat No.	

T.E. (Electrical Engineering) (Part– I) (CGPA) Examination, 2017
POWER SYSTEM ANALYSIS

Day and Date : Wednesday, 29-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00. p.m.

Instructions *:* *1)* ***All*** *questions are* ***compulsory****.*
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SECTION – I

2. Solve **any four** : **(4×3=12)**

a) Explain a transient on a transmission line.

b) Express the representation of synchronous machine model in pu (per unit) system.

c) Fig. shows a generator feeding two motors— through transformers and line. The ratings and reactances are as under

Generator – 100 MVA, 11 kV, 3ϕ, x = 20%

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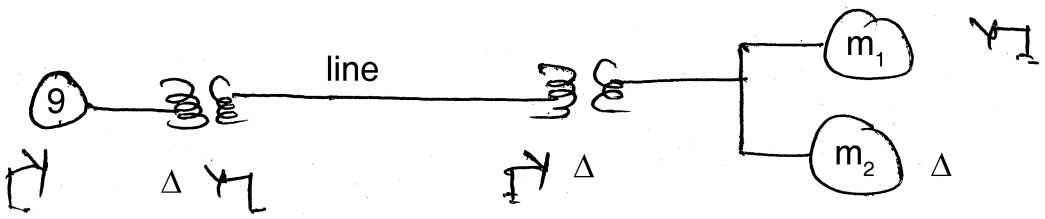
The line reactance is 80Ω.

Select suitable base values. Draw reactance diagram. Indicate pu reactances on the diagram.



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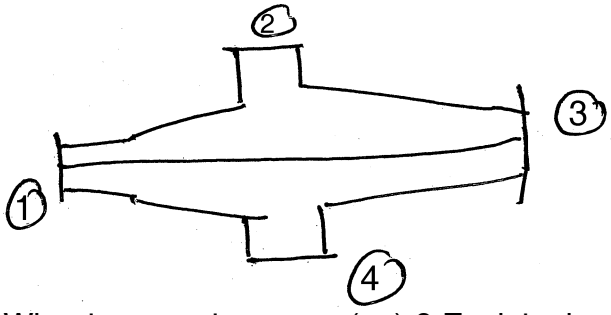

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SECTION – II

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a) Explain the phenomena of lightening. Give the names of different types of lighting arresters.

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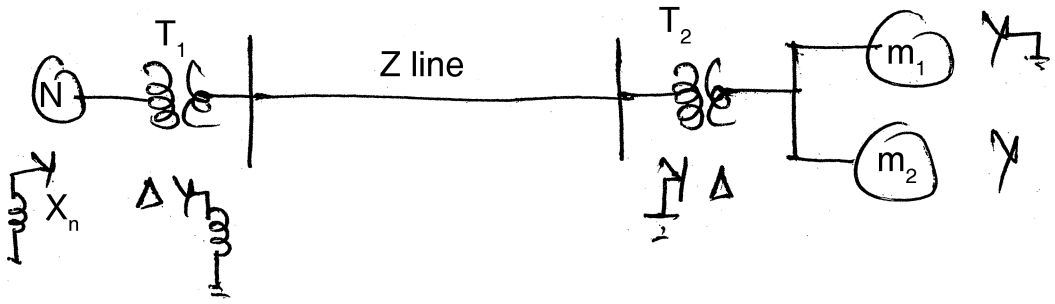

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a) Draw a diagram showing inter connection of sequence n/w for double line to ground fault. Derive an expression for the currents and voltage.

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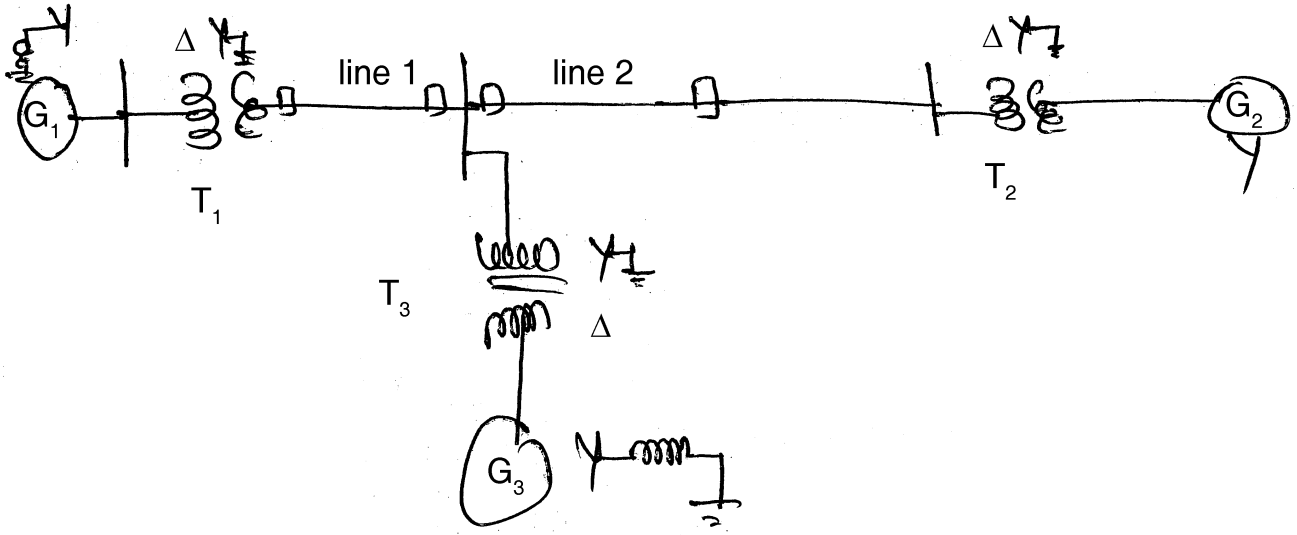
c) For the power system shown in figure draw +ve, –ve and zero sequence networks.



Set Q

SLR-TJ – 362

Seat No.	

Set R

T.E. (Electrical Engineering) (Part– I) (CGPA) Examination, 2017
POWER SYSTEM ANALYSIS

Day and Date : Wednesday, 29-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00. p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Objective questions : **14**

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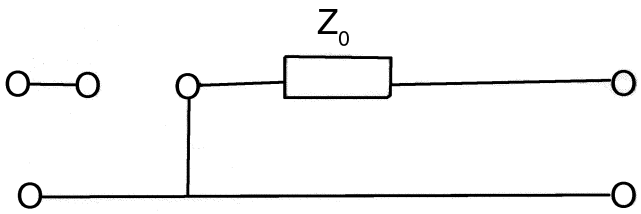

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P.T.O.

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_____

SLR-TJ – 362

Seat No.	

T.E. (Electrical Engineering) (Part– I) (CGPA) Examination, 2017
POWER SYSTEM ANALYSIS

Day and Date : Wednesday, 29-11-2017 Marks : 56
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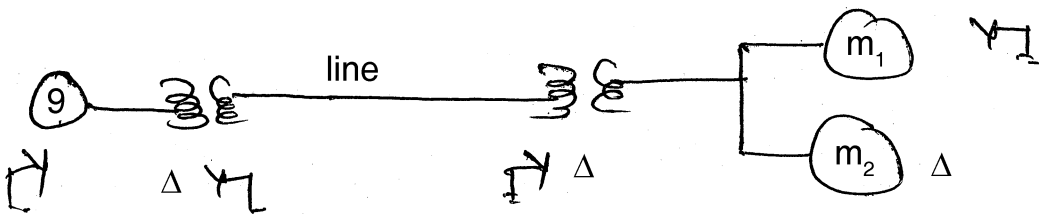

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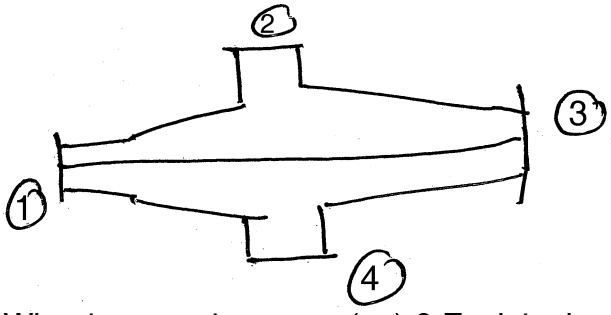

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SECTION – II

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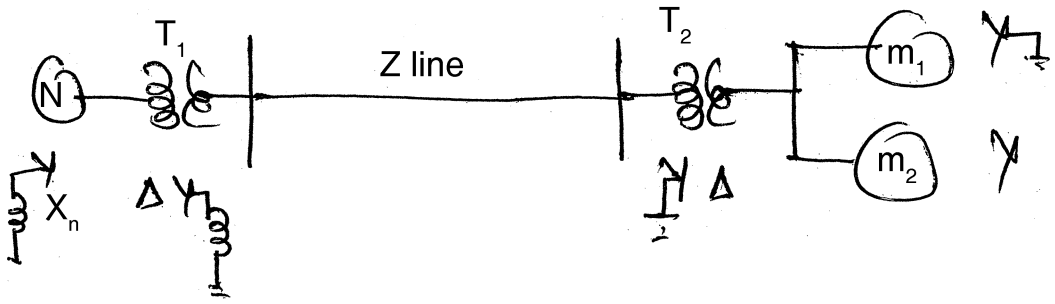

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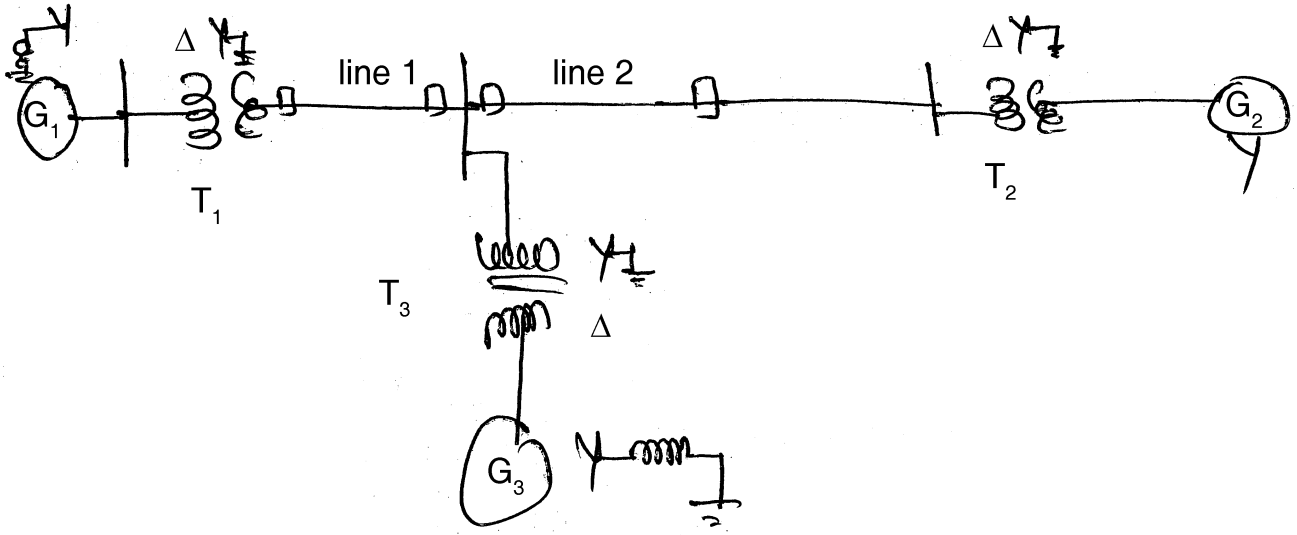

Set R

SLR-TJ – 362

Seat No.	

Set S

T.E. (Electrical Engineering) (Part– I) (CGPA) Examination, 2017
POWER SYSTEM ANALYSIS

Day and Date : Wednesday, 29-11-2017 Max. Marks : 70
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4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Objective questions : **14**

1) In case of single line to ground fault _____
   a) All sequence networks are connected in parallel
   b) All sequence networks are connected in series
   c) Positive and negative sequence networks are connected in parallel
   d) Zero and negative sequence networks are connected in series

2) Zero sequence fault current is absent when fault is
   a) Single line to ground fault
   b) Line to line fault
   c) Double line to ground fault
   d) None of the above

3) If the torque angle keeps on increasing with time, then the system is
   a) Unstable b) Stable
   c) Marginally stable d) None of the above

4) Which of the following method/s can be used to improve the stability of the system ?
   a) Use of double circuit line b) Series compensation of line
   c) Use of bundled conductors d) All of the above

5) In an extra high voltage transmission line ; earth wire is provided to protect the line against _____
   a) Switching surge
   b) Lightening surge
   c) Corona effect
   d) Ensure fault voltages

6) The per unit value of any quantity is defined as _____

   a) (The actual value in any units) × (The base value in the same units)

   b) $\dfrac{\text{The actual value in any units}}{\text{The base value in the same units}}$

   c) $\dfrac{\text{The base value in the any units}}{\text{The actual value in same units}}$

   d) $\dfrac{1}{\text{The actual value in the same units}}$

7) Percentage value is _____ times per unit value.
   a) 100 b) 1/100 c) 10 d) 1/10

8) The per unit impedance of a circuit element is 0.40. If the base kV and base MVA are halved, then the new value of per unit impedance of the circuit element will be _____
   a) 0.40 b) 0.80 c) 0.20 d) 0.004

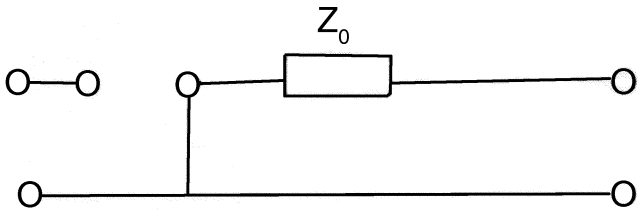
9) Normally Z_{bus} Matrix is a
   a) Null matrix b) Sparse matrix c) Full matrix d) Unity matrix

10) Which among these quantities are to be determined in slack bus ?
   a) P and Q b) Q and |V| c) |V| and δ d) Q and δ

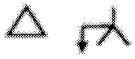
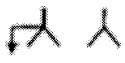
11) In a power system the maximum numbers of buses are _____
   a) PV buses b) Slack buses
   c) PQ buses d) Any of the above

12) Which one of the following is correct ?
   a) $X_d'' = X_d' = X_d$ b) $X_d'' < X_d' < X_d$
   c) $X_d'' = \dfrac{X_d}{2}$ d) $X_d' = \dfrac{X_d}{2}$

13) Below figure shows the zero sequence network of transformer. Transformer connections are _____



   The transformers T_1 and T_2 are connected as :

   a) b) c)  d) 

14) Which of the following results in a symmetrical fault ?
   a) Single line to ground fault b) Phase to phase fault
   c) All the three phases to earth fault d) Two phase to earth

_____

SLR-TJ – 362

Seat No.	

T.E. (Electrical Engineering) (Part– I) (CGPA) Examination, 2017
POWER SYSTEM ANALYSIS

Day and Date : Wednesday, 29-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00. p.m.

Instructions *:* *1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data if ***necessary****.*

SECTION – I

2. Solve **any four** : **(4×3=12)**

a) Explain a transient on a transmission line.

b) Express the representation of synchronous machine model in pu (per unit) system.

c) Fig. shows a generator feeding two motors— through transformers and line. The ratings and reactances are as under

Generator – 100 MVA, 11 kV, 3ϕ, x = 20%

Transformer – T_1 – 3ϕ, 100 MVA, 11/132 kV, x = 5%

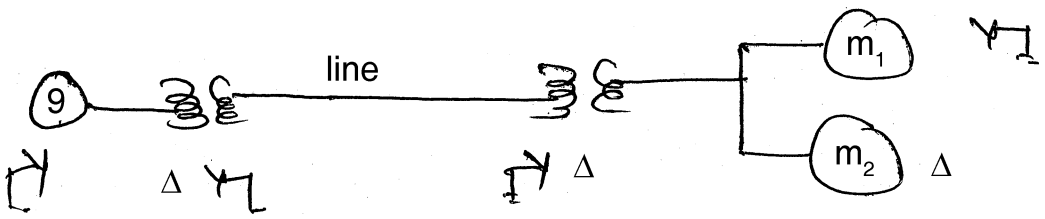
Transformer – T_2 – bank of three 1ϕ transformers, each rated at 35 MVA, 66/11 kV x = 4x

Motor m_1 = 40 MVA, 3ϕ, 10 kV, x = 20x

Motor m_2 = 60 MVA, 3ϕ, 11 kV, x = 15%.

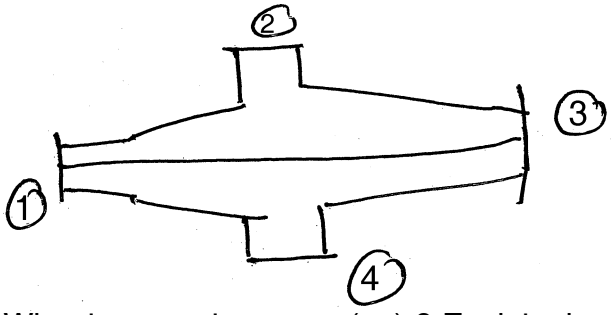
The line reactance is 80Ω.

Select suitable base values. Draw reactance diagram. Indicate pu reactances on the diagram.



d) Determine x bus as shown in fig.

line	Z in pu
1 – 2	0.25 + j1.00
1 – 3	0.20 + j 0.8
1 – 4	0.30 + j 1.2
2 – 3	0.20 + j 0.8
3 – 4	0.15 + j 0.6



e) What is per unit system (pu) ? Explain the advantages of pu system.

3. a) A synchronous generator feeds bus – 1 of a system. A power network feeds bus – 2 of the system. Buses – 1 and 2 are connected through a transformer and a x^n line. Per unit reactances of the various compounds are
Gen^r – (connected to BB 1) = 0.25
Transformer = 0.12
Transmission line = 0.28
The power network can be represented by a generator with a reactance (unknown in series)
With the generator on no load and with 1.0 pu voltage at each bus under operating condition. A 3ϕ short circuit occurring on bus 1. Causes a current of 5.0 pu to flow into the fault. Determine the equivalent reactance of the power system network. **8**

b) Write a short note on selection of circuit breaker. **8**

OR

b) Write a computation calculation algorithmic method of Gauss Seidel methods. **8**

SECTION – II

4. Solve **any four** : **(4×3=12)**

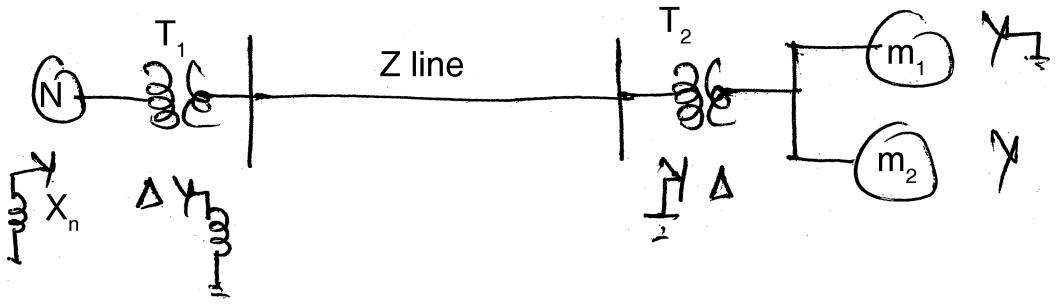
a) Explain the phenomena of lightening. Give the names of different types of lighting arresters.

b) Derive an inter connection of sequence network for a LG fault.

c) The line current in a 3ϕ system are $I_a = 5\angle 60^\circ$, $I_b = 5\angle -60^\circ$ and $I_e = 0$ A. Find the symmetrical components.

d) Explain how an unbalanced set of 3ϕ voltages can be represented by three set of symmetrical components.

e) Draw the zero sequence diagram of the following power system n/w.

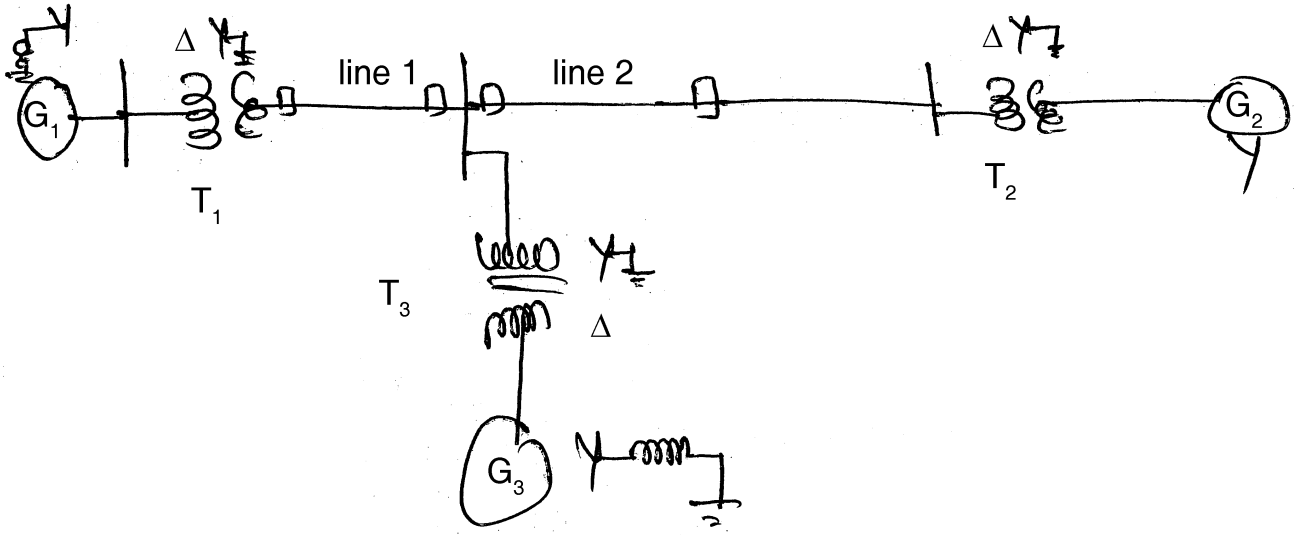


5. Solve **any two** : **(8×2=16)**

a) Draw a diagram showing inter connection of sequence n/w for double line to ground fault. Derive an expression for the currents and voltage.

b) Determine the fault current in each phase following a double line to ground fault occurs at the terminals of star connected systems synchronous machine is operating initially at no load open circuit voltage of 1.0 pu. The +ve, –ve and zero sequence reactance of generator are respectively j0.35, j0.25 and j0.20 and its star point is isolated from ground.

c) For the power system shown in figure draw +ve, –ve and zero sequence networks.



Set S

SLR-TJ – 363

Seat No.	

Set P

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 2-12-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) _____ helps to control the inventory which is more valued.
A) Make or buy decision B) EOQ
C) Value engineering D) ABC analysis

2) Which of the following is having limited liability of members ?
A) Partnership B) Public limited company
C) Proprietorship D) All of above

3) ICAR means
A) Indian Council for Aeronautical Research
B) Indian Council for Atomic Research
C) Indian Council for Agricultural Research
D) India's Centralized Academic Research

4) 2012-2017 is a _____ five year plan.
A) 10th B) 14th C) 13th D) 12th

5) Economics is important for engineers because
A) They improve and increase production
B) They reduce human efforts and increase wealth
C) Both A) and B)
D) None of the above

6) In ABC analysis, A items should be under tight control and accurate record to be maintained of the material
A) The statement is correct
B) The statement is wrong
C) The statement is neither right nor wrong
D) The statement is irrelevant

7) Cost ratio analysis is useful for
   A) For short, medium and long term planning
   B) For diagnosis of industrial sickness
   C) For decision making in organization
   D) All of the above

8) Reasons for Entrepreneurial failure is
   A) Poor management and technology B) Financial problem
   C) Production problem D) All of above

9) Which of the following factors should not be considered for deciding type of MIS ?
   A) Purpose B) Accuracy C) Area of Land D) Frequency

10) Electricity Act, 2003
   A) Empowers electrical inspectors to carry out inspections entering the premises
   B) Ensures safety in the premises
   C) Encourages electricity production by facilitating energy production by non renewable energy sources
   D) All of above

11) Entrepreneurship development means and includes
   A) Creation of jobs for unemployed
   B) Imposing GST on new entrepreneurs
   C) Making more stringent acts to take loans from bank
   D) Absorbing in the job by Government job

12) Thermal energy source
   A) Exhausts with its use
   B) Can be renewed as and when wants
   C) Both of above
   D) None of the above

13) Planning of project means to complete it within specific time limit irrespective of cost element
   A) The statement is absolutely correct
   B) The statement is totally false
   C) The statement is partially correct
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14) CPM stands for
   A) Critical Process Management
   B) Critical Product Method
   C) Critical Path Method
   D) Critical Process Method

SLR-TJ – 363

Seat No.	

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 2-12-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Short notes (**any four**) : **(4×4=16)**
   A) Value Engineering
   B) Problems of Agricultural sector in India
   C) Line and Staff organization
   D) Economic Order Quantity
   E) Importance of Engineering Economics.

3. Attempt the following : **12**
   A) Explain ABC analysis in detail with suitable example.
   B) Discuss organization structure and characteristics.

   OR

   B) Write in detail the efforts taken by Indian government related to development of Science and Technology.

SECTION – II

4. Write a short note on **any four** : **(4×4=16)**
   A) Functions of Management.
   B) PERT method.
   C) Characteristics of Good Management Information System.
   D) Cottage Industry.
   E) Key factors in deciding location of industry.

5. What are characteristics/qualities of Entrepreneur ? **6**

6. Explain advantages of a Small Scale Industry. **6**

   OR

   Explain in detail Electricity Act, 2003 and its amendments.

Set P

Set P

SLR-TJ – 363

Seat No.	

Set **Q**

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 2-12-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Reasons for Entrepreneurial failure is
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   B) 14th
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SLR-TJ – 363

Seat No.	

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 2-12-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

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   OR

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Set Q

Set Q

SLR-TJ – 363

Seat No.	

Set R

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 2-12-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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_____

SLR-TJ – 363

Seat No.	

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 2-12-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

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SECTION – II

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   C) Characteristics of Good Management Information System.
   D) Cottage Industry.
   E) Key factors in deciding location of industry.

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   OR

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Set R

Set R

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Seat No.	

Set **S**

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 2-12-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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14) Which of the following factors should not be considered for deciding type of MIS ?
   A) Purpose B) Accuracy C) Area of Land D) Frequency

SLR-TJ – 363

Seat No.	

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 2-12-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Short notes (**any four**) : **(4×4=16)**
   A) Value Engineering
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SECTION – II

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5. What are characteristics/qualities of Entrepreneur ? **6**

6. Explain advantages of a Small Scale Industry. **6**

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   Explain in detail Electricity Act, 2003 and its amendments.

Set S

Set S

SLR-TJ – 364

Seat No.	

Set P

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
ELECTROMAGNETIC ENGINEERING

Day and Date : Tuesday, 5-12-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume ***suitable*** *data and mention it, if* ***necessary****.*
4) ***Use*** *of non-programmable calculator is* ***allowed****.*
5) ***All*** *questions are* ***compulsory****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternative : **(14×1=14)**

1) For a vector $D = Z\hat{a}_x + (x+y)\hat{a}_y$ the Z component of the vector in cylindrical coordinates will be
   a) Z
   b) $Z\cos\phi + (x+y)\sin\phi$
   c) $-Z\sin\phi + (x+y)\cos\phi$
   d) Zero

2) The electric field E is _____ to the electric equipotential lines.
   a) Tangential
   b) Opposite
   c) Normal
   d) Unrelated

3) In Dot product of unit vector in spherical and rectangular coordinate system for $a_y \cdot a_\theta$ is
   a) $\cos\theta\sin\phi$
   b) $\cos\theta\cos\phi$
   c) $\sin\theta\sin\phi$
   d) $\sin\theta\cos\phi$

4) The electric flux density D is measured in
   a) c/m
   b) c/m^2
   c) c/m^3
   d) c

5) The unit of dipole moment is
   a) c/m
   b) c/m^2
   c) c/m^3
   d) c

P.T.O.

6) $\nabla \cdot E$ for field of uniform line charge in cylindrical coordinates is
   a) 0 b) 1
   c) Infinite d) None of the above

7) The electric field due to electric dipole is
   a) proportional to distance from dipole
   b) proportional to square distance from dipole
   c) proportional to inverse square distance from dipole
   d) proportional to inverse cube of distance from dipole

8) A magnetic field exists around
   a) Iron b) Copper
   c) Aluminium d) Moving charges

9) A conductor of length L has current I passing through it, when it is placed parallel to a magnetic field. The force experienced by the conductor will be
   a) Zero b) BLI c) B^2LI d) BLI^2

10) Materials subjected to rapid reversal of magnetism should have
   a) large area of B – H loop
   b) high permeability and low hysteresis loss
   c) high co-ercivity and high reten-tivity
   d) high co-ercivity and low density

11) When a magnet is in motion relative to a coil the induced e.m.f. does not depend upon
   a) resistance of the coil b) motion of the magnet
   c) number of turns of the coil d) pole strength of the magnet

12) A 200 turn coil has an inductance of 12 mH. If the number of turns is increased to 400 turns, all other quantities (area, length etc.) remaining the same, the inductance will be
   a) 6 mH b) 14 mH c) 24 mH d) 48 mH

13) The force on a charge moving with velocity v under the influence of electric and magnetic fields is given by which one of the following ?
   a) $q(E + B \times V)$ b) $q(E + V \times B)$
   c) $q(H + V \times E)$ d) $q(E + V \times H)$

14) If the static magnetic flux density is B, then
   a) Curl of B = 0 b) Divergence of B = 0
   c) Curl of B = J d) Divergence of B = J

SLR-TJ – 364

Seat No.	

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
ELECTROMAGNETIC ENGINEERING

Day and Date : Tuesday, 5-12-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *i)* ***All*** *questions are* ***compulsory****.*
ii) Assume ***suitable*** *data and mention it, if* ***necessary****.*
iii) ***Use*** *of non-programmable calculator is* ***allowed****.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

a) Transform the given vector $A = 2xy\ \hat{a}_x - 5\ (x+y+z)\hat{a}_2$ at $(2, 60^\circ, 3)$ into cylindrical co-ordinate system.

b) Two point charges A = 20 nc and B = 10 nc are separated from each other by a distance of 25 cm in free space. Calculate the electric field at point 'P' that is 15 cm away from A and 20 cm away from B.

c) A point charge of 1 μc is located at origin of a cylindrical co-ordinate system. Determine the potential between two points 1 m and 2 m radially away from the origin.

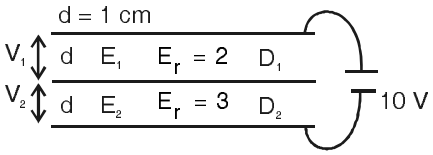
d) Given potential $V = \frac{10}{r^2}\ \sin\theta \cos\phi$. Find electric flux density D at $\left(2, \pi/2, 0\right)$.

e) Evaluate $\nabla \cdot A$ given $A = xy\ a_x + yz\ a_y + zx\ a_z$.

f) Derive continuity of current equation.

3. Solve **any two** : **(2×6=12)**

a) Determine E_1, D_1, V_1, E_2, D_2 and V_2 for following geometry



b) The point charges – 1 nc, 4 nc and 3 nc are located at (0, 0, 0), (0, 0, 1) and (1, 0, 0) respectively. Find the energy in system.

c) Derive divergence theorem.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Prove that divergence of curl of a vector is zero using Stoke's Theorem.

b) A line y = 1, z = 4 carries filamentary current 50π mA along $\bar{a}x$ while the z = 0 plane carries 20 mA/m along $\bar{a}x$. Find H at (3, 4, 5).

c) A point charge of 10 C moves with a uniform velocity of $2\bar{a}_x - 4\bar{a}_z$ m/s in an electromagnetic field having $E = \bar{a}_x - 3\bar{a}_y + 8\bar{a}_z$ V/m and $B = 0.3\bar{a}_x + 0.1\bar{a}_y$ Wb/m. Find (a) Electric Force Fe (b) Magnetic Force Fm.

d) Explain scalar and vector Magnetic Potential.

e) Derive the Maxwell's equation from Ampere's law for static field in integral and point form.

5. Solve **any two** : **(2×6=12)**

a) Derive the Maxwell's equation from Gauss Law for electric and magnetic fields for time varying fields.

b) Two homogeneous, linear and isotropic media have an interface at x = 0. x < 0 describes medium 1 and x > 0 describes medium 2. $\mu_{r1} = 2$ and $\mu_{r2} = 5$. The magnetic field in medium 1 is $150\bar{a}_x - 400\bar{a}_y + 250\bar{a}_z$ A/m.

Determine :

i) Magnetic field in medium 2

ii) Magnetic flux density in medium 1

iii) Magnetic flux density in medium 2.

c) Derive the magnetic field intensity due to an infinite wire carrying a current using Biot-Savart law.

SLR-TJ – 364

Seat No.	

Set **Q**

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
ELECTROMAGNETIC ENGINEERING

Day and Date : Tuesday, 5-12-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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3) Assume ***suitable*** *data and mention it, if* ***necessary****.*
4) ***Use*** *of non-programmable calculator is* ***allowed****.*
5) ***All*** *questions are* ***compulsory****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternative : **(14×1=14)**

1) A magnetic field exists around
   a) Iron b) Copper
   c) Aluminium d) Moving charges

2) A conductor of length L has current I passing through it, when it is placed parallel to a magnetic field. The force experienced by the conductor will be
   a) Zero b) BLI c) B^2LI d) BLI^2

3) Materials subjected to rapid reversal of magnetism should have
   a) large area of B – H loop
   b) high permeability and low hysteresis loss
   c) high co-ercivity and high reten-tivity
   d) high co-ercivity and low density

4) When a magnet is in motion relative to a coil the induced e.m.f. does not depend upon
   a) resistance of the coil b) motion of the magnet
   c) number of turns of the coil d) pole strength of the magnet

5) A 200 turn coil has an inductance of 12 mH. If the number of turns is increased to 400 turns, all other quantities (area, length etc.) remaining the same, the inductance will be
a) 6 mH b) 14 mH c) 24 mH d) 48 mH

6) The force on a charge moving with velocity v under the influence of electric and magnetic fields is given by which one of the following ?
a) $q(E + B \times V)$ b) $q(E + V \times B)$
c) $q(H + V \times E)$ d) $q(E + V \times H)$

7) If the static magnetic flux density is B, then
a) Curl of B = 0 b) Divergence of B = 0
c) Curl of B = J d) Divergence of B = J

8) For a vector $D = Z\hat{a}_x + (x + y)\hat{a}_y$ the Z component of the vector in cylindrical coordinates will be
a) Z b) $Z\cos\phi + (x + y)\sin\phi$
c) $-Z\sin\phi + (x + y)\cos\phi$ d) Zero

9) The electric field E is _____ to the electric equipotential lines.
a) Tangential b) Opposite
c) Normal d) Unrelated

10) In Dot product of unit vector in spherical and rectangular coordinate system for $a_y \cdot a_\theta$ is
a) $\cos\theta \sin\phi$ b) $\cos\theta \cos\phi$
c) $\sin\theta \sin\phi$ d) $\sin\theta \cos\phi$

11) The electric flux density D is measured in
a) c/m b) c/m^2 c) c/m^3 d) c

12) The unit of dipole moment is
a) c/m b) c/m^2 c) c/m^3 d) c

13) $\nabla \cdot E$ for field of uniform line charge in cylindrical coordinates is
a) 0 b) 1
c) Infinite d) None of the above

14) The electric field due to electric dipole is
a) proportional to distance from dipole
b) proportional to square distance from dipole
c) proportional to inverse square distance from dipole
d) proportional to inverse cube of distance from dipole

SLR-TJ – 364

Seat No.	

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
ELECTROMAGNETIC ENGINEERING

Day and Date : Tuesday, 5-12-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *i)* ***All*** *questions are* ***compulsory****.*
ii) Assume ***suitable*** *data and mention it, if* ***necessary****.*
iii) ***Use*** *of non-programmable calculator is* ***allowed****.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

a) Transform the given vector $A = 2xy\ \hat{a}_x - 5\ (x+y+z)\hat{a}_2$ at $(2, 60^\circ, 3)$ into cylindrical co-ordinate system.

b) Two point charges A = 20 nc and B = 10 nc are separated from each other by a distance of 25 cm in free space. Calculate the electric field at point 'P' that is 15 cm away from A and 20 cm away from B.

c) A point charge of 1 μc is located at origin of a cylindrical co-ordinate system. Determine the potential between two points 1 m and 2 m radially away from the origin.

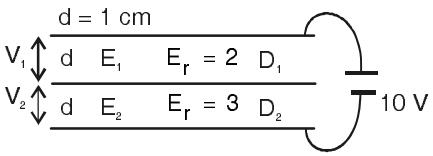
d) Given potential $V = \frac{10}{r^2}\ \sin\theta \cos\phi$. Find electric flux density D at $\left(2, \pi/2, 0\right)$.

e) Evaluate $\nabla \cdot A$ given $A = xy\ a_x + yz\ a_y + zx\ a_z$.

f) Derive continuity of current equation.

3. Solve **any two** : **(2×6=12)**

a) Determine E_1, D_1, V_1, E_2, D_2 and V_2 for following geometry



b) The point charges – 1 nc, 4 nc and 3 nc are located at (0, 0, 0), (0, 0, 1) and (1, 0, 0) respectively. Find the energy in system.

c) Derive divergence theorem.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Prove that divergence of curl of a vector is zero using Stoke's Theorem.

b) A line y = 1, z = 4 carries filamentary current 50π mA along $\bar{a}x$ while the z = 0 plane carries 20 mA/m along $\bar{a}x$. Find H at (3, 4, 5).

c) A point charge of 10 C moves with a uniform velocity of $2\bar{a}_x - 4\bar{a}_z$ m/s in an electromagnetic field having $E = \bar{a}_x - 3\bar{a}_y + 8\bar{a}_z$ V/m and $B = 0.3\bar{a}_x + 0.1\bar{a}_y$ Wb/m. Find (a) Electric Force Fe (b) Magnetic Force Fm.

d) Explain scalar and vector Magnetic Potential.

e) Derive the Maxwell's equation from Ampere's law for static field in integral and point form.

5. Solve **any two** : **(2×6=12)**

a) Derive the Maxwell's equation from Gauss Law for electric and magnetic fields for time varying fields.

b) Two homogeneous, linear and isotropic media have an interface at x = 0. x < 0 describes medium 1 and x > 0 describes medium 2. $\mu_{r1} = 2$ and $\mu_{r2} = 5$. The magnetic field in medium 1 is $150\bar{a}_x - 400\bar{a}_y + 250\bar{a}_z$ A/m.

Determine :

i) Magnetic field in medium 2

ii) Magnetic flux density in medium 1

iii) Magnetic flux density in medium 2.

c) Derive the magnetic field intensity due to an infinite wire carrying a current using Biot-Savart law.

SLR-TJ – 364

Seat No.	

Set R

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
ELECTROMAGNETIC ENGINEERING

Day and Date : Tuesday, 5-12-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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4) ***Use*** *of non-programmable calculator is* ***allowed****.*
5) ***All*** *questions are* ***compulsory****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternative : **(14×1=14)**

1) The unit of dipole moment is
a) c/m b) c/m^2 c) c/m^3 d) c

2) $\nabla \cdot E$ for field of uniform line charge in cylindrical coordinates is
a) 0 b) 1
c) Infinite d) None of the above

3) The electric field due to electric dipole is
a) proportional to distance from dipole
b) proportional to square distance from dipole
c) proportional to inverse square distance from dipole
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4) A magnetic field exists around
a) Iron b) Copper
c) Aluminium d) Moving charges

5) A conductor of length L has current I passing through it, when it is placed parallel to a magnetic field. The force experienced by the conductor will be
a) Zero b) BLI c) B^2LI d) BLI^2

P.T.O.

6) Materials subjected to rapid reversal of magnetism should have
   a) large area of B – H loop
   b) high permeability and low hysteresis loss
   c) high co-ercivity and high reten-tivity
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7) When a magnet is in motion relative to a coil the induced e.m.f. does not depend upon
   a) resistance of the coil
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   c) number of turns of the coil
   d) pole strength of the magnet

8) A 200 turn coil has an inductance of 12 mH. If the number of turns is increased to 400 turns, all other quantities (area, length etc.) remaining the same, the inductance will be
   a) 6 mH
   b) 14 mH
   c) 24 mH
   d) 48 mH

9) The force on a charge moving with velocity v under the influence of electric and magnetic fields is given by which one of the following ?
   a) $q(E + B \times V)$
   b) $q(E + V \times B)$
   c) $q(H + V \times E)$
   d) $q(E + V \times H)$

10) If the static magnetic flux density is B, then
   a) Curl of B = 0
   b) Divergence of B = 0
   c) Curl of B = J
   d) Divergence of B = J

11) For a vector $D = Z\hat{a}_x + (x+y)\hat{a}_y$ the Z component of the vector in cylindrical coordinates will be
   a) Z
   b) $Z\cos\phi + (x+y)\sin\phi$
   c) $-Z\sin\phi + (x+y)\cos\phi$
   d) Zero

12) The electric field E is _____ to the electric equipotential lines.
   a) Tangential
   b) Opposite
   c) Normal
   d) Unrelated

13) In Dot product of unit vector in spherical and rectangular coordinate system for $a_y \cdot a_\theta$ is
   a) $\cos\theta \sin\phi$
   b) $\cos\theta \cos\phi$
   c) $\sin\theta \sin\phi$
   d) $\sin\theta \cos\phi$

14) The electric flux density D is measured in
   a) c/m
   b) c/m^2
   c) c/m^3
   d) c

SLR-TJ – 364

Seat No.	

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
ELECTROMAGNETIC ENGINEERING

Day and Date : Tuesday, 5-12-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *i)* ***All*** *questions are* ***compulsory****.*
ii) Assume ***suitable*** *data and mention it, if* ***necessary****.*
iii) ***Use*** *of non-programmable calculator is* ***allowed****.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

a) Transform the given vector $A = 2xy\ \hat{a}_x - 5\ (x+y+z)\hat{a}_2$ at $(2, 60^\circ, 3)$ into cylindrical co-ordinate system.

b) Two point charges A = 20 nc and B = 10 nc are separated from each other by a distance of 25 cm in free space. Calculate the electric field at point 'P' that is 15 cm away from A and 20 cm away from B.

c) A point charge of 1 μc is located at origin of a cylindrical co-ordinate system. Determine the potential between two points 1 m and 2 m radially away from the origin.

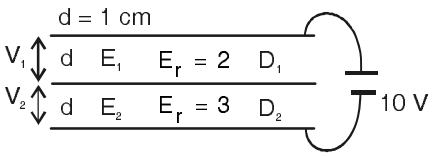
d) Given potential $V = \frac{10}{r^2}\ \sin\theta \cos\phi$. Find electric flux density D at $\left(2, \pi/2, 0\right)$.

e) Evaluate $\nabla \cdot A$ given $A = xy\ a_x + yz\ a_y + zx\ a_z$.

f) Derive continuity of current equation.

3. Solve **any two** : **(2×6=12)**

a) Determine E_1, D_1, V_1, E_2, D_2 and V_2 for following geometry



b) The point charges – 1 nc, 4 nc and 3 nc are located at (0, 0, 0), (0, 0, 1) and (1, 0, 0) respectively. Find the energy in system.

c) Derive divergence theorem.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Prove that divergence of curl of a vector is zero using Stoke's Theorem.

b) A line y = 1, z = 4 carries filamentary current 50π mA along $\bar{a}x$ while the z = 0 plane carries 20 mA/m along $\bar{a}x$. Find H at (3, 4, 5).

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e) Derive the Maxwell's equation from Ampere's law for static field in integral and point form.

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Determine :

i) Magnetic field in medium 2

ii) Magnetic flux density in medium 1

iii) Magnetic flux density in medium 2.

c) Derive the magnetic field intensity due to an infinite wire carrying a current using Biot-Savart law.

SLR-TJ – 364

Seat No.	

Set **S**

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
ELECTROMAGNETIC ENGINEERING

Day and Date : Tuesday, 5-12-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume ***suitable*** *data and mention it, if* ***necessary****.*
4) ***Use*** *of non-programmable calculator is* ***allowed****.*
5) ***All*** *questions are* ***compulsory****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternative : **(14×1=14)**

1) Materials subjected to rapid reversal of magnetism should have
   a) large area of B – H loop
   b) high permeability and low hysteresis loss
   c) high co-ercivity and high reten-tivity
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2) When a magnet is in motion relative to a coil the induced e.m.f. does not depend upon
   a) resistance of the coil b) motion of the magnet
   c) number of turns of the coil d) pole strength of the magnet

3) A 200 turn coil has an inductance of 12 mH. If the number of turns is increased to 400 turns, all other quantities (area, length etc.) remaining the same, the inductance will be
   a) 6 mH b) 14 mH c) 24 mH d) 48 mH

4) The force on a charge moving with velocity v under the influence of electric and magnetic fields is given by which one of the following ?
   a) $q(E + B \times V)$ b) $q(E + V \times B)$
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P.T.O.

5) If the static magnetic flux density is B, then
   a) Curl of B = 0
   b) Divergence of B = 0
   c) Curl of B = J
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6) For a vector D = $Z\hat{a}_x + (x+y)\hat{a}_y$ the Z component of the vector in cylindrical coordinates will be
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   b) $Z\cos\phi + (x+y)\sin\phi$
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   d) Zero

7) The electric field E is _____ to the electric equipotential lines.
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8) In Dot product of unit vector in spherical and rectangular coordinate system for $a_y \cdot a_\theta$ is
   a) $\cos\theta\sin\phi$
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10) The unit of dipole moment is
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11) $\nabla \cdot E$ for field of uniform line charge in cylindrical coordinates is
   a) 0
   b) 1
   c) Infinite
   d) None of the above

12) The electric field due to electric dipole is
   a) proportional to distance from dipole
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13) A magnetic field exists around
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14) A conductor of length L has current I passing through it, when it is placed parallel to a magnetic field. The force experienced by the conductor will be
   a) Zero
   b) BLI
   c) B^2LI
   d) BLI^2

_____

SLR-TJ – 364

Seat No.	

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
ELECTROMAGNETIC ENGINEERING

Day and Date : Tuesday, 5-12-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *i)* ***All*** *questions are* ***compulsory****.*
ii) Assume ***suitable*** *data and mention it, if* ***necessary****.*
iii) ***Use*** *of non-programmable calculator is* ***allowed****.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

a) Transform the given vector $A = 2xy\ \hat{a}_x - 5\ (x+y+z)\hat{a}_2$ at $(2, 60^\circ, 3)$ into cylindrical co-ordinate system.

b) Two point charges A = 20 nc and B = 10 nc are separated from each other by a distance of 25 cm in free space. Calculate the electric field at point 'P' that is 15 cm away from A and 20 cm away from B.

c) A point charge of 1 μc is located at origin of a cylindrical co-ordinate system. Determine the potential between two points 1 m and 2 m radially away from the origin.

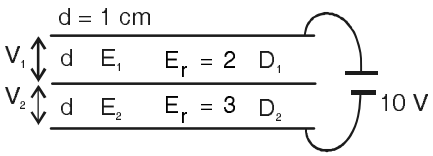
d) Given potential $V = \frac{10}{r^2}\ \sin\theta \cos\phi$. Find electric flux density D at $\left(2, \pi/2, 0\right)$.

e) Evaluate $\nabla \cdot A$ given $A = xy\ a_x + yz\ a_y + zx\ a_z$.

f) Derive continuity of current equation.

3. Solve **any two** : **(2×6=12)**

a) Determine E_1, D_1, V_1, E_2, D_2 and V_2 for following geometry



b) The point charges – 1 nc, 4 nc and 3 nc are located at (0, 0, 0), (0, 0, 1) and (1, 0, 0) respectively. Find the energy in system.

c) Derive divergence theorem.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Prove that divergence of curl of a vector is zero using Stoke's Theorem.

b) A line y = 1, z = 4 carries filamentary current 50π mA along $\bar{a}x$ while the z = 0 plane carries 20 mA/m along $\bar{a}x$. Find H at (3, 4, 5).

c) A point charge of 10 C moves with a uniform velocity of $2\bar{a}_x - 4\bar{a}_z$ m/s in an electromagnetic field having $E = \bar{a}_x - 3\bar{a}_y + 8\bar{a}_z$ V/m and $B = 0.3\bar{a}_x + 0.1\bar{a}_y$ Wb/m. Find (a) Electric Force Fe (b) Magnetic Force Fm.

d) Explain scalar and vector Magnetic Potential.

e) Derive the Maxwell's equation from Ampere's law for static field in integral and point form.

5. Solve **any two** : **(2×6=12)**

a) Derive the Maxwell's equation from Gauss Law for electric and magnetic fields for time varying fields.

b) Two homogeneous, linear and isotropic media have an interface at x = 0. x < 0 describes medium 1 and x > 0 describes medium 2. $\mu_{r1} = 2$ and $\mu_{r2} = 5$. The magnetic field in medium 1 is $150\bar{a}_x - 400\bar{a}_y + 250\bar{a}_z$ A/m.

Determine :

i) Magnetic field in medium 2

ii) Magnetic flux density in medium 1

iii) Magnetic flux density in medium 2.

c) Derive the magnetic field intensity due to an infinite wire carrying a current using Biot-Savart law.

SLR-TJ – 365

Seat No.	

Set P

T.E. (Electrical Engineering) (Part – I) (CGPA) Examination, 2017
ELECTRICAL MACHINES – III

Day and Date : Thursday, 7-12-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) An alternator is also called as _____ generator.
   a) synchronous b) asynchronous
   c) Rosenberg d) none of these

2) A turbo alternator uses
   a) salient pole field structure b) non salient pole field structure
   c) rotating a.c. armature winding d) none of these

3) High speed alternators are driven by
   a) diesel engines b) hydraulic turbines
   c) steam turbines d) none of these

4) Turbo alternators have rotors of
   a) small diameter and long axial length
   b) large diameter and long axial length
   c) large diameter and small axial length
   d) same diameter and axial length

5) In the armature winding of an alternator, the coil span falls short of full pitch by 60° (electrical). The pitch factor is
   a) 0.866 b) 0.5 c) 0.25 d) none of these

6) The regulation of an alternator is given as
   a) $\frac{V-EO}{V}*100$ b) $\frac{EO-V}{V}*100$ c) $\frac{V}{EO}*100$ d) none of these

7) The short circuit characteristics of an alternator is
   a) always linear
   b) always non-linear
   c) either a) or b)
   d) none of these

8) The voltage regulation of an alternator having 0.75 leading p.f. load, no load induced e.m.f. of 2400 V and rated terminal voltage of 3000 V is _____ percent.
   a) 20
   b) – 20
   c) 150
   d) – 26.7

9) Zero power factor method of an alternator is used to find its
   a) efficiency
   b) voltage regulation
   c) armature resistance
   d) synchronous impedance

10) The regulation of an alternator is
   a) the reduction in terminal voltage when alternator is loaded
   b) the variation of terminal voltage under the conditions of maximum and minimum excitation
   c) the increase in terminal voltage when load is thrown off
   d) the change in terminal voltage from lagging power factor to leading power factor

11) The rotational speed of a given stepper motor is determined solely by the
   a) shaft load
   b) step pulse frequency
   c) polarity of stator current
   d) magnitude of stator current

12) A stepper motor may be considered as a _____ converter.
   a) dc to dc
   b) ac to ac
   c) dc to ac
   d) digital-to-analog

13) The rotor of a stepper motor has no
   a) windings
   b) commutator
   c) brushes
   d) all of the above

14) Wave excitation of a stepper motor results in
   a) microstepping
   b) half-stepping
   c) increased step angle
   d) reduced resolution

_____

Seat No.	

T.E. (Electrical Engineering) (Part – I) (CGPA) Examination, 2017
ELECTRICAL MACHINES – III

Day and Date : Thursday, 7-12-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

2. Solve **any four** : **16**
   1) Explain EMF method for calculation of voltage regulation of an alternator.
   2) Derive an e.m.f. equation of an alternator.
   3) A 12-pole 3-phase 50Hz star connected alternator has 72 slots. The flux per pole is 0.0988 Wb. Calculate :
      a) terminal e.m.f. for full pitch coils and 8 conductors per slot.
      b) the terminal if the coil span is reduced to 2/3 of the pole pitch.
   4) Derive the expression for pitch factor and distribution factor.
   5) Explain the methods of synchronization.
   6) Calculate the distribution factor for a single phase alternator having 6 slots/ pole :
      a) when all the slots are wound and
      b) when only four adjacent slots per pole are wound, the remaining slots being unwound.

3. Solve **any two** : **12**
   1) A 3-phase star connected 1000 kVA 2000 V 50 Hz alternator gave following O.C. and S. C. test readings :

Field current	10	20	25	30	40	50
O.C. line V	800	1500	1760	2000	2350	2600
S. C. current		200	250	300		

   The armature resistance is 0.2 Ω. Determine voltage regulation by using MMF method at :
      a) 0.8 p.f. lagging
      b) 0.8 p.f. leading.

2) Derive an expression for power developed in :
   i) salient pole type alternator
   ii) non salient pole type alternator.

3) With neat sketch, explain working principle, operation and types of an alternator.

4. Solve **any four** : **16**

1) With neat sketch, explain synchronous condenser.

2) With neat sketch, explain switched reluctance motor.

3) Explain V and inverted V curves for synchronous motor.

4) With neat sketch, explain phasor diagrams for synchronous motor.

5) With neat sketch, explain low inertia DC motor.

6) With neat sketch, explain Universal Motor.

5. Solve **any two** : **12**

1) Write notes on :
   a) Single stack variable reluctance stepper motor.
   b) Multi stack variable reluctance stepper motor.

2) Explain AC and DC servomotor.

3) Why synchronous motor is not self starting ? How unidirectional torque is obtained ? What is the use of damper winding in synchronous motor.

SLR-TJ – 365

Seat No.	

Set Q

T.E. (Electrical Engineering) (Part – I) (CGPA) Examination, 2017
ELECTRICAL MACHINES – III

Day and Date : Thursday, 7-12-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) The voltage regulation of an alternator having 0.75 leading p.f. load, no load induced e.m.f. of 2400 V and rated terminal voltage of 3000 V is _____ percent.
   a) 20 b) – 20 c) 150 d) – 26.7

2) Zero power factor method of an alternator is used to find its
   a) efficiency b) voltage regulation
   c) armature resistance d) synchronous impedance

3) The regulation of an alternator is
   a) the reduction in terminal voltage when alternator is loaded
   b) the variation of terminal voltage under the conditions of maximum and minimum excitation
   c) the increase in terminal voltage when load is thrown off
   d) the change in terminal voltage from lagging power factor to leading power factor

4) The rotational speed of a given stepper motor is determined solely by the
   a) shaft load b) step pulse frequency
   c) polarity of stator current d) magnitude of stator current

5) A stepper motor may be considered as a _____ converter.
   a) dc to dc b) ac to ac
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6) The rotor of a stepper motor has no
   a) windings b) commutator c) brushes d) all of the above
7) Wave excitation of a stepper motor results in
   a) microstepping b) half-stepping
   c) increased step angle d) reduced resolution
8) An alternator is also called as _____ generator.
   a) synchronous b) asynchronous
   c) Rosenberg d) none of these
9) A turbo alternator uses
   a) salient pole field structure b) non salient pole field structure
   c) rotating a.c. armature winding d) none of these
10) High speed alternators are driven by
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11) Turbo alternators have rotors of
   a) small diameter and long axial length
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12) In the armature winding of an alternator, the coil span falls short of full pitch by 60° (electrical). The pitch factor is
   a) 0.866 b) 0.5 c) 0.25 d) none of these
13) The regulation of an alternator is given as
   a) $\frac{V-EO}{V} * 100$ b) $\frac{EO-V}{V} * 100$ c) $\frac{V}{EO} * 100$ d) none of these
14) The short circuit characteristics of an alternator is
   a) always linear b) always non-linear
   c) either a) or b) d) none of these

_____

SLR-TJ – 365

Seat No.	

T.E. (Electrical Engineering) (Part – I) (CGPA) Examination, 2017
ELECTRICAL MACHINES – III

Day and Date : Thursday, 7-12-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

2. Solve **any four** : **16**
   1) Explain EMF method for calculation of voltage regulation of an alternator.
   2) Derive an e.m.f. equation of an alternator.
   3) A 12-pole 3-phase 50Hz star connected alternator has 72 slots. The flux per pole is 0.0988 Wb. Calculate :
      a) terminal e.m.f. for full pitch coils and 8 conductors per slot.
      b) the terminal if the coil span is reduced to 2/3 of the pole pitch.
   4) Derive the expression for pitch factor and distribution factor.
   5) Explain the methods of synchronization.
   6) Calculate the distribution factor for a single phase alternator having 6 slots/ pole :
      a) when all the slots are wound and
      b) when only four adjacent slots per pole are wound, the remaining slots being unwound.

3. Solve **any two** : **12**
   1) A 3-phase star connected 1000 kVA 2000 V 50 Hz alternator gave following O.C. and S. C. test readings :

Field current	10	20	25	30	40	50
O.C. line V	800	1500	1760	2000	2350	2600
S. C. current		200	250	300		

   The armature resistance is 0.2 Ω. Determine voltage regulation by using MMF method at :
   a) 0.8 p.f. lagging
   b) 0.8 p.f. leading.

2) Derive an expression for power developed in :
   i) salient pole type alternator
   ii) non salient pole type alternator.

3) With neat sketch, explain working principle, operation and types of an alternator.

4. Solve **any four** : **16**

1) With neat sketch, explain synchronous condenser.

2) With neat sketch, explain switched reluctance motor.

3) Explain V and inverted V curves for synchronous motor.

4) With neat sketch, explain phasor diagrams for synchronous motor.

5) With neat sketch, explain low inertia DC motor.

6) With neat sketch, explain Universal Motor.

5. Solve **any two** : **12**

1) Write notes on :
   a) Single stack variable reluctance stepper motor.
   b) Multi stack variable reluctance stepper motor.

2) Explain AC and DC servomotor.

3) Why synchronous motor is not self starting ? How unidirectional torque is obtained ? What is the use of damper winding in synchronous motor.

SLR-TJ – 365

Seat No.	

Set R

T.E. (Electrical Engineering) (Part – I) (CGPA) Examination, 2017
ELECTRICAL MACHINES – III

Day and Date : Thursday, 7-12-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) In the armature winding of an alternator, the coil span falls short of full pitch by 60° (electrical). The pitch factor is
   a) 0.866 b) 0.5 c) 0.25 d) none of these

2) The regulation of an alternator is given as
   a) $\frac{V-EO}{V}*100$ b) $\frac{EO-V}{V}*100$ c) $\frac{V}{EO}*100$ d) none of these

3) The short circuit characteristics of an alternator is
   a) always linear b) always non-linear
   c) either a) or b) d) none of these

4) The voltage regulation of an alternator having 0.75 leading p.f. load, no load induced e.m.f. of 2400 V and rated terminal voltage of 3000 V is _____ percent.
   a) 20 b) – 20 c) 150 d) – 26.7

5) Zero power factor method of an alternator is used to find its
   a) efficiency b) voltage regulation
   c) armature resistance d) synchronous impedance

6) The regulation of an alternator is
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_____

Seat No.	

T.E. (Electrical Engineering) (Part – I) (CGPA) Examination, 2017
ELECTRICAL MACHINES – III

Day and Date : Thursday, 7-12-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

2. Solve **any four** : **16**
   1) Explain EMF method for calculation of voltage regulation of an alternator.
   2) Derive an e.m.f. equation of an alternator.
   3) A 12-pole 3-phase 50Hz star connected alternator has 72 slots. The flux per pole is 0.0988 Wb. Calculate :
      a) terminal e.m.f. for full pitch coils and 8 conductors per slot.
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   4) Derive the expression for pitch factor and distribution factor.
   5) Explain the methods of synchronization.
   6) Calculate the distribution factor for a single phase alternator having 6 slots/ pole :
      a) when all the slots are wound and
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   1) A 3-phase star connected 1000 kVA 2000 V 50 Hz alternator gave following O.C. and S. C. test readings :

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   The armature resistance is 0.2 Ω. Determine voltage regulation by using MMF method at :
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2) Derive an expression for power developed in :
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   ii) non salient pole type alternator.

3) With neat sketch, explain working principle, operation and types of an alternator.

4. Solve **any four** : **16**

1) With neat sketch, explain synchronous condenser.

2) With neat sketch, explain switched reluctance motor.

3) Explain V and inverted V curves for synchronous motor.

4) With neat sketch, explain phasor diagrams for synchronous motor.

5) With neat sketch, explain low inertia DC motor.

6) With neat sketch, explain Universal Motor.

5. Solve **any two** : **12**

1) Write notes on :
   a) Single stack variable reluctance stepper motor.
   b) Multi stack variable reluctance stepper motor.

2) Explain AC and DC servomotor.

3) Why synchronous motor is not self starting ? How unidirectional torque is obtained ? What is the use of damper winding in synchronous motor.

SLR-TJ – 365

Seat No.	

Set S

T.E. (Electrical Engineering) (Part – I) (CGPA) Examination, 2017
ELECTRICAL MACHINES – III

Day and Date : Thursday, 7-12-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) The regulation of an alternator is
   a) the reduction in terminal voltage when alternator is loaded
   b) the variation of terminal voltage under the conditions of maximum and minimum excitation
   c) the increase in terminal voltage when load is thrown off
   d) the change in terminal voltage from lagging power factor to leading power factor

2) The rotational speed of a given stepper motor is determined solely by the
   a) shaft load b) step pulse frequency
   c) polarity of stator current d) magnitude of stator current

3) A stepper motor may be considered as a _____ converter.
   a) dc to dc b) ac to ac
   c) dc to ac d) digital-to-analog

4) The rotor of a stepper motor has no
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14) Zero power factor method of an alternator is used to find its
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    c) armature resistance
    d) synchronous impedance

_____

Seat No.	

T.E. (Electrical Engineering) (Part – I) (CGPA) Examination, 2017
ELECTRICAL MACHINES – III

Day and Date : Thursday, 7-12-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

2. Solve **any four** : **16**
   1) Explain EMF method for calculation of voltage regulation of an alternator.
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   3) A 12-pole 3-phase 50Hz star connected alternator has 72 slots. The flux per pole is 0.0988 Wb. Calculate :
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   6) Calculate the distribution factor for a single phase alternator having 6 slots/ pole :
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3. Solve **any two** : **12**
   1) A 3-phase star connected 1000 kVA 2000 V 50 Hz alternator gave following O.C. and S. C. test readings :

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   The armature resistance is 0.2 Ω. Determine voltage regulation by using MMF method at :
      a) 0.8 p.f. lagging
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2) Derive an expression for power developed in :
   i) salient pole type alternator
   ii) non salient pole type alternator.

3) With neat sketch, explain working principle, operation and types of an alternator.

4. Solve **any four** : **16**

1) With neat sketch, explain synchronous condenser.

2) With neat sketch, explain switched reluctance motor.

3) Explain V and inverted V curves for synchronous motor.

4) With neat sketch, explain phasor diagrams for synchronous motor.

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6) With neat sketch, explain Universal Motor.

5. Solve **any two** : **12**

1) Write notes on :
   a) Single stack variable reluctance stepper motor.
   b) Multi stack variable reluctance stepper motor.

2) Explain AC and DC servomotor.

3) Why synchronous motor is not self starting ? How unidirectional torque is obtained ? What is the use of damper winding in synchronous motor.

SLR-TJ – 366

Seat No.	

Set P

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
CONTROL SYSTEM – I

Day and Date : Saturday, 9-12-2017 Max. Marks : 70

Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer.

1) The mathematical model is solved for various types of input to obtain
   a) automation
   b) control system
   c) the physical model
   d) the dynamic response of the system

2) A control system in which control action is some how dependent on the output is called the _____ control system.
   a) open b) closed loop c) stable d) unstable

3) In a negative feedback system with loop gain T, the noise generated within the basic amplifier
   a) decreases by a factor (1 + T)
   b) decreases by a factor (1 – T)
   c) increases by a factor (1 + T)
   d) increases by a factor (1 – T)

4) Feedback is employed in control system primarily to
   a) reduce the sensitivity of the system to parameter variation
   b) increases the gain of system
   c) improve the system stability
   d) none of the above

5) The input to a controller is always a/an _____ signal.
   a) error b) servo c) sensed d) none of these

6) In F-V analogy Capacitance is analogous to
   a) mass b) spring c) friction d) none of these

7) A signal flow graph is a _____ representation of the relationships between the variables of a set of linear algebraic equations.
   a) graphical b) block
   c) modified graph d) polar graphical

8) By which of the following the system response can be tested better ?
   a) Ramp input signal
   b) Sinusoidal input signal
   c) Unit impulse input signal
   d) Exponentially decaying signal

9) The valid relation between setting time ts and rise time tr is
   a) tr > ts b) ts > tr
   c) ts = tr d) none of these

10) The phase shift of $G(s) = \frac{1}{s^2}$ is
   a) 90° b) –90° c) 180° d) –180°

11) The position and velocity errors of a type-2 system are
   a) constant, constant b) constant, infinity
   c) zero, constant d) zero, zero

12) Slope of K in Bode Magnitude Plot is
   a) 90° b) 0° c) – 90° d) –180°

13) In general which of the following system is preferred ?
   a) overdamped b) critically damped
   c) underdamped d) undamped

14) Considering the root locus diagram for a system with $G(s) = \frac{K(s+5)}{s(s+2)(s+4)(s^2+2s+2)}$ the meeting point of the asymptotes on the real axis occurs at
   a) –1.2 b) – 0.85 c) –1.0 d) – 0.75

SLR-TJ – 366

Seat No.	

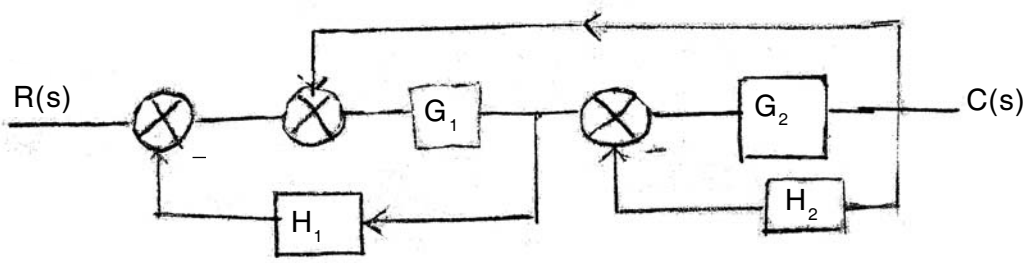
T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
CONTROL SYSTEM – I

Day and Date : Saturday, 9-12-2017 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

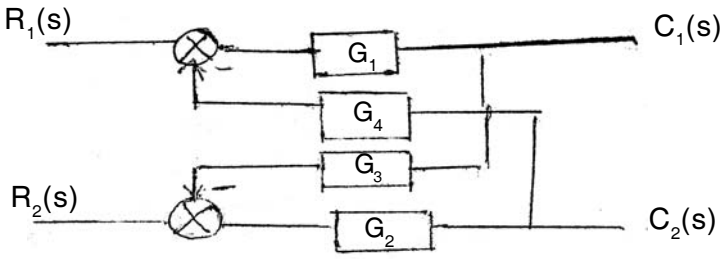
SECTION – I

2. Attempt **any four**. **(4×4=16)**
   a) Explain the closed loop system with an example.
   b) Derive the transfer function of DC servomotor.
   c) Convert the given block diagram into SFG and find out T.F. from SFG.



   d) Explain force to current analogy (F-I).
   e) Explain any four rules of a block diagram reduction techniques.
   f) Compare open loop and closed loop control system.

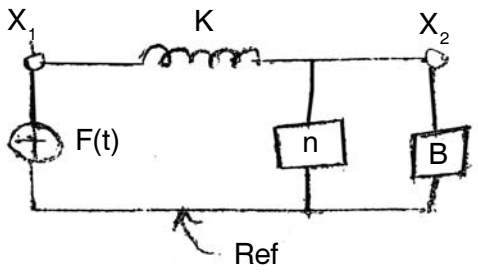
3. Attempt **any two** : **(6×2=12)**
   a) Find T. F. = C_1/R_1, T.F.= C_2/R_1, T.F. = C_1/R_2, T.F. = C_2/R_2



   b) Explain translational and rotational mechanical system.

Set P

c) Derive the transfer function of below block diagram.



SECTION – II

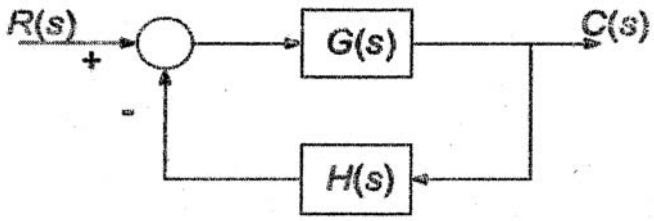
4. Solve **any four**. **(4×4=16)**

a) Explain the correlation between transient response and frequency response.

b) Explain the Time domain specifications.

c) Discuss the effect of ζ on the performance of second order system.

d) Using Routh's stability criteria, determine the range of K for which the system in fig. will remain stable .



Where G(s) = K /s (1 + s) (1 + 2 s) and H(s) = 1

e) Explain the different types of controllers in control system.

f) The open loop transfer function of unity feedback system is given by G(s) = 50/ (1+ 0.1s) (s +10). Determine the static error constants K_P, K_V, K_a.

5. Solve **any two** : **(2×6=12)**

a) Draw the root locus for the unity feedback system whose OLTF is

$$G(s) = \frac{K}{s\,(s^2 + 2s + 5)}$$ comment on stability.

b) A second order unity feedback system has open loop transfer function

$$G(s) = \frac{4}{s\,(s+1)}$$. Find peak time, settling time.

c) Construct the bode plot for the system below. Determine (a) gain crossover frequency (b) the phase crossover frequency.

$$G(s)\,H(s) = \frac{2000}{s\,(1+s)\,(100+s)}.$$

Set P

SLR-TJ – 366

Seat No.	

Set Q

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
CONTROL SYSTEM – I

Day and Date : Saturday, 9-12-2017 Max. Marks : 70

Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3.*** ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer.

1) By which of the following the system response can be tested better ?
   a) Ramp input signal
   b) Sinusoidal input signal
   c) Unit impulse input signal
   d) Exponentially decaying signal

2) The valid relation between setting time ts and rise time tr is
   a) tr > ts b) ts > tr
   c) ts = tr d) none of these

3) The phase shift of $G(s) = \frac{1}{s^2}$ is
   a) 90° b) –90° c) 180° d) –180°

4) The position and velocity errors of a type-2 system are
   a) constant, constant b) constant, infinity
   c) zero, constant d) zero, zero

5) Slope of K in Bode Magnitude Plot is
   a) 90° b) 0° c) – 90° d) –180°

6) In general which of the following system is preferred ?
   a) overdamped b) critically damped
   c) underdamped d) undamped

7) Considering the root locus diagram for a system with $G(s) = \frac{K(s+5)}{s(s+2)(s+4)(s^2+2s+2)}$ the meeting point of the asymptotes on the real axis occurs at
   a) –1.2 b) – 0.85 c) –1.0 d) – 0.75

P.T.O.

8) The mathematical model is solved for various types of input to obtain
   a) automation
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   d) the dynamic response of the system

9) A control system in which control action is some how dependent on the output is called the _____ control system.
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10) In a negative feedback system with loop gain T, the noise generated within the basic amplifier
   a) decreases by a factor (1 + T)
   b) decreases by a factor (1 – T)
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11) Feedback is employed in control system primarily to
   a) reduce the sensitivity of the system to parameter variation
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12) The input to a controller is always a/an _____ signal.
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13) In F-V analogy Capacitance is analogous to
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14) A signal flow graph is a _____ representation of the relationships between the variables of a set of linear algebraic equations.
   a) graphical b) block
   c) modified graph d) polar graphical

_____

SLR-TJ – 366

Seat No.	

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
CONTROL SYSTEM – I

Day and Date : Saturday, 9-12-2017 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four**. **(4×4=16)**
   a) Explain the closed loop system with an example.
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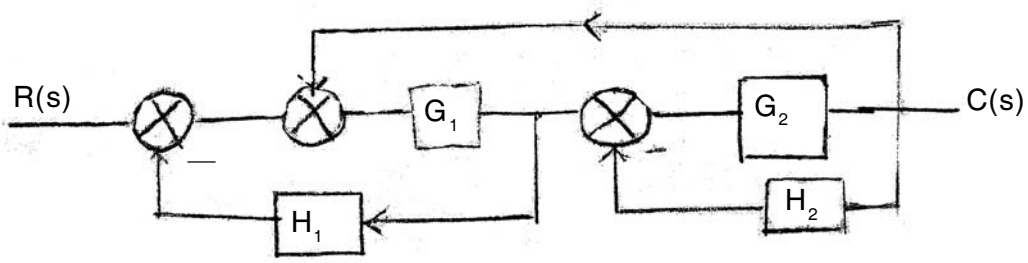

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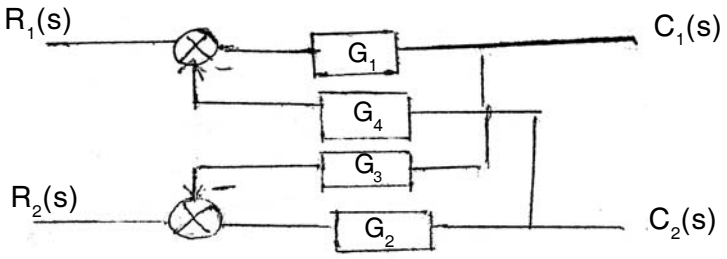
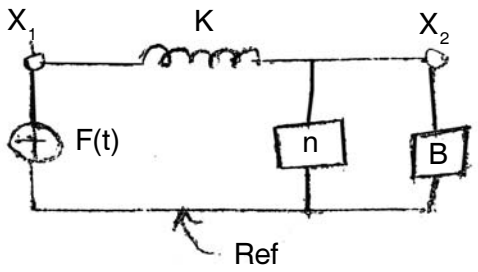
   a) Find T. F. = C_1/R_1, T.F.= C_2/R_1, T.F. = C_1/R_2, T.F. = C_2/R_2



   b) Explain translational and rotational mechanical system.

Set Q

c) Derive the transfer function of below block diagram.



SECTION – II

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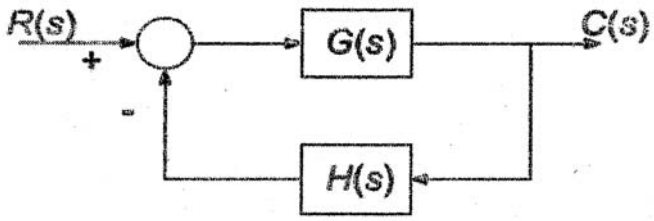

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Set Q

SLR-TJ – 366

Seat No.	

Set R

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
CONTROL SYSTEM – I

Day and Date : Saturday, 9-12-2017 Max. Marks : 70

Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer.

1) The input to a controller is always a/an _____ signal.

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P.T.O.

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SLR-TJ – 366

Seat No.	

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
CONTROL SYSTEM – I

Day and Date : Saturday, 9-12-2017 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

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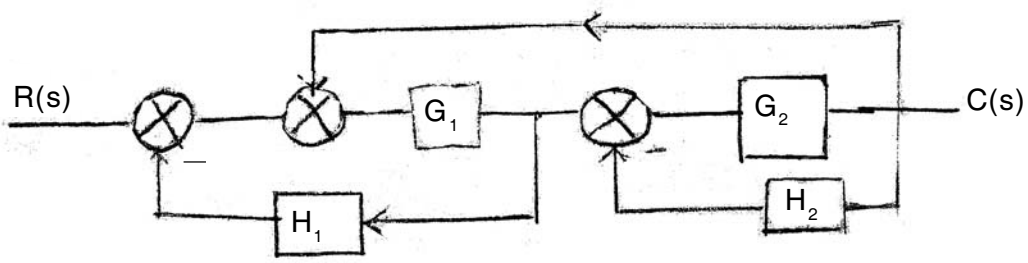

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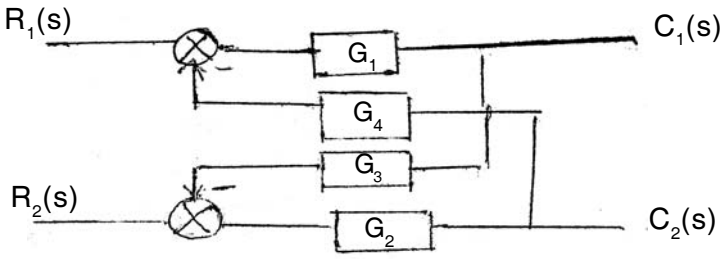

   b) Explain translational and rotational mechanical system.

Set R

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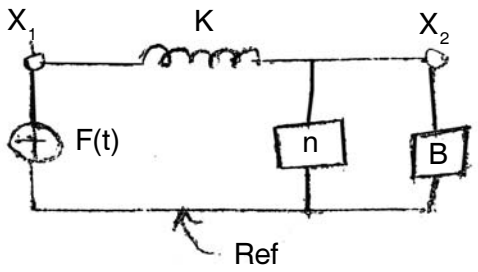

SECTION – II

4. Solve **any four**. **(4×4=16)**

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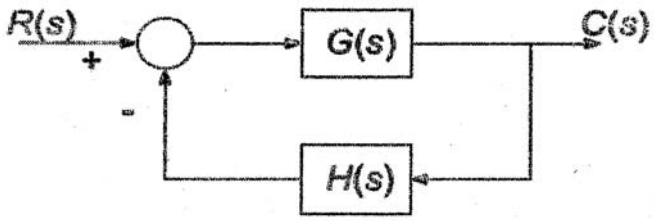

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Set R

SLR-TJ – 366

Seat No.	

Set S

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
CONTROL SYSTEM – I

Day and Date : Saturday, 9-12-2017 Max. Marks : 70

Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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_____

SLR-TJ – 366

Seat No.	

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017
CONTROL SYSTEM – I

Day and Date : Saturday, 9-12-2017 Marks : 56

Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four**. **(4×4=16)**
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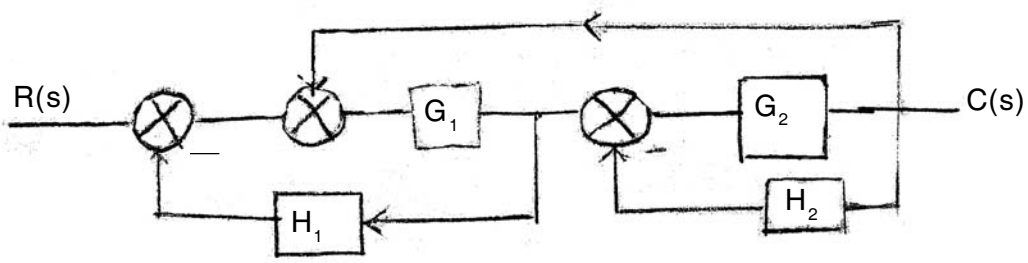

   d) Explain force to current analogy (F-I).
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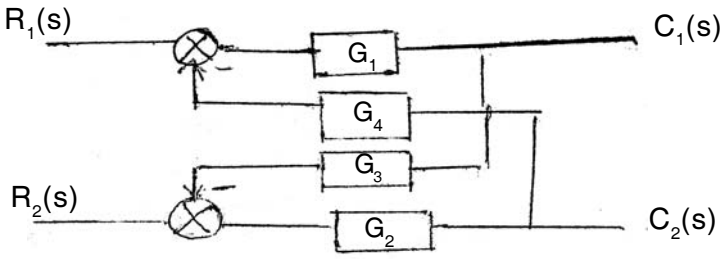

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Set S

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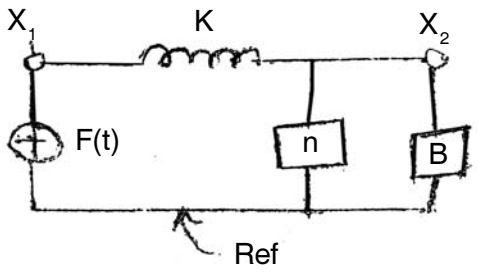

SECTION – II

4. Solve **any four**. **(4×4=16)**

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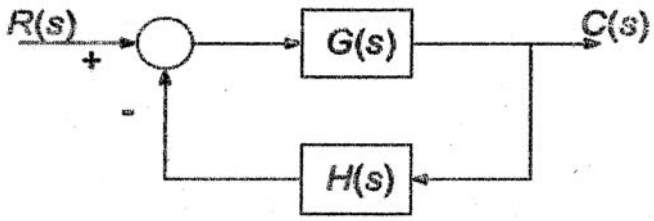

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Set S

SLR-TJ – 368

Seat No.	

Set P

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 21-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3. Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternatives : **14**

1) CRGO has _____ in comparison to hot rolled silicon steel.
   A) Better finished B) Improve space factor
   C) Much better magnetic properties D) All of the above

2) The condition for a transformer to be designed for the minimum volume is
   A) Iron loss = copper loss B) Volume of iron = volume of copper
   C) Weight of iron = weight of copper D) The volume of iron is minimum

3) The hum in a transformer is due to
   A) Magnetostriction
   B) Vibration developed by lamination depending upon tightness of clamping
   C) Mechanical vibration of the tank walls
   D) All of the above

4) The main area of design are
   A) Insulation B) Thermal circuit
   C) Mechanical consideration D) All of the above

5) Commutation imposed limitation on
   A) induction motor B) dc motor
   C) synchronous motor D) all of the above

6) The basic need of good conducting material used for windings of electrical machines are
   A) Highest possible conductivity and least possible temperature coefficient of resistance
   B) High tensile strength and absence of brittleness
   C) Reliability, durability, good weldability and solderability
   D) All of the above

7) Caters coefficient is applicable to estimating
   A) Requirement if air-gap mmf
   B) Flux distribution in air gap
   C) Length of air-gap
   D) No-load loss

8) Use of number of poles in a dc machines reduces
   A) Cost of copper in armature as well as field
   B) Overall diameter and length of the machine
   C) Length of commutator
   D) All of the above

9) The yoke of dc machines
   A) Must made of magnetic material
   B) Should preferably be made of magnetic material but can be of non-magnetic material
   C) Must be made of non-magnetic material
   D) Is partially made of magnetic material and partially of non-magnetic material

10) An increase in number of poles of an induction motor results in
   A) Decrease in maximum p.f.
   B) Increase in maximum p.f.
   C) No change in maximum p.f.
   D) Can-not be predicted

11) When 3 phase induction motor is designed with higher value of B_{av} it will give
   A) Better full load power factor
   B) A higher starting torque
   C) Higher full load efficiency
   D) Higher overload capacity

12) Higher values of flux density can be taken while designing machines for
   A) Large rotor diameter
   B) Large output
   C) Both A) and B)
   D) None of these

13) In turbo-alternator the rotor diameter is limited to about 1.2 m due to
   A) Centrifugal forces
   B) Deflection
   C) Critical speed
   D) All of the above

14) _____ cooling is most used in hydrogenation.
   A) Closed circuit air
   B) Hydrogen gas
   C) Direct water
   D) Any of these

_____

SLR-TJ – 368

Seat No.	

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 21-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Explain the principles of design for electromagnetic machines.
   2) Derive an equation for emf per turn for transformer.
   3) Explain the factors affecting the size of rotating machines.
   4) Calculate the kVA output of a single phase transformer from the following data :

$$\frac{\text{core height}}{\text{distance between core centres}} = 2.8, \quad \frac{\text{diameter of circumscribing circle}}{\text{distance between core centres}} = 0.56$$

$$\frac{\text{net iron area}}{\text{area of circumscribing circle}} = 0.7$$

   Current density = 2.3 A/mm^2, window space factor = 0.27, frequency = 50 Hz, Flux density of core = 1.2 Wb/m^2 , distance between core centres = 0.4 m.
   5) For a transformer having two stepped core section prove that Ai = 0.56d^2.

3. Solve **any two** : **(6×2=12)**
   1) A 250 kVA 6600/400 V, 50 Hz, 3 phase Delta/Star, core type oil immersed natural cool transformer with following data :
      i) Winding temperature not to exceed 50°C
      ii) Total loss at 50°C is 5.0 kW
      iii) Tank dimensions, height × length × width = 125 × 100 × 50 (all in cm)
      iv) Oil level = 115 cm length

      Sketch the diagram to show the arrangement.

2) Find the main dimensions, number of poles and length of air gap of a 1000 kW, 500 V, 300 r.p.m. dc generator. Assume the specific magnetic loading B_{av} = 0.7 Wb/m^2, ampere conductor per meter = 40000, square pole face, ratio of pole arc to pole pitch is 0.7. Assume efficiency as 92% and gap contraction factor as 1.15.

3) Determine the main dimensions, number of poles and the length of air gap of a 600 kW, 500 V, 900 r.p.m. generators. Assume average gap density as 0.6 Wb/m^2 and ampere conductor per meter as 35000. The ratio of pole arc to pole pitch is 0.75 and efficiency is 91%. The following are the design constraints.
   i) Peripheral speed < 40 m/s
   ii) Frequency of flux reversal < 50 Hz
   iii) Current per brush arm < 400 Amp
   iv) Armature mmf per pole < 7500 A

SECTION – II

4. Solve **any four** : **(4×4=16)**

1) Find the current in the bars and end rings of a cage rotor of a 6 pole, 3Φ, induction motor having 72 stator slots with 15 conductor in each slot. If the stator current per phase is 20 Amp and rotor slots are 55. Hence find the suitable size of the cage bars and end rings.

2) Discuss the effect of air gap length of 3-ph induction motor on following factor.
   a) Power factor
   b) Overload capacity
   c) Pulsation loss and noise
   d) Unbalanced magnetic pull.

3) Derive the output equation of single phase induction motor.

4) Discuss the choice of specific electric loading and specific magnetic loading of synchronous generator.

5) A 11 kW, 3Φ, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing 9 conductor. Calculate the value of bar and end ring current. The number of rotor bars is 64. The machines has an efficiency of 0.86 and power factor of 0.85. The rotor mmf may assume as 85% of stator mmf. Also find bar and the end ring section if the current density is 5A/mm^2.

5. Solve **any two** : **(2×6=12)**

1) In the design of 30 H.P, 3Φ , 440 V, 960 r.p.m., 50 Hz, delta connected induction motor. Assume the specific electric loading of 25000 A/m, specific magnetic loading of 0.46 Wb/m^2. Full load efficiency 86%, p.f. = 0.87 and estimate the following :
   i) Stator core dimensions
   ii) Number of stator slots and winding turns.

2) A 500 kVA, 3.3 kV, 50 Hz, 600 r.p.m., 3 phase salient pole alternator has 180 turns per phase., Estimate the length of air gap if average flux density is 0.54 Wb/m^2; the ratio pole arc to pole pitch 0.65; short circuit ratio 1.2; the gap contraction factor 1.15 and winding factor 0.955. The mmf required for gap is 80% of no. load field mmf. Star connection

3) For a 2500 kVA, 3.3 kV, 32 pole, 50 Hz, vertical shaft water wheel generator. Find suitable value of
   i) diameter at air gap
   ii) core length
   iii) periphery speed.

   The specific magnetic and electric loading may be taken as 0.68 Wb/m^2 and 30000 amp. Cond per meter. The ratio of pole arc to pole pitch for the circular pole to be used is 0.65. If the runaway speed is to be limited to twice the normal speed. What type of pole construction would you suggest ?

Set P

SLR-TJ – 368

Seat No.	

Set Q

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 21-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3. Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternatives : **14**

1) Use of number of poles in a dc machines reduces
   A) Cost of copper in armature as well as field
   B) Overall diameter and length of the machine
   C) Length of commutator
   D) All of the above

2) The yoke of dc machines
   A) Must made of magnetic material
   B) Should preferably be made of magnetic material but can be of non-magnetic material
   C) Must be made of non-magnetic material
   D) Is partially made of magnetic material and partially of non-magnetic material

3) An increase in number of poles of an induction motor results in
   A) Decrease in maximum p.f. B) Increase in maximum p.f.
   C) No change in maximum p.f. D) Can-not be predicted

4) When 3 phase induction motor is designed with higher value of B_{av} it will give
   A) Better full load power factor B) A higher starting torque
   C) Higher full load efficiency D) Higher overload capacity

5) Higher values of flux density can be taken while designing machines for
   A) Large rotor diameter B) Large output
   C) Both A) and B) D) None of these

P.T.O.

6) In turbo-alternator the rotor diameter is limited to about 1.2 m due to
   A) Centrifugal forces
   B) Deflection
   C) Critical speed
   D) All of the above

7) _____ cooling is most used in hydrogenation.
   A) Closed circuit air
   B) Hydrogen gas
   C) Direct water
   D) Any of these

8) CRGO has _____ in comparison to hot rolled silicon steel.
   A) Better finished
   B) Improve space factor
   C) Much better magnetic properties
   D) All of the above

9) The condition for a transformer to be designed for the minimum volume is
   A) Iron loss = copper loss
   B) Volume of iron = volume of copper
   C) Weight of iron = weight of copper
   D) The volume of iron is minimum

10) The hum in a transformer is due to
   A) Magnetostriction
   B) Vibration developed by lamination depending upon tightness of clamping
   C) Mechanical vibration of the tank walls
   D) All of the above

11) The main area of design are
   A) Insulation
   B) Thermal circuit
   C) Mechanical consideration
   D) All of the above

12) Commutation imposed limitation on
   A) induction motor
   B) dc motor
   C) synchronous motor
   D) all of the above

13) The basic need of good conducting material used for windings of electrical machines are
   A) Highest possible conductivity and least possible temperature coefficient of resistance
   B) High tensile strength and absence of brittleness
   C) Reliability, durability, good weldability and solderability
   D) All of the above

14) Caters coefficient is applicable to estimating
   A) Requirement if air-gap mmf
   B) Flux distribution in air gap
   C) Length of air-gap
   D) No-load loss

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SLR-TJ – 368

Seat No.	

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 21-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Explain the principles of design for electromagnetic machines.
   2) Derive an equation for emf per turn for transformer.
   3) Explain the factors affecting the size of rotating machines.
   4) Calculate the kVA output of a single phase transformer from the following data :

$$\frac{\text{core height}}{\text{distance between core centres}} = 2.8, \quad \frac{\text{diameter of circumscribing circle}}{\text{distance between core centres}} = 0.56$$

$$\frac{\text{net iron area}}{\text{area of circumscribing circle}} = 0.7$$

   Current density = 2.3 A/mm^2, window space factor = 0.27, frequency = 50 Hz, Flux density of core = 1.2 Wb/m^2 , distance between core centres = 0.4 m.
   5) For a transformer having two stepped core section prove that Ai = 0.56d^2.

3. Solve **any two** : **(6×2=12)**
   1) A 250 kVA 6600/400 V, 50 Hz, 3 phase Delta/Star, core type oil immersed natural cool transformer with following data :
      i) Winding temperature not to exceed 50°C
      ii) Total loss at 50°C is 5.0 kW
      iii) Tank dimensions, height × length × width = 125 × 100 × 50 (all in cm)
      iv) Oil level = 115 cm length

      Sketch the diagram to show the arrangement.

2) Find the main dimensions, number of poles and length of air gap of a 1000 kW, 500 V, 300 r.p.m. dc generator. Assume the specific magnetic loading B_{av} = 0.7 Wb/m^2, ampere conductor per meter = 40000, square pole face, ratio of pole arc to pole pitch is 0.7. Assume efficiency as 92% and gap contraction factor as 1.15.

3) Determine the main dimensions, number of poles and the length of air gap of a 600 kW, 500 V, 900 r.p.m. generators. Assume average gap density as 0.6 Wb/m^2 and ampere conductor per meter as 35000. The ratio of pole arc to pole pitch is 0.75 and efficiency is 91%. The following are the design constraints.
   i) Peripheral speed < 40 m/s
   ii) Frequency of flux reversal < 50 Hz
   iii) Current per brush arm < 400 Amp
   iv) Armature mmf per pole < 7500 A

SECTION – II

4. Solve **any four** : **(4×4=16)**

1) Find the current in the bars and end rings of a cage rotor of a 6 pole, 3Φ, induction motor having 72 stator slots with 15 conductor in each slot. If the stator current per phase is 20 Amp and rotor slots are 55. Hence find the suitable size of the cage bars and end rings.

2) Discuss the effect of air gap length of 3-ph induction motor on following factor.
   a) Power factor
   b) Overload capacity
   c) Pulsation loss and noise
   d) Unbalanced magnetic pull.

3) Derive the output equation of single phase induction motor.

4) Discuss the choice of specific electric loading and specific magnetic loading of synchronous generator.

5) A 11 kW, 3Φ, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing 9 conductor. Calculate the value of bar and end ring current. The number of rotor bars is 64. The machines has an efficiency of 0.86 and power factor of 0.85. The rotor mmf may assume as 85% of stator mmf. Also find bar and the end ring section if the current density is 5A/mm^2.

5. Solve **any two** : **(2×6=12)**

1) In the design of 30 H.P, 3Φ , 440 V, 960 r.p.m., 50 Hz, delta connected induction motor. Assume the specific electric loading of 25000 A/m, specific magnetic loading of 0.46 Wb/m^2. Full load efficiency 86%, p.f. = 0.87 and estimate the following :
   i) Stator core dimensions
   ii) Number of stator slots and winding turns.

2) A 500 kVA, 3.3 kV, 50 Hz, 600 r.p.m., 3 phase salient pole alternator has 180 turns per phase., Estimate the length of air gap if average flux density is 0.54 Wb/m^2; the ratio pole arc to pole pitch 0.65; short circuit ratio 1.2; the gap contraction factor 1.15 and winding factor 0.955. The mmf required for gap is 80% of no. load field mmf. Star connection

3) For a 2500 kVA, 3.3 kV, 32 pole, 50 Hz, vertical shaft water wheel generator. Find suitable value of
   i) diameter at air gap
   ii) core length
   iii) periphery speed.

   The specific magnetic and electric loading may be taken as 0.68 Wb/m^2 and 30000 amp. Cond per meter. The ratio of pole arc to pole pitch for the circular pole to be used is 0.65. If the runaway speed is to be limited to twice the normal speed. What type of pole construction would you suggest ?

Set Q

SLR-TJ – 368

Seat No.	

Set R

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 21-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3. Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternatives : **14**

1) Commutation imposed limitation on
A) induction motor B) dc motor
C) synchronous motor D) all of the above

2) The basic need of good conducting material used for windings of electrical machines are
A) Highest possible conductivity and least possible temperature coefficient of resistance
B) High tensile strength and absence of brittleness
C) Reliability, durability, good weldability and solderability
D) All of the above

3) Caters coefficient is applicable to estimating
A) Requirement if air-gap mmf
B) Flux distribution in air gap
C) Length of air-gap
D) No-load loss

4) Use of number of poles in a dc machines reduces
A) Cost of copper in armature as well as field
B) Overall diameter and length of the machine
C) Length of commutator
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5) The yoke of dc machines
   A) Must made of magnetic material
   B) Should preferably be made of magnetic material but can be of non-magnetic material
   C) Must be made of non-magnetic material
   D) Is partially made of magnetic material and partially of non-magnetic material

6) An increase in number of poles of an induction motor results in
   A) Decrease in maximum p.f. B) Increase in maximum p.f.
   C) No change in maximum p.f. D) Can-not be predicted

7) When 3 phase induction motor is designed with higher value of B_{av} it will give
   A) Better full load power factor B) A higher starting torque
   C) Higher full load efficiency D) Higher overload capacity

8) Higher values of flux density can be taken while designing machines for
   A) Large rotor diameter B) Large output
   C) Both A) and B) D) None of these

9) In turbo-alternator the rotor diameter is limited to about 1.2 m due to
   A) Centrifugal forces B) Deflection
   C) Critical speed D) All of the above

10) _____ cooling is most used in hydrogenation.
   A) Closed circuit air B) Hydrogen gas
   C) Direct water D) Any of these

11) CRGO has _____ in comparison to hot rolled silicon steel.
   A) Better finished B) Improve space factor
   C) Much better magnetic properties D) All of the above

12) The condition for a transformer to be designed for the minimum volume is
   A) Iron loss = copper loss B) Volume of iron = volume of copper
   C) Weight of iron = weight of copper D) The volume of iron is minimum

13) The hum in a transformer is due to
   A) Magnetostriction
   B) Vibration developed by lamination depending upon tightness of clamping
   C) Mechanical vibration of the tank walls
   D) All of the above

14) The main area of design are
   A) Insulation B) Thermal circuit
   C) Mechanical consideration D) All of the above

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SLR-TJ – 368

Seat No.	

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 21-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Explain the principles of design for electromagnetic machines.
   2) Derive an equation for emf per turn for transformer.
   3) Explain the factors affecting the size of rotating machines.
   4) Calculate the kVA output of a single phase transformer from the following data :

$$\frac{\text{core height}}{\text{distance between core centres}} = 2.8, \quad \frac{\text{diameter of circumscribing circle}}{\text{distance between core centres}} = 0.56$$

$$\frac{\text{net iron area}}{\text{area of circumscribing circle}} = 0.7$$

   Current density = 2.3 A/mm^2, window space factor = 0.27, frequency = 50 Hz, Flux density of core = 1.2 Wb/m^2 , distance between core centres = 0.4 m.
   5) For a transformer having two stepped core section prove that Ai = 0.56d^2.

3. Solve **any two** : **(6×2=12)**
   1) A 250 kVA 6600/400 V, 50 Hz, 3 phase Delta/Star, core type oil immersed natural cool transformer with following data :
      i) Winding temperature not to exceed 50°C
      ii) Total loss at 50°C is 5.0 kW
      iii) Tank dimensions, height × length × width = 125 × 100 × 50 (all in cm)
      iv) Oil level = 115 cm length

      Sketch the diagram to show the arrangement.

2) Find the main dimensions, number of poles and length of air gap of a 1000 kW, 500 V, 300 r.p.m. dc generator. Assume the specific magnetic loading B_{av} = 0.7 Wb/m^2, ampere conductor per meter = 40000, square pole face, ratio of pole arc to pole pitch is 0.7. Assume efficiency as 92% and gap contraction factor as 1.15.

3) Determine the main dimensions, number of poles and the length of air gap of a 600 kW, 500 V, 900 r.p.m. generators. Assume average gap density as 0.6 Wb/m^2 and ampere conductor per meter as 35000. The ratio of pole arc to pole pitch is 0.75 and efficiency is 91%. The following are the design constraints.
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   iii) Current per brush arm < 400 Amp
   iv) Armature mmf per pole < 7500 A

SECTION – II

4. Solve **any four** : **(4×4=16)**

1) Find the current in the bars and end rings of a cage rotor of a 6 pole, 3Φ, induction motor having 72 stator slots with 15 conductor in each slot. If the stator current per phase is 20 Amp and rotor slots are 55. Hence find the suitable size of the cage bars and end rings.

2) Discuss the effect of air gap length of 3-ph induction motor on following factor.
   a) Power factor
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   c) Pulsation loss and noise
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3) Derive the output equation of single phase induction motor.

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3) For a 2500 kVA, 3.3 kV, 32 pole, 50 Hz, vertical shaft water wheel generator. Find suitable value of
   i) diameter at air gap
   ii) core length
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   The specific magnetic and electric loading may be taken as 0.68 Wb/m^2 and 30000 amp. Cond per meter. The ratio of pole arc to pole pitch for the circular pole to be used is 0.65. If the runaway speed is to be limited to twice the normal speed. What type of pole construction would you suggest ?

Set R

SLR-TJ – 368

Seat No.	

Set S

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 21-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3. Each*** *question carries* ***one*** *mark.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternatives : **14**

1) An increase in number of poles of an induction motor results in
A) Decrease in maximum p.f. B) Increase in maximum p.f.
C) No change in maximum p.f. D) Can-not be predicted

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A) Better full load power factor B) A higher starting torque
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A) Large rotor diameter B) Large output
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P.T.O.

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   A) induction motor
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SLR-TJ – 368

Seat No.	

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 21-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Explain the principles of design for electromagnetic machines.
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$$\frac{\text{net iron area}}{\text{area of circumscribing circle}} = 0.7$$

   Current density = 2.3 A/mm^2, window space factor = 0.27, frequency = 50 Hz, Flux density of core = 1.2 Wb/m^2 , distance between core centres = 0.4 m.
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   ii) Frequency of flux reversal < 50 Hz
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SECTION – II

4. Solve **any four** : **(4×4=16)**

1) Find the current in the bars and end rings of a cage rotor of a 6 pole, 3Φ, induction motor having 72 stator slots with 15 conductor in each slot. If the stator current per phase is 20 Amp and rotor slots are 55. Hence find the suitable size of the cage bars and end rings.

2) Discuss the effect of air gap length of 3-ph induction motor on following factor.
   a) Power factor
   b) Overload capacity
   c) Pulsation loss and noise
   d) Unbalanced magnetic pull.

3) Derive the output equation of single phase induction motor.

4) Discuss the choice of specific electric loading and specific magnetic loading of synchronous generator.

5) A 11 kW, 3Φ, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing 9 conductor. Calculate the value of bar and end ring current. The number of rotor bars is 64. The machines has an efficiency of 0.86 and power factor of 0.85. The rotor mmf may assume as 85% of stator mmf. Also find bar and the end ring section if the current density is 5A/mm^2.

5. Solve **any two** : **(2×6=12)**

1) In the design of 30 H.P, 3Φ , 440 V, 960 r.p.m., 50 Hz, delta connected induction motor. Assume the specific electric loading of 25000 A/m, specific magnetic loading of 0.46 Wb/m^2. Full load efficiency 86%, p.f. = 0.87 and estimate the following :
   i) Stator core dimensions
   ii) Number of stator slots and winding turns.

2) A 500 kVA, 3.3 kV, 50 Hz, 600 r.p.m., 3 phase salient pole alternator has 180 turns per phase., Estimate the length of air gap if average flux density is 0.54 Wb/m^2; the ratio pole arc to pole pitch 0.65; short circuit ratio 1.2; the gap contraction factor 1.15 and winding factor 0.955. The mmf required for gap is 80% of no. load field mmf. Star connection

3) For a 2500 kVA, 3.3 kV, 32 pole, 50 Hz, vertical shaft water wheel generator. Find suitable value of
   i) diameter at air gap
   ii) core length
   iii) periphery speed.

   The specific magnetic and electric loading may be taken as 0.68 Wb/m^2 and 30000 amp. Cond per meter. The ratio of pole arc to pole pitch for the circular pole to be used is 0.65. If the runaway speed is to be limited to twice the normal speed. What type of pole construction would you suggest ?

Set S

SLR-TJ – 369

Seat No.	

Set P

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
CONTROL SYSTEMS – II

Day and Date : Wednesday, 22-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answers : **(1×14=14)**

1) Leading compensator network is
   a) Equalizer b) High pass filter
   c) Low pass filter d) None of the above

2) The function of phase lag network.
   a) Increases system stability b) Decreases bandwidth
   c) Maintains velocity gain constant d) All of the above

3) Roots of the characteristic equations are
   a) Poles of closed loop b) Poles of open loop
   c) Zero of closed loop d) Zero of open loop

4) _____ is not frequency domain.
   a) Root locus b) Bode plot c) Nyquist plot d) Polar plot

5) In bode plot the gain cross over frequency is the frequency at which
   a) $|G(jw)H(jw)|=1$ b) $|G(jw)H(jw)|=0$
   c) $|G(jw)H(jw)|=\infty$ d) $\frac{1}{|G(jw)H(jw)|}=K$

6) A network has a pole at s = –1 and a zero at s = –2. If this network is excited by sinusoidal input, the output
   a) Leads the input b) Lags the input
   c) Is in phase with input d) Decays exponentially to zero

P.T.O.

7) The eigen values of linear system are the location of
   a) Poles of the system
   b) Zero of the system
   c) Both a) and b)
   d) Finite pole and zero

8) Observable matrix is given by

   a) $\begin{bmatrix} B \\ BA \\ \vdots \\ BA^{n-1} \end{bmatrix}$ b) $\begin{bmatrix} A \\ AC \\ \vdots \\ AC^{n-1} \end{bmatrix}$ c) $\begin{bmatrix} C \\ CA \\ \vdots \\ CA^{n-1} \end{bmatrix}$ d) $\begin{bmatrix} D \\ DA \\ \vdots \\ DA^{n-1} \end{bmatrix}$

9) If $\dot{X} = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$ and Y = [b 0] x where b is unknown constant, the system is
   a) Observable for all values of b
   b) Unobservable for all values of b
   c) Observable for all nonzero values of b
   d) Unobservable for all nonzero values of b

10) The state variable description of a linear autonomous system is $\dot{X} = Ax$, where x is the two dimensional state vector and A is the system matrix given by $A = \begin{bmatrix} 0 & 2 \\ 2 & 0 \end{bmatrix}$. The roots of the characteristic equation are
    a) –2 and +2
    b) –j2 and +j2
    c) –2 and –2
    d) +2 and +2

11) The necessary and sufficient condition to be satisfied for arbitrary pole placement is that the system should be completely
    a) State controllable
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    c) State controllable and state observable
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12) Non-linearities can be
    a) Incidental
    b) Intensional
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13) Small coefficient of friction
    a) Gives less steady state error
    b) Gives more steady state error
    c) Has no effect on steady state error
    d) None of the above

14) Inherent characteristic of a digital controller is that it accepts _____ data.
    a) Analog
    b) Sampled
    c) Either a) or b)
    d) Intermittent

SLR-TJ – 369

Seat No.	

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
CONTROL SYSTEMS – II

Day and Date : Wednesday, 22-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**

a) A system whose open loop transfer function is $G(s) = \frac{2.66}{s(s+1)(s+4)}$.
Compensate the system so that it meets the following specifications. (i) damping ratio $\xi = 0.5$, (ii) settling time $t_s = 10$ sec. (iii) velocity error constant $K_v \geq 5\ sec^{-1}$.

b) Explain the design procedure for designing the lag compensator by frequency response method.

c) Obtain the state space representation of field controlled D.C. motor.

d) Given the state equation $\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} x(t)$. Find the state transition matrix and zero input response for $X_0 = \begin{bmatrix} 1 \\ -1 \end{bmatrix}$.

e) Derive the realization of lead compensator using electrical network.

3. a) Design a suitable compensator for a system whose open loop transfer function is $G(s) = \frac{k}{s(s+1)}$. So that the compensated system has an undamped natural frequency $\omega_n = 3$ rad/sec. and damping ratio $\xi = 0.5$. **6**

b) Consider a type-1 unity feedback system with an OLTF $G(s) = \frac{K}{s(s+1)}$.
It is specified that $K_v = 12\ sec^{-1}$ and P.M. = 40°. Design lead compensator to meet the specifications. **6**

OR

c) Obtain the state space representation of the system shown in fig. below.

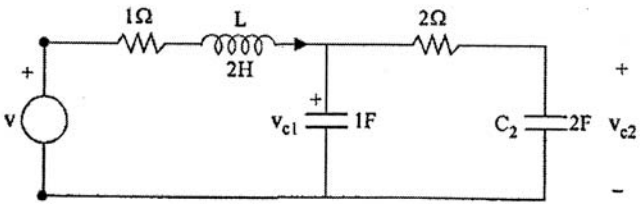

Fig. 1

Take $x_1 = i_L$ $x_2 = Vc_1$ $x_3 = Vc_2$ $V = u$ and $y = Vc_2$.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Explain any one method of determining state feedback gain matrix K.

b) Derive the pulse T.F. of closed loop systems.

c) Determine the kind of singularity for the following differential equation $\ddot{y} + 3\dot{y} + 2y = 0$.

d) Explain the isocline method for construction of phase trajectories.

e) Determine the z-domain transfer function for the following s-domain transfer function $H(s) = \dfrac{a}{s(s+a)}$.

5. Solve **any two** : **(2×6=12)**

a) A system defined by $\dot{x} = Ax + Bu$ and $y = Cx$. Where $A = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$, $B = \begin{bmatrix} 0 \\ 2 \end{bmatrix}$ and $C = [1 \;\; 0]$. It is desired to have eigenvalues at –3 and –5 by using a state feedback control $u = -Kx$. Determine the necessary feedback gain matrix K and the control signal u.

b) Consider the discrete time unity feedback control system (with sampling period T = 1 sec.) whose open loop pulse transfer function is given by $G(z) = \dfrac{K(0.3679z + 0.2642)}{(z - 0.3679)(z - 1)}$. Determine the range of gain K for stability by use of the Jury stability test.

c) Explain the stability of nonlinear control system.

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Seat No.	

Set Q

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
CONTROL SYSTEMS – II

Day and Date : Wednesday, 22-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answers : **(1×14=14)**

1) Observable matrix is given by

a) $\begin{bmatrix} B \\ BA \\ \vdots \\ BA^{n-1} \end{bmatrix}$ b) $\begin{bmatrix} A \\ AC \\ \vdots \\ AC^{n-1} \end{bmatrix}$ c) $\begin{bmatrix} C \\ CA \\ \vdots \\ CA^{n-1} \end{bmatrix}$ d) $\begin{bmatrix} D \\ DA \\ \vdots \\ DA^{n-1} \end{bmatrix}$

2) If $\dot{X} = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$ and Y = [b 0] x where b is unknown constant, the system is
a) Observable for all values of b
b) Unobservable for all values of b
c) Observable for all nonzero values of b
d) Unobservable for all nonzero values of b

3) The state variable description of a linear autonomous system is $\dot{X} = Ax$, where x is the two dimensional state vector and A is the system matrix given by $A = \begin{bmatrix} 0 & 2 \\ 2 & 0 \end{bmatrix}$. The roots of the characteristic equation are

a) –2 and +2 b) –j2 and +j2 c) –2 and –2 d) +2 and +2

P.T.O.

4) The necessary and sufficient condition to be satisfied for arbitrary pole placement is that the system should be completely
   a) State controllable
   b) State observable
   c) State controllable and state observable
   d) Any of the above

5) Non-linearities can be
   a) Incidental b) Intensional c) Linearized d) a) and b)

6) Small coefficient of friction
   a) Gives less steady state error
   b) Gives more steady state error
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7) Inherent characteristic of a digital controller is that it accepts _____ data.
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   c) Both a) and b) d) Finite pole and zero

_____

SLR-TJ – 369

Seat No.	

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
CONTROL SYSTEMS – II

Day and Date : Wednesday, 22-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**

a) A system whose open loop transfer function is $G(s) = \frac{2.66}{s(s+1)(s+4)}$.
Compensate the system so that it meets the following specifications. (i) damping ratio $\xi = 0.5$, (ii) settling time $t_s = 10$ sec. (iii) velocity error constant $K_v \geq 5\ sec^{-1}$.

b) Explain the design procedure for designing the lag compensator by frequency response method.

c) Obtain the state space representation of field controlled D.C. motor.

d) Given the state equation $\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} x(t)$. Find the state transition matrix and zero input response for $X_0 = \begin{bmatrix} 1 \\ -1 \end{bmatrix}$.

e) Derive the realization of lead compensator using electrical network.

3. a) Design a suitable compensator for a system whose open loop transfer function is $G(s) = \frac{k}{s(s+1)}$. So that the compensated system has an undamped natural frequency $\omega_n = 3$ rad/sec. and damping ratio $\xi = 0.5$. **6**

b) Consider a type-1 unity feedback system with an OLTF $G(s) = \frac{K}{s(s+1)}$.
It is specified that $K_v = 12\ sec^{-1}$ and P.M. = 40°. Design lead compensator to meet the specifications. **6**

OR

c) Obtain the state space representation of the system shown in fig. below.

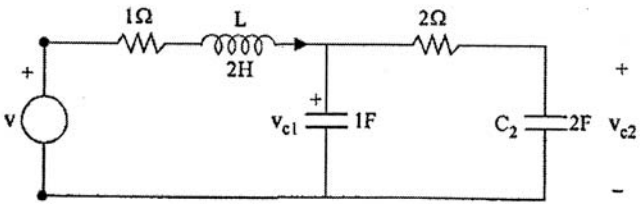

Fig. 1

Take $x_1 = i_L$ $x_2 = Vc_1$ $x_3 = Vc_2$ $V = u$ and $y = Vc_2$.

SECTION – II

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b) Consider the discrete time unity feedback control system (with sampling period T = 1 sec.) whose open loop pulse transfer function is given by $G(z) = \dfrac{K(0.3679z + 0.2642)}{(z - 0.3679)(z - 1)}$. Determine the range of gain K for stability by use of the Jury stability test.

c) Explain the stability of nonlinear control system.

SLR-TJ – 369

Seat No.	

Set R

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
CONTROL SYSTEMS – II

Day and Date : Wednesday, 22-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answers : **(1×14=14)**

1) In bode plot the gain cross over frequency is the frequency at which
   a) $|G(jw)H(jw)| = 1$ b) $|G(jw)H(jw)| = 0$
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2) A network has a pole at s = –1 and a zero at s = –2. If this network is excited by sinusoidal input, the output
   a) Leads the input b) Lags the input
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8) Non-linearities can be
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   a) Gives less steady state error
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10) Inherent characteristic of a digital controller is that it accepts _____ data.
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11) Leading compensator network is
   a) Equalizer b) High pass filter
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12) The function of phase lag network.
   a) Increases system stability b) Decreases bandwidth
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SLR-TJ – 369

Seat No.	

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
CONTROL SYSTEMS – II

Day and Date : Wednesday, 22-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**

a) A system whose open loop transfer function is $G(s) = \frac{2.66}{s(s+1)(s+4)}$.
Compensate the system so that it meets the following specifications. (i) damping ratio $\xi = 0.5$, (ii) settling time $t_s = 10$ sec. (iii) velocity error constant $K_v \geq 5\ sec^{-1}$.

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c) Obtain the state space representation of field controlled D.C. motor.

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3. a) Design a suitable compensator for a system whose open loop transfer function is $G(s) = \frac{k}{s(s+1)}$. So that the compensated system has an undamped natural frequency $\omega_n = 3$ rad/sec. and damping ratio $\xi = 0.5$. **6**

b) Consider a type-1 unity feedback system with an OLTF $G(s) = \frac{K}{s(s+1)}$.
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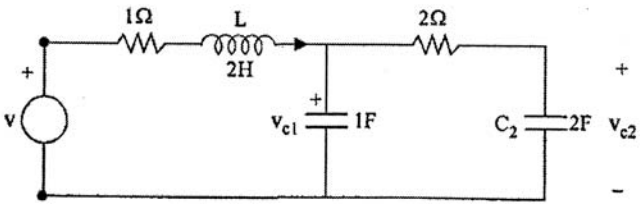

Fig. 1

Take $x_1 = i_L$ $x_2 = Vc_1$ $x_3 = Vc_2$ $V = u$ and $y = Vc_2$.

SECTION – II

4. Solve **any four** : **(4×4=16)**

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c) Explain the stability of nonlinear control system.

SLR-TJ – 369

Seat No.	

Set S

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
CONTROL SYSTEMS – II

Day and Date : Wednesday, 22-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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P.T.O.

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SLR-TJ – 369

Seat No.	

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
CONTROL SYSTEMS – II

Day and Date : Wednesday, 22-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**

a) A system whose open loop transfer function is $G(s) = \frac{2.66}{s(s+1)(s+4)}$.
Compensate the system so that it meets the following specifications. (i) damping ratio $\xi = 0.5$, (ii) settling time $t_s = 10$ sec. (iii) velocity error constant $K_v \geq 5\ sec^{-1}$.

b) Explain the design procedure for designing the lag compensator by frequency response method.

c) Obtain the state space representation of field controlled D.C. motor.

d) Given the state equation $\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} x(t)$. Find the state transition matrix and zero input response for $X_0 = \begin{bmatrix} 1 \\ -1 \end{bmatrix}$.

e) Derive the realization of lead compensator using electrical network.

3. a) Design a suitable compensator for a system whose open loop transfer function is $G(s) = \frac{k}{s(s+1)}$. So that the compensated system has an undamped natural frequency $\omega_n = 3$ rad/sec. and damping ratio $\xi = 0.5$. **6**

b) Consider a type-1 unity feedback system with an OLTF $G(s) = \frac{K}{s(s+1)}$.
It is specified that $K_v = 12\ sec^{-1}$ and P.M. = 40°. Design lead compensator to meet the specifications. **6**

OR

c) Obtain the state space representation of the system shown in fig. below.

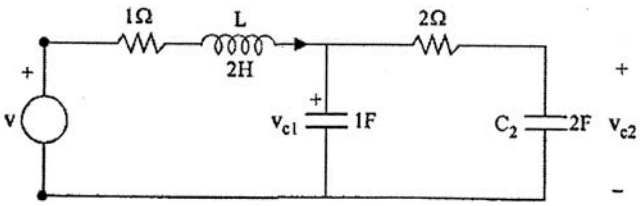

Fig. 1

Take $x_1 = i_L$ $x_2 = Vc_1$ $x_3 = Vc_2$ $V = u$ and $y = Vc_2$.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Explain any one method of determining state feedback gain matrix K.

b) Derive the pulse T.F. of closed loop systems.

c) Determine the kind of singularity for the following differential equation $\ddot{y} + 3\dot{y} + 2y = 0$.

d) Explain the isocline method for construction of phase trajectories.

e) Determine the z-domain transfer function for the following s-domain transfer function $H(s) = \dfrac{a}{s(s+a)}$.

5. Solve **any two** : **(2×6=12)**

a) A system defined by $\dot{x} = Ax + Bu$ and $y = Cx$. Where $A = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$, $B = \begin{bmatrix} 0 \\ 2 \end{bmatrix}$ and $C = [1 \;\; 0]$. It is desired to have eigenvalues at –3 and –5 by using a state feedback control $u = -Kx$. Determine the necessary feedback gain matrix K and the control signal u.

b) Consider the discrete time unity feedback control system (with sampling period T = 1 sec.) whose open loop pulse transfer function is given by $G(z) = \dfrac{K(0.3679z + 0.2642)}{(z - 0.3679)(z - 1)}$. Determine the range of gain K for stability by use of the Jury stability test.

c) Explain the stability of nonlinear control system.

SLR-TJ – 370

Seat No.	

Set P

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
MICROPROCESSORS AND MICROCONTROLLERS

Day and Date : Thursday, 23-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions :
1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) ***All*** *questions are* ***compulsory****.*
4) *Assume suitable data* ***if*** *necessary.*
5) *Figure to* ***right*** *indicates* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Which of the following statements for 8085 is correct ?
   a) Program Counter (PC) specifies the address of the instruction last executed
   b) PC specifies the address of the instruction being executed
   c) PC specifies the address of the instruction to be executed
   d) PC specifies the number of instructions executed so far

2) In 8085 microprocessor, why READY signal is used
   a) To indicate to user that the microprocessor is working and is ready for use
   b) To provide proper WAIT states when the microprocessor is communicating with a slow peripheral device
   c) To slow down a fast peripheral device so as to communicate at the microprocessor's device
   d) None of the above

3) Following is a 16-bit register for 8085 microprocessor
   a) Stack pointer b) Accumulator c) Register C d) All of these

4) The 8051 microcontroller is of _____ pin package as a _____ processor.
   a) 30, 1 byte b) 20, 1 byte c) 40, 8 bit d) 40, 8 byte

5) After reset, SP register is initialized to address
   a) 8H b) 9H c) 7H d) 5H

6) An alternate function of port pin P3.4 in the 8051 is
   a) Timer 0 b) Timer 1 c) Interrupt 0 d) Interrupt 1

7) The contents of the accumulator after this operation
MOV A, #0BH
ANL A, #2CH will be
a) 11010111 b) 11011010 c) 00001000 d) 00101000

8) Memory size = 4KB, if starting address is 2000H, then _____ is the end address.
a) 1FFFH b) 2FFFH c) 3FFFH d) 4FFFH

9) Timer overflow flag bit is available in which of the following SFRs ?
a) TMOD b) SBUF c) SCON d) TCON

10) The output of DAC 0808 is
a) current b) voltage
c) frequency d) none of the above

11) While interfacing 8051 with 16×2 LCD, what is status of enable line for write operation ?
a) High b) Low c) High to Low d) Low to High

12) External crystal frequency range of RTC 12887 is
a) 32768 KHz b) 32.768 KHz c) 50 Hz d) 32.768 MHz

13) In 8051 Timer, Mode 2 is known as
a) 8-bit auto reload b) 13-bit timer mode
c) Split timer mode d) 16-bit timer mode

14) The memory which is similar to EEPROM is erased and programmed in blocks instead of one byte at a time is called as
a) PROM b) Flash memory c) ROM d) RAM

SLR-TJ – 370

Seat No.	

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
MICROPROCESSORS AND MICROCONTROLLERS

Day and Date : Thursday, 23-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data ***if*** *necessary.*
3) Figure to ***right*** *indicates* ***full*** *marks.*

SECTION – I

2. Solve **any four** : **(3.5×4=14)**
   1) Compare 8085 and 8051.
   2) What is significance of ALE pin in 8085 microprocessor ?
   3) Explain the direct addressing modes and indirect addressing modes of 8085 with example.
   4) What is use of EA pin in 8051 ?
   5) Explain in brief DAA instruction with example.

3. Solve **any two** : **(7×2=14)**
   1) Explain flag register of 8085.
   2) Describe various byte addressable instructions. Write ALP for arranging the given array in ascending order using 8051 instruction.
   3) Draw block diagram of 8085 microprocessor explain in brief. Explain timing and control section of 8085 in detail.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   1) Write an ALP to generate triangular wave using DAC 0808.
   2) Explain in detail interfacing of MCS-51 with ADC 0809.
   3) Write difference between static RAM and Dynamic RAM.
   4) Explain the operation of port 1 structure of 8051 in detail.
   5) Draw the interfacing diagram of dc motor with 8051. Write an ALP to rotate it in counterclockwise direction.

Set P

5. Solve **any two** : **(2×6=12)**

   1) Interface matrix type keyboard with 8051. Write an ALP to read the key code and display on Port 3 of 8051 microcontroller.

   2) Draw the interfacing diagram of 8051 with LCD. Write an ALP to display “INDIA” message on 16×2 LCD.

   3) Interface LED to P2.5 pin of 8051 microcontroller. Write an ALP to turn ON and turn OFF LED after 2 sec delay.

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SLR-TJ – 370

Seat No.	

Set Q

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
MICROPROCESSORS AND MICROCONTROLLERS

Day and Date : Thursday, 23-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions :
1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) ***All*** *questions are* ***compulsory****.*
4) *Assume suitable data* ***if*** *necessary.*
5) *Figure to* ***right*** *indicates* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Memory size = 4KB, if starting address is 2000H, then _____ is the end address.
   a) 1FFFH b) 2FFFH c) 3FFFH d) 4FFFH

2) Timer overflow flag bit is available in which of the following SFRs ?
   a) TMOD b) SBUF c) SCON d) TCON

3) The output of DAC 0808 is
   a) current b) voltage
   c) frequency d) none of the above

4) While interfacing 8051 with 16×2 LCD, what is status of enable line for write operation ?
   a) High b) Low c) High to Low d) Low to High

5) External crystal frequency range of RTC 12887 is
   a) 32768 KHz b) 32.768 KHz c) 50 Hz d) 32.768 MHz

6) In 8051 Timer, Mode 2 is known as
   a) 8-bit auto reload b) 13-bit timer mode
   c) Split timer mode d) 16-bit timer mode

7) The memory which is similar to EEPROM is erased and programmed in blocks instead of one byte at a time is called as
   a) PROM b) Flash memory
   c) ROM d) RAM

8) Which of the following statements for 8085 is correct ?
   a) Program Counter (PC) specifies the address of the instruction last executed
   b) PC specifies the address of the instruction being executed
   c) PC specifies the address of the instruction to be executed
   d) PC specifies the number of instructions executed so far

9) In 8085 microprocessor, why READY signal is used
   a) To indicate to user that the microprocessor is working and is ready for use
   b) To provide proper WAIT states when the microprocessor is communicating with a slow peripheral device
   c) To slow down a fast peripheral device so as to communicate at the microprocessor's device
   d) None of the above

10) Following is a 16-bit register for 8085 microprocessor
   a) Stack pointer b) Accumulator c) Register C d) All of these

11) The 8051 microcontroller is of _____ pin package as a _____ processor.
   a) 30, 1 byte b) 20, 1 byte c) 40, 8 bit d) 40, 8 byte

12) After reset, SP register is initialized to address
   a) 8H b) 9H c) 7H d) 5H

13) An alternate function of port pin P3.4 in the 8051 is
   a) Timer 0 b) Timer 1 c) Interrupt 0 d) Interrupt 1

14) The contents of the accumulator after this operation
   MOV A, #0BH
   ANL A, #2CH will be
   a) 11010111 b) 11011010 c) 00001000 d) 00101000

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SLR-TJ – 370

Seat No.	

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
MICROPROCESSORS AND MICROCONTROLLERS

Day and Date : Thursday, 23-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data ***if*** *necessary.*
3) Figure to ***right*** *indicates* ***full*** *marks.*

SECTION – I

2. Solve **any four** : **(3.5×4=14)**
   1) Compare 8085 and 8051.
   2) What is significance of ALE pin in 8085 microprocessor ?
   3) Explain the direct addressing modes and indirect addressing modes of 8085 with example.
   4) What is use of EA pin in 8051 ?
   5) Explain in brief DAA instruction with example.

3. Solve **any two** : **(7×2=14)**
   1) Explain flag register of 8085.
   2) Describe various byte addressable instructions. Write ALP for arranging the given array in ascending order using 8051 instruction.
   3) Draw block diagram of 8085 microprocessor explain in brief. Explain timing and control section of 8085 in detail.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   1) Write an ALP to generate triangular wave using DAC 0808.
   2) Explain in detail interfacing of MCS-51 with ADC 0809.
   3) Write difference between static RAM and Dynamic RAM.
   4) Explain the operation of port 1 structure of 8051 in detail.
   5) Draw the interfacing diagram of dc motor with 8051. Write an ALP to rotate it in counterclockwise direction.

5. Solve **any two** : **(2×6=12)**

   1) Interface matrix type keyboard with 8051. Write an ALP to read the key code and display on Port 3 of 8051 microcontroller.

   2) Draw the interfacing diagram of 8051 with LCD. Write an ALP to display “INDIA” message on 16×2 LCD.

   3) Interface LED to P2.5 pin of 8051 microcontroller. Write an ALP to turn ON and turn OFF LED after 2 sec delay.

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SLR-TJ – 370

Seat No.	

Set R

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
MICROPROCESSORS AND MICROCONTROLLERS

Day and Date : Thursday, 23-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions :
1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) ***All*** *questions are* ***compulsory****.*
4) *Assume suitable data* ***if*** *necessary.*
5) *Figure to* ***right*** *indicates* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) After reset, SP register is initialized to address
   a) 8H b) 9H c) 7H d) 5H

2) An alternate function of port pin P3.4 in the 8051 is
   a) Timer 0 b) Timer 1 c) Interrupt 0 d) Interrupt 1

3) The contents of the accumulator after this operation
   MOV A, #0BH
   ANL A, #2CH will be
   a) 11010111 b) 11011010 c) 00001000 d) 00101000

4) Memory size = 4KB, if starting address is 2000H, then _____ is the end address.
   a) 1FFFH b) 2FFFH c) 3FFFH d) 4FFFH

5) Timer overflow flag bit is available in which of the following SFRs ?
   a) TMOD b) SBUF c) SCON d) TCON

6) The output of DAC 0808 is
   a) current b) voltage
   c) frequency d) none of the above

7) While interfacing 8051 with 16×2 LCD, what is status of enable line for write operation ?
   a) High b) Low
   c) High to Low d) Low to High

P.T.O.

8) External crystal frequency range of RTC 12887 is
   a) 32768 KHz b) 32.768 KHz c) 50 Hz d) 32.768 MHz

9) In 8051 Timer, Mode 2 is known as
   a) 8-bit auto reload b) 13-bit timer mode
   c) Split timer mode d) 16-bit timer mode

10) The memory which is similar to EEPROM is erased and programmed in blocks instead of one byte at a time is called as
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11) Which of the following statements for 8085 is correct ?
   a) Program Counter (PC) specifies the address of the instruction last executed
   b) PC specifies the address of the instruction being executed
   c) PC specifies the address of the instruction to be executed
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12) In 8085 microprocessor, why READY signal is used
   a) To indicate to user that the microprocessor is working and is ready for use
   b) To provide proper WAIT states when the microprocessor is communicating with a slow peripheral device
   c) To slow down a fast peripheral device so as to communicate at the microprocessor's device
   d) None of the above

13) Following is a 16-bit register for 8085 microprocessor
   a) Stack pointer b) Accumulator c) Register C d) All of these

14) The 8051 microcontroller is of _____ pin package as a _____ processor.
   a) 30, 1 byte b) 20, 1 byte c) 40, 8 bit d) 40, 8 byte

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SLR-TJ – 370

Seat No.	

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
MICROPROCESSORS AND MICROCONTROLLERS

Day and Date : Thursday, 23-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data ***if*** *necessary.*
3) Figure to ***right*** *indicates* ***full*** *marks.*

SECTION – I

2. Solve **any four** : **(3.5×4=14)**
   1) Compare 8085 and 8051.
   2) What is significance of ALE pin in 8085 microprocessor ?
   3) Explain the direct addressing modes and indirect addressing modes of 8085 with example.
   4) What is use of EA pin in 8051 ?
   5) Explain in brief DAA instruction with example.

3. Solve **any two** : **(7×2=14)**
   1) Explain flag register of 8085.
   2) Describe various byte addressable instructions. Write ALP for arranging the given array in ascending order using 8051 instruction.
   3) Draw block diagram of 8085 microprocessor explain in brief. Explain timing and control section of 8085 in detail.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   1) Write an ALP to generate triangular wave using DAC 0808.
   2) Explain in detail interfacing of MCS-51 with ADC 0809.
   3) Write difference between static RAM and Dynamic RAM.
   4) Explain the operation of port 1 structure of 8051 in detail.
   5) Draw the interfacing diagram of dc motor with 8051. Write an ALP to rotate it in counterclockwise direction.

Set R

5. Solve **any two** : **(2×6=12)**

   1) Interface matrix type keyboard with 8051. Write an ALP to read the key code and display on Port 3 of 8051 microcontroller.

   2) Draw the interfacing diagram of 8051 with LCD. Write an ALP to display “INDIA” message on 16×2 LCD.

   3) Interface LED to P2.5 pin of 8051 microcontroller. Write an ALP to turn ON and turn OFF LED after 2 sec delay.

_____

SLR-TJ – 370

Seat No.	

Set S

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
MICROPROCESSORS AND MICROCONTROLLERS

Day and Date : Thursday, 23-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions :
1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) ***All*** *questions are* ***compulsory****.*
4) *Assume suitable data* ***if*** *necessary.*
5) *Figure to* ***right*** *indicates* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) The output of DAC 0808 is
   a) current b) voltage
   c) frequency d) none of the above

2) While interfacing 8051 with 16×2 LCD, what is status of enable line for write operation ?
   a) High b) Low c) High to Low d) Low to High

3) External crystal frequency range of RTC 12887 is
   a) 32768 KHz b) 32.768 KHz c) 50 Hz d) 32.768 MHz

4) In 8051 Timer, Mode 2 is known as
   a) 8-bit auto reload b) 13-bit timer mode
   c) Split timer mode d) 16-bit timer mode

5) The memory which is similar to EEPROM is erased and programmed in blocks instead of one byte at a time is called as
   a) PROM b) Flash memory c) ROM d) RAM

6) Which of the following statements for 8085 is correct ?
   a) Program Counter (PC) specifies the address of the instruction last executed
   b) PC specifies the address of the instruction being executed
   c) PC specifies the address of the instruction to be executed
   d) PC specifies the number of instructions executed so far

7) In 8085 microprocessor, why READY signal is used
   a) To indicate to user that the microprocessor is working and is ready for use
   b) To provide proper WAIT states when the microprocessor is communicating with a slow peripheral device
   c) To slow down a fast peripheral device so as to communicate at the microprocessor's device
   d) None of the above

8) Following is a 16-bit register for 8085 microprocessor
   a) Stack pointer b) Accumulator c) Register C d) All of these

9) The 8051 microcontroller is of _____ pin package as a _____ processor.
   a) 30, 1 byte b) 20, 1 byte c) 40, 8 bit d) 40, 8 byte

10) After reset, SP register is initialized to address
   a) 8H b) 9H c) 7H d) 5H

11) An alternate function of port pin P3.4 in the 8051 is
   a) Timer 0 b) Timer 1 c) Interrupt 0 d) Interrupt 1

12) The contents of the accumulator after this operation
   MOV A, #0BH
   ANL A, #2CH will be
   a) 11010111 b) 11011010 c) 00001000 d) 00101000

13) Memory size = 4KB, if starting address is 2000H, then _____ is the end address.
   a) 1FFFH b) 2FFFH c) 3FFFH d) 4FFFH

14) Timer overflow flag bit is available in which of the following SFRs ?
   a) TMOD b) SBUF c) SCON d) TCON

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SLR-TJ – 370

Seat No.	

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
MICROPROCESSORS AND MICROCONTROLLERS

Day and Date : Thursday, 23-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data ***if*** *necessary.*
3) Figure to ***right*** *indicates* ***full*** *marks.*

SECTION – I

2. Solve **any four** : **(3.5×4=14)**
   1) Compare 8085 and 8051.
   2) What is significance of ALE pin in 8085 microprocessor ?
   3) Explain the direct addressing modes and indirect addressing modes of 8085 with example.
   4) What is use of EA pin in 8051 ?
   5) Explain in brief DAA instruction with example.

3. Solve **any two** : **(7×2=14)**
   1) Explain flag register of 8085.
   2) Describe various byte addressable instructions. Write ALP for arranging the given array in ascending order using 8051 instruction.
   3) Draw block diagram of 8085 microprocessor explain in brief. Explain timing and control section of 8085 in detail.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   1) Write an ALP to generate triangular wave using DAC 0808.
   2) Explain in detail interfacing of MCS-51 with ADC 0809.
   3) Write difference between static RAM and Dynamic RAM.
   4) Explain the operation of port 1 structure of 8051 in detail.
   5) Draw the interfacing diagram of dc motor with 8051. Write an ALP to rotate it in counterclockwise direction.

Set S

5. Solve **any two** : **(2×6=12)**

   1) Interface matrix type keyboard with 8051. Write an ALP to read the key code and display on Port 3 of 8051 microcontroller.

   2) Draw the interfacing diagram of 8051 with LCD. Write an ALP to display “INDIA” message on 16×2 LCD.

   3) Interface LED to P2.5 pin of 8051 microcontroller. Write an ALP to turn ON and turn OFF LED after 2 sec delay.

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SLR-TJ – 371

Seat No.	

Set P

T.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER ELECTRONICS (CGPA)

Day and Date : Friday, 24-11-2017 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume data, if **necessary**.*
*3) **All** questions are **compulsory**.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) Which of the following terminals does not belong to the MOSFET ?
A) Source B) Drain C) Gate D) Base

2) A TRIAC
A) Conducts when not triggered
B) Conducts when not triggered in both directions
C) Conducts when triggered in one
D) None of the above

3) In a 3 phase half wave rectifier, when firing angle is less than 90 degree, then the average dc output voltage becomes
A) Positive B) Negative C) Zero D) None of these

4) A single phase ac-dc converter is also known as
A) Rectifier B) Inverter C) SMPS D) Regulator

5) A modern power semiconductor device that combines the characteristic of BJT and MOSFET is
A) IGBT B) TRIAC C) SIT D) GTO

6) A DIAC has _____ terminals.
A) Two B) Three
C) Four D) None of the above

P.T.O.

7) In a full wave rectifier, the rectification ratio is approximately equal to
   A) 61% B) 71% C) 81% D) 91%
8) A buck converter can be used in
   A) Electric traction B) Electric vehicles
   C) Machine tools D) All of these
9) In a 3-phase bridge rectifier circuit for HVDC transmission, the ratio of output dc voltage to input ac voltage is
   A) 0.5 B) 1.0 C) 1.71 D) 2
10) A dc to dc converter cannot be line commutated.
   A) True B) False
11) Ripple factor is the ratio of
   A) Rms value of the ac component of load voltage to the dc voltage
   B) Average value of the ac component of load voltage to the peak value of voltage
   C) Average value of the dc component of load voltage to the ac voltage
   D) Peak value of the dc component of load voltage to the ac voltage
12) The two modes of operation of three phase bridge inverters are known as
   A) 60° mode and 120° mode
   B) 90° mode and 120° mode
   C) 120° mode and 180° mode
   D) 120° mode and 240° mode
13) In a 3 phase bridge inverter with 180° mode of operation the numbers of thyristors conducting at one time are
   A) 1 B) 3 C) 2 D) 4
14) A converter which can operate in both 3-pulse and 6-pulse modes is
   A) 1-phase full converter
   B) 3-phase half wave converter
   C) 3-phase semiconverter
   D) 3-phase full converter

Seat No.	

T.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER ELECTRONICS (CGPA)

Day and Date : Friday, 24-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume data, if **necessary**.*
*3) **All** questions are **compulsory**.*

SECTION – I

2. Attempt **any four** of the following : **(4×4=16)**
   a) What is a GTO ? Describe the turn – on and turn – off characteristics of a GTO.
   b) i) State and explain protection schemes of thyristors.
      ii) What are dv/dt and di/dt ratings of SCRs. What happens if these ratings are exceeded, explain.
   c) With the necessary circuit diagrams and relevant waveforms, discuss class 'D' commutation of thyristors.
   d) Explain circuit operation of single half wave controlled rectifier with R load and draw output waveforms at an firing angle of 30°and 65°.
   e) A single phase 230 V, 1 KW heater is connected across a single phase, 230V, 50Hz, supply through an SCR. For firing angle delay of 45°, calculate the power absorbed in the element.
   f) i) Explain different modes of operation of TRIAC with neat schematic diagram.
      ii) Give few applications of TRIAC.

3. Attempt **any two** of the following : **(2×6=12)**
   a) What is free-wheeling diode ? Draw the circuit diagram of single phase full wave controlled rectifier with and without free-wheeling diode and explain the operation of the circuit with the help of necessary waveforms.
   b) How many structures are there for power MOSFETs and describe any one of them with suitable diagram.
   c) A single phase semiconverter converter is connected to 120 V, 50 Hz supply. The load current can assumed continuous and ripple free. If delay angle is $\pi/2$. Calculate (i) average output voltage (ii) rms output voltage (iii) harmonic factor (iv) displacement factor (v) power factor.

SECTION – II

4. Attempt **any four** of the following : **(4×4=16)**

a) Write short notes on application of power electronics converters in HVDC transmission systems.

b) A single phase half bridge inverter, connected to 230 V dc source, feeds a resistive load of 10 ohm. Determine (i) fundamental rms value of output voltage (ii) total output power and fundamental frequency power (iii) average and peak currents of each thyristor.

c) Explain the control methods of output voltage of single phase inverters.

d) Explain principle of buck converter and derive expression for output voltage in terms of input voltage and duty cycle.

e) Explain principle of integral cycle control type of ac voltage controllers.

f) Explain role of power electronics converters in integration of renewable energy sources into grid.

5. Attempt **any two** of the following : **(2×6=12)**

a) Explain principle of single phase full wave AC voltage controller with R-L load and draw the relevant waveforms.

b) A dc-dc converter has resistive load of $R = 10\Omega$ and the input dc voltage 200 V. When the converter switch remains ON, its voltage drop is 2 volts and the frequency is 1 kHz. If the duty cycle is 30%, determine :

i) The average load voltage

ii) rms load voltage

iii) FF

iv) RF.

c) Explain three phase 180 degree mode voltage source inverter with a balanced star connected resistive load and draw the respective output phase and line voltage waveforms.

SLR-TJ – 371

Seat No.	

Set Q

T.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER ELECTRONICS (CGPA)

Day and Date : Friday, 24-11-2017 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume data, if **necessary**.*
*3) **All** questions are **compulsory**.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) A buck converter can be used in
   A) Electric traction B) Electric vehicles
   C) Machine tools D) All of these

2) In a 3-phase bridge rectifier circuit for HVDC transmission, the ratio of output dc voltage to input ac voltage is
   A) 0.5 B) 1.0 C) 1.71 D) 2

3) A dc to dc converter cannot be line commutated.
   A) True B) False

4) Ripple factor is the ratio of
   A) Rms value of the ac component of load voltage to the dc voltage
   B) Average value of the ac component of load voltage to the peak value of voltage
   C) Average value of the dc component of load voltage to the ac voltage
   D) Peak value of the dc component of load voltage to the ac voltage

5) The two modes of operation of three phase bridge inverters are known as
   A) 60° mode and 120° mode B) 90° mode and 120° mode
   C) 120° mode and 180° mode D) 120° mode and 240° mode

6) In a 3 phase bridge inverter with 180° mode of operation the numbers of thyristors conducting at one time are
   A) 1 B) 3 C) 2 D) 4
7) A converter which can operate in both 3-pulse and 6-pulse modes is
   A) 1-phase full converter
   B) 3-phase half wave converter
   C) 3-phase semiconverter
   D) 3-phase full converter
8) Which of the following terminals does not belong to the MOSFET ?
   A) Source B) Drain C) Gate D) Base
9) A TRIAC
   A) Conducts when not triggered
   B) Conducts when not triggered in both directions
   C) Conducts when triggered in one
   D) None of the above
10) In a 3 phase half wave rectifier, when firing angle is less than 90 degree, then the average dc output voltage becomes
   A) Positive B) Negative C) Zero D) None of these
11) A single phase ac-dc converter is also known as
   A) Rectifier B) Inverter C) SMPS D) Regulator
12) A modern power semiconductor device that combines the characteristic of BJT and MOSFET is
   A) IGBT B) TRIAC C) SIT D) GTO
13) A DIAC has _____ terminals.
   A) Two B) Three
   C) Four D) None of the above
14) In a full wave rectifier, the rectification ratio is approximately equal to
   A) 61% B) 71% C) 81% D) 91%

_____

SLR-TJ – 371

Seat No.	

T.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER ELECTRONICS (CGPA)

Day and Date : Friday, 24-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume data, if **necessary**.*
*3) **All** questions are **compulsory**.*

SECTION – I

2. Attempt **any four** of the following : **(4×4=16)**
   a) What is a GTO ? Describe the turn – on and turn – off characteristics of a GTO.
   b) i) State and explain protection schemes of thyristors.
      ii) What are dv/dt and di/dt ratings of SCRs. What happens if these ratings are exceeded, explain.
   c) With the necessary circuit diagrams and relevant waveforms, discuss class 'D' commutation of thyristors.
   d) Explain circuit operation of single half wave controlled rectifier with R load and draw output waveforms at an firing angle of 30°and 65°.
   e) A single phase 230 V, 1 KW heater is connected across a single phase, 230V, 50Hz, supply through an SCR. For firing angle delay of 45°, calculate the power absorbed in the element.
   f) i) Explain different modes of operation of TRIAC with neat schematic diagram.
      ii) Give few applications of TRIAC.

3. Attempt **any two** of the following : **(2×6=12)**
   a) What is free-wheeling diode ? Draw the circuit diagram of single phase full wave controlled rectifier with and without free-wheeling diode and explain the operation of the circuit with the help of necessary waveforms.
   b) How many structures are there for power MOSFETs and describe any one of them with suitable diagram.
   c) A single phase semiconverter converter is connected to 120 V, 50 Hz supply. The load current can assumed continuous and ripple free. If delay angle is $\pi/2$. Calculate (i) average output voltage (ii) rms output voltage (iii) harmonic factor (iv) displacement factor (v) power factor.

SECTION – II

4. Attempt **any four** of the following : **(4×4=16)**

a) Write short notes on application of power electronics converters in HVDC transmission systems.

b) A single phase half bridge inverter, connected to 230 V dc source, feeds a resistive load of 10 ohm. Determine (i) fundamental rms value of output voltage (ii) total output power and fundamental frequency power (iii) average and peak currents of each thyristor.

c) Explain the control methods of output voltage of single phase inverters.

d) Explain principle of buck converter and derive expression for output voltage in terms of input voltage and duty cycle.

e) Explain principle of integral cycle control type of ac voltage controllers.

f) Explain role of power electronics converters in integration of renewable energy sources into grid.

5. Attempt **any two** of the following : **(2×6=12)**

a) Explain principle of single phase full wave AC voltage controller with R-L load and draw the relevant waveforms.

b) A dc-dc converter has resistive load of $R = 10\Omega$ and the input dc voltage 200 V. When the converter switch remains ON, its voltage drop is 2 volts and the frequency is 1 kHz. If the duty cycle is 30%, determine :

i) The average load voltage

ii) rms load voltage

iii) FF

iv) RF.

c) Explain three phase 180 degree mode voltage source inverter with a balanced star connected resistive load and draw the respective output phase and line voltage waveforms.

SLR-TJ – 371

Seat No.	

Set R

T.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER ELECTRONICS (CGPA)

Day and Date : Friday, 24-11-2017 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume data, if **necessary**.*
*3) **All** questions are **compulsory**.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) A modern power semiconductor device that combines the characteristic of BJT and MOSFET is
A) IGBT B) TRIAC C) SIT D) GTO

2) A DIAC has _____ terminals.
A) Two B) Three
C) Four D) None of the above

3) In a full wave rectifier, the rectification ratio is approximately equal to
A) 61% B) 71% C) 81% D) 91%

4) A buck converter can be used in
A) Electric traction B) Electric vehicles
C) Machine tools D) All of these

5) In a 3-phase bridge rectifier circuit for HVDC transmission, the ratio of output dc voltage to input ac voltage is
A) 0.5 B) 1.0 C) 1.71 D) 2

6) A dc to dc converter cannot be line commutated.
A) True B) False

7) Ripple factor is the ratio of
   A) Rms value of the ac component of load voltage to the dc voltage
   B) Average value of the ac component of load voltage to the peak value of voltage
   C) Average value of the dc component of load voltage to the ac voltage
   D) Peak value of the dc component of load voltage to the ac voltage
8) The two modes of operation of three phase bridge inverters are known as
   A) 60° mode and 120° mode
   B) 90° mode and 120° mode
   C) 120° mode and 180° mode
   D) 120° mode and 240° mode
9) In a 3 phase bridge inverter with 180° mode of operation the numbers of thyristors conducting at one time are
   A) 1 B) 3 C) 2 D) 4
10) A converter which can operate in both 3-pulse and 6-pulse modes is
   A) 1-phase full converter
   B) 3-phase half wave converter
   C) 3-phase semiconverter
   D) 3-phase full converter
11) Which of the following terminals does not belong to the MOSFET ?
   A) Source B) Drain C) Gate D) Base
12) A TRIAC
   A) Conducts when not triggered
   B) Conducts when not triggered in both directions
   C) Conducts when triggered in one
   D) None of the above
13) In a 3 phase half wave rectifier, when firing angle is less than 90 degree, then the average dc output voltage becomes
   A) Positive B) Negative C) Zero D) None of these
14) A single phase ac-dc converter is also known as
   A) Rectifier B) Inverter C) SMPS D) Regulator

SLR-TJ – 371

Seat No.	

T.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER ELECTRONICS (CGPA)

Day and Date : Friday, 24-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume data, if **necessary**.*
*3) **All** questions are **compulsory**.*

SECTION – I

2. Attempt **any four** of the following : **(4×4=16)**
   a) What is a GTO ? Describe the turn – on and turn – off characteristics of a GTO.
   b) i) State and explain protection schemes of thyristors.
      ii) What are dv/dt and di/dt ratings of SCRs. What happens if these ratings are exceeded, explain.
   c) With the necessary circuit diagrams and relevant waveforms, discuss class 'D' commutation of thyristors.
   d) Explain circuit operation of single half wave controlled rectifier with R load and draw output waveforms at an firing angle of 30°and 65°.
   e) A single phase 230 V, 1 KW heater is connected across a single phase, 230V, 50Hz, supply through an SCR. For firing angle delay of 45°, calculate the power absorbed in the element.
   f) i) Explain different modes of operation of TRIAC with neat schematic diagram.
      ii) Give few applications of TRIAC.

3. Attempt **any two** of the following : **(2×6=12)**
   a) What is free-wheeling diode ? Draw the circuit diagram of single phase full wave controlled rectifier with and without free-wheeling diode and explain the operation of the circuit with the help of necessary waveforms.
   b) How many structures are there for power MOSFETs and describe any one of them with suitable diagram.
   c) A single phase semiconverter converter is connected to 120 V, 50 Hz supply. The load current can assumed continuous and ripple free. If delay angle is $\pi/2$. Calculate (i) average output voltage (ii) rms output voltage (iii) harmonic factor (iv) displacement factor (v) power factor.

SECTION – II

4. Attempt **any four** of the following : **(4×4=16)**

a) Write short notes on application of power electronics converters in HVDC transmission systems.

b) A single phase half bridge inverter, connected to 230 V dc source, feeds a resistive load of 10 ohm. Determine (i) fundamental rms value of output voltage (ii) total output power and fundamental frequency power (iii) average and peak currents of each thyristor.

c) Explain the control methods of output voltage of single phase inverters.

d) Explain principle of buck converter and derive expression for output voltage in terms of input voltage and duty cycle.

e) Explain principle of integral cycle control type of ac voltage controllers.

f) Explain role of power electronics converters in integration of renewable energy sources into grid.

5. Attempt **any two** of the following : **(2×6=12)**

a) Explain principle of single phase full wave AC voltage controller with R-L load and draw the relevant waveforms.

b) A dc-dc converter has resistive load of $R = 10\Omega$ and the input dc voltage 200 V. When the converter switch remains ON, its voltage drop is 2 volts and the frequency is 1 kHz. If the duty cycle is 30%, determine :

i) The average load voltage

ii) rms load voltage

iii) FF

iv) RF.

c) Explain three phase 180 degree mode voltage source inverter with a balanced star connected resistive load and draw the respective output phase and line voltage waveforms.

SLR-TJ – 371

Seat No.	

Set S

T.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER ELECTRONICS (CGPA)

Day and Date : Friday, 24-11-2017 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume data, if **necessary**.*
*3) **All** questions are **compulsory**.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(14×1=14)**

1) A dc to dc converter cannot be line commutated.
   A) True B) False

2) Ripple factor is the ratio of
   A) Rms value of the ac component of load voltage to the dc voltage
   B) Average value of the ac component of load voltage to the peak value of voltage
   C) Average value of the dc component of load voltage to the ac voltage
   D) Peak value of the dc component of load voltage to the ac voltage

3) The two modes of operation of three phase bridge inverters are known as
   A) 60° mode and 120° mode
   B) 90° mode and 120° mode
   C) 120° mode and 180° mode
   D) 120° mode and 240° mode

4) In a 3 phase bridge inverter with 180° mode of operation the numbers of thyristors conducting at one time are
   A) 1 B) 3 C) 2 D) 4

5) A converter which can operate in both 3-pulse and 6-pulse modes is
   A) 1-phase full converter
   B) 3-phase half wave converter
   C) 3-phase semiconverter
   D) 3-phase full converter
6) Which of the following terminals does not belong to the MOSFET ?
   A) Source B) Drain C) Gate D) Base
7) A TRIAC
   A) Conducts when not triggered
   B) Conducts when not triggered in both directions
   C) Conducts when triggered in one
   D) None of the above
8) In a 3 phase half wave rectifier, when firing angle is less than 90 degree, then the average dc output voltage becomes
   A) Positive B) Negative C) Zero D) None of these
9) A single phase ac-dc converter is also known as
   A) Rectifier B) Inverter C) SMPS D) Regulator
10) A modern power semiconductor device that combines the characteristic of BJT and MOSFET is
   A) IGBT B) TRIAC C) SIT D) GTO
11) A DIAC has _____ terminals.
   A) Two B) Three
   C) Four D) None of the above
12) In a full wave rectifier, the rectification ratio is approximately equal to
   A) 61% B) 71% C) 81% D) 91%
13) A buck converter can be used in
   A) Electric traction B) Electric vehicles
   C) Machine tools D) All of these
14) In a 3-phase bridge rectifier circuit for HVDC transmission, the ratio of output dc voltage to input ac voltage is
   A) 0.5 B) 1.0 C) 1.71 D) 2

_____

SLR-TJ – 371

Seat No.	

T.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER ELECTRONICS (CGPA)

Day and Date : Friday, 24-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume data, if **necessary**.*
*3) **All** questions are **compulsory**.*

SECTION – I

2. Attempt **any four** of the following : **(4×4=16)**
   a) What is a GTO ? Describe the turn – on and turn – off characteristics of a GTO.
   b) i) State and explain protection schemes of thyristors.
      ii) What are dv/dt and di/dt ratings of SCRs. What happens if these ratings are exceeded, explain.
   c) With the necessary circuit diagrams and relevant waveforms, discuss class 'D' commutation of thyristors.
   d) Explain circuit operation of single half wave controlled rectifier with R load and draw output waveforms at an firing angle of 30°and 65°.
   e) A single phase 230 V, 1 KW heater is connected across a single phase, 230V, 50Hz, supply through an SCR. For firing angle delay of 45°, calculate the power absorbed in the element.
   f) i) Explain different modes of operation of TRIAC with neat schematic diagram.
      ii) Give few applications of TRIAC.

3. Attempt **any two** of the following : **(2×6=12)**
   a) What is free-wheeling diode ? Draw the circuit diagram of single phase full wave controlled rectifier with and without free-wheeling diode and explain the operation of the circuit with the help of necessary waveforms.
   b) How many structures are there for power MOSFETs and describe any one of them with suitable diagram.
   c) A single phase semiconverter converter is connected to 120 V, 50 Hz supply. The load current can assumed continuous and ripple free. If delay angle is $\pi/2$. Calculate (i) average output voltage (ii) rms output voltage (iii) harmonic factor (iv) displacement factor (v) power factor.

SECTION – II

4. Attempt **any four** of the following : **(4×4=16)**

a) Write short notes on application of power electronics converters in HVDC transmission systems.

b) A single phase half bridge inverter, connected to 230 V dc source, feeds a resistive load of 10 ohm. Determine (i) fundamental rms value of output voltage (ii) total output power and fundamental frequency power (iii) average and peak currents of each thyristor.

c) Explain the control methods of output voltage of single phase inverters.

d) Explain principle of buck converter and derive expression for output voltage in terms of input voltage and duty cycle.

e) Explain principle of integral cycle control type of ac voltage controllers.

f) Explain role of power electronics converters in integration of renewable energy sources into grid.

5. Attempt **any two** of the following : **(2×6=12)**

a) Explain principle of single phase full wave AC voltage controller with R-L load and draw the relevant waveforms.

b) A dc-dc converter has resistive load of $R = 10\Omega$ and the input dc voltage 200 V. When the converter switch remains ON, its voltage drop is 2 volts and the frequency is 1 kHz. If the duty cycle is 30%, determine :

i) The average load voltage

ii) rms load voltage

iii) FF

iv) RF.

c) Explain three phase 180 degree mode voltage source inverter with a balanced star connected resistive load and draw the respective output phase and line voltage waveforms.

SLR-TJ – 372

Seat No.	

Set P

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Saturday, 25-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***if necessary*** *and mention* ***it clearly****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3. Each*** *question carries* ***one*** *mark.*
5) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answers : **(14×1=14)**

1) A signal is an energy signal if
   a) E = 0, P = 0 b) E = ∞, P = finite
   c) E = finite, P = 0 d) E = finite, P = ∞

2) The convolution of x(n)* $\delta(n - n_0)$ is _____
   a) x(n) b) $\delta(n)$ c) $x(n - n_0)$ d) None

3) If $x_1(t) = x_2(t) = u(t)$ then $x_1(t)*x_2(t)$ = _____
   a) u(t) b) $u(t^2)$ c) tu(t) d) $\frac{t^2}{2}u(t)$

4) Fourier Transform of a constant function f(t) = A is
   a) $\pi A \delta(w)$ b) $\pi \delta(w)$ c) $2\pi A \delta(w)$ d) $2\pi \delta(w)$

5) A system whose output depends on future inputs is a
   a) Static System b) Dynamic System
   c) Causal system d) Non-causal System

6) A _____ signal is one whose occurrence is always random.
   a) Deterministic b) Non-Deterministic
   c) Regular d) None of above

P.T.O.

7) _____ type of signal is identical about the origin.
   a) Even b) Odd c) Periodic d) None of these

8) Z transform of x(n) = n u(n)
   a) $z/(z-1)$ b) $z/(z-1)^2$ c) $z/(z-1)^3$ d) $z/(z-1)^4$

9) The sufficient condition for the existence of DTFT is
   a) $\sum_{n=-\infty}^{\infty} |x(n)| < \infty$ b) $\sum_{n=-\infty}^{\infty} |x(n)| > \infty$
   c) $\sum_{n=-\infty}^{\infty} |x(n)| = 0$ d) None of above

10) The range of Z for which X(Z) approaches to finite value is called as
   a) Bilateral Z transform b) Unilateral Z transform
   c) Region of Convergence d) None

11) The ROC of Z transform of discrete time sequence $x(n) = (2)^n u(n) + (3)^n u(-n-1)$ is
   a) $|z| > 2$ b) $2 < |z| < 3$
   c) $|z| < 3$ d) $2 > |z| > 3$

12) The N point DFT of a sequence x(n) is
   a) $X(K) = \sum_{n=0}^{N-1} x(n)\, e^{-j2\pi nK/N}$ b) $X(K) = \sum_{n=0}^{N-1} x(n)\, e^{j2\pi nK/N}$
   c) $X(K) = \sum_{n=0}^{N} x(n)\, e^{-j2\pi K/N}$ d) $X(K) = \sum_{n=-\infty}^{N} x(n)\, e^{-j2\pi K/N}$

13) DFT X[K] of x(n) can be obtained by
   a) DIT-FFT algorithm b) DIF-FFT algorithm
   c) Both a) and b) d) Neither a) nor b)

14) If x(z) = {1, 2, 1, 2, 3 .} ROC is
   $\updownarrow$
   a) Entire z-plane
   b) Entire z-plane except $z = \infty$
   c) Entire z-plane except $z = 0$, $z = \infty$
   d) Entire z-plane except $z = 0$

_____

SLR-TJ – 372

Seat No.	

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Saturday, 25-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***if necessary*** *and mention* ***it clearly****.*
3) Figures to the right indicate ***full*** *marks.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

a) Sketch even and odd part the signal

$$x(t) = t \quad \text{for} \quad 0 \le t \le 1$$
$$= 2t \quad \text{for} \quad 1 \le t \le 2$$

b) Find the fundamental period T of the following continuous time signals

i) $x(t) = je^{j5t}$

ii) $x(t) = 20 \cos\left(10\pi t + \frac{\pi}{6}\right)$

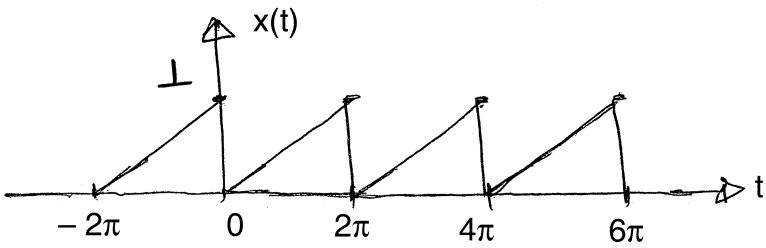
c) Check linearity and time invariance of the following system
$y(n) = \log_{10} | x(n) |$

d) Find Fourier Transform of $x(t) = te^{-3t} u(t)$.

e) Derive the Time scaling property of Fourier transform.

3. Solve **any two** : **(6×2=12)**

a) Find the trigonometric Fourier series of the following signal.



b) Find the Fourier transform of the following signal

$$x(t) = \frac{1}{2}\left[\delta(t+1)+\delta\left(t+\frac{1}{2}\right)+\delta\left(t-\frac{1}{2}\right)+\delta(t-1)\right]$$

c) Determine the convolution of the following sequences
$x(n) = \{1, 4, 3, 2\}$ and $h(n) = \{1, 3, 2, 1\}$

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Derive the relation between Z transform and Fourier Transform.

b) Find Z transform and sketch R.O.C. for following sequence.
$X[n] = (0.6)^n u[n] + (0.4)^n u[n]$.

c) If $Z\{x(n)\} = X(Z)$, then prove that, $Z\{nx(n)\} = -Z(d/dz) . X(Z)$.

d) Find the 4 point DFT of following sequence.
$X(n) = \{1, -2, 3, 4\}$

e) Find DTFT of the following :
$x(n) = (0.5)^n u(n) + 2^n u(-n-1)$

5. Solve **any two** : **(6×2=12)**

a) Compute 8 point DFT of sequence using DIT FFT algorithm.
$x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$

b) Determine the sequence x[n] associated with Z transform given below using "Power Series method".
$X[Z] = (Z^2 + Z)/(Z^2 - 2Z + 1)$; $|Z| > 3$ R.O.C.

c) Find the 4 point IDFT of following sequences

i) $X(Z) = \{1, 1 - j2, -1, 1 + jz\}$

ii) $X(Z) = \{1, 0, 1, 0\}$.

SLR-TJ – 372

Seat No.	

Set Q

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Saturday, 25-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***if necessary*** *and mention* ***it clearly****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3. Each*** *question carries* ***one*** *mark.*
5) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answers : **(14×1=14)**

1) Z transform of x(n) = n u(n)
   a) $z/(z-1)$ b) $z/(z-1)^2$ c) $z/(z-1)^3$ d) $z/(z-1)^4$

2) The sufficient condition for the existence of DTFT is
   a) $\sum_{n=-\infty}^{\infty} |x(n)| < \infty$ b) $\sum_{n=-\infty}^{\infty} |x(n)| > \infty$
   c) $\sum_{n=-\infty}^{\infty} |x(n)| = 0$ d) None of above

3) The range of Z for which X(Z) approaches to finite value is called as
   a) Bilateral Z transform b) Unilateral Z transform
   c) Region of Convergence d) None

4) The ROC of Z transform of discrete time sequence $x(n) = (2)^n u(n) + (3)^n u(-n-1)$ is
   a) $|z| > 2$ b) $2 < |z| < 3$
   c) $|z| < 3$ d) $2 > |z| > 3$

5) The N point DFT of a sequence x(n) is
   a) $X(K) = \sum_{n=0}^{N-1} x(n)\, e^{-j2\pi nK/N}$ b) $X(K) = \sum_{n=0}^{N-1} x(n)\, e^{j2\pi nK/N}$
   c) $X(K) = \sum_{n=0}^{N} x(n)\, e^{-j2\pi K/N}$ d) $X(K) = \sum_{n=-\infty}^{N} x(n)\, e^{-j2\pi K/N}$

P.T.O.

6) DFT X[K] of x(n) can be obtained by
   a) DIT-FFT algorithm
   b) DIF-FFT algorithm
   c) Both a) and b)
   d) Neither a) nor b)

7) If x(z) = {1, 2, 1, 2, 3 .} ROC is
   $\updownarrow$
   a) Entire z-plane
   b) Entire z-plane except z = ∞
   c) Entire z-plane except z = 0, z = ∞
   d) Entire z-plane except z = 0

8) A signal is an energy signal if
   a) E = 0, P = 0
   b) E = ∞, P = finite
   c) E = finite, P = 0
   d) E = finite, P = ∞

9) The convolution of x(n)* $\delta(n - n_0)$ is _____
   a) x(n)
   b) $\delta(n)$
   c) $x(n - n_0)$
   d) None

10) If $x_1(t) = x_2(t) = u(t)$ then $x_1(t)*x_2(t)$ = _____
   a) u(t)
   b) $u(t^2)$
   c) tu(t)
   d) $\frac{t^2}{2}u(t)$

11) Fourier Transform of a constant function f(t) = A is
   a) $\pi A \delta(w)$
   b) $\pi \delta(w)$
   c) $2\pi A \delta(w)$
   d) $2\pi \delta(w)$

12) A system whose output depends on future inputs is a
   a) Static System
   b) Dynamic System
   c) Causal system
   d) Non-causal System

13) A _____ signal is one whose occurrence is always random.
   a) Deterministic
   b) Non-Deterministic
   c) Regular
   d) None of above

14) _____ type of signal is identical about the origin.
   a) Even
   b) Odd
   c) Periodic
   d) None of these

_____

SLR-TJ – 372

Seat No.	

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Saturday, 25-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***if necessary*** *and mention* ***it clearly****.*
3) Figures to the right indicate ***full*** *marks.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

a) Sketch even and odd part the signal

$$x(t) = t \quad \text{for} \quad 0 \le t \le 1$$
$$= 2t \quad \text{for} \quad 1 \le t \le 2$$

b) Find the fundamental period T of the following continuous time signals

i) $x(t) = je^{j5t}$

ii) $x(t) = 20 \cos\left(10\pi t + \frac{\pi}{6}\right)$

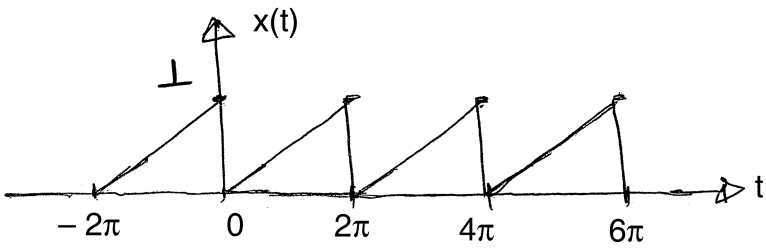
c) Check linearity and time invariance of the following system
$y(n) = \log_{10} | x(n) |$

d) Find Fourier Transform of $x(t) = te^{-3t} u(t)$.

e) Derive the Time scaling property of Fourier transform.

3. Solve **any two** : **(6×2=12)**

a) Find the trigonometric Fourier series of the following signal.



b) Find the Fourier transform of the following signal

$$x(t) = \frac{1}{2}\left[\delta(t+1)+\delta\left(t+\frac{1}{2}\right)+\delta\left(t-\frac{1}{2}\right)+\delta(t-1)\right]$$

c) Determine the convolution of the following sequences
$x(n) = \{1, 4, 3, 2\}$ and $h(n) = \{1, 3, 2, 1\}$

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Derive the relation between Z transform and Fourier Transform.

b) Find Z transform and sketch R.O.C. for following sequence.
$X[n] = (0.6)^n u[n] + (0.4)^n u[n]$.

c) If $Z\{x(n)\} = X(Z)$, then prove that, $Z\{nx(n)\} = -Z(d/dz) . X(Z)$.

d) Find the 4 point DFT of following sequence.
$X(n) = \{1, -2, 3, 4\}$

e) Find DTFT of the following :
$x(n) = (0.5)^n u(n) + 2^n u(-n-1)$

5. Solve **any two** : **(6×2=12)**

a) Compute 8 point DFT of sequence using DIT FFT algorithm.
$x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$

b) Determine the sequence x[n] associated with Z transform given below using "Power Series method".
$X[Z] = (Z^2 + Z)/(Z^2 - 2Z + 1)$; $|Z| > 3$ R.O.C.

c) Find the 4 point IDFT of following sequences

i) $X(Z) = \{1, 1 - j2, -1, 1 + jz\}$

ii) $X(Z) = \{1, 0, 1, 0\}$.

SLR-TJ – 372

Seat No.	

Set R

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Saturday, 25-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***if necessary*** *and mention* ***it clearly****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3. Each*** *question carries* ***one*** *mark.*
5) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answers : **(14×1=14)**

1) A system whose output depends on future inputs is a
   a) Static System b) Dynamic System
   c) Causal system d) Non-causal System

2) A _____ signal is one whose occurrence is always random.
   a) Deterministic b) Non-Deterministic
   c) Regular d) None of above

3) _____ type of signal is identical about the origin.
   a) Even b) Odd c) Periodic d) None of these

4) Z transform of x(n) = n u(n)
   a) $z/(z-1)$ b) $z/(z-1)^2$ c) $z/(z-1)^3$ d) $z/(z-1)^4$

5) The sufficient condition for the existence of DTFT is
   a) $\sum_{n=-\infty}^{\infty} |x(n)| < \infty$ b) $\sum_{n=-\infty}^{\infty} |x(n)| > \infty$
   c) $\sum_{n=-\infty}^{\infty} |x(n)| = 0$ d) None of above

6) The range of Z for which X(Z) approaches to finite value is called as
   a) Bilateral Z transform b) Unilateral Z transform
   c) Region of Convergence d) None

P.T.O.

7) The ROC of Z transform of discrete time sequence $x(n) = (2)^n u(n) + (3)^n u(-n-1)$ is

a) $|z| > 2$ b) $2 < |z| < 3$

c) $|z| < 3$ d) $2 > |z| > 3$

8) The N point DFT of a sequence x(n) is

a) $X(K) = \sum_{n=0}^{N-1} x(n)\, e^{-j2\pi nK/N}$ b) $X(K) = \sum_{n=0}^{N-1} x(n)\, e^{j2\pi nK/N}$

c) $X(K) = \sum_{n=0}^{N} x(n)\, e^{-j2\pi K/N}$ d) $X(K) = \sum_{n=-\infty}^{N} x(n)\, e^{-j2\pi K/N}$

9) DFT X[K] of x(n) can be obtained by

a) DIT-FFT algorithm b) DIF-FFT algorithm

c) Both a) and b) d) Neither a) nor b)

10) If $x(z) = \{1, 2, 1, 2, 3\ .\}$ ROC is

$\updownarrow$

a) Entire z-plane

b) Entire z-plane except $z = \infty$

c) Entire z-plane except $z = 0$, $z = \infty$

d) Entire z-plane except $z = 0$

11) A signal is an energy signal if

a) $E = 0, P = 0$ b) $E = \infty, P =$ finite

c) $E =$ finite, $P = 0$ d) $E =$ finite, $P = \infty$

12) The convolution of $x(n) * \delta(n - n_0)$ is _____

a) $x(n)$ b) $\delta(n)$ c) $x(n - n_0)$ d) None

13) If $x_1(t) = x_2(t) = u(t)$ then $x_1(t) * x_2(t) =$ _____

a) $u(t)$ b) $u(t^2)$ c) $tu(t)$ d) $\frac{t^2}{2}u(t)$

14) Fourier Transform of a constant function $f(t) = A$ is

a) $\pi A \delta(w)$ b) $\pi \delta(w)$ c) $2\pi A \delta(w)$ d) $2\pi \delta(w)$

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SLR-TJ – 372

Seat No.	

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Saturday, 25-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***if necessary*** *and mention* ***it clearly****.*
3) Figures to the right indicate ***full*** *marks.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

a) Sketch even and odd part the signal

$$x(t) = t \quad \text{for} \quad 0 \le t \le 1$$
$$= 2t \quad \text{for} \quad 1 \le t \le 2$$

b) Find the fundamental period T of the following continuous time signals

i) $x(t) = je^{j5t}$

ii) $x(t) = 20 \cos\left(10\pi t + \frac{\pi}{6}\right)$

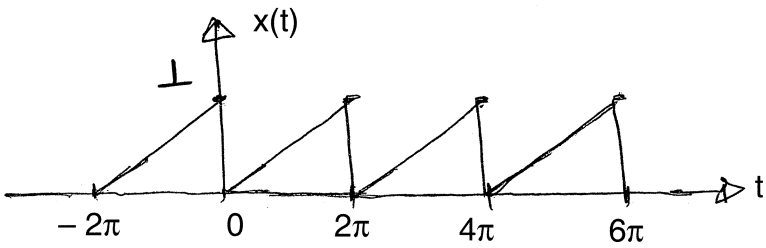
c) Check linearity and time invariance of the following system
$y(n) = \log_{10} | x(n) |$

d) Find Fourier Transform of $x(t) = te^{-3t} u(t)$.

e) Derive the Time scaling property of Fourier transform.

3. Solve **any two** : **(6×2=12)**

a) Find the trigonometric Fourier series of the following signal.



b) Find the Fourier transform of the following signal

$$x(t) = \frac{1}{2}\left[\delta(t+1)+\delta\left(t+\frac{1}{2}\right)+\delta\left(t-\frac{1}{2}\right)+\delta(t-1)\right]$$

c) Determine the convolution of the following sequences
$x(n) = \{1, 4, 3, 2\}$ and $h(n) = \{1, 3, 2, 1\}$

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Derive the relation between Z transform and Fourier Transform.

b) Find Z transform and sketch R.O.C. for following sequence.
$X[n] = (0.6)^n u[n] + (0.4)^n u[n]$.

c) If $Z\{x(n)\} = X(Z)$, then prove that, $Z\{nx(n)\} = -Z(d/dz) . X(Z)$.

d) Find the 4 point DFT of following sequence.
$X(n) = \{1, -2, 3, 4\}$

e) Find DTFT of the following :
$x(n) = (0.5)^n u(n) + 2^n u(-n-1)$

5. Solve **any two** : **(6×2=12)**

a) Compute 8 point DFT of sequence using DIT FFT algorithm.
$x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$

b) Determine the sequence x[n] associated with Z transform given below using "Power Series method".
$X[Z] = (Z^2 + Z)/(Z^2 - 2Z + 1)$; $|Z| > 3$ R.O.C.

c) Find the 4 point IDFT of following sequences

i) $X(Z) = \{1, 1 - j2, -1, 1 + jz\}$

ii) $X(Z) = \{1, 0, 1, 0\}$.

SLR-TJ – 372

Seat No.	

Set S

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Saturday, 25-11-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***if necessary*** *and mention* ***it clearly****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3. Each*** *question carries* ***one*** *mark.*
5) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answers : **(14×1=14)**

1) The range of Z for which X(Z) approaches to finite value is called as
   a) Bilateral Z transform b) Unilateral Z transform
   c) Region of Convergence d) None

2) The ROC of Z transform of discrete time sequence $x(n) = (2)^n u(n) + (3)^n u(-n-1)$ is
   a) $|z| > 2$ b) $2 < |z| < 3$
   c) $|z| < 3$ d) $2 > |z| > 3$

3) The N point DFT of a sequence x(n) is
   a) $X(K) = \sum_{n=0}^{N-1} x(n)\, e^{-j2\pi nK/N}$ b) $X(K) = \sum_{n=0}^{N-1} x(n)\, e^{j2\pi nK/N}$
   c) $X(K) = \sum_{n=0}^{N} x(n)\, e^{-j2\pi K/N}$ d) $X(K) = \sum_{n=-\infty}^{N} x(n)\, e^{-j2\pi K/N}$

4) DFT X[K] of x(n) can be obtained by
   a) DIT-FFT algorithm b) DIF-FFT algorithm
   c) Both a) and b) d) Neither a) nor b)

5) If x(z) = {1, 2, 1, 2, 3 .} ROC is
   $\updownarrow$
   a) Entire z-plane b) Entire z-plane except $z = \infty$
   c) Entire z-plane except $z = 0$, $z = \infty$ d) Entire z-plane except $z = 0$

P.T.O.

6) A signal is an energy signal if

a) E = 0, P = 0 b) E = ∞, P = finite

c) E = finite, P = 0 d) E = finite, P = ∞

7) The convolution of x(n)* $\delta(n - n_0)$ is _____

a) x(n) b) $\delta(n)$ c) $x(n - n_0)$ d) None

8) If $x_1(t) = x_2(t) = u(t)$ then $x_1(t)*x_2(t)$ = _____

a) u(t) b) $u(t^2)$ c) tu(t) d) $\frac{t^2}{2}u(t)$

9) Fourier Transform of a constant function f(t) = A is

a) $\pi A \delta(w)$ b) $\pi \delta(w)$ c) $2\pi A \delta(w)$ d) $2\pi \delta(w)$

10) A system whose output depends on future inputs is a

a) Static System b) Dynamic System

c) Causal system d) Non-causal System

11) A _____ signal is one whose occurrence is always random.

a) Deterministic b) Non-Deterministic

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12) _____ type of signal is identical about the origin.

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13) Z transform of x(n) = n u(n)

a) z/(z – 1) b) $z/(z - 1)^2$ c) $z/(z - 1)^3$ d) $z/(z - 1)^4$

14) The sufficient condition for the existence of DTFT is

a) $\sum_{n=-\infty}^{\infty} |x(n)| < \infty$ b) $\sum_{n=-\infty}^{\infty} |x(n)| > \infty$

c) $\sum_{n=-\infty}^{\infty} |x(n)| = 0$ d) None of above

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SLR-TJ – 372

Seat No.	

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Saturday, 25-11-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***if necessary*** *and mention* ***it clearly****.*
3) Figures to the right indicate ***full*** *marks.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

a) Sketch even and odd part the signal

$$x(t) = t \quad \text{for} \quad 0 \le t \le 1$$
$$= 2t \quad \text{for} \quad 1 \le t \le 2$$

b) Find the fundamental period T of the following continuous time signals

i) $x(t) = je^{j5t}$

ii) $x(t) = 20 \cos\left(10\pi t + \frac{\pi}{6}\right)$

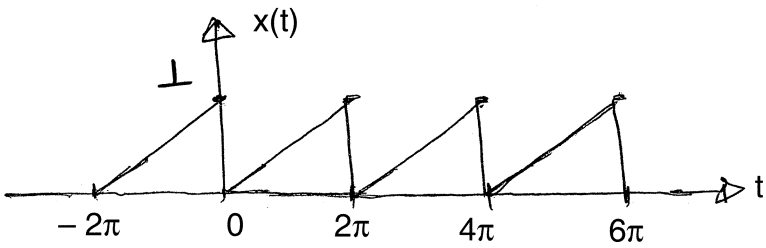
c) Check linearity and time invariance of the following system
$y(n) = \log_{10} | x(n) |$

d) Find Fourier Transform of $x(t) = te^{-3t} u(t)$.

e) Derive the Time scaling property of Fourier transform.

3. Solve **any two** : **(6×2=12)**

a) Find the trigonometric Fourier series of the following signal.



b) Find the Fourier transform of the following signal

$$x(t) = \frac{1}{2}\left[\delta(t+1)+\delta\left(t+\frac{1}{2}\right)+\delta\left(t-\frac{1}{2}\right)+\delta(t-1)\right]$$

c) Determine the convolution of the following sequences
$x(n) = \{1, 4, 3, 2\}$ and $h(n) = \{1, 3, 2, 1\}$

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Derive the relation between Z transform and Fourier Transform.

b) Find Z transform and sketch R.O.C. for following sequence.
$X[n] = (0.6)^n u[n] + (0.4)^n u[n]$.

c) If $Z\{x(n)\} = X(Z)$, then prove that, $Z\{nx(n)\} = -Z(d/dz) . X(Z)$.

d) Find the 4 point DFT of following sequence.
$X(n) = \{1, -2, 3, 4\}$

e) Find DTFT of the following :
$x(n) = (0.5)^n u(n) + 2^n u(-n-1)$

5. Solve **any two** : **(6×2=12)**

a) Compute 8 point DFT of sequence using DIT FFT algorithm.
$x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$

b) Determine the sequence x[n] associated with Z transform given below using "Power Series method".
$X[Z] = (Z^2 + Z)/(Z^2 - 2Z + 1)$; $|Z| > 3$ R.O.C.

c) Find the 4 point IDFT of following sequences

i) $X(Z) = \{1, 1 - j2, -1, 1 + jz\}$

ii) $X(Z) = \{1, 0, 1, 0\}$.

SLR-TJ – 373

Seat No.	

Set P

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
SELF LEARNING MODULE – II (Safety Engineering and Disaster Management)

Day and Date : Monday, 27-11-2017 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

1. Choose the correct answer : **(1×10=10)**

1) A workplace emergency evacuation plan is the responsibility of
   a) Company management
   b) The government
   c) The Health and Safety committee
   d) Individual employees

2) Which is the most effective method of reducing contamination to workers ?
   a) PPE
   b) Administration controls
   c) Fans
   d) Engineering controls

3) Which of the following is a major contribution to workplace stress ?
   a) Low pay b) Poor working conditions
   c) Reasonable work pressures d) Social isolation

4) The workplace hazard excessive noise may be controlled by
   a) Air conditioning b) Ventilation
   c) Shift work d) PPE

5) An emergency that could arise and cause a risk to H&S could include
   a) Fire b) Explosion
   c) Chemical spill d) All of the above

P.T.O.

6) All of the following are TRUE about disasters EXCEPT
   a) A disaster may be domestic or international
   b) A disaster may be caused by nature or have human origins
   c) A disaster always receives widespread media coverage
   d) A disaster may have a known and gradual onset

7) Disasters frequently result in all of the following EXCEPT
   a) Damage to the ecological environment
   b) Displacement of populations
   c) Destruction of a population's homeland
   d) Sustained public attention during the recovery phase

8) There are nine tasks in the *disaster management*. All of the following are tasks of this model EXCEPT
   a) Assess secondary social problems such as health epidemics, displaced persons
   b) Counsel those who have suffered trauma and bereavement
   c) Control rumors, provide accurate information
   d) Provide security; prevent looting, protect person and property

9) Which one of the following theories of disaster management informs organizational readiness and response in a disaster ?
   a) Hobfoll's theory of Conservation of Resources
   b) The problem-solving task model
   c) Structure-functional theory
   d) Theory of traumatogenic forces

10) Ensuring the safety, health and welfare of the employees is the primary purpose of the
   a) Factories Act, 1948
   b) Payment of Wages Act, 1936
   c) Equal Remuneration Act, 1976
   d) Industrial Disputes Act, 1947

SLR-TJ – 373

Seat No.	

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
SELF LEARNING MODULE – II (Safety Engineering and Disaster Management)

Day and Date : Monday, 27-11-2017 Marks : 40

Time : 10.00 a.m. to 12.00 noon

2. Solve **any four** : **(4×5=20)**

   a) What are the various safety considerations to be kept in mind in regard to electrical engineering ?

   b) Discuss in detail about Hazards, their nature, Consequences and classifications.

   c) Discuss various hazard analysis techniques. Also discuss hazard prevention strategies.

   d) As an engineer how would you describe safety as an essential parameter in designing industrial production system ?

   e) Discuss contributions of safety engineering on plant productivity.

3. Solve **any two** : **(2×10=20)**

   a) What are the impacts of most damaging hazards occurring in the country, on communities, infrastructure, environment etc.

   b) What is concept of system safety ? Also discuss safety engineering analysis.

   c) Discuss organization structure of safety department along with role and responsibilities of each position.

Set P

SLR-TJ – 373

Seat No.	

Set Q

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
SELF LEARNING MODULE – II (Safety Engineering and Disaster Management)

Day and Date : Monday, 27-11-2017 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

1. Choose the correct answer : **(1×10=10)**

1) Which one of the following theories of disaster management informs organizational readiness and response in a disaster ?
   a) Hobfoll's theory of Conservation of Resources
   b) The problem-solving task model
   c) Structure-functional theory
   d) Theory of traumatogenic forces

2) Ensuring the safety, health and welfare of the employees is the primary purpose of the
   a) Factories Act, 1948
   b) Payment of Wages Act, 1936
   c) Equal Remuneration Act, 1976
   d) Industrial Disputes Act, 1947

3) Disasters frequently result in all of the following EXCEPT
   a) Damage to the ecological environment
   b) Displacement of populations
   c) Destruction of a population's homeland
   d) Sustained public attention during the recovery phase

4) There are nine tasks in the *disaster management*. All of the following are tasks of this model EXCEPT
   a) Assess secondary social problems such as health epidemics, displaced persons
   b) Counsel those who have suffered trauma and bereavement
   c) Control rumors, provide accurate information
   d) Provide security; prevent looting, protect person and property
5) A workplace emergency evacuation plan is the responsibility of
   a) Company management
   b) The government
   c) The Health and Safety committee
   d) Individual employees
6) Which is the most effective method of reducing contamination to workers ?
   a) PPE
   b) Administration controls
   c) Fans
   d) Engineering controls
7) Which of the following is a major contribution to workplace stress ?
   a) Low pay
   b) Poor working conditions
   c) Reasonable work pressures
   d) Social isolation
8) The workplace hazard excessive noise may be controlled by
   a) Air conditioning
   b) Ventilation
   c) Shift work
   d) PPE
9) An emergency that could arise and cause a risk to H&S could include
   a) Fire
   b) Explosion
   c) Chemical spill
   d) All of the above
10) All of the following are TRUE about disasters EXCEPT
   a) A disaster may be domestic or international
   b) A disaster may be caused by nature or have human origins
   c) A disaster always receives widespread media coverage
   d) A disaster may have a known and gradual onset

Seat No.	

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
SELF LEARNING MODULE – II (Safety Engineering and Disaster Management)

Day and Date : Monday, 27-11-2017 Marks : 40

Time : 10.00 a.m. to 12.00 noon

2. Solve **any four** : **(4×5=20)**

   a) What are the various safety considerations to be kept in mind in regard to electrical engineering ?

   b) Discuss in detail about Hazards, their nature, Consequences and classifications.

   c) Discuss various hazard analysis techniques. Also discuss hazard prevention strategies.

   d) As an engineer how would you describe safety as an essential parameter in designing industrial production system ?

   e) Discuss contributions of safety engineering on plant productivity.

3. Solve **any two** : **(2×10=20)**

   a) What are the impacts of most damaging hazards occurring in the country, on communities, infrastructure, environment etc.

   b) What is concept of system safety ? Also discuss safety engineering analysis.

   c) Discuss organization structure of safety department along with role and responsibilities of each position.

Set Q

SLR-TJ – 373

Seat No.	

Set R

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
SELF LEARNING MODULE – II (Safety Engineering and Disaster Management)

Day and Date : Monday, 27-11-2017 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*
2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

1. Choose the correct answer : **(1×10=10)**

1) An emergency that could arise and cause a risk to H&S could include
   a) Fire
   b) Explosion
   c) Chemical spill
   d) All of the above

2) All of the following are TRUE about disasters EXCEPT
   a) A disaster may be domestic or international
   b) A disaster may be caused by nature or have human origins
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   c) Structure-functional theory
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   a) Low pay
   b) Poor working conditions
   c) Reasonable work pressures
   d) Social isolation

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   a) Air conditioning
   b) Ventilation
   c) Shift work
   d) PPE

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   a) Company management
   b) The government
   c) The Health and Safety committee
   d) Individual employees

8) Which is the most effective method of reducing contamination to workers ?
   a) PPE
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   d) Engineering controls

9) Disasters frequently result in all of the following EXCEPT
   a) Damage to the ecological environment
   b) Displacement of populations
   c) Destruction of a population's homeland
   d) Sustained public attention during the recovery phase

10) There are nine tasks in the *disaster management*. All of the following are tasks of this model EXCEPT
   a) Assess secondary social problems such as health epidemics, displaced persons
   b) Counsel those who have suffered trauma and bereavement
   c) Control rumors, provide accurate information
   d) Provide security; prevent looting, protect person and property

Seat No.	

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
SELF LEARNING MODULE – II (Safety Engineering and Disaster Management)

Day and Date : Monday, 27-11-2017 Marks : 40

Time : 10.00 a.m. to 12.00 noon

2. Solve **any four** : **(4×5=20)**

   a) What are the various safety considerations to be kept in mind in regard to electrical engineering ?

   b) Discuss in detail about Hazards, their nature, Consequences and classifications.

   c) Discuss various hazard analysis techniques. Also discuss hazard prevention strategies.

   d) As an engineer how would you describe safety as an essential parameter in designing industrial production system ?

   e) Discuss contributions of safety engineering on plant productivity.

3. Solve **any two** : **(2×10=20)**

   a) What are the impacts of most damaging hazards occurring in the country, on communities, infrastructure, environment etc.

   b) What is concept of system safety ? Also discuss safety engineering analysis.

   c) Discuss organization structure of safety department along with role and responsibilities of each position.

Set R

SLR-TJ – 373

Seat No.	

Set S

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
SELF LEARNING MODULE – II (Safety Engineering and Disaster Management)

Day and Date : Monday, 27-11-2017 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

1. Choose the correct answer : **(1×10=10)**

1) Which of the following is a major contribution to workplace stress ?
   a) Low pay b) Poor working conditions
   c) Reasonable work pressures d) Social isolation

2) The workplace hazard excessive noise may be controlled by
   a) Air conditioning b) Ventilation
   c) Shift work d) PPE

3) An emergency that could arise and cause a risk to H&S could include
   a) Fire b) Explosion
   c) Chemical spill d) All of the above

4) All of the following are TRUE about disasters EXCEPT
   a) A disaster may be domestic or international
   b) A disaster may be caused by nature or have human origins
   c) A disaster always receives widespread media coverage
   d) A disaster may have a known and gradual onset

5) Disasters frequently result in all of the following EXCEPT
   a) Damage to the ecological environment
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   d) Sustained public attention during the recovery phase

6) There are nine tasks in the *disaster management*. All of the following are tasks of this model EXCEPT
   a) Assess secondary social problems such as health epidemics, displaced persons
   b) Counsel those who have suffered trauma and bereavement
   c) Control rumors, provide accurate information
   d) Provide security; prevent looting, protect person and property
7) Which one of the following theories of disaster management informs organizational readiness and response in a disaster ?
   a) Hobfoll's theory of Conservation of Resources
   b) The problem-solving task model
   c) Structure-functional theory
   d) Theory of traumatogenic forces
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   a) Factories Act, 1948
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   c) Equal Remuneration Act, 1976
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9) A workplace emergency evacuation plan is the responsibility of
   a) Company management
   b) The government
   c) The Health and Safety committee
   d) Individual employees
10) Which is the most effective method of reducing contamination to workers ?
   a) PPE
   b) Administration controls
   c) Fans
   d) Engineering controls

SLR-TJ – 373

Seat No.	

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
SELF LEARNING MODULE – II (Safety Engineering and Disaster Management)

Day and Date : Monday, 27-11-2017 Marks : 40

Time : 10.00 a.m. to 12.00 noon

2. Solve **any four** : **(4×5=20)**

   a) What are the various safety considerations to be kept in mind in regard to electrical engineering ?

   b) Discuss in detail about Hazards, their nature, Consequences and classifications.

   c) Discuss various hazard analysis techniques. Also discuss hazard prevention strategies.

   d) As an engineer how would you describe safety as an essential parameter in designing industrial production system ?

   e) Discuss contributions of safety engineering on plant productivity.

3. Solve **any two** : **(2×10=20)**

   a) What are the impacts of most damaging hazards occurring in the country, on communities, infrastructure, environment etc.

   b) What is concept of system safety ? Also discuss safety engineering analysis.

   c) Discuss organization structure of safety department along with role and responsibilities of each position.

Set S

SLR-TJ – 374

Seat No.	

Set P

T.E. (Electrical Engineering) (Part – II) (CGPA) Examination, 2017
INTELLECTUAL PROPERTY RIGHTS
Self Learning Module – II

Day and Date : Monday, 27-11-2017 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

1. **True** or **False**. **10**
   1) The copyright enforcement advisory council is state government authority.
   2) Trade related aspects of intellectual property act is nothing but the TRIPS.
   3) A trademark is a special symbol for distinguishing the goods offered for sale.
   4) Trademark includes only mark, symbol, name.
   5) Banarasi Saree is an example of geographical indication.
   6) The first application for patient in India was made in 1856.
   7) The agreement concerning International registration of trademarks was adopted in the year 1891 at Madrid.
   8) Design means the shape, pattern, configuration or ornamentation of an industrial article.
   9) Piracy means illegal use of intellectual property.
   10) Intellectual Property Rights (IPR) protect the use of information and ideas that are of commercial value.

2. Attempt following questions **(any two)** : **20**
   1) Suggest the measures for controlling piracy in India.
   2) Explain the importance of patent for engineers in detail.
   3) Explain statutory authorities and registration procedure of trademark.

3. Short notes **(any four)** : **20**
   1) Indian Intellectual Property Act
   2) Patent on Biotechnology
   3) Cyber attack
   4) Geographical indication of goods
   5) Software copyright
   6) Commercial exploitation and infringement.

SLR-TJ – 375

Seat No.	

Set P

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
Self Learning
VALUE ENGINEERING

Day and Date : Monday, 27-11-2017 Total Marks : 50
Time : 10.00 a.m. to 12.00 noon

Instructions : *1)* ***All*** *the questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **10**

1) The nature of value engineering is _____
   a) Micro b) Macro
   c) Normative and micro d) Only normative

2) Which of the following indicators are considered for measuring organizational effectiveness ?
   a) Ability to produce useful results b) Productivity
   c) Quality d) All of the above

3) Reason for entrepreneurial failure is _____
   a) Financial problem b) Production problem
   c) Marketing problem d) All of the above

4) Value is equal to _____
   a) Utility/cost b) Cost/utility
   c) Utility d) Cost

5) The time taken by a trained operator to perform a job, while working a steady pace is known as
   a) Standard time b) Normal time
   c) Representative time d) None of these

P.T.O.

6) SAVE means _____
   a) Society of American Value Engineering
   b) Secretary of American Value Engineering
   c) Symbol of American Value Engineering
   d) None of the above

7) Planning is the _____ function.
   a) Primary
   b) Secondary
   c) Both a) and b)
   d) None of the above

8) MIS means _____
   a) Material Information System
   b) Management Information System
   c) Methodology Information System
   d) None of the above

9) The term SSI means
   a) System Selection Information
   b) Social Science Information
   c) Small Scale Industries
   d) None of the above

10) Aim of value analysis is _____
   a) Simplify the product
   b) Modify and improve product design
   c) Save money or increase profit
   d) All of the above

_____

SLR-TJ – 375

Seat No.	

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
Self Learning
VALUE ENGINEERING

Day and Date : Monday, 27-11-2017 Marks : 40
Time : 10.00 a.m. to 12.00 noon

Instructions : *1)* ***All*** *the questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

2. Write short notes on **any four** : **(5×4=20)**
   1) Methods of reducing project cost.
   2) Objects of value engineering.
   3) Value analysis for value engineering.
   4) Causes of unnecessary cost.
   5) Tests for value of a product.
   6) Basic steps in value engineering.

3. Solve **any two** : **(2×10=20)**
   1) Explain use of value engineering in cost reduction techniques.
   2) Describe the procedure for evaluation of value engineering projects.
   3) How value engineering is useful in maintaince and repair activities ? Explain in detail.

_____

Set P

SLR-TJ – 375

Seat No.	

Set Q

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
Self Learning
VALUE ENGINEERING

Day and Date : Monday, 27-11-2017 Total Marks : 50
Time : 10.00 a.m. to 12.00 noon

Instructions : *1)* ***All*** *the questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **10**

1) The term SSI means
   a) System Selection Information b) Social Science Information
   c) Small Scale Industries d) None of the above

2) Aim of value analysis is _____
   a) Simplify the product b) Modify and improve product design
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3) Planning is the _____ function.
   a) Primary b) Secondary
   c) Both a) and b) d) None of the above

4) MIS means _____
   a) Material Information System b) Management Information System
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   c) Normative and micro d) Only normative

P.T.O.

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   a) Ability to produce useful results
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   c) Quality
   d) All of the above

7) Reason for entrepreneurial failure is _____
   a) Financial problem
   b) Production problem
   c) Marketing problem
   d) All of the above

8) Value is equal to _____
   a) Utility/cost
   b) Cost/utility
   c) Utility
   d) Cost

9) The time taken by a trained operator to perform a job, while working a steady pace is known as
   a) Standard time
   b) Normal time
   c) Representative time
   d) None of these

10) SAVE means _____
   a) Society of American Value Engineering
   b) Secretary of American Value Engineering
   c) Symbol of American Value Engineering
   d) None of the above

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SLR-TJ – 375

Seat No.	

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
Self Learning
VALUE ENGINEERING

Day and Date : Monday, 27-11-2017 Marks : 40
Time : 10.00 a.m. to 12.00 noon

Instructions : *1)* ***All*** *the questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

2. Write short notes on **any four** : **(5×4=20)**
   1) Methods of reducing project cost.
   2) Objects of value engineering.
   3) Value analysis for value engineering.
   4) Causes of unnecessary cost.
   5) Tests for value of a product.
   6) Basic steps in value engineering.

3. Solve **any two** : **(2×10=20)**
   1) Explain use of value engineering in cost reduction techniques.
   2) Describe the procedure for evaluation of value engineering projects.
   3) How value engineering is useful in maintaince and repair activities ? Explain in detail.

_____

Set Q

SLR-TJ – 375

Seat No.	

Set R

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
Self Learning
VALUE ENGINEERING

Day and Date : Monday, 27-11-2017 Total Marks : 50
Time : 10.00 a.m. to 12.00 noon

Instructions : *1)* ***All*** *the questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **10**

1) The time taken by a trained operator to perform a job, while working a steady pace is known as
   a) Standard time b) Normal time
   c) Representative time d) None of these

2) SAVE means _____
   a) Society of American Value Engineering
   b) Secretary of American Value Engineering
   c) Symbol of American Value Engineering
   d) None of the above

3) The term SSI means
   a) System Selection Information b) Social Science Information
   c) Small Scale Industries d) None of the above

4) Aim of value analysis is _____
   a) Simplify the product b) Modify and improve product design
   c) Save money or increase profit d) All of the above

P.T.O.

5) Reason for entrepreneurial failure is _____
   a) Financial problem
   b) Production problem
   c) Marketing problem
   d) All of the above

6) Value is equal to _____
   a) Utility/cost
   b) Cost/utility
   c) Utility
   d) Cost

7) The nature of value engineering is _____
   a) Micro
   b) Macro
   c) Normative and micro
   d) Only normative

8) Which of the following indicators are considered for measuring organizational effectiveness ?
   a) Ability to produce useful results
   b) Productivity
   c) Quality
   d) All of the above

9) Planning is the _____ function.
   a) Primary
   b) Secondary
   c) Both a) and b)
   d) None of the above

10) MIS means _____
   a) Material Information System
   b) Management Information System
   c) Methodology Information System
   d) None of the above

_____

SLR-TJ – 375

Seat No.	

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
Self Learning
VALUE ENGINEERING

Day and Date : Monday, 27-11-2017 Marks : 40
Time : 10.00 a.m. to 12.00 noon

Instructions : *1)* ***All*** *the questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

2. Write short notes on **any four** : **(5×4=20)**
   1) Methods of reducing project cost.
   2) Objects of value engineering.
   3) Value analysis for value engineering.
   4) Causes of unnecessary cost.
   5) Tests for value of a product.
   6) Basic steps in value engineering.

3. Solve **any two** : **(2×10=20)**
   1) Explain use of value engineering in cost reduction techniques.
   2) Describe the procedure for evaluation of value engineering projects.
   3) How value engineering is useful in maintaince and repair activities ? Explain in detail.

_____

Set R

SLR-TJ – 375

Seat No.	

Set S

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
Self Learning
VALUE ENGINEERING

Day and Date : Monday, 27-11-2017 Total Marks : 50
Time : 10.00 a.m. to 12.00 noon

Instructions : *1)* ***All*** *the questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **10**

1) Reason for entrepreneurial failure is _____
   a) Financial problem b) Production problem
   c) Marketing problem d) All of the above

2) Value is equal to _____
   a) Utility/cost b) Cost/utility
   c) Utility d) Cost

3) The time taken by a trained operator to perform a job, while working a steady pace is known as
   a) Standard time b) Normal time
   c) Representative time d) None of these

4) SAVE means _____
   a) Society of American Value Engineering
   b) Secretary of American Value Engineering
   c) Symbol of American Value Engineering
   d) None of the above

P.T.O.

5) Planning is the _____ function.
   a) Primary
   b) Secondary
   c) Both a) and b)
   d) None of the above

6) MIS means _____
   a) Material Information System
   b) Management Information System
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   a) System Selection Information
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8) Aim of value analysis is _____
   a) Simplify the product
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   c) Save money or increase profit
   d) All of the above

9) The nature of value engineering is _____
   a) Micro
   b) Macro
   c) Normative and micro
   d) Only normative

10) Which of the following indicators are considered for measuring organizational effectiveness ?
   a) Ability to produce useful results
   b) Productivity
   c) Quality
   d) All of the above

_____

SLR-TJ – 375

Seat No.	

T.E. (Electrical) (Part – II) (CGPA) Examination, 2017
Self Learning
VALUE ENGINEERING

Day and Date : Monday, 27-11-2017 Marks : 40
Time : 10.00 a.m. to 12.00 noon

Instructions : *1)* ***All*** *the questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *marks.*

2. Write short notes on **any four** : **(5×4=20)**
   1) Methods of reducing project cost.
   2) Objects of value engineering.
   3) Value analysis for value engineering.
   4) Causes of unnecessary cost.
   5) Tests for value of a product.
   6) Basic steps in value engineering.

3. Solve **any two** : **(2×10=20)**
   1) Explain use of value engineering in cost reduction techniques.
   2) Describe the procedure for evaluation of value engineering projects.
   3) How value engineering is useful in maintaince and repair activities ? Explain in detail.

_____

Set S

SLR-TJ – 376

Seat No.	

Set P

T.E. (Electrical) (Part – I) (Old) Examination, 2017
LINEAR INTEGRATED CIRCUITS

Day and Date : Wednesday, 13-12-2017 Max. Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) For an op-amp with negative feedback, the o/p is
   a) equal to the i/p b) increased
   c) feedback to the inverting i/p d) feedback to the non-inverting i/p

2) In scaling address, the resistors are
   a) all of the same values
   b) all of the different values
   c) each proportional to the weight of its i/p
   d) related by a factor of two

3) Gain of non-inverting amplifier is always greater than 1
   a) True b) False
   c) Neither true nor false d) Partially true

4) The 741 IC has unity gain frequency of
   a) 10 Hz b) 20 KHz c) 1 MHz d) 15 KHz

5) Typical value of CMRR for 741
   a) 90 db b) 120 db c) –20 db d) 20 dB

6) A schmitt trigger uses
   a) +ve feedback b) –ve feedback
   c) Compensating capacitors d) Pull-up resistors

7) The ratio $\frac{A_d}{A_{cm}}$ is
   a) Slew rate b) CMRR
   c) SVRR d) None of these

8) UGB stands for
   a) Union Great Bias b) Union Gain Bias
   c) Unity Gain Bandwidth d) Unity Grounded Bias

P.T.O.

9) A voltage follower
   a) Has a gain of 1
   b) Is non-inverting
   c) Has no feedback resistor
   d) All of these

10) The zero level detector is one application of a
   a) Comparator
   b) Differentiator
   c) Summing amplifier
   d) Diode

11) A single resistor and a single capacitor can be connected to form a filter with a roll of rate of
   a) – 20 dB/decade
   b) – 40 dB/decade
   c) – 60 dB/decade
   d) both a and c

12) The cut off frequency is the frequency where the response drops to
   a) 4 dB
   b) 3 dB
   c) 5 dB
   d) 7 dB

13) If the butterworth filter has nine 2nd order stages, its roll off rate is
   a) 20 dB/decade
   b) 40 dB/decade
   c) 180 dB/decade
   d) 360 dB/decade

14) In full wave rectifier circuit, regardless of the polarity of i/p stage, o/p is always
   a) negative going
   b) positive going
   c) same as i/p
   d) none

15) The region between the passband and the stopband is called the
   a) attenuation
   b) centre
   c) transition
   d) ripple

16) A triangular waveform generator can be designed by using a square wave generated connected in
   a) Differentiator
   b) Integrator
   c) Multiplier
   d) Adder

17) The Weinbridge oscillator is useful
   a) at low frequencies
   b) at high frequencies
   c) with IC tank circuit
   d) at small i/p stage

18) For an oscillator to properly start, the gain around the feedback loop must initially be
   a) 1
   b) less than 1
   c) greater than 1
   d) equal to B

19) The IC LM317 is a
   a) adjustable voltage regulator
   b) fixed voltage regulator
   c) precision voltage regulator
   d) comparator

20) The 78 XX series of voltage regulators produces an o/p voltage i.e.
   a) positive
   b) negative
   c) either positive or negative
   d) unregulated

SLR-TJ – 376

Seat No.	

T.E. (Electrical) (Part – I) (Old) Examination, 2017
LINEAR INTEGRATED CIRCUITS

Day and Date : Wednesday, 13-12-2017 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**

   a) With the help of neat diagram explain concept of virtual ground.

   b) Design a circuit for following equation,

   $V_o = -(V_o + V_b + V_c)$.

   c) Explain in detail zero crossing detector.

   d) Explain integrator with frequency response.

   e) Explain the block diagram of op-amp with characteristics contributed by each block.

3. Solve **any two** : **(2×10=20)**

   a) Explain differentiator with frequency response and practical circut. Draw the waveforms.

   b) Explain op-amp as non-inverting amplifier and derive the gain in closed loop.

   c) Explain in detail V to I converter with floating and grounded load. Also give one example of each.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   a) Explain with circuit diagram IC 555 astable multivibrator.

   b) Draw and explain circuit diagram of triangular wave generator, also sketch the waveforms.

   c) Explain square wave generator in detail.

   d) Explain the positive adjustable voltage regulator with diagram.

   e) Design a high pass filter at cut off frequency of 1 KHz with a passband gain of 2. Plot frequency response of filter.

Set P

5. Solve **any two**: **(2×10=20)**

a) Explain Wein bridge oscillator with circut diagram and design the same so that f_o = 965 KHz.

b) Design an adjustable voltage regulator to satisfy the following specification

Output Voltage = V_o = 5 to 12 V

Output Current = I_o = 1A

Voltage regulator is LM 317.

c) Explain in detail the applications of IC 565 :

i) FM detector

ii) Frequency synthesizer.

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SLR-TJ – 376

Seat No.	

Set Q

T.E. (Electrical) (Part – I) (Old) Examination, 2017
LINEAR INTEGRATED CIRCUITS

Day and Date : Wednesday, 13-12-2017 Max. Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) A triangular waveform generator can be designed by using a square wave generated connected in
   a) Differentiator b) Integrator
   c) Multiplier d) Adder

2) The Weinbridge oscillator is useful
   a) at low frequencies b) at high frequencies
   c) with IC tank circuit d) at small i/p stage

3) For an oscillator to properly start, the gain around the feedback loop must initially be
   a) 1 b) less than 1
   c) greater than 1 d) equal to B

4) The IC LM317 is a
   a) adjustable voltage regulator b) fixed voltage regulator
   c) precision voltage regulator d) comparator

5) The 78 XX series of voltage regulators produces an o/p voltage i.e.
   a) positive b) negative
   c) either positive or negative d) unregulated

6) For an op-amp with negative feedback, the o/p is
   a) equal to the i/p b) increased
   c) feedback to the inverting i/p d) feedback to the non-inverting i/p

7) In scaling address, the resistors are
   a) all of the same values
   b) all of the different values
   c) each proportional to the weight of its i/p
   d) related by a factor of two

P.T.O.

8) Gain of non-inverting amplifier is always greater than 1
   a) True b) False
   c) Neither true nor false d) Partially true

9) The 741 IC has unity gain frequency of
   a) 10 Hz b) 20 KHz c) 1 MHz d) 15 KHz

10) Typical value of CMRR for 741
   a) 90 db b) 120 db c) –20 db d) 20 dB

11) A schmitt trigger uses
   a) +ve feedback b) –ve feedback
   c) Compensating capacitors d) Pull-up resistors

12) The ratio $\frac{A_d}{A_{cm}}$ is
   a) Slew rate b) CMRR
   c) SVRR d) None of these

13) UGB stands for
   a) Union Great Bias b) Union Gain Bias
   c) Unity Gain Bandwidth d) Unity Grounded Bias

14) A voltage follower
   a) Has a gain of 1 b) Is non-inverting
   c) Has no feedback resistor d) All of these

15) The zero level detector is one application of a
   a) Comparator b) Differentiator
   c) Summing amplifier d) Diode

16) A single resistor and a single capacitor can be connected to form a filter with a roll of rate of
   a) – 20 dB/decade b) – 40 dB/decade
   c) – 60 dB/decade d) both a and c

17) The cut off frequency is the frequency where the response drops to
   a) 4 dB b) 3 dB c) 5 dB d) 7 dB

18) If the butterworth filter has nine 2nd order stages, its roll off rate is
   a) 20 dB/decade b) 40 dB/decade
   c) 180 dB/decade d) 360 dB/decade

19) In full wave rectifier circuit, regardless of the polarity of i/p stage, o/p is always
   a) negative going b) positive going
   c) same as i/p d) none

20) The region between the passband and the stopband is called the
   a) attenuation b) centre
   c) transition d) ripple

SLR-TJ – 376

Seat No.	

T.E. (Electrical) (Part – I) (Old) Examination, 2017
LINEAR INTEGRATED CIRCUITS

Day and Date : Wednesday, 13-12-2017 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**

   a) With the help of neat diagram explain concept of virtual ground.

   b) Design a circuit for following equation,

   $V_o = -(V_o + V_b + V_c)$.

   c) Explain in detail zero crossing detector.

   d) Explain integrator with frequency response.

   e) Explain the block diagram of op-amp with characteristics contributed by each block.

3. Solve **any two** : **(2×10=20)**

   a) Explain differentiator with frequency response and practical circut. Draw the waveforms.

   b) Explain op-amp as non-inverting amplifier and derive the gain in closed loop.

   c) Explain in detail V to I converter with floating and grounded load. Also give one example of each.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   a) Explain with circuit diagram IC 555 astable multivibrator.

   b) Draw and explain circuit diagram of triangular wave generator, also sketch the waveforms.

   c) Explain square wave generator in detail.

   d) Explain the positive adjustable voltage regulator with diagram.

   e) Design a high pass filter at cut off frequency of 1 KHz with a passband gain of 2. Plot frequency response of filter.

Set Q

5. Solve **any two**: **(2×10=20)**

a) Explain Wein bridge oscillator with circut diagram and design the same so that f_o = 965 KHz.

b) Design an adjustable voltage regulator to satisfy the following specification

Output Voltage = V_o = 5 to 12 V

Output Current = I_o = 1A

Voltage regulator is LM 317.

c) Explain in detail the applications of IC 565 :

i) FM detector

ii) Frequency synthesizer.

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SLR-TJ – 376

Seat No.	

Set R

T.E. (Electrical) (Part – I) (Old) Examination, 2017
LINEAR INTEGRATED CIRCUITS

Day and Date : Wednesday, 13-12-2017 Max. Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) A single resistor and a single capacitor can be connected to form a filter with a roll of rate of
   a) – 20 dB/decade b) – 40 dB/decade
   c) – 60 dB/decade d) both a and c

2) The cut off frequency is the frequency where the response drops to
   a) 4 dB b) 3 dB c) 5 dB d) 7 dB

3) If the butterworth filter has nine 2nd order stages, its roll off rate is
   a) 20 dB/decade b) 40 dB/decade
   c) 180 dB/decade d) 360 dB/decade

4) In full wave rectifier circuit, regardless of the polarity of i/p stage, o/p is always
   a) negative going b) positive going
   c) same as i/p d) none

5) The region between the passband and the stopband is called the
   a) attenuation b) centre
   c) transition d) ripple

6) A triangular waveform generator can be designed by using a square wave generated connected in
   a) Differentiator b) Integrator
   c) Multiplier d) Adder

7) The Weinbridge oscillator is useful
   a) at low frequencies b) at high frequencies
   c) with IC tank circuit d) at small i/p stage

8) For an oscillator to properly start, the gain around the feedback loop must initially be
   a) 1 b) less than 1
   c) greater than 1 d) equal to B

P.T.O.

9) The IC LM317 is a
   a) adjustable voltage regulator
   b) fixed voltage regulator
   c) precision voltage regulator
   d) comparator

10) The 78 XX series of voltage regulators produces an o/p voltage i.e.
   a) positive
   b) negative
   c) either positive or negative
   d) unregulated

11) For an op-amp with negative feedback, the o/p is
   a) equal to the i/p
   b) increased
   c) feedback to the inverting i/p
   d) feedback to the non-inverting i/p

12) In scaling address, the resistors are
   a) all of the same values
   b) all of the different values
   c) each proportional to the weight of its i/p
   d) related by a factor of two

13) Gain of non-inverting amplifier is always greater than 1
   a) True
   b) False
   c) Neither true nor false
   d) Partially true

14) The 741 IC has unity gain frequency of
   a) 10 Hz
   b) 20 KHz
   c) 1 MHz
   d) 15 KHz

15) Typical value of CMRR for 741
   a) 90 db
   b) 120 db
   c) –20 db
   d) 20 dB

16) A schmitt trigger uses
   a) +ve feedback
   b) –ve feedback
   c) Compensating capacitors
   d) Pull-up resistors

17) The ratio $\frac{A_d}{A_{cm}}$ is
   a) Slew rate
   b) CMRR
   c) SVRR
   d) None of these

18) UGB stands for
   a) Union Great Bias
   b) Union Gain Bias
   c) Unity Gain Bandwidth
   d) Unity Grounded Bias

19) A voltage follower
   a) Has a gain of 1
   b) Is non-inverting
   c) Has no feedback resistor
   d) All of these

20) The zero level detector is one application of a
   a) Comparator
   b) Differentiator
   c) Summing amplifier
   d) Diode

SLR-TJ – 376

Seat No.	

T.E. (Electrical) (Part – I) (Old) Examination, 2017
LINEAR INTEGRATED CIRCUITS

Day and Date : Wednesday, 13-12-2017 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**

   a) With the help of neat diagram explain concept of virtual ground.

   b) Design a circuit for following equation,

   $V_o = -(V_o + V_b + V_c)$.

   c) Explain in detail zero crossing detector.

   d) Explain integrator with frequency response.

   e) Explain the block diagram of op-amp with characteristics contributed by each block.

3. Solve **any two** : **(2×10=20)**

   a) Explain differentiator with frequency response and practical circut. Draw the waveforms.

   b) Explain op-amp as non-inverting amplifier and derive the gain in closed loop.

   c) Explain in detail V to I converter with floating and grounded load. Also give one example of each.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   a) Explain with circuit diagram IC 555 astable multivibrator.

   b) Draw and explain circuit diagram of triangular wave generator, also sketch the waveforms.

   c) Explain square wave generator in detail.

   d) Explain the positive adjustable voltage regulator with diagram.

   e) Design a high pass filter at cut off frequency of 1 KHz with a passband gain of 2. Plot frequency response of filter.

Set R

5. Solve **any two**: **(2×10=20)**

a) Explain Wein bridge oscillator with circut diagram and design the same so that f_o = 965 KHz.

b) Design an adjustable voltage regulator to satisfy the following specification

Output Voltage = V_o = 5 to 12 V

Output Current = I_o = 1A

Voltage regulator is LM 317.

c) Explain in detail the applications of IC 565 :

i) FM detector

ii) Frequency synthesizer.

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SLR-TJ – 376

Seat No.	

Set S

T.E. (Electrical) (Part – I) (Old) Examination, 2017
LINEAR INTEGRATED CIRCUITS

Day and Date : Wednesday, 13-12-2017 Max. Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) A schmitt trigger uses
   a) +ve feedback b) –ve feedback
   c) Compensating capacitors d) Pull-up resistors

2) The ratio $\frac{A_d}{A_{cm}}$ is
   a) Slew rate b) CMRR
   c) SVRR d) None of these

3) UGB stands for
   a) Union Great Bias b) Union Gain Bias
   c) Unity Gain Bandwidth d) Unity Grounded Bias

4) A voltage follower
   a) Has a gain of 1 b) Is non-inverting
   c) Has no feedback resistor d) All of these

5) The zero level detector is one application of a
   a) Comparator b) Differentiator
   c) Summing amplifier d) Diode

6) A single resistor and a single capacitor can be connected to form a filter with a roll of rate of
   a) – 20 dB/decade b) – 40 dB/decade
   c) – 60 dB/decade d) both a and c

7) The cut off frequency is the frequency where the response drops to
   a) 4 dB b) 3 dB c) 5 dB d) 7 dB

8) If the butterworth filter has nine 2nd order stages, its roll off rate is
   a) 20 dB/decade b) 40 dB/decade
   c) 180 dB/decade d) 360 dB/decade

P.T.O.

9) In full wave rectifier circuit, regardless of the polarity of i/p stage, o/p is always
   a) negative going
   b) positive going
   c) same as i/p
   d) none

10) The region between the passband and the stopband is called the
   a) attenuation
   b) centre
   c) transition
   d) ripple

11) A triangular waveform generator can be designed by using a square wave generated connected in
   a) Differentiator
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   c) Multiplier
   d) Adder

12) The Weinbridge oscillator is useful
   a) at low frequencies
   b) at high frequencies
   c) with IC tank circuit
   d) at small i/p stage

13) For an oscillator to properly start, the gain around the feedback loop must initially be
   a) 1
   b) less than 1
   c) greater than 1
   d) equal to B

14) The IC LM317 is a
   a) adjustable voltage regulator
   b) fixed voltage regulator
   c) precision voltage regulator
   d) comparator

15) The 78 XX series of voltage regulators produces an o/p voltage i.e.
   a) positive
   b) negative
   c) either positive or negative
   d) unregulated

16) For an op-amp with negative feedback, the o/p is
   a) equal to the i/p
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   c) feedback to the inverting i/p
   d) feedback to the non-inverting i/p

17) In scaling address, the resistors are
   a) all of the same values
   b) all of the different values
   c) each proportional to the weight of its i/p
   d) related by a factor of two

18) Gain of non-inverting amplifier is always greater than 1
   a) True
   b) False
   c) Neither true nor false
   d) Partially true

19) The 741 IC has unity gain frequency of
   a) 10 Hz
   b) 20 KHz
   c) 1 MHz
   d) 15 KHz

5) Typical value of CMRR for 741
   a) 90 db
   b) 120 db
   c) –20 db
   d) 20 dB

SLR-TJ – 376

Seat No.	

T.E. (Electrical) (Part – I) (Old) Examination, 2017
LINEAR INTEGRATED CIRCUITS

Day and Date : Wednesday, 13-12-2017 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**

   a) With the help of neat diagram explain concept of virtual ground.

   b) Design a circuit for following equation,

   $V_o = -(V_o + V_b + V_c)$.

   c) Explain in detail zero crossing detector.

   d) Explain integrator with frequency response.

   e) Explain the block diagram of op-amp with characteristics contributed by each block.

3. Solve **any two** : **(2×10=20)**

   a) Explain differentiator with frequency response and practical circut. Draw the waveforms.

   b) Explain op-amp as non-inverting amplifier and derive the gain in closed loop.

   c) Explain in detail V to I converter with floating and grounded load. Also give one example of each.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   a) Explain with circuit diagram IC 555 astable multivibrator.

   b) Draw and explain circuit diagram of triangular wave generator, also sketch the waveforms.

   c) Explain square wave generator in detail.

   d) Explain the positive adjustable voltage regulator with diagram.

   e) Design a high pass filter at cut off frequency of 1 KHz with a passband gain of 2. Plot frequency response of filter.

5. Solve **any two**: **(2×10=20)**

a) Explain Wein bridge oscillator with circut diagram and design the same so that f_o = 965 KHz.

b) Design an adjustable voltage regulator to satisfy the following specification

Output Voltage = V_o = 5 to 12 V

Output Current = I_o = 1A

Voltage regulator is LM 317.

c) Explain in detail the applications of IC 565 :

i) FM detector

ii) Frequency synthesizer.

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SLR-TJ – 377

Seat No.	

Set **P**

T.E. (Electrical Engineering) (Part – II) (Old) Examination, 2017
POWER SYSTEM – II

Day and Date : Friday, 15-12-2017 Max Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Figures to ***right*** *indicate* ***full*** *marks.*
4) Assume data ***if*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) The ohmic impedance of a transmission line having a p.u. impedance of 0.31 p.u. on a base of 100 MVA, 220 KV is
   a) J150Ω b) j100Ω c) j31Ω d) j0.31Ω
2) The magnitudes of p.u. impedance of transformer determined from the HT side and LT side of transformer are
   a) unequal b) equal
   c) depends on the turn's ratio d) none of the above
3) A 100MVA transformer with 5% reactance will have a reactance of 10% at
   a) $100(MVA)_B$ b) $400(MVA)_B$ c) $200(MVA)_B$ d) $500(MVA)_B$
4) In case of three phase short circuit in a system, the power fed into the system is
   a) mostly reactive b) mostly active
   c) active and reactive both equal d) reactive only
5) The time elapsed before the relays detect the fault current is called the
   a) detection time b) interrupting time
   c) sleep time d) none of the above
6) The bus which is infinitely strong and has a constant voltage and frequency is known as
   a) infinite bus b) slack bus
   c) both a and b d) none of the above
7) In a balanced three phase system, negative and zero sequence currents are
   a) absent b) equal c) infinite d) don't know

8) Phase shift of symmetrical components happens in which of the following cases ?
a) Y – Y b) $\Delta - \Delta$ c) Δ–Y d) All of the above

9) In delta connected winding zero sequence currents may be present in
a) lines b) phase windings
c) nowhere d) both a and b

10) In the absence of neutral in Y connections, the zero sequences currents are
a) maximum b) minimum c) zero d) can't say

11) The current in neutral to ground is 3A the zero sequence current in this case will be
a) 9A b) 0A c) 1A d) Infinite

12) In case of an LG fault the three sequence are connected in
a) series b) parallel
c) star d) none of the above

13) For stability reasons, the transmission line is operated with power angle in the range
a) 10° to 25° b) 30° to 45° c) 60° to 75° d) 65° to 90°

14) If the torque angle keeps on increasing with time, then the system is
a) unstable b) marginally stable
c) stable d) can't say

15) The p.u. impedance value of an alternator corresponding to base values of 13.2 KV and 30 MVA IS 0.2 p.u. the p.u. value for the base values of 26.4 KV and 60 MVA will be
a) 0.2 p.u. b) 0.1 p.u. c) 0.4 p.u. d) 0.8 p.u.

16) For calculating the interrupting current in synchronous generators, the reactance generally used is
a) leakage reactance b) transient reactance
c) sub-transient reactance d) steady state reactance

17) Symmetrical fault analysis of large systems using computers is done using
a) using Kirchoff's law
b) using Thevanin's theorem
c) by forming the bus impedance matrix
d) none of the above

18) For static equipment's like transformers and transmission lines the positive and negative sequence impedances are
a) infinite b) unequal c) equal d) can't say

19) The fault where in the positive, negative and zero sequence component currents are equal is a
a) LL Fault b) LLG Fault c) LG Fault d) 3L Fault

20) From stability point in view, the star point of a synchronous machine should be grounded through
a) reactance b) resistance
c) nothing d) no grounding required

SLR-TJ-377

Seat No.	

T.E. (Electrical Engineering) (Part – II) (Old) Examination, 2017
POWER SYSTEM – II

Day and Date : Friday, 15-12-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Figures to **right** indicate **full** marks.*
*2) Assume data **if** necessary.*
*3) **All** questions are **compulsory**.*

SECTION – I

II. Answer **any four** questions : **(4×5=20)**

1) With a neat diagram explain the impedance and reactance diagram.

2) Derive an expression for Y_{BUS} by singular transformation method.

3) Write the algorithm for Newton-Raphson method for load flow analysis.

4) Write a note on symmetrical short circuit of a synchronous generator on no load.

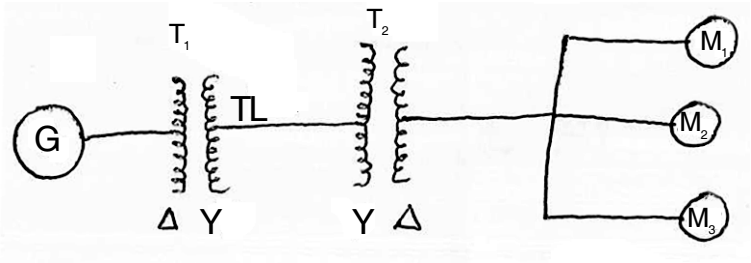
5) Table below gives the line impedances identified by the buses on which these terminate. The shunt admittances at all buses are negligible. Find the Y_{BUS} assuming that line 1 – 2 is connected and draw the single line diagram.

Line :	1 – 2	1 – 3	2 – 3	2 – 4	3 – 4
R_1 :	0.05	0.10	0.15	0.10	0.05
X_1 :	0.15	0.30	0.45	0.30	0.15

III. Answer **any two** questions : **(10×2=20)**

1) Derive an expression for modification of Z_{BUS} when adding Z_b between two existing buses j and k.

2) Derive and explain the equations for fast decoupled load flow analysis.
3) A 100 MVA, 33 KV, 3-phase generator has a sub transient reactance of 15%. The generator is connected to the motors through a transmission line and transformers as shown in fig. the motors have rated outputs of 30 MVA, 20 MVA and 50 MVA at 30 KV with 0% sub transient reactance each. The 3 phase transformers are rated 100 MVA, 32 KV Δ/100 KV Y with leakage reactance of 8%. The line has a reactance of 50 ohm. Selecting the generator rating as the base in the generator circuit, draw the p.u. reactance diagram.



SECTION – II

IV. Answer **any four** questions : **(4×5=20)**

1) Derive the relation between sequence components of phase and the line currents in delta connected systems.
2) Derive an expression for fault current if line-to-line fault.
3) State equal area criterion (EAC). What are the assumptions made in applying EAC ? Discuss its applications.
4) Briefly explain the resolution of unbalanced phasors into symmetrical components.
5) The sequence components of voltages in a three connected impedance of (8 + j6) ohm in each phase with mutual impedance j2 ohm are $V_{a1} = 230 \angle 0°$v, $V_{a2} = 60 \angle -30°$v, & $V_{a0} = 40 \angle -90°$v, determine the line currents and also voltage drop across the neutral impedance.

V. Answer **any two** questions : **(10×2=20)**

1) Derive an expression for double line to ground fault (LLG) on an unloaded generator through a fault impedance.
2) Find the steady state stability limit of a line with $|V_S|$ & $|V_R|$ fixed and $Z = R + j X$. if R is constant and X is varied, find 'X' in terms of 'R' if $V_S = V_R$ also find the corresponding power.
3) A 3-line voltages of a 3-phase system are $|V_A| = 400$ V, $|V_B| = 500$ V & $|V_C| = 600$ V. Determine the sequence components of the line and phase voltage and hence the phase voltages.

SLR-TJ – 377

Seat No.	

Set **Q**

T.E. (Electrical Engineering) (Part – II) (Old) Examination, 2017
POWER SYSTEM – II

Day and Date : Friday, 15-12-2017 Max Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Figures to ***right*** *indicate* ***full*** *marks.*
4) Assume data ***if*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) For calculating the interrupting current in synchronous generators, the reactance generally used is
   a) leakage reactance b) transient reactance
   c) sub-transient reactance d) steady state reactance

2) Symmetrical fault analysis of large systems using computers is done using
   a) using Kirchoff's law
   b) using Thevanin's theorem
   c) by forming the bus impedance matrix
   d) none of the above

3) For static equipment's like transformers and transmission lines the positive and negative sequence impedances are
   a) infinite b) unequal c) equal d) can't say

4) The fault where in the positive, negative and zero sequence component currents are equal is a
   a) LL Fault b) LLG Fault c) LG Fault d) 3L Fault

5) From stability point in view, the star point of a synchronous machine should be grounded through
   a) reactance b) resistance
   c) nothing d) no grounding required

6) The ohmic impedance of a transmission line having a p.u. impedance of 0.31 p.u. on a base of 100 MVA, 220 KV is
   a) J150Ω b) j100Ω c) j31Ω d) j0.31Ω

P.T.O.

7) The magnitudes of p.u. impedance of transformer determined from the HT side and LT side of transformer are
a) unequal b) equal
c) depends on the turn's ratio d) none of the above

8) A 100MVA transformer with 5% reactance will have a reactance of 10% at
a) $100(MVA)_B$ b) $400(MVA)_B$ c) $200(MVA)_B$ d) $500(MVA)_B$

9) In case of three phase short circuit in a system, the power fed into the system is
a) mostly reactive b) mostly active
c) active and reactive both equal d) reactive only

10) The time elapsed before the relays detect the fault current is called the
a) detection time b) interrupting time
c) sleep time d) none of the above

11) The bus which is infinitely strong and has a constant voltage and frequency is known as
a) infinite bus b) slack bus
c) both a and b d) none of the above

12) In a balanced three phase system, negative and zero sequence currents are
a) absent b) equal c) infinite d) don't know

13) Phase shift of symmetrical components happens in which of the following cases ?
a) Y – Y b) $\Delta - \Delta$ c) Δ–Y d) All of the above

14) In delta connected winding zero sequence currents may be present in
a) lines b) phase windings
c) nowhere d) both a and b

15) In the absence of neutral in Y connections, the zero sequences currents are
a) maximum b) minimum c) zero d) can't say

16) The current in neutral to ground is 3A the zero sequence current in this case will be
a) 9A b) 0A c) 1A d) Infinite

17) In case of an LG fault the three sequence are connected in
a) series b) parallel
c) star d) none of the above

18) For stability reasons, the transmission line is operated with power angle in the range
a) 10° to 25° b) 30° to 45° c) 60° to 75° d) 65° to 90°

19) If the torque angle keeps on increasing with time, then the system is
a) unstable b) marginally stable
c) stable d) can't say

20) The p.u. impedance value of an alternator corresponding to base values of 13.2 KV and 30 MVA IS 0.2 p.u. the p.u. value for the base values of 26.4 KV and 60 MVA will be
a) 0.2 p.u. b) 0.1 p.u. c) 0.4 p.u. d) 0.8 p.u.

Seat No.	

T.E. (Electrical Engineering) (Part – II) (Old) Examination, 2017
POWER SYSTEM – II

Day and Date : Friday, 15-12-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Figures to **right** indicate **full** marks.*
*2) Assume data **if** necessary.*
*3) **All** questions are **compulsory**.*

SECTION – I

II. Answer **any four** questions : **(4×5=20)**

1) With a neat diagram explain the impedance and reactance diagram.

2) Derive an expression for Y_{BUS} by singular transformation method.

3) Write the algorithm for Newton-Raphson method for load flow analysis.

4) Write a note on symmetrical short circuit of a synchronous generator on no load.

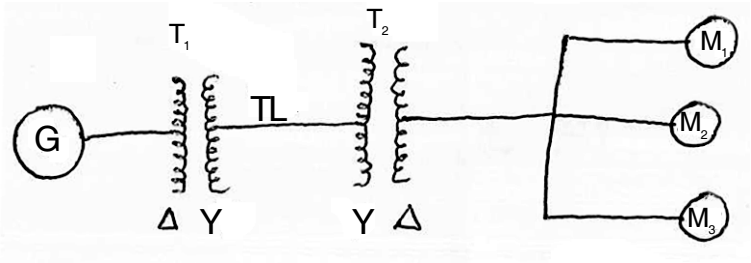
5) Table below gives the line impedances identified by the buses on which these terminate. The shunt admittances at all buses are negligible. Find the Y_{BUS} assuming that line 1 – 2 is connected and draw the single line diagram.

Line :	1 – 2	1 – 3	2 – 3	2 – 4	3 – 4
R_1 :	0.05	0.10	0.15	0.10	0.05
X_1 :	0.15	0.30	0.45	0.30	0.15

III. Answer **any two** questions : **(10×2=20)**

1) Derive an expression for modification of Z_{BUS} when adding Z_b between two existing buses j and k.

2) Derive and explain the equations for fast decoupled load flow analysis.
3) A 100 MVA, 33 KV, 3-phase generator has a sub transient reactance of 15%. The generator is connected to the motors through a transmission line and transformers as shown in fig. the motors have rated outputs of 30 MVA, 20 MVA and 50 MVA at 30 KV with 0% sub transient reactance each. The 3 phase transformers are rated 100 MVA, 32 KV Δ/100 KV Y with leakage reactance of 8%. The line has a reactance of 50 ohm. Selecting the generator rating as the base in the generator circuit, draw the p.u. reactance diagram.



SECTION – II

IV. Answer **any four** questions : **(4×5=20)**

1) Derive the relation between sequence components of phase and the line currents in delta connected systems.
2) Derive an expression for fault current if line-to-line fault.
3) State equal area criterion (EAC). What are the assumptions made in applying EAC ? Discuss its applications.
4) Briefly explain the resolution of unbalanced phasors into symmetrical components.
5) The sequence components of voltages in a three connected impedance of (8 + j6) ohm in each phase with mutual impedance j2 ohm are $V_{a1} = 230 \underline{|0}°$v, $V_{a2} = 60 \underline{|-30}°$v, & $V_{a0} = 40 \underline{|-90}°$v, determine the line currents and also voltage drop across the neutral impedance.

V. Answer **any two** questions : **(10×2=20)**

1) Derive an expression for double line to ground fault (LLG) on an unloaded generator through a fault impedance.
2) Find the steady state stability limit of a line with $|V_S|$ & $|V_R|$ fixed and $Z = R + j X$. if R is constant and X is varied, find 'X' in terms of 'R' if $V_S = V_R$ also find the corresponding power.
3) A 3-line voltages of a 3-phase system are $|V_A| = 400$ V, $|V_B| = 500$ V & $|V_C| = 600$ V. Determine the sequence components of the line and phase voltage and hence the phase voltages.

SLR-TJ – 377

Seat No.	

Set **R**

T.E. (Electrical Engineering) (Part – II) (Old) Examination, 2017
POWER SYSTEM – II

Day and Date : Friday, 15-12-2017 Max Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Figures to ***right*** *indicate* ***full*** *marks.*
4) Assume data ***if*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) The current in neutral to ground is 3A the zero sequence current in this case will be
   a) 9A b) 0A c) 1A d) Infinite
2) In case of an LG fault the three sequence are connected in
   a) series b) parallel
   c) star d) none of the above
3) For stability reasons, the transmission line is operated with power angle in the range
   a) 10° to 25° b) 30° to 45° c) 60° to 75° d) 65° to 90°
4) If the torque angle keeps on increasing with time, then the system is
   a) unstable b) marginally stable
   c) stable d) can't say
5) The p.u. impedance value of an alternator corresponding to base values of 13.2 KV and 30 MVA IS 0.2 p.u. the p.u. value for the base values of 26.4 KV and 60 MVA will be
   a) 0.2 p.u. b) 0.1 p.u. c) 0.4 p.u. d) 0.8 p.u.
6) For calculating the interrupting current in synchronous generators, the reactance generally used is
   a) leakage reactance b) transient reactance
   c) sub-transient reactance d) steady state reactance
7) Symmetrical fault analysis of large systems using computers is done using
   a) using Kirchoff's law
   b) using Thevanin's theorem
   c) by forming the bus impedance matrix
   d) none of the above

8) For static equipment's like transformers and transmission lines the positive and negative sequence impedances are
a) infinite b) unequal c) equal d) can't say

9) The fault where in the positive, negative and zero sequence component currents are equal is a
a) LL Fault b) LLG Fault c) LG Fault d) 3L Fault

10) From stability point in view, the star point of a synchronous machine should be grounded through
a) reactance b) resistance
c) nothing d) no grounding required

11) The ohmic impedance of a transmission line having a p.u. impedance of 0.31 p.u. on a base of 100 MVA, 220 KV is
a) J150Ω b) j100Ω c) j31Ω d) j0.31Ω

12) The magnitudes of p.u. impedance of transformer determined from the HT side and LT side of transformer are
a) unequal b) equal
c) depends on the turn's ratio d) none of the above

13) A 100MVA transformer with 5% reactance will have a reactance of 10% at
a) $100(MVA)_B$ b) $400(MVA)_B$ c) $200(MVA)_B$ d) $500(MVA)_B$

14) In case of three phase short circuit in a system, the power fed into the system is
a) mostly reactive b) mostly active
c) active and reactive both equal d) reactive only

15) The time elapsed before the relays detect the fault current is called the
a) detection time b) interrupting time
c) sleep time d) none of the above

16) The bus which is infinitely strong and has a constant voltage and frequency is known as
a) infinite bus b) slack bus
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17) In a balanced three phase system, negative and zero sequence currents are
a) absent b) equal c) infinite d) don't know

18) Phase shift of symmetrical components happens in which of the following cases ?
a) Y – Y b) $\Delta - \Delta$ c) Δ–Y d) All of the above

19) In delta connected winding zero sequence currents may be present in
a) lines b) phase windings
c) nowhere d) both a and b

20) In the absence of neutral in Y connections, the zero sequences currents are
a) maximum b) minimum c) zero d) can't say

SLR-TJ-377

Seat No.	

T.E. (Electrical Engineering) (Part – II) (Old) Examination, 2017
POWER SYSTEM – II

Day and Date : Friday, 15-12-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Figures to **right** indicate **full** marks.*
*2) Assume data **if** necessary.*
*3) **All** questions are **compulsory**.*

SECTION – I

II. Answer **any four** questions : **(4×5=20)**

1) With a neat diagram explain the impedance and reactance diagram.

2) Derive an expression for Y_{BUS} by singular transformation method.

3) Write the algorithm for Newton-Raphson method for load flow analysis.

4) Write a note on symmetrical short circuit of a synchronous generator on no load.

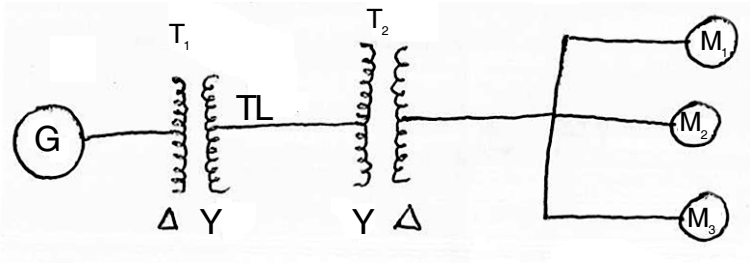
5) Table below gives the line impedances identified by the buses on which these terminate. The shunt admittances at all buses are negligible. Find the Y_{BUS} assuming that line 1 – 2 is connected and draw the single line diagram.

Line :	1 – 2	1 – 3	2 – 3	2 – 4	3 – 4
R_1 :	0.05	0.10	0.15	0.10	0.05
X_1 :	0.15	0.30	0.45	0.30	0.15

III. Answer **any two** questions : **(10×2=20)**

1) Derive an expression for modification of Z_{BUS} when adding Z_b between two existing buses j and k.

2) Derive and explain the equations for fast decoupled load flow analysis.
3) A 100 MVA, 33 KV, 3-phase generator has a sub transient reactance of 15%. The generator is connected to the motors through a transmission line and transformers as shown in fig. the motors have rated outputs of 30 MVA, 20 MVA and 50 MVA at 30 KV with 0% sub transient reactance each. The 3 phase transformers are rated 100 MVA, 32 KV Δ/100 KV Y with leakage reactance of 8%. The line has a reactance of 50 ohm. Selecting the generator rating as the base in the generator circuit, draw the p.u. reactance diagram.



SECTION – II

IV. Answer **any four** questions : **(4×5=20)**

1) Derive the relation between sequence components of phase and the line currents in delta connected systems.
2) Derive an expression for fault current if line-to-line fault.
3) State equal area criterion (EAC). What are the assumptions made in applying EAC ? Discuss its applications.
4) Briefly explain the resolution of unbalanced phasors into symmetrical components.
5) The sequence components of voltages in a three connected impedance of (8 + j6) ohm in each phase with mutual impedance j2 ohm are $V_{a1} = 230 \underline{|0}°$v, $V_{a2} = 60 \underline{|-30}°$v, & $V_{a0} = 40 \underline{|-90}°$v, determine the line currents and also voltage drop across the neutral impedance.

V. Answer **any two** questions : **(10×2=20)**

1) Derive an expression for double line to ground fault (LLG) on an unloaded generator through a fault impedance.
2) Find the steady state stability limit of a line with $|V_S|$ & $|V_R|$ fixed and $Z = R + j X$. if R is constant and X is varied, find 'X' in terms of 'R' if $V_S = V_R$ also find the corresponding power.
3) A 3-line voltages of a 3-phase system are $|V_A| = 400$ V, $|V_B| = 500$ V & $|V_C| = 600$ V. Determine the sequence components of the line and phase voltage and hence the phase voltages.

SLR-TJ – 377

Seat No.	

Set **S**

T.E. (Electrical Engineering) (Part – II) (Old) Examination, 2017
POWER SYSTEM – II

Day and Date : Friday, 15-12-2017 Max Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Figures to ***right*** *indicate* ***full*** *marks.*
4) Assume data ***if*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) The bus which is infinitely strong and has a constant voltage and frequency is known as
   a) infinite bus b) slack bus
   c) both a and b d) none of the above

2) In a balanced three phase system, negative and zero sequence currents are
   a) absent b) equal c) infinite d) don't know

3) Phase shift of symmetrical components happens in which of the following cases ?
   a) Y – Y b) $\Delta - \Delta$ c) Δ–Y d) All of the above

4) In delta connected winding zero sequence currents may be present in
   a) lines b) phase windings
   c) nowhere d) both a and b

5) In the absence of neutral in Y connections, the zero sequences currents are
   a) maximum b) minimum c) zero d) can't say

6) The current in neutral to ground is 3A the zero sequence current in this case will be
   a) 9A b) 0A c) 1A d) Infinite

7) In case of an LG fault the three sequence are connected in
   a) series b) parallel
   c) star d) none of the above

8) For stability reasons, the transmission line is operated with power angle in the range
   a) 10° to 25° b) 30° to 45° c) 60° to 75° d) 65° to 90°

9) If the torque angle keeps on increasing with time, then the system is
a) unstable b) marginally stable
c) stable d) can't say

10) The p.u. impedance value of an alternator corresponding to base values of 13.2 KV and 30 MVA IS 0.2 p.u. the p.u. value for the base values of 26.4 KV and 60 MVA will be
a) 0.2 p.u. b) 0.1 p.u. c) 0.4 p.u. d) 0.8 p.u.

11) For calculating the interrupting current in synchronous generators, the reactance generally used is
a) leakage reactance b) transient reactance
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a) using Kirchoff's law
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13) For static equipment's like transformers and transmission lines the positive and negative sequence impedances are
a) infinite b) unequal c) equal d) can't say

14) The fault where in the positive, negative and zero sequence component currents are equal is a
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15) From stability point in view, the star point of a synchronous machine should be grounded through
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16) The ohmic impedance of a transmission line having a p.u. impedance of 0.31 p.u. on a base of 100 MVA, 220 KV is
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17) The magnitudes of p.u. impedance of transformer determined from the HT side and LT side of transformer are
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18) A 100MVA transformer with 5% reactance will have a reactance of 10% at
a) $100(MVA)_B$ b) $400(MVA)_B$ c) $200(MVA)_B$ d) $500(MVA)_B$

19) In case of three phase short circuit in a system, the power fed into the system is
a) mostly reactive b) mostly active
c) active and reactive both equal d) reactive only

20) The time elapsed before the relays detect the fault current is called the
a) detection time b) interrupting time
c) sleep time d) none of the above

SLR-TJ-377

Seat No.	

T.E. (Electrical Engineering) (Part – II) (Old) Examination, 2017
POWER SYSTEM – II

Day and Date : Friday, 15-12-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Figures to **right** indicate **full** marks.*
*2) Assume data **if** necessary.*
*3) **All** questions are **compulsory**.*

SECTION – I

II. Answer **any four** questions : **(4×5=20)**

1) With a neat diagram explain the impedance and reactance diagram.

2) Derive an expression for Y_{BUS} by singular transformation method.

3) Write the algorithm for Newton-Raphson method for load flow analysis.

4) Write a note on symmetrical short circuit of a synchronous generator on no load.

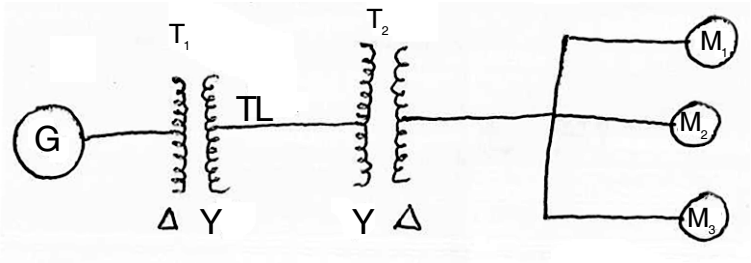
5) Table below gives the line impedances identified by the buses on which these terminate. The shunt admittances at all buses are negligible. Find the Y_{BUS} assuming that line 1 – 2 is connected and draw the single line diagram.

Line :	1 – 2	1 – 3	2 – 3	2 – 4	3 – 4
R_1 :	0.05	0.10	0.15	0.10	0.05
X_1 :	0.15	0.30	0.45	0.30	0.15

III. Answer **any two** questions : **(10×2=20)**

1) Derive an expression for modification of Z_{BUS} when adding Z_b between two existing buses j and k.

2) Derive and explain the equations for fast decoupled load flow analysis.
3) A 100 MVA, 33 KV, 3-phase generator has a sub transient reactance of 15%. The generator is connected to the motors through a transmission line and transformers as shown in fig. the motors have rated outputs of 30 MVA, 20 MVA and 50 MVA at 30 KV with 0% sub transient reactance each. The 3 phase transformers are rated 100 MVA, 32 KV Δ/100 KV Y with leakage reactance of 8%. The line has a reactance of 50 ohm. Selecting the generator rating as the base in the generator circuit, draw the p.u. reactance diagram.



SECTION – II

IV. Answer **any four** questions : **(4×5=20)**

1) Derive the relation between sequence components of phase and the line currents in delta connected systems.
2) Derive an expression for fault current if line-to-line fault.
3) State equal area criterion (EAC). What are the assumptions made in applying EAC ? Discuss its applications.
4) Briefly explain the resolution of unbalanced phasors into symmetrical components.
5) The sequence components of voltages in a three connected impedance of (8 + j6) ohm in each phase with mutual impedance j2 ohm are $V_{a1} = 230 \underline{|0}°$v, $V_{a2} = 60 \underline{|-30}°$v, & $V_{a0} = 40 \underline{|-90}°$v, determine the line currents and also voltage drop across the neutral impedance.

V. Answer **any two** questions : **(10×2=20)**

1) Derive an expression for double line to ground fault (LLG) on an unloaded generator through a fault impedance.
2) Find the steady state stability limit of a line with $|V_S|$ & $|V_R|$ fixed and $Z = R + j X$. if R is constant and X is varied, find 'X' in terms of 'R' if $V_S = V_R$ also find the corresponding power.
3) A 3-line voltages of a 3-phase system are $|V_A| = 400$ V, $|V_B| = 500$ V & $|V_C| = 600$ V. Determine the sequence components of the line and phase voltage and hence the phase voltages.

SLR-TJ – 378

Seat No.	

Set P

T.E. (Electrical) (Part – II) (Old) Examination, 2017
UTILIZATION OF ELECTRICAL ENERGY AND ENERGY CONSERVATION

Day and Date : Monday, 18-12-2017 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book on Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) For arc heating, the electrodes are made of
   a) Copper b) Aluminum
   c) Graphite d) ACSR conductor

2) Following weldings are varieties of resistance welding
   a) Seam welding b) Butt welding c) Spot welding d) All of the above

3) Which motor has relatively wider range of speed control ?
   a) D.C. shunt motor b) Synchronous motor
   c) Slip ring I.M. d) Squirrel cage I.M.

4) Flame proof motors are used in
   a) Mines b) Steel mills
   c) Paper mills d) Moist atmosphere

5) Candela is the unit of
   a) Luminous flux b) Luminous intensity
   c) Wavelength d) None of the above

6) Which method of heating is likely to give leading power factor ?
   a) Electric arc heating b) Induction heating
   c) Dielectric heating d) Resistance heating

7) Desirable property of resistance heating element is
   a) Low temperature coefficient b) High resistivity
   c) High melting point d) All of the above

8) The unit of luminous flux is
   a) Steradian b) Candela c) Lumen d) Lux

9) The welding transformer used in resistance welding will
   a) Step up current b) Step down current
   c) Step up voltage d) Step up power

P.T.O.

10) Change of frequency in the supply does not affect
a) Dielectric heating
b) Resistance heating
c) Induction heating
d) Microwave heating

11) Radiant efficiency of the luminous source depends on
a) Shape of the source
b) Temperature of the source
c) Wavelength of light rays
d) All of the above

12) In a fluorescent tube circuit, choke acts as
a) starter
b) power factor improving device
c) source of heat
d) current limiting device

13) Which motor is used in tramways ?
a) AC single phase capacitor start motor
b) AC three phase motor
c) DC series motor
d) DC shunt motor

14) Energy consumption in propelling the train is required for
a) acceleration
b) work against gravity while moving up the gradient
c) work against the resistance to motion
d) all of the above

15) Free running and coasting periods arc generally long in ease if
a) urban service
b) sub-urban service
c) main-line service
d) all of the above

16) Specific energy consumption is least in
a) urban service
b) sub-urban service
c) main-line service
d) equal for all types of services

17) Which of the following factor affects specific energy consumption ?
a) Distance between stops
b) Gradient
c) Retardation and acceleration values
d) All of the above

18) The main difference between speed-time curves of mainline service as compared to suburban services lies in
a) longer free running periods
b) longer coasting periods
c) shorter acceleration gand braking periods
d) all of the above

19) The coefficient of adhesion is highest when
a) the rails are dry
b) the rails are oiled
c) the rails ark wet with dew
d) the rails are dusty

20) Braking retardation on suburban trains is
a) 0.3 to 0.5 kmphps
b) 0.5 to 1 kmphps
c) 3 to 5 kmphps
d) 30 to 40 kmphps

SLR-TJ – 378

Seat No.	

T.E. (Electrical) (Part – II) (Old) Examination, 2017
UTILIZATION OF ELECTRICAL ENERGY AND ENERGY CONSERVATION

Day and Date : Monday, 18-12-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) Give a short note on motor selection in sugar mills.
   2) Explain indirect resistance heating along with neat sketch.
   3) Explain laws of illumination in brief.
   4) Explain the comparison between tungsten filament lamps and fluorescent tubes.
   5) Explain types of loads with examples.
   6) Explain advantages of electric heating over other methods of heating.

3. Solve **any two** : **(2×10=20)**
   1) Define the following terms :
      a) Mean Horizontal Candle Power (MHCP).
      b) Mean Spherical Candle Power (MSCP).
      c) Mean Hemispherical Candle Power (MHSCP).
      d) Reduction Factor.
      e) Lamp Efficiency.
   2) Explain modern welding techniques like ultrasonic welding, laser welding in detail.
   3) a) Explain motor selection in machine tool industries.
      b) Explain motor selection in cement industry.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   1) Explain the mechanics of train movement.
   2) Explain dynamic braking in detail.
   3) Write short note on crest speed, average speed, schedule speed.
   4) Explain energy conservation in transport and agricultural sectors.
   5) What are the motivations for energy conservation ?
   6) Draw typical speed time curve for train and explain acceleration, free run, retardation and braking.

5. Solve **any two** : **(2×10=20)**

   1) Explain trapezoidal speed time curve mathematical expression for total distance and crest speed.
   2) Determine specific energy consumption by using simplified speed time curve.
   3) a) Explain energy conservation legislation.
      b) A suburban electric train has maximum speed of 70 kmph. The schedule speed including station stop time of 30 seconds is 45 kmph, if the acceleration is 1.5 kmphps, find the value of retardation when the distance between the stops is 4 km.

SLR-TJ – 378

Seat No.	

Set Q

T.E. (Electrical) (Part – II) (Old) Examination, 2017
UTILIZATION OF ELECTRICAL ENERGY AND ENERGY CONSERVATION

Day and Date : Monday, 18-12-2017 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book on Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Specific energy consumption is least in
   a) urban service b) sub-urban service
   c) main-line service d) equal for all types of services

2) Which of the following factor affects specific energy consumption ?
   a) Distance between stops
   b) Gradient
   c) Retardation and acceleration values
   d) All of the above

3) The main difference between speed-time curves of mainline service as compared to suburban services lies in
   a) longer free running periods
   b) longer coasting periods
   c) shorter acceleration gand braking periods
   d) all of the above

4) The coefficient of adhesion is highest when
   a) the rails are dry b) the rails are oiled
   c) the rails ark wet with dew d) the rails are dusty

5) Braking retardation on suburban trains is
   a) 0.3 to 0.5 kmphps b) 0.5 to 1 kmphps
   c) 3 to 5 kmphps d) 30 to 40 kmphps

6) For arc heating, the electrodes are made of
   a) Copper b) Aluminum
   c) Graphite d) ACSR conductor

7) Following weldings are varieties of resistance welding
   a) Seam welding b) Butt welding c) Spot welding d) All of the above

P.T.O.

8) Which motor has relatively wider range of speed control ?
   a) D.C. shunt motor
   b) Synchronous motor
   c) Slip ring I.M.
   d) Squirrel cage I.M.

9) Flame proof motors are used in
   a) Mines
   b) Steel mills
   c) Paper mills
   d) Moist atmosphere

10) Candela is the unit of
   a) Luminous flux
   b) Luminous intensity
   c) Wavelength
   d) None of the above

11) Which method of heating is likely to give leading power factor ?
   a) Electric arc heating
   b) Induction heating
   c) Dielectric heating
   d) Resistance heating

12) Desirable property of resistance heating element is
   a) Low temperature coefficient
   b) High resistivity
   c) High melting point
   d) All of the above

13) The unit of luminous flux is
   a) Steradian
   b) Candela
   c) Lumen
   d) Lux

14) The welding transformer used in resistance welding will
   a) Step up current
   b) Step down current
   c) Step up voltage
   d) Step up power

15) Change of frequency in the supply does not affect
   a) Dielectric heating
   b) Resistance heating
   c) Induction heating
   d) Microwave heating

16) Radiant efficiency of the luminous source depends on
   a) Shape of the source
   b) Temperature of the source
   c) Wavelength of light rays
   d) All of the above

17) In a fluorescent tube circuit, choke acts as
   a) starter
   b) power factor improving device
   c) source of heat
   d) current limiting device

18) Which motor is used in tramways ?
   a) AC single phase capacitor start motor
   b) AC three phase motor
   c) DC series motor
   d) DC shunt motor

19) Energy consumption in propelling the train is required for
   a) acceleration
   b) work against gravity while moving up the gradient
   c) work against the resistance to motion
   d) all of the above

20) Free running and coasting periods arc generally long in ease if
   a) urban service
   b) sub-urban service
   c) main-line service
   d) all of the above

SLR-TJ – 378

Seat No.	

T.E. (Electrical) (Part – II) (Old) Examination, 2017
UTILIZATION OF ELECTRICAL ENERGY AND ENERGY CONSERVATION

Day and Date : Monday, 18-12-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) Give a short note on motor selection in sugar mills.
   2) Explain indirect resistance heating along with neat sketch.
   3) Explain laws of illumination in brief.
   4) Explain the comparison between tungsten filament lamps and fluorescent tubes.
   5) Explain types of loads with examples.
   6) Explain advantages of electric heating over other methods of heating.

3. Solve **any two** : **(2×10=20)**
   1) Define the following terms :
      a) Mean Horizontal Candle Power (MHCP).
      b) Mean Spherical Candle Power (MSCP).
      c) Mean Hemispherical Candle Power (MHSCP).
      d) Reduction Factor.
      e) Lamp Efficiency.
   2) Explain modern welding techniques like ultrasonic welding, laser welding in detail.
   3) a) Explain motor selection in machine tool industries.
      b) Explain motor selection in cement industry.

SECTION – II

4. Solve **any four** : **(4×5=20)**
   1) Explain the mechanics of train movement.
   2) Explain dynamic braking in detail.
   3) Write short note on crest speed, average speed, schedule speed.
   4) Explain energy conservation in transport and agricultural sectors.
   5) What are the motivations for energy conservation ?
   6) Draw typical speed time curve for train and explain acceleration, free run, retardation and braking.

5. Solve **any two** : **(2×10=20)**
   1) Explain trapezoidal speed time curve mathematical expression for total distance and crest speed.
   2) Determine specific energy consumption by using simplified speed time curve.
   3) a) Explain energy conservation legislation.
      b) A suburban electric train has maximum speed of 70 kmph. The schedule speed including station stop time of 30 seconds is 45 kmph, if the acceleration is 1.5 kmphps, find the value of retardation when the distance between the stops is 4 km.

SLR-TJ – 378

Seat No.	

Set R

T.E. (Electrical) (Part – II) (Old) Examination, 2017
UTILIZATION OF ELECTRICAL ENERGY AND ENERGY CONSERVATION

Day and Date : Monday, 18-12-2017 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book on Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Radiant efficiency of the luminous source depends on
   a) Shape of the source
   b) Temperature of the source
   c) Wavelength of light rays
   d) All of the above

2) In a fluorescent tube circuit, choke acts as
   a) starter
   b) power factor improving device
   c) source of heat
   d) current limiting device

3) Which motor is used in tramways ?
   a) AC single phase capacitor start motor
   b) AC three phase motor
   c) DC series motor
   d) DC shunt motor

4) Energy consumption in propelling the train is required for
   a) acceleration
   b) work against gravity while moving up the gradient
   c) work against the resistance to motion
   d) all of the above

5) Free running and coasting periods arc generally long in ease if
   a) urban service
   b) sub-urban service
   c) main-line service
   d) all of the above

6) Specific energy consumption is least in
   a) urban service
   b) sub-urban service
   c) main-line service
   d) equal for all types of services

7) Which of the following factor affects specific energy consumption ?
   a) Distance between stops
   b) Gradient
   c) Retardation and acceleration values
   d) All of the above

8) The main difference between speed-time curves of mainline service as compared to suburban services lies in
   a) longer free running periods
   b) longer coasting periods
   c) shorter acceleration gand braking periods
   d) all of the above

9) The coefficient of adhesion is highest when
   a) the rails are dry
   b) the rails are oiled
   c) the rails ark wet with dew
   d) the rails are dusty

10) Braking retardation on suburban trains is
   a) 0.3 to 0.5 kmphps
   b) 0.5 to 1 kmphps
   c) 3 to 5 kmphps
   d) 30 to 40 kmphps

11) For arc heating, the electrodes are made of
   a) Copper
   b) Aluminum
   c) Graphite
   d) ACSR conductor

12) Following weldings are varieties of resistance welding
   a) Seam welding b) Butt welding c) Spot welding d) All of the above

13) Which motor has relatively wider range of speed control ?
   a) D.C. shunt motor
   b) Synchronous motor
   c) Slip ring I.M.
   d) Squirrel cage I.M.

14) Flame proof motors are used in
   a) Mines
   b) Steel mills
   c) Paper mills
   d) Moist atmosphere

15) Candela is the unit of
   a) Luminous flux
   b) Luminous intensity
   c) Wavelength
   d) None of the above

16) Which method of heating is likely to give leading power factor ?
   a) Electric arc heating
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17) Desirable property of resistance heating element is
   a) Low temperature coefficient
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   a) Steradian b) Candela c) Lumen d) Lux

19) The welding transformer used in resistance welding will
   a) Step up current
   b) Step down current
   c) Step up voltage
   d) Step up power

20) Change of frequency in the supply does not affect
   a) Dielectric heating
   b) Resistance heating
   c) Induction heating
   d) Microwave heating

SLR-TJ – 378

Seat No.	

T.E. (Electrical) (Part – II) (Old) Examination, 2017
UTILIZATION OF ELECTRICAL ENERGY AND ENERGY CONSERVATION

Day and Date : Monday, 18-12-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) Give a short note on motor selection in sugar mills.
   2) Explain indirect resistance heating along with neat sketch.
   3) Explain laws of illumination in brief.
   4) Explain the comparison between tungsten filament lamps and fluorescent tubes.
   5) Explain types of loads with examples.
   6) Explain advantages of electric heating over other methods of heating.

3. Solve **any two** : **(2×10=20)**
   1) Define the following terms :
      a) Mean Horizontal Candle Power (MHCP).
      b) Mean Spherical Candle Power (MSCP).
      c) Mean Hemispherical Candle Power (MHSCP).
      d) Reduction Factor.
      e) Lamp Efficiency.
   2) Explain modern welding techniques like ultrasonic welding, laser welding in detail.
   3) a) Explain motor selection in machine tool industries.
      b) Explain motor selection in cement industry.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   1) Explain the mechanics of train movement.
   2) Explain dynamic braking in detail.
   3) Write short note on crest speed, average speed, schedule speed.
   4) Explain energy conservation in transport and agricultural sectors.
   5) What are the motivations for energy conservation ?
   6) Draw typical speed time curve for train and explain acceleration, free run, retardation and braking.

5. Solve **any two** : **(2×10=20)**

   1) Explain trapezoidal speed time curve mathematical expression for total distance and crest speed.
   2) Determine specific energy consumption by using simplified speed time curve.
   3) a) Explain energy conservation legislation.
      b) A suburban electric train has maximum speed of 70 kmph. The schedule speed including station stop time of 30 seconds is 45 kmph, if the acceleration is 1.5 kmphps, find the value of retardation when the distance between the stops is 4 km.

SLR-TJ – 378

Seat No.	

Set S

T.E. (Electrical) (Part – II) (Old) Examination, 2017
UTILIZATION OF ELECTRICAL ENERGY AND ENERGY CONSERVATION

Day and Date : Monday, 18-12-2017 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. **3**. **Each** question carries **one** mark.*

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Which method of heating is likely to give leading power factor ?
   a) Electric arc heating b) Induction heating
   c) Dielectric heating d) Resistance heating

2) Desirable property of resistance heating element is
   a) Low temperature coefficient b) High resistivity
   c) High melting point d) All of the above

3) The unit of luminous flux is
   a) Steradian b) Candela c) Lumen d) Lux

4) The welding transformer used in resistance welding will
   a) Step up current b) Step down current
   c) Step up voltage d) Step up power

5) Change of frequency in the supply does not affect
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6) Radiant efficiency of the luminous source depends on
   a) Shape of the source b) Temperature of the source
   c) Wavelength of light rays d) All of the above

7) In a fluorescent tube circuit, choke acts as
   a) starter b) power factor improving device
   c) source of heat d) current limiting device

8) Which motor is used in tramways ?
   a) AC single phase capacitor start motor
   b) AC three phase motor
   c) DC series motor
   d) DC shunt motor

9) Energy consumption in propelling the train is required for
   a) acceleration
   b) work against gravity while moving up the gradient
   c) work against the resistance to motion
   d) all of the above

10) Free running and coasting periods arc generally long in ease if
   a) urban service b) sub-urban service
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12) Which of the following factor affects specific energy consumption ?
   a) Distance between stops
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19) Flame proof motors are used in
   a) Mines b) Steel mills
   c) Paper mills d) Moist atmosphere

20) Candela is the unit of
   a) Luminous flux b) Luminous intensity
   c) Wavelength d) None of the above

SLR-TJ – 378

Seat No.	

T.E. (Electrical) (Part – II) (Old) Examination, 2017
UTILIZATION OF ELECTRICAL ENERGY AND ENERGY CONSERVATION

Day and Date : Monday, 18-12-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) Give a short note on motor selection in sugar mills.
   2) Explain indirect resistance heating along with neat sketch.
   3) Explain laws of illumination in brief.
   4) Explain the comparison between tungsten filament lamps and fluorescent tubes.
   5) Explain types of loads with examples.
   6) Explain advantages of electric heating over other methods of heating.

3. Solve **any two** : **(2×10=20)**
   1) Define the following terms :
      a) Mean Horizontal Candle Power (MHCP).
      b) Mean Spherical Candle Power (MSCP).
      c) Mean Hemispherical Candle Power (MHSCP).
      d) Reduction Factor.
      e) Lamp Efficiency.
   2) Explain modern welding techniques like ultrasonic welding, laser welding in detail.
   3) a) Explain motor selection in machine tool industries.
      b) Explain motor selection in cement industry.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   1) Explain the mechanics of train movement.
   2) Explain dynamic braking in detail.
   3) Write short note on crest speed, average speed, schedule speed.
   4) Explain energy conservation in transport and agricultural sectors.
   5) What are the motivations for energy conservation ?
   6) Draw typical speed time curve for train and explain acceleration, free run, retardation and braking.

5. Solve **any two** : **(2×10=20)**

   1) Explain trapezoidal speed time curve mathematical expression for total distance and crest speed.
   2) Determine specific energy consumption by using simplified speed time curve.
   3) a) Explain energy conservation legislation.
      b) A suburban electric train has maximum speed of 70 kmph. The schedule speed including station stop time of 30 seconds is 45 kmph, if the acceleration is 1.5 kmphps, find the value of retardation when the distance between the stops is 4 km.

SLR-TJ – 379

Seat No.	

Set P

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
ELECTRICAL DRIVES AND CONTROL

Day and Date : Tuesday, 28-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume suitable data ***if necessary****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) For the motor to deliver a torque of 2.5 Nm at 1400 rpm, the armature voltage to be applied is
   A) 125.5 V B) 193.3 V
   C) 200 V D) 241.7 V

2) The advantage of a synchronous motor in addition to its constant speed is
   A) high power factor B) better efficiency
   C) lower cost D) all of the above

3) In a constant power type load
   A) torque is proportional to speed
   B) torque is proportional to square of speed
   C) torque is inversely proportional to speed
   D) torque is independent of speed

4) Applications of dc motor is restricted to a few load speed applications because of
   A) cost of motor is high
   B) mechanical commutation problems
   C) maintenance problem
   D) all of above

5) Torque developed by motor is counter balanced by
   A) moment of inertia B) load torque
   C) angular velocity D) all of above

6) Under discontinuous conduction mode of dc motor
   A) Armature voltage is discontinuous B) Field current is discontinuous
   C) Armature current is discontinuous D) Field voltage is discontinuous

7) A separately excited dc motor when fed from 1 phase full converter runs at speed of 1200 rpm. Load current remains continuous. If one of the four SCRs get open circuited the motor speed will reduce to

A) 600 rpm B) 900 rpm C) 800 rpm D) 400 rpm

8) Reduction in supply voltage by 10% will change the torque of motor by

A) 38% B) 19% C) 9.5% D) no change

9) Output power requirements of constant torque loads vary with

A) speed B) voltage
C) current D) power factor

10) Efficiency by using rotor resistance control in IM is

A) High B) Low
C) Very High D) Very low

11) BLDC motor drive will be fed from

A) 0° conduction mode of inverter B) 120° conduction mode of inverter
C) 60° conduction mode of inverter D) 180° conduction mode of inverter

12) In solar powered drives charge controller is required to protect

A) overvoltage B) overload
C) excessive discharge D) all of above

13) If copper loss, core loss and windage loss of induction motor is ignored and full load slip is 0.4 then efficiency of motor will be

A) 40% B) 50%
C) 60% D) 70%

14) Field oriented control of induction motor provides

A) only flux control
B) only torque control
C) flux and torque control independently
D) no control on flux and torque

Seat No.	

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
ELECTRICAL DRIVES AND CONTROL

Day and Date : Tuesday, 28-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4 Marks Each)**
   a) State and explain various sources employed in electrical drives.
   b) Explain why a dc series motor is more suited to deal with torque over loads than other dc motors.
   c) Estimate the firing angle required to produce a mean output voltage of 300 V from a fully controlled 3-phase converter supplied from stiff 415 V, 50 Hz mains. Assume that the load current is continuous.
   d) Explain with neat sketch Dual converter fed DC motor drives.
   e) A motor – load system has torque of T= 400 – 0.4N, N-m. where N is speed in rpm. A load of $\pm$ 200 N-m is coupled with motor. Calculate the motor speed for motoring and braking operations in the forward directions.
   f) A 220 v dc series motor runs at 1000 rpm and takes a current of 100 amp. Resistance of armature and field windings are 0.05 Ohm each. If the terminal voltage is reversed and field winding turns reduced to 80% then calculate the speed of motor.

3. Solve the following : **(6 Marks Each)**
   a) State and explain how armature current and speed of a dc separately excited motor will be affected when
      1) Halving armature voltage and field current at constant load.
      2) Halving armature voltage and field current at constant power developed.
   b) A 230 V, 960 rpm and 220 A separately excited DC motor has Ra = 0.02 Ω. The motor is fed from a chopper which provides both motoring and braking operations. The source has a voltage of 230 V. Assuming continuous conduction :
      i) Calculate duty ratio of chopper for motoring operation at rated torque and 350 rpm.
      ii) Calculate duty ratio of chopper for braking operation at rated torque and 350 rpm.
      iii) If the max. duty ratio is limited to 0.95 and maximum permissible motor current is twice the rated, calculate maximum permissible motor speed obtainable without filed weakening and power fed to the source.

OR

b) A 220 V, 1200 rpm, 15 A separately excited dc motor has armature circuit resistance and inductance of 1.8 Ohm and 32 mH, respectively. It is fed from a single phase fully controlled rectifier with an ac source voltage of 230 V, 50 Hz calculate :

a) Motor torque for α = 60° and speed = 1500 rpm

b) Motor speed for α = 45° and T = 10 N-m.

SECTION – II

4. Solve **any four** : **(4 Marks Each)**

a) A 440 V, 3 phase, 50 Hz, 6 pole star connected induction motor has following parameters referred to stator :

$R_s = R_r' = 0.3$ Ohm, $X_s = X_r' = 1.0$ Ohm, $X_m = 40$ Ohm.

Normal full load slip is 0.05 calculate motor current, torque and efficiency at normal full load slip.

b) Derive the harmonic torque equation with inverter fed induction motor drive.

c) Explain with block diagram feedback vector control.

d) A 3 phase, 5 kW, 440 v, 50 Hz, 4 pole star connected synchronous motor has Rs = 0.2 Ohm, X_s = 8 Ohm and field current of 1 amp. and full load unity power factor. Calculate the torque angle when operating at full load.

e) With neat sketch explain the operation of VSI fed synchronous motor drive.

f) A multi stack variable reluctance motor has 4 stacks and 18 rotor poles. Calculate pole pitch and step angle of motor.

5. Solve **any two** : **(6 Marks Each)**

a) A 440 V, 3 phase, 50 Hz, 4 pole, 1415 rpm delta connected induction motor has following parameters referred to stator :

$R_s = 0.6$ Ohm, $R_r' = 0.8$ Ohm, $X_s = 0.5$ Ohm, $X_r' = 0.6$ Ohm and $X_m = 15$ Ohm.

The motor is fed from current source inverter. Determine motor speed, current and torque when operating at 40 Hz and rated slip speed.

b) A 400 V, 3 phase, 50 Hz, 6 pole, 925 rpm delta connected induction motor has following parameters referred to stator :

$R_s = 0.2$ Ohm, $R_r' = 0.3$ Ohm, $X_s = 0.5$ Ohm, $X_r' = 1$ Ohm.

The motor is fed from voltage source inverter with constant v/f ratio from 0 to 50 Hz and constant voltage of 400 v above 50 Hz frequency. Determine the breakdown torque for the frequency of 100 Hz as a ratio of its value at 50 Hz.

c) Draw circuit diagram and output waveform and explain with torque equation brushless dc motor drive for servo application.

SLR-TJ – 379

Seat No.	

Set Q

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
ELECTRICAL DRIVES AND CONTROL

Day and Date : Tuesday, 28-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume suitable data ***if necessary****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Reduction in supply voltage by 10% will change the torque of motor by
   A) 38% B) 19% C) 9.5% D) no change

2) Output power requirements of constant torque loads vary with
   A) speed B) voltage
   C) current D) power factor

3) Efficiency by using rotor resistance control in IM is
   A) High B) Low
   C) Very High D) Very low

4) BLDC motor drive will be fed from
   A) 0° conduction mode of inverter B) 120° conduction mode of inverter
   C) 60° conduction mode of inverter D) 180° conduction mode of inverter

5) In solar powered drives charge controller is required to protect
   A) overvoltage B) overload
   C) excessive discharge D) all of above

6) If copper loss, core loss and windage loss of induction motor is ignored and full load slip is 0.4 then efficiency of motor will be
   A) 40% B) 50%
   C) 60% D) 70%

7) Field oriented control of induction motor provides
   A) only flux control
   B) only torque control
   C) flux and torque control independently
   D) no control on flux and torque

8) For the motor to deliver a torque of 2.5 Nm at 1400 rpm, the armature voltage to be applied is
   A) 125.5 V B) 193.3 V
   C) 200 V D) 241.7 V

9) The advantage of a synchronous motor in addition to its constant speed is
   A) high power factor B) better efficiency
   C) lower cost D) all of the above

10) In a constant power type load
   A) torque is proportional to speed
   B) torque is proportional to square of speed
   C) torque is inversely proportional to speed
   D) torque is independent of speed

11) Applications of dc motor is restricted to a few load speed applications because of
   A) cost of motor is high
   B) mechanical commutation problems
   C) maintenance problem
   D) all of above

12) Torque developed by motor is counter balanced by
   A) moment of inertia B) load torque
   C) angular velocity D) all of above

13) Under discontinuous conduction mode of dc motor
   A) Armature voltage is discontinuous B) Field current is discontinuous
   C) Armature current is discontinuous D) Field voltage is discontinuous

14) A separately excited dc motor when fed from 1 phase full converter runs at speed of 1200 rpm. Load current remains continuous. If one of the four SCRs get open circuited the motor speed will reduce to
   A) 600 rpm B) 900 rpm C) 800 rpm D) 400 rpm

Seat No.	

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
ELECTRICAL DRIVES AND CONTROL

Day and Date : Tuesday, 28-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4 Marks Each)**
   a) State and explain various sources employed in electrical drives.
   b) Explain why a dc series motor is more suited to deal with torque over loads than other dc motors.
   c) Estimate the firing angle required to produce a mean output voltage of 300 V from a fully controlled 3-phase converter supplied from stiff 415 V, 50 Hz mains. Assume that the load current is continuous.
   d) Explain with neat sketch Dual converter fed DC motor drives.
   e) A motor – load system has torque of T= 400 – 0.4N, N-m. where N is speed in rpm. A load of $\pm$ 200 N-m is coupled with motor. Calculate the motor speed for motoring and braking operations in the forward directions.
   f) A 220 v dc series motor runs at 1000 rpm and takes a current of 100 amp. Resistance of armature and field windings are 0.05 Ohm each. If the terminal voltage is reversed and field winding turns reduced to 80% then calculate the speed of motor.

3. Solve the following : **(6 Marks Each)**
   a) State and explain how armature current and speed of a dc separately excited motor will be affected when
      1) Halving armature voltage and field current at constant load.
      2) Halving armature voltage and field current at constant power developed.
   b) A 230 V, 960 rpm and 220 A separately excited DC motor has Ra = 0.02 Ω. The motor is fed from a chopper which provides both motoring and braking operations. The source has a voltage of 230 V. Assuming continuous conduction :
      i) Calculate duty ratio of chopper for motoring operation at rated torque and 350 rpm.
      ii) Calculate duty ratio of chopper for braking operation at rated torque and 350 rpm.
      iii) If the max. duty ratio is limited to 0.95 and maximum permissible motor current is twice the rated, calculate maximum permissible motor speed obtainable without filed weakening and power fed to the source.

OR

b) A 220 V, 1200 rpm, 15 A separately excited dc motor has armature circuit resistance and inductance of 1.8 Ohm and 32 mH, respectively. It is fed from a single phase fully controlled rectifier with an ac source voltage of 230 V, 50 Hz calculate :

a) Motor torque for α = 60° and speed = 1500 rpm

b) Motor speed for α = 45° and T = 10 N-m.

SECTION – II

4. Solve **any four** : **(4 Marks Each)**

a) A 440 V, 3 phase, 50 Hz, 6 pole star connected induction motor has following parameters referred to stator :

$R_s = R_r' = 0.3$ Ohm, $X_s = X_r' = 1.0$ Ohm, $X_m = 40$ Ohm.

Normal full load slip is 0.05 calculate motor current, torque and efficiency at normal full load slip.

b) Derive the harmonic torque equation with inverter fed induction motor drive.

c) Explain with block diagram feedback vector control.

d) A 3 phase, 5 kW, 440 v, 50 Hz, 4 pole star connected synchronous motor has Rs = 0.2 Ohm, X_s = 8 Ohm and field current of 1 amp. and full load unity power factor. Calculate the torque angle when operating at full load.

e) With neat sketch explain the operation of VSI fed synchronous motor drive.

f) A multi stack variable reluctance motor has 4 stacks and 18 rotor poles. Calculate pole pitch and step angle of motor.

5. Solve **any two** : **(6 Marks Each)**

a) A 440 V, 3 phase, 50 Hz, 4 pole, 1415 rpm delta connected induction motor has following parameters referred to stator :

$R_s = 0.6$ Ohm, $R_r' = 0.8$ Ohm, $X_s = 0.5$ Ohm, $X_r' = 0.6$ Ohm and $X_m = 15$ Ohm.

The motor is fed from current source inverter. Determine motor speed, current and torque when operating at 40 Hz and rated slip speed.

b) A 400 V, 3 phase, 50 Hz, 6 pole, 925 rpm delta connected induction motor has following parameters referred to stator :

$R_s = 0.2$ Ohm, $R_r' = 0.3$ Ohm, $X_s = 0.5$ Ohm, $X_r' = 1$ Ohm.

The motor is fed from voltage source inverter with constant v/f ratio from 0 to 50 Hz and constant voltage of 400 v above 50 Hz frequency. Determine the breakdown torque for the frequency of 100 Hz as a ratio of its value at 50 Hz.

c) Draw circuit diagram and output waveform and explain with torque equation brushless dc motor drive for servo application.

SLR-TJ – 379

Seat No.	

Set R

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
ELECTRICAL DRIVES AND CONTROL

Day and Date : Tuesday, 28-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume suitable data ***if necessary****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Torque developed by motor is counter balanced by
A) moment of inertia B) load torque
C) angular velocity D) all of above

2) Under discontinuous conduction mode of dc motor
A) Armature voltage is discontinuous B) Field current is discontinuous
C) Armature current is discontinuous D) Field voltage is discontinuous

3) A separately excited dc motor when fed from 1 phase full converter runs at speed of 1200 rpm. Load current remains continuous. If one of the four SCRs get open circuited the motor speed will reduce to
A) 600 rpm B) 900 rpm C) 800 rpm D) 400 rpm

4) Reduction in supply voltage by 10% will change the torque of motor by
A) 38% B) 19% C) 9.5% D) no change

5) Output power requirements of constant torque loads vary with
A) speed B) voltage
C) current D) power factor

6) Efficiency by using rotor resistance control in IM is
A) High B) Low
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7) BLDC motor drive will be fed from
A) 0° conduction mode of inverter B) 120° conduction mode of inverter
C) 60° conduction mode of inverter D) 180° conduction mode of inverter

8) In solar powered drives charge controller is required to protect
   A) overvoltage
   B) overload
   C) excessive discharge
   D) all of above

9) If copper loss, core loss and windage loss of induction motor is ignored and full load slip is 0.4 then efficiency of motor will be
   A) 40%
   B) 50%
   C) 60%
   D) 70%

10) Field oriented control of induction motor provides
   A) only flux control
   B) only torque control
   C) flux and torque control independently
   D) no control on flux and torque

11) For the motor to deliver a torque of 2.5 Nm at 1400 rpm, the armature voltage to be applied is
   A) 125.5 V
   B) 193.3 V
   C) 200 V
   D) 241.7 V

12) The advantage of a synchronous motor in addition to its constant speed is
   A) high power factor
   B) better efficiency
   C) lower cost
   D) all of the above

13) In a constant power type load
   A) torque is proportional to speed
   B) torque is proportional to square of speed
   C) torque is inversely proportional to speed
   D) torque is independent of speed

14) Applications of dc motor is restricted to a few load speed applications because of
   A) cost of motor is high
   B) mechanical commutation problems
   C) maintenance problem
   D) all of above

Seat No.	

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
ELECTRICAL DRIVES AND CONTROL

Day and Date : Tuesday, 28-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4 Marks Each)**
   a) State and explain various sources employed in electrical drives.
   b) Explain why a dc series motor is more suited to deal with torque over loads than other dc motors.
   c) Estimate the firing angle required to produce a mean output voltage of 300 V from a fully controlled 3-phase converter supplied from stiff 415 V, 50 Hz mains. Assume that the load current is continuous.
   d) Explain with neat sketch Dual converter fed DC motor drives.
   e) A motor – load system has torque of T= 400 – 0.4N, N-m. where N is speed in rpm. A load of $\pm$ 200 N-m is coupled with motor. Calculate the motor speed for motoring and braking operations in the forward directions.
   f) A 220 v dc series motor runs at 1000 rpm and takes a current of 100 amp. Resistance of armature and field windings are 0.05 Ohm each. If the terminal voltage is reversed and field winding turns reduced to 80% then calculate the speed of motor.

3. Solve the following : **(6 Marks Each)**
   a) State and explain how armature current and speed of a dc separately excited motor will be affected when
      1) Halving armature voltage and field current at constant load.
      2) Halving armature voltage and field current at constant power developed.
   b) A 230 V, 960 rpm and 220 A separately excited DC motor has Ra = 0.02 Ω. The motor is fed from a chopper which provides both motoring and braking operations. The source has a voltage of 230 V. Assuming continuous conduction :
      i) Calculate duty ratio of chopper for motoring operation at rated torque and 350 rpm.
      ii) Calculate duty ratio of chopper for braking operation at rated torque and 350 rpm.
      iii) If the max. duty ratio is limited to 0.95 and maximum permissible motor current is twice the rated, calculate maximum permissible motor speed obtainable without filed weakening and power fed to the source.

OR

b) A 220 V, 1200 rpm, 15 A separately excited dc motor has armature circuit resistance and inductance of 1.8 Ohm and 32 mH, respectively. It is fed from a single phase fully controlled rectifier with an ac source voltage of 230 V, 50 Hz calculate :

a) Motor torque for α = 60° and speed = 1500 rpm

b) Motor speed for α = 45° and T = 10 N-m.

SECTION – II

4. Solve **any four** : **(4 Marks Each)**

a) A 440 V, 3 phase, 50 Hz, 6 pole star connected induction motor has following parameters referred to stator :

$R_s = R_r' = 0.3$ Ohm, $X_s = X_r' = 1.0$ Ohm, $X_m = 40$ Ohm.

Normal full load slip is 0.05 calculate motor current, torque and efficiency at normal full load slip.

b) Derive the harmonic torque equation with inverter fed induction motor drive.

c) Explain with block diagram feedback vector control.

d) A 3 phase, 5 kW, 440 v, 50 Hz, 4 pole star connected synchronous motor has Rs = 0.2 Ohm, X_s = 8 Ohm and field current of 1 amp. and full load unity power factor. Calculate the torque angle when operating at full load.

e) With neat sketch explain the operation of VSI fed synchronous motor drive.

f) A multi stack variable reluctance motor has 4 stacks and 18 rotor poles. Calculate pole pitch and step angle of motor.

5. Solve **any two** : **(6 Marks Each)**

a) A 440 V, 3 phase, 50 Hz, 4 pole, 1415 rpm delta connected induction motor has following parameters referred to stator :

$R_s = 0.6$ Ohm, $R_r' = 0.8$ Ohm, $X_s = 0.5$ Ohm, $X_r' = 0.6$ Ohm and $X_m = 15$ Ohm.

The motor is fed from current source inverter. Determine motor speed, current and torque when operating at 40 Hz and rated slip speed.

b) A 400 V, 3 phase, 50 Hz, 6 pole, 925 rpm delta connected induction motor has following parameters referred to stator :

$R_s = 0.2$ Ohm, $R_r' = 0.3$ Ohm, $X_s = 0.5$ Ohm, $X_r' = 1$ Ohm.

The motor is fed from voltage source inverter with constant v/f ratio from 0 to 50 Hz and constant voltage of 400 v above 50 Hz frequency. Determine the breakdown torque for the frequency of 100 Hz as a ratio of its value at 50 Hz.

c) Draw circuit diagram and output waveform and explain with torque equation brushless dc motor drive for servo application.

SLR-TJ – 379

Seat No.	

Set S

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
ELECTRICAL DRIVES AND CONTROL

Day and Date : Tuesday, 28-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Efficiency by using rotor resistance control in IM is

A) High B) Low

C) Very High D) Very low

2) BLDC motor drive will be fed from

A) 0° conduction mode of inverter B) 120° conduction mode of inverter

C) 60° conduction mode of inverter D) 180° conduction mode of inverter

3) In solar powered drives charge controller is required to protect

A) overvoltage B) overload

C) excessive discharge D) all of above

4) If copper loss, core loss and windage loss of induction motor is ignored and full load slip is 0.4 then efficiency of motor will be

A) 40% B) 50%

C) 60% D) 70%

5) Field oriented control of induction motor provides

A) only flux control

B) only torque control

C) flux and torque control independently

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6) For the motor to deliver a torque of 2.5 Nm at 1400 rpm, the armature voltage to be applied is
   A) 125.5 V
   B) 193.3 V
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7) The advantage of a synchronous motor in addition to its constant speed is
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   A) cost of motor is high
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10) Torque developed by motor is counter balanced by
   A) moment of inertia
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12) A separately excited dc motor when fed from 1 phase full converter runs at speed of 1200 rpm. Load current remains continuous. If one of the four SCRs get open circuited the motor speed will reduce to
   A) 600 rpm
   B) 900 rpm
   C) 800 rpm
   D) 400 rpm

13) Reduction in supply voltage by 10% will change the torque of motor by
   A) 38%
   B) 19%
   C) 9.5%
   D) no change

14) Output power requirements of constant torque loads vary with
   A) speed
   B) voltage
   C) current
   D) power factor

Seat No.	

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
ELECTRICAL DRIVES AND CONTROL

Day and Date : Tuesday, 28-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4 Marks Each)**
   a) State and explain various sources employed in electrical drives.
   b) Explain why a dc series motor is more suited to deal with torque over loads than other dc motors.
   c) Estimate the firing angle required to produce a mean output voltage of 300 V from a fully controlled 3-phase converter supplied from stiff 415 V, 50 Hz mains. Assume that the load current is continuous.
   d) Explain with neat sketch Dual converter fed DC motor drives.
   e) A motor – load system has torque of T= 400 – 0.4N, N-m. where N is speed in rpm. A load of $\pm$ 200 N-m is coupled with motor. Calculate the motor speed for motoring and braking operations in the forward directions.
   f) A 220 v dc series motor runs at 1000 rpm and takes a current of 100 amp. Resistance of armature and field windings are 0.05 Ohm each. If the terminal voltage is reversed and field winding turns reduced to 80% then calculate the speed of motor.

3. Solve the following : **(6 Marks Each)**
   a) State and explain how armature current and speed of a dc separately excited motor will be affected when
      1) Halving armature voltage and field current at constant load.
      2) Halving armature voltage and field current at constant power developed.
   b) A 230 V, 960 rpm and 220 A separately excited DC motor has Ra = 0.02 Ω. The motor is fed from a chopper which provides both motoring and braking operations. The source has a voltage of 230 V. Assuming continuous conduction :
      i) Calculate duty ratio of chopper for motoring operation at rated torque and 350 rpm.
      ii) Calculate duty ratio of chopper for braking operation at rated torque and 350 rpm.
      iii) If the max. duty ratio is limited to 0.95 and maximum permissible motor current is twice the rated, calculate maximum permissible motor speed obtainable without filed weakening and power fed to the source.

OR

b) A 220 V, 1200 rpm, 15 A separately excited dc motor has armature circuit resistance and inductance of 1.8 Ohm and 32 mH, respectively. It is fed from a single phase fully controlled rectifier with an ac source voltage of 230 V, 50 Hz calculate :

a) Motor torque for α = 60° and speed = 1500 rpm

b) Motor speed for α = 45° and T = 10 N-m.

SECTION – II

4. Solve **any four** : **(4 Marks Each)**

a) A 440 V, 3 phase, 50 Hz, 6 pole star connected induction motor has following parameters referred to stator :

$R_s = R_r' = 0.3$ Ohm, $X_s = X_r' = 1.0$ Ohm, $X_m = 40$ Ohm.

Normal full load slip is 0.05 calculate motor current, torque and efficiency at normal full load slip.

b) Derive the harmonic torque equation with inverter fed induction motor drive.

c) Explain with block diagram feedback vector control.

d) A 3 phase, 5 kW, 440 v, 50 Hz, 4 pole star connected synchronous motor has Rs = 0.2 Ohm, X_s = 8 Ohm and field current of 1 amp. and full load unity power factor. Calculate the torque angle when operating at full load.

e) With neat sketch explain the operation of VSI fed synchronous motor drive.

f) A multi stack variable reluctance motor has 4 stacks and 18 rotor poles. Calculate pole pitch and step angle of motor.

5. Solve **any two** : **(6 Marks Each)**

a) A 440 V, 3 phase, 50 Hz, 4 pole, 1415 rpm delta connected induction motor has following parameters referred to stator :

$R_s = 0.6$ Ohm, $R_r' = 0.8$ Ohm, $X_s = 0.5$ Ohm, $X_r' = 0.6$ Ohm and $X_m = 15$ Ohm.

The motor is fed from current source inverter. Determine motor speed, current and torque when operating at 40 Hz and rated slip speed.

b) A 400 V, 3 phase, 50 Hz, 6 pole, 925 rpm delta connected induction motor has following parameters referred to stator :

$R_s = 0.2$ Ohm, $R_r' = 0.3$ Ohm, $X_s = 0.5$ Ohm, $X_r' = 1$ Ohm.

The motor is fed from voltage source inverter with constant v/f ratio from 0 to 50 Hz and constant voltage of 400 v above 50 Hz frequency. Determine the breakdown torque for the frequency of 100 Hz as a ratio of its value at 50 Hz.

c) Draw circuit diagram and output waveform and explain with torque equation brushless dc motor drive for servo application.

SLR-TJ – 380

Seat No.	

Set P

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
SWITCHGEAR AND PROTECTION

Day and Date : Thursday, 30-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) Which is the correct direction of flow of information in a relaying scenario ?
   a) CT/PT $\rightarrow$ CB $\rightarrow$ Relay
   b) Relay $\rightarrow$ CB $\rightarrow$ CT/PT
   c) CT/PT $\rightarrow$ Relay $\rightarrow$ CB
   d) None of the above

2) In a biased differential relay the bias is defined as a ratio of
   a) Number of turns of restraining coil and operating coil
   b) Fault current and operating coil current
   c) Fault current and restraining coil current
   d) Operating coil current and restraining coil current

3) An OC relay of current setting 5A and setting 150% is connected to the secondary of CT ratio 400/5. What will be the current in lines for which the relay picks up ?
   a) 600 A b) 150 A c) 1200 A d) 300 A

4) Operating point of protection class CT on the B-H curve is
   a) Near knee point b) Well below knee point
   c) Beyond knee point d) None of these

5) For protection of long line the preferred distance relay is
   a) Mho relay b) Reactance relay
   c) Impedance d) None of these

6) Mho relay is
   a) Directional relay with current restraint
   b) Voltage relay with current restraint
   c) Directional relay with voltage restraint
   d) Overcurrent relay with voltage restraint

7) In a three phase system, which of the following schemes of over-current protection will be optimum ?
   a) 3 nos. of phase fault OC relays and 1 no. of ground fault OC relay
   b) 1 no. of phase fault OC relay and 1 no. of ground fault OC relay
   c) 2 nos. of phase fault OC relays and 1 no. of ground fault OC relay
   d) 3 nos. of phase fault OC relays and 3 no. of ground fault OC relay

8) Merz-Price protection is employed for protection of _____
   a) Alternator b) Transformer
   c) Transmission line d) a) and b)

9) Magnetizing inrush phenomenon occur in
   a) Large transformer primary only, when the transformer is switched on
   b) Large transformer primary when a three phase fault occurs in the secondary
   c) Large transformer secondary only, when the transformer is switched on in the primary
   d) None of above

10) A three phase, 33 kV oil circuit breaker is rated 1200 A, 2000 MVA, 3s. The symmetrical braking current is
   a) 1200 A b) 3600 A c) 35 kA d) 104.8 kA

11) Arc formation in vacuum CB is due to _____
   a) Ions present in vacuum
   b) Thermionic emission from electrodes
   c) Vaporization of electrode material
   d) Electrons emitted by CB enclosure

12) A 50 Hz, 17.32 kV generator is connected to a power system. The system reactance and capacitance per phase are 10 mH and 0.02 μF respectively. What is the maximum voltage across the contacts of the circuit breaker at an instant when it passes through zero ?
   a) 28.28 kV b) 30.28 kV c) 32.28 kV d) 34.28 kV

13) Which of the following sequence of operation is correct for operation of circuit breaker, isolator and earthing switch while closing a circuit ?
   a) Open earthing switch – close isolator – close circuit breaker
   b) Close circuit breaker – open earthing switch – close isolator
   c) Open earthing switch – close circuit breaker – close isolator
   d) Close circuit breaker – close isolator – open earthing switch

14) An overhead transmission line is provided with earth wire for protection against
   a) Switching surge b) Lightning surge
   c) Power frequency overvoltage d) None of these

_____

SLR-TJ – 380

Seat No.	

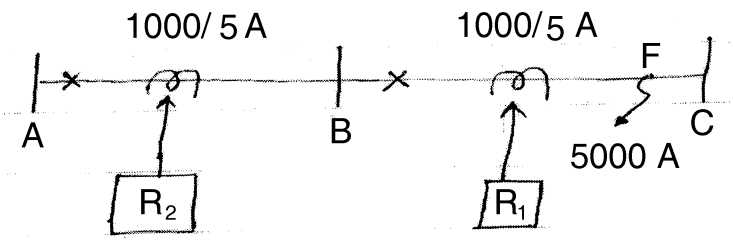
B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
SWITCHGEAR AND PROTECTION

Day and Date : Thursday, 30-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** questions : **(4×4=16)**
   1) Explain various desirable characteristics of relays.
   2) Explain with neat diagram three stepped distance protection of transmission line.
   3) Explain with neat diagram percentage differential protection scheme.
   4) With neat block diagram explain static definite time overcurrent relay.
   5) Define pick up current and plug setting multiplier of overcurrent relay. Explain why plug setting of earth fault relay is less than that of phase fault relay.

3. Solve **any two** questions : **(2×6=12)**
   1) Two relays R_1 and R_2 are connected in two sections of a feeder as shown below. CTs are of ratio 1000/5A. The plug setting of relay R_1 is 100% and that of R_2 is 125%. The time multiplier setting of the relay R_1 is 0.3. The time grading scheme has a discriminative time margin of 0.5 sec. between the relays. A three phase short circuit at point F results in a fault current of 5000A. Find the actual operating time of Relays R_1 and Relay R_2. Also determine time multiplier setting of the relay R_2.



   Time current characteristics of relays for TMS of 1 are given below. Both relays have identical time current characteristics.

PSM	2	4	5	8	10	20
Operating time (in seconds)	10	5	4	3	2.8	2.4

   2) Draw neat diagram of induction disc relay. Also derive the mathematical equation of torque developed in the induction type relays.
   3) With neat block diagram and flowchart explain microprocessor based impedance relay.

SECTION – II

4. Solve **any four** questions : **(4×4=16)**

   1) Explain phenomenon of current chopping in circuit breaker with neat diagram.
   2) Explain different ratings of circuit breaker.
   3) Draw and describe the construction and working principle of vacuum circuit breaker.
   4) Explain the over-fluxing phenomenon in a transformer. Which relay is used for the protection of transformer against over-fluxing ?
   5) Explain Metal Oxide Arrester (MOA) type lightening arrester. Write advantages of MOA type lightening arrester.

5. Solve **any two** questions : **(2×6=12)**

   1) Explain with neat diagram percentage differential protection of transformer. Indicate all three phases.
   2) Define re-striking voltage. Derive an expression for re-striking voltage in terms of system inductance and capacitance.
   3) In a 220 kV, 50 Hz system, the reactance and capacitance upto the location of C.B. is 8 Ω and 0.025 μF resp. A resistance of 600 Ω is connected across the contacts of C.B. Determine :
      a) Natural frequency of oscillation
      b) Damped frequency of oscillation
      c) Critical value of resistance which will give no oscillations
      d) The value of resistance which will give damped frequency, one fourth of natural frequency of oscillation.

SLR-TJ – 380

Seat No.	

Set Q

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
SWITCHGEAR AND PROTECTION

Day and Date : Thursday, 30-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) Merz-Price protection is employed for protection of _____
   a) Alternator b) Transformer
   c) Transmission line d) a) and b)

2) Magnetizing inrush phenomenon occur in
   a) Large transformer primary only, when the transformer is switched on
   b) Large transformer primary when a three phase fault occurs in the secondary
   c) Large transformer secondary only, when the transformer is switched on in the primary
   d) None of above

3) A three phase, 33 kV oil circuit breaker is rated 1200 A, 2000 MVA, 3s. The symmetrical braking current is
   a) 1200 A b) 3600 A c) 35 kA d) 104.8 kA

4) Arc formation in vacuum CB is due to _____
   a) Ions present in vacuum
   b) Thermionic emission from electrodes
   c) Vaporization of electrode material
   d) Electrons emitted by CB enclosure

5) A 50 Hz, 17.32 kV generator is connected to a power system. The system reactance and capacitance per phase are 10 mH and 0.02 μF respectively. What is the maximum voltage across the contacts of the circuit breaker at an instant when it passes through zero ?
   a) 28.28 kV b) 30.28 kV c) 32.28 kV d) 34.28 kV

6) Which of the following sequence of operation is correct for operation of circuit breaker, isolator and earthing switch while closing a circuit ?
   a) Open earthing switch – close isolator – close circuit breaker
   b) Close circuit breaker – open earthing switch – close isolator
   c) Open earthing switch – close circuit breaker – close isolator
   d) Close circuit breaker – close isolator – open earthing switch

7) An overhead transmission line is provided with earth wire for protection against
   a) Switching surge
   b) Lightning surge
   c) Power frequency overvoltage
   d) None of these

8) Which is the correct direction of flow of information in a relaying scenario ?
   a) CT/PT $\rightarrow$ CB $\rightarrow$ Relay
   b) Relay $\rightarrow$ CB $\rightarrow$ CT/PT
   c) CT/PT $\rightarrow$ Relay $\rightarrow$ CB
   d) None of the above

9) In a biased differential relay the bias is defined as a ratio of
   a) Number of turns of restraining coil and operating coil
   b) Fault current and operating coil current
   c) Fault current and restraining coil current
   d) Operating coil current and restraining coil current

10) An OC relay of current setting 5A and setting 150% is connected to the secondary of CT ratio 400/5. What will be the current in lines for which the relay picks up ?
   a) 600 A
   b) 150 A
   c) 1200 A
   d) 300 A

11) Operating point of protection class CT on the B-H curve is
   a) Near knee point
   b) Well below knee point
   c) Beyond knee point
   d) None of these

12) For protection of long line the preferred distance relay is
   a) Mho relay
   b) Reactance relay
   c) Impedance
   d) None of these

13) Mho relay is
   a) Directional relay with current restraint
   b) Voltage relay with current restraint
   c) Directional relay with voltage restraint
   d) Overcurrent relay with voltage restraint

14) In a three phase system, which of the following schemes of over-current protection will be optimum ?
   a) 3 nos. of phase fault OC relays and 1 no. of ground fault OC relay
   b) 1 no. of phase fault OC relay and 1 no. of ground fault OC relay
   c) 2 nos. of phase fault OC relays and 1 no. of ground fault OC relay
   d) 3 nos. of phase fault OC relays and 3 no. of ground fault OC relay

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SLR-TJ – 380

Seat No.	

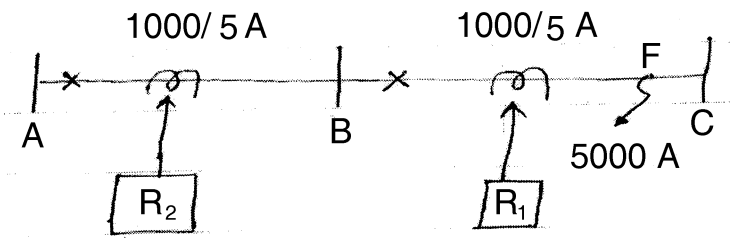
B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
SWITCHGEAR AND PROTECTION

Day and Date : Thursday, 30-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** questions : **(4×4=16)**
   1) Explain various desirable characteristics of relays.
   2) Explain with neat diagram three stepped distance protection of transmission line.
   3) Explain with neat diagram percentage differential protection scheme.
   4) With neat block diagram explain static definite time overcurrent relay.
   5) Define pick up current and plug setting multiplier of overcurrent relay. Explain why plug setting of earth fault relay is less than that of phase fault relay.

3. Solve **any two** questions : **(2×6=12)**
   1) Two relays R_1 and R_2 are connected in two sections of a feeder as shown below. CTs are of ratio 1000/5A. The plug setting of relay R_1 is 100% and that of R_2 is 125%. The time multiplier setting of the relay R_1 is 0.3. The time grading scheme has a discriminative time margin of 0.5 sec. between the relays. A three phase short circuit at point F results in a fault current of 5000A. Find the actual operating time of Relays R_1 and Relay R_2. Also determine time multiplier setting of the relay R_2.



   Time current characteristics of relays for TMS of 1 are given below. Both relays have identical time current characteristics.

PSM	2	4	5	8	10	20
Operating time (in seconds)	10	5	4	3	2.8	2.4

   2) Draw neat diagram of induction disc relay. Also derive the mathematical equation of torque developed in the induction type relays.
   3) With neat block diagram and flowchart explain microprocessor based impedance relay.

SECTION – II

4. Solve **any four** questions : **(4×4=16)**

   1) Explain phenomenon of current chopping in circuit breaker with neat diagram.
   2) Explain different ratings of circuit breaker.
   3) Draw and describe the construction and working principle of vacuum circuit breaker.
   4) Explain the over-fluxing phenomenon in a transformer. Which relay is used for the protection of transformer against over-fluxing ?
   5) Explain Metal Oxide Arrester (MOA) type lightening arrester. Write advantages of MOA type lightening arrester.

5. Solve **any two** questions : **(2×6=12)**

   1) Explain with neat diagram percentage differential protection of transformer. Indicate all three phases.
   2) Define re-striking voltage. Derive an expression for re-striking voltage in terms of system inductance and capacitance.
   3) In a 220 kV, 50 Hz system, the reactance and capacitance upto the location of C.B. is 8 Ω and 0.025 μF resp. A resistance of 600 Ω is connected across the contacts of C.B. Determine :
      a) Natural frequency of oscillation
      b) Damped frequency of oscillation
      c) Critical value of resistance which will give no oscillations
      d) The value of resistance which will give damped frequency, one fourth of natural frequency of oscillation.

SLR-TJ – 380

Seat No.	

Set R

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
SWITCHGEAR AND PROTECTION

Day and Date : Thursday, 30-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) For protection of long line the preferred distance relay is
   a) Mho relay b) Reactance relay
   c) Impedance d) None of these

2) Mho relay is
   a) Directional relay with current restraint
   b) Voltage relay with current restraint
   c) Directional relay with voltage restraint
   d) Overcurrent relay with voltage restraint

3) In a three phase system, which of the following schemes of over-current protection will be optimum ?
   a) 3 nos. of phase fault OC relays and 1 no. of ground fault OC relay
   b) 1 no. of phase fault OC relay and 1 no. of ground fault OC relay
   c) 2 nos. of phase fault OC relays and 1 no. of ground fault OC relay
   d) 3 nos. of phase fault OC relays and 3 no. of ground fault OC relay

4) Merz-Price protection is employed for protection of _____
   a) Alternator b) Transformer
   c) Transmission line d) a) and b)

5) Magnetizing inrush phenomenon occur in
   a) Large transformer primary only, when the transformer is switched on
   b) Large transformer primary when a three phase fault occurs in the secondary
   c) Large transformer secondary only, when the transformer is switched on in the primary
   d) None of above

6) A three phase, 33 kV oil circuit breaker is rated 1200 A, 2000 MVA, 3s. The symmetrical braking current is
   a) 1200 A b) 3600 A c) 35 kA d) 104.8 kA

7) Arc formation in vacuum CB is due to _____
   a) Ions present in vacuum
   b) Thermionic emission from electrodes
   c) Vaporization of electrode material
   d) Electrons emitted by CB enclosure

8) A 50 Hz, 17.32 kV generator is connected to a power system. The system reactance and capacitance per phase are 10 mH and 0.02 μF respectively. What is the maximum voltage across the contacts of the circuit breaker at an instant when it passes through zero ?
   a) 28.28 kV b) 30.28 kV c) 32.28 kV d) 34.28 kV

9) Which of the following sequence of operation is correct for operation of circuit breaker, isolator and earthing switch while closing a circuit ?
   a) Open earthing switch – close isolator – close circuit breaker
   b) Close circuit breaker – open earthing switch – close isolator
   c) Open earthing switch – close circuit breaker – close isolator
   d) Close circuit breaker – close isolator – open earthing switch

10) An overhead transmission line is provided with earth wire for protection against
   a) Switching surge b) Lightning surge
   c) Power frequency overvoltage d) None of these

11) Which is the correct direction of flow of information in a relaying scenario ?
   a) CT/PT $\rightarrow$ CB $\rightarrow$ Relay
   b) Relay $\rightarrow$ CB $\rightarrow$ CT/PT
   c) CT/PT $\rightarrow$ Relay $\rightarrow$ CB
   d) None of the above

12) In a biased differential relay the bias is defined as a ratio of
   a) Number of turns of restraining coil and operating coil
   b) Fault current and operating coil current
   c) Fault current and restraining coil current
   d) Operating coil current and restraining coil current

13) An OC relay of current setting 5A and setting 150% is connected to the secondary of CT ratio 400/5. What will be the current in lines for which the relay picks up ?
   a) 600 A b) 150 A c) 1200 A d) 300 A

14) Operating point of protection class CT on the B-H curve is
   a) Near knee point b) Well below knee point
   c) Beyond knee point d) None of these

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SLR-TJ – 380

Seat No.	

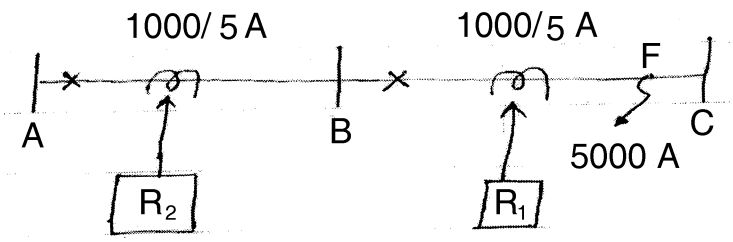
B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
SWITCHGEAR AND PROTECTION

Day and Date : Thursday, 30-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** questions : **(4×4=16)**
   1) Explain various desirable characteristics of relays.
   2) Explain with neat diagram three stepped distance protection of transmission line.
   3) Explain with neat diagram percentage differential protection scheme.
   4) With neat block diagram explain static definite time overcurrent relay.
   5) Define pick up current and plug setting multiplier of overcurrent relay. Explain why plug setting of earth fault relay is less than that of phase fault relay.

3. Solve **any two** questions : **(2×6=12)**
   1) Two relays R_1 and R_2 are connected in two sections of a feeder as shown below. CTs are of ratio 1000/5A. The plug setting of relay R_1 is 100% and that of R_2 is 125%. The time multiplier setting of the relay R_1 is 0.3. The time grading scheme has a discriminative time margin of 0.5 sec. between the relays. A three phase short circuit at point F results in a fault current of 5000A. Find the actual operating time of Relays R_1 and Relay R_2. Also determine time multiplier setting of the relay R_2.



   Time current characteristics of relays for TMS of 1 are given below. Both relays have identical time current characteristics.

PSM	2	4	5	8	10	20
Operating time (in seconds)	10	5	4	3	2.8	2.4

   2) Draw neat diagram of induction disc relay. Also derive the mathematical equation of torque developed in the induction type relays.
   3) With neat block diagram and flowchart explain microprocessor based impedance relay.

SECTION – II

4. Solve **any four** questions : **(4×4=16)**

   1) Explain phenomenon of current chopping in circuit breaker with neat diagram.
   2) Explain different ratings of circuit breaker.
   3) Draw and describe the construction and working principle of vacuum circuit breaker.
   4) Explain the over-fluxing phenomenon in a transformer. Which relay is used for the protection of transformer against over-fluxing ?
   5) Explain Metal Oxide Arrester (MOA) type lightening arrester. Write advantages of MOA type lightening arrester.

5. Solve **any two** questions : **(2×6=12)**

   1) Explain with neat diagram percentage differential protection of transformer. Indicate all three phases.
   2) Define re-striking voltage. Derive an expression for re-striking voltage in terms of system inductance and capacitance.
   3) In a 220 kV, 50 Hz system, the reactance and capacitance upto the location of C.B. is 8 Ω and 0.025 μF resp. A resistance of 600 Ω is connected across the contacts of C.B. Determine :
      a) Natural frequency of oscillation
      b) Damped frequency of oscillation
      c) Critical value of resistance which will give no oscillations
      d) The value of resistance which will give damped frequency, one fourth of natural frequency of oscillation.

SLR-TJ – 380

Seat No.	

Set S

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
SWITCHGEAR AND PROTECTION

Day and Date : Thursday, 30-11-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) A three phase, 33 kV oil circuit breaker is rated 1200 A, 2000 MVA, 3s. The symmetrical braking current is
   a) 1200 A b) 3600 A c) 35 kA d) 104.8 kA

2) Arc formation in vacuum CB is due to _____
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3) A 50 Hz, 17.32 kV generator is connected to a power system. The system reactance and capacitance per phase are 10 mH and 0.02 μF respectively. What is the maximum voltage across the contacts of the circuit breaker at an instant when it passes through zero ?
   a) 28.28 kV b) 30.28 kV c) 32.28 kV d) 34.28 kV

4) Which of the following sequence of operation is correct for operation of circuit breaker, isolator and earthing switch while closing a circuit ?
   a) Open earthing switch – close isolator – close circuit breaker
   b) Close circuit breaker – open earthing switch – close isolator
   c) Open earthing switch – close circuit breaker – close isolator
   d) Close circuit breaker – close isolator – open earthing switch

5) An overhead transmission line is provided with earth wire for protection against
   a) Switching surge b) Lightning surge
   c) Power frequency overvoltage d) None of these

6) Which is the correct direction of flow of information in a relaying scenario ?
   a) CT/PT $\rightarrow$ CB $\rightarrow$ Relay
   b) Relay $\rightarrow$ CB $\rightarrow$ CT/PT
   c) CT/PT $\rightarrow$ Relay $\rightarrow$ CB
   d) None of the above

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   a) Number of turns of restraining coil and operating coil
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12) In a three phase system, which of the following schemes of over-current protection will be optimum ?
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   b) 1 no. of phase fault OC relay and 1 no. of ground fault OC relay
   c) 2 nos. of phase fault OC relays and 1 no. of ground fault OC relay
   d) 3 nos. of phase fault OC relays and 3 no. of ground fault OC relay

13) Merz-Price protection is employed for protection of _____
   a) Alternator b) Transformer
   c) Transmission line d) a) and b)

14) Magnetizing inrush phenomenon occur in
   a) Large transformer primary only, when the transformer is switched on
   b) Large transformer primary when a three phase fault occurs in the secondary
   c) Large transformer secondary only, when the transformer is switched on in the primary
   d) None of above

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Seat No.	

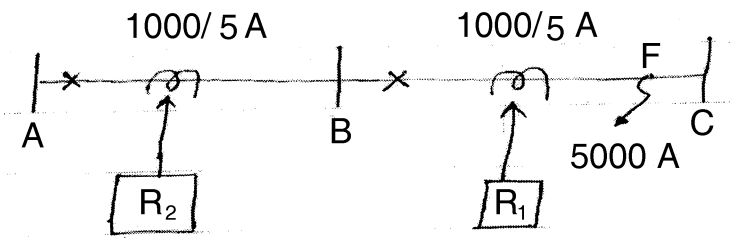
B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
SWITCHGEAR AND PROTECTION

Day and Date : Thursday, 30-11-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** questions : **(4×4=16)**
   1) Explain various desirable characteristics of relays.
   2) Explain with neat diagram three stepped distance protection of transmission line.
   3) Explain with neat diagram percentage differential protection scheme.
   4) With neat block diagram explain static definite time overcurrent relay.
   5) Define pick up current and plug setting multiplier of overcurrent relay. Explain why plug setting of earth fault relay is less than that of phase fault relay.

3. Solve **any two** questions : **(2×6=12)**
   1) Two relays R_1 and R_2 are connected in two sections of a feeder as shown below. CTs are of ratio 1000/5A. The plug setting of relay R_1 is 100% and that of R_2 is 125%. The time multiplier setting of the relay R_1 is 0.3. The time grading scheme has a discriminative time margin of 0.5 sec. between the relays. A three phase short circuit at point F results in a fault current of 5000A. Find the actual operating time of Relays R_1 and Relay R_2. Also determine time multiplier setting of the relay R_2.



   Time current characteristics of relays for TMS of 1 are given below. Both relays have identical time current characteristics.

PSM	2	4	5	8	10	20
Operating time (in seconds)	10	5	4	3	2.8	2.4

   2) Draw neat diagram of induction disc relay. Also derive the mathematical equation of torque developed in the induction type relays.
   3) With neat block diagram and flowchart explain microprocessor based impedance relay.

SECTION – II

4. Solve **any four** questions : **(4×4=16)**

   1) Explain phenomenon of current chopping in circuit breaker with neat diagram.
   2) Explain different ratings of circuit breaker.
   3) Draw and describe the construction and working principle of vacuum circuit breaker.
   4) Explain the over-fluxing phenomenon in a transformer. Which relay is used for the protection of transformer against over-fluxing ?
   5) Explain Metal Oxide Arrester (MOA) type lightening arrester. Write advantages of MOA type lightening arrester.

5. Solve **any two** questions : **(2×6=12)**

   1) Explain with neat diagram percentage differential protection of transformer. Indicate all three phases.
   2) Define re-striking voltage. Derive an expression for re-striking voltage in terms of system inductance and capacitance.
   3) In a 220 kV, 50 Hz system, the reactance and capacitance upto the location of C.B. is 8 Ω and 0.025 μF resp. A resistance of 600 Ω is connected across the contacts of C.B. Determine :
      a) Natural frequency of oscillation
      b) Damped frequency of oscillation
      c) Critical value of resistance which will give no oscillations
      d) The value of resistance which will give damped frequency, one fourth of natural frequency of oscillation.

SLR-TJ – 381

Seat No.	

Set P

B.E. (Electrical Engineering) (Part – I) (New) Examination, 2017
ELECTRICAL UTILIZATION
(CGPA)

Day and Date : Monday, 4-12-2017 Total Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume the ***suitable*** *data* ***wherever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) In a steam locomotive electric power is provided through
   A) Battery system B) Diesel engine generator
   C) Overhead wire D) Small turbo generator

2) Radiant efficiency of the luminous source depends on
   A) Shape of the source B) Wavelength of light rays
   C) Temperature of the source D) All of the above

3) A submarine while moving under water, is provided driving power through
   A) diesel engines B) steam turbine
   C) gas turbine D) batteries

4) Energy consumption in propelling the train is required for
   A) Acceleration
   B) Work against gravity while moving up the gradient
   C) Work against the resistance to motion
   D) All of the above

5) If the coefficient of adhesion on dry rails 0.25. Which of the following could be the value for wet rails ?
   A) 0.32 B) 0.25 C) 0.245 D) 0.15

6) Distance between the rails for meter gauge track is
   A) $2' - 6\ 3/8''$ B) $3' - 4\ 3/4''$ C) $4' - 6\ 1/2''$ D) One meter

7) Over head lines for power supply to tramcars are at a minimum height of
   A) 2 m B) 5 m C) 10 m D) 15 m

8) The temperature inside a furnace is usually measured by which of the following ?
   A) Optical pyrometer B) Mercury thermometer
   C) Alcohol thermometer D) All of the above

9) In induction heating _____ is abnormally high.
   A) Phase angle B) Frequency C) Current D) Voltage

10) A zero watt lamp consumes
   A) No power B) About 5 to 7 W power
   C) About 25 to 30 W power D) None of the above

11) In welding transformers taps are provided on
   A) Primary side B) Secondary side
   C) Both D) None of above

12) Speed of locomotive is controlled by
   A) Gear box B) Flywheel
   C) Regulating stream to engine D) Applying brakes

13) Halogen lamps are useful for the illumination of
   A) Sports grounds B) Parks C) Airports D) All of the above

14) The Act which has been enacted to provide for efficient use of energy and its conservation and for matters connected therewith is
   A) Indian Electricity Act 2003 B) Energy Conservation Act 2001
   C) Indian Electricity Act 2010 D) Energy Conservation Act 2007

SLR-TJ – 381

Seat No.	

B.E. (Electrical Engineering) (Part – I) (New) Examination, 2017
ELECTRICAL UTILIZATION
(CGPA)

Day and Date : Monday, 4-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instruction** : Assume the **suitable** data **whenever** necessary.*

2. Solve **any four** : **(4×4=16)**

1) Explain the procedure of calculating the specific energy consumption of an electric train.

2) Explain the working of multiple unit system and point out its merits.

3) A train is weighing 120 tonnes is to be driven up an incline of 2% at a speed of 36 kmph. If the train resistance is at this speed is 2 kg per tonne, find the current required at 1500 V dc, if the efficiency of motor and gearing is 88%. If current were cut-off, how long would the train take to come to rest.

4) Write a short note on mechanics of train movement.

5) Explain mechanical regenerative braking.

6) An electric train has quadrilateral speed-time curve as follows :
   i) Uniform acceleration from rest at 2 kmphps for 30 seconds
   ii) Coasting for 50 seconds
   iii) Braking period of 20 seconds.

The train is moving a uniform down gradient of 1%, tractive resistance 40 N/tone, rotational inertia effect 10% of dead weight, duration of stop 15 seconds and overall efficiency of transmission gear and motor as 75%. Calculate its schedule speed and specific energy consumption of run.

3. Solve **any two** : **(6×2=12)**

1) Draw and explain the complete view of drum controller giving shunt transition between two series traction motors.

2) An electric train weighing 100 tonnes has a rotational inertia of 10%. This train while Running between two stations which are 2.5 km apart has an average speed of 50 kmph. The acceleration and retardation during braking are 1 kmphps and 2 kmphps respectively. Train has an up gradient is 1% and the train is move up the incline track resistance is 40 N/Tonne, if the combined efficiency of train is 60% find
   i) maximum power from driving axle
   ii) Total energy consumption and
   iii) Specific energy consumption.

   Assume Trapezoidal speed-time curve.

3) Explain the starting of DC series motor type traction motors and prove that with the series-parallel method of starting the efficiency of starter is increased from 50% in case of normal rheostatic starting to 66.67%.

4. Solve **any four** : **(4×4=16)**

1) Explain the comparison between DC welding and AC welding.
2) Write short note on energy conservation in small scale industries.
3) Write short note on motor selection in cement factory.
4) With the help of neat diagram explain butt welding.
5) Define the terms : maintenance factor, depreciation factor, waste light factor, absorption factor, reflection factor.
6) Write short note on integrating sphere.

5. Solve **any two** : **(6×2=12)**

1) Explain the construction and working of direct arc furnace.
2) Draw and explain circuit of mercury vapour discharge lamp.
3) Write short note on :
   a) Energy Conservation Legislation.
   b) Energy conservation in Agriculture.

SLR-TJ – 381

Seat No.	

Set Q

B.E. (Electrical Engineering) (Part – I) (New) Examination, 2017
ELECTRICAL UTILIZATION
(CGPA)

Day and Date : Monday, 4-12-2017 Total Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume the ***suitable*** *data* ***wherever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) The temperature inside a furnace is usually measured by which of the following ?
A) Optical pyrometer B) Mercury thermometer
C) Alcohol thermometer D) All of the above

2) In induction heating _____ is abnormally high.
A) Phase angle B) Frequency C) Current D) Voltage

3) A zero watt lamp consumes
A) No power B) About 5 to 7 W power
C) About 25 to 30 W power D) None of the above

4) In welding transformers taps are provided on
A) Primary side B) Secondary side
C) Both D) None of above

5) Speed of locomotive is controlled by
A) Gear box B) Flywheel
C) Regulating stream to engine D) Applying brakes

P.T.O.

6) Halogen lamps are useful for the illumination of
   A) Sports grounds B) Parks C) Airports D) All of the above

7) The Act which has been enacted to provide for efficient use of energy and its conservation and for matters connected therewith is
   A) Indian Electricity Act 2003 B) Energy Conservation Act 2001
   C) Indian Electricity Act 2010 D) Energy Conservation Act 2007

8) In a steam locomotive electric power is provided through
   A) Battery system B) Diesel engine generator
   C) Overhead wire D) Small turbo generator

9) Radiant efficiency of the luminous source depends on
   A) Shape of the source B) Wavelength of light rays
   C) Temperature of the source D) All of the above

10) A submarine while moving under water, is provided driving power through
   A) diesel engines B) steam turbine
   C) gas turbine D) batteries

11) Energy consumption in propelling the train is required for
   A) Acceleration
   B) Work against gravity while moving up the gradient
   C) Work against the resistance to motion
   D) All of the above

12) If the coefficient of adhesion on dry rails 0.25. Which of the following could be the value for wet rails ?
   A) 0.32 B) 0.25 C) 0.245 D) 0.15

13) Distance between the rails for meter gauge track is
   A) $2' - 6\ 3/8''$ B) $3' - 4\ 3/4''$ C) $4' - 6\ 1/2''$ D) One meter

14) Over head lines for power supply to tramcars are at a minimum height of
   A) 2 m B) 5 m C) 10 m D) 15 m

SLR-TJ – 381

Seat No.	

B.E. (Electrical Engineering) (Part – I) (New) Examination, 2017
ELECTRICAL UTILIZATION
(CGPA)

Day and Date : Monday, 4-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instruction** : Assume the **suitable** data **whenever** necessary.*

2. Solve **any four** : **(4×4=16)**

1) Explain the procedure of calculating the specific energy consumption of an electric train.

2) Explain the working of multiple unit system and point out its merits.

3) A train is weighing 120 tonnes is to be driven up an incline of 2% at a speed of 36 kmph. If the train resistance is at this speed is 2 kg per tonne, find the current required at 1500 V dc, if the efficiency of motor and gearing is 88%. If current were cut-off, how long would the train take to come to rest.

4) Write a short note on mechanics of train movement.

5) Explain mechanical regenerative braking.

6) An electric train has quadrilateral speed-time curve as follows :
   i) Uniform acceleration from rest at 2 kmphps for 30 seconds
   ii) Coasting for 50 seconds
   iii) Braking period of 20 seconds.

The train is moving a uniform down gradient of 1%, tractive resistance 40 N/tone, rotational inertia effect 10% of dead weight, duration of stop 15 seconds and overall efficiency of transmission gear and motor as 75%. Calculate its schedule speed and specific energy consumption of run.

3. Solve **any two** : **(6×2=12)**

1) Draw and explain the complete view of drum controller giving shunt transition between two series traction motors.

2) An electric train weighing 100 tonnes has a rotational inertia of 10%. This train while Running between two stations which are 2.5 km apart has an average speed of 50 kmph. The acceleration and retardation during braking are 1 kmphps and 2 kmphps respectively. Train has an up gradient is 1% and the train is move up the incline track resistance is 40 N/Tonne, if the combined efficiency of train is 60% find
   i) maximum power from driving axle
   ii) Total energy consumption and
   iii) Specific energy consumption.

   Assume Trapezoidal speed-time curve.

3) Explain the starting of DC series motor type traction motors and prove that with the series-parallel method of starting the efficiency of starter is increased from 50% in case of normal rheostatic starting to 66.67%.

4. Solve **any four** : **(4×4=16)**

1) Explain the comparison between DC welding and AC welding.
2) Write short note on energy conservation in small scale industries.
3) Write short note on motor selection in cement factory.
4) With the help of neat diagram explain butt welding.
5) Define the terms : maintenance factor, depreciation factor, waste light factor, absorption factor, reflection factor.
6) Write short note on integrating sphere.

5. Solve **any two** : **(6×2=12)**

1) Explain the construction and working of direct arc furnace.
2) Draw and explain circuit of mercury vapour discharge lamp.
3) Write short note on :
   a) Energy Conservation Legislation.
   b) Energy conservation in Agriculture.

SLR-TJ – 381

Seat No.	

Set R

B.E. (Electrical Engineering) (Part – I) (New) Examination, 2017
ELECTRICAL UTILIZATION
(CGPA)

Day and Date : Monday, 4-12-2017 Total Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume the ***suitable*** *data* ***wherever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) If the coefficient of adhesion on dry rails 0.25. Which of the following could be the value for wet rails ?
A) 0.32 B) 0.25 C) 0.245 D) 0.15

2) Distance between the rails for meter gauge track is
A) $2' - 6\ 3/8''$ B) $3' - 4\ 3/4''$ C) $4' - 6\ 1/2''$ D) One meter

3) Over head lines for power supply to tramcars are at a minimum height of
A) 2 m B) 5 m C) 10 m D) 15 m

4) The temperature inside a furnace is usually measured by which of the following ?
A) Optical pyrometer B) Mercury thermometer
C) Alcohol thermometer D) All of the above

5) In induction heating _____ is abnormally high.
A) Phase angle B) Frequency C) Current D) Voltage

6) A zero watt lamp consumes
A) No power B) About 5 to 7 W power
C) About 25 to 30 W power D) None of the above

P.T.O.

7) In welding transformers taps are provided on
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   A) Gear box B) Flywheel
   C) Regulating stream to engine D) Applying brakes

9) Halogen lamps are useful for the illumination of
   A) Sports grounds B) Parks C) Airports D) All of the above

10) The Act which has been enacted to provide for efficient use of energy and its conservation and for matters connected therewith is
   A) Indian Electricity Act 2003 B) Energy Conservation Act 2001
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12) Radiant efficiency of the luminous source depends on
   A) Shape of the source B) Wavelength of light rays
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13) A submarine while moving under water, is provided driving power through
   A) diesel engines B) steam turbine
   C) gas turbine D) batteries

14) Energy consumption in propelling the train is required for
   A) Acceleration
   B) Work against gravity while moving up the gradient
   C) Work against the resistance to motion
   D) All of the above

Seat No.	

B.E. (Electrical Engineering) (Part – I) (New) Examination, 2017
ELECTRICAL UTILIZATION
(CGPA)

Day and Date : Monday, 4-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instruction** : Assume the **suitable** data **whenever** necessary.*

2. Solve **any four** : **(4×4=16)**

1) Explain the procedure of calculating the specific energy consumption of an electric train.

2) Explain the working of multiple unit system and point out its merits.

3) A train is weighing 120 tonnes is to be driven up an incline of 2% at a speed of 36 kmph. If the train resistance is at this speed is 2 kg per tonne, find the current required at 1500 V dc, if the efficiency of motor and gearing is 88%. If current were cut-off, how long would the train take to come to rest.

4) Write a short note on mechanics of train movement.

5) Explain mechanical regenerative braking.

6) An electric train has quadrilateral speed-time curve as follows :
   i) Uniform acceleration from rest at 2 kmphps for 30 seconds
   ii) Coasting for 50 seconds
   iii) Braking period of 20 seconds.

The train is moving a uniform down gradient of 1%, tractive resistance 40 N/tone, rotational inertia effect 10% of dead weight, duration of stop 15 seconds and overall efficiency of transmission gear and motor as 75%. Calculate its schedule speed and specific energy consumption of run.

3. Solve **any two** : **(6×2=12)**

   1) Draw and explain the complete view of drum controller giving shunt transition between two series traction motors.

   2) An electric train weighing 100 tonnes has a rotational inertia of 10%. This train while Running between two stations which are 2.5 km apart has an average speed of 50 kmph. The acceleration and retardation during braking are 1 kmphps and 2 kmphps respectively. Train has an up gradient is 1% and the train is move up the incline track resistance is 40 N/Tonne, if the combined efficiency of train is 60% find
      i) maximum power from driving axle
      ii) Total energy consumption and
      iii) Specific energy consumption.

      Assume Trapezoidal speed-time curve.

   3) Explain the starting of DC series motor type traction motors and prove that with the series-parallel method of starting the efficiency of starter is increased from 50% in case of normal rheostatic starting to 66.67%.

4. Solve **any four** : **(4×4=16)**

   1) Explain the comparison between DC welding and AC welding.

   2) Write short note on energy conservation in small scale industries.

   3) Write short note on motor selection in cement factory.

   4) With the help of neat diagram explain butt welding.

   5) Define the terms : maintenance factor, depreciation factor, waste light factor, absorption factor, reflection factor.

   6) Write short note on integrating sphere.

5. Solve **any two** : **(6×2=12)**

   1) Explain the construction and working of direct arc furnace.

   2) Draw and explain circuit of mercury vapour discharge lamp.

   3) Write short note on :
      a) Energy Conservation Legislation.
      b) Energy conservation in Agriculture.

SLR-TJ – 381

Seat No.	

Set S

B.E. (Electrical Engineering) (Part – I) (New) Examination, 2017
ELECTRICAL UTILIZATION
(CGPA)

Day and Date : Monday, 4-12-2017 Total Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions: *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume the ***suitable*** *data* ***wherever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) A zero watt lamp consumes
A) No power B) About 5 to 7 W power
C) About 25 to 30 W power D) None of the above

2) In welding transformers taps are provided on
A) Primary side B) Secondary side
C) Both D) None of above

3) Speed of locomotive is controlled by
A) Gear box B) Flywheel
C) Regulating stream to engine D) Applying brakes

4) Halogen lamps are useful for the illumination of
A) Sports grounds B) Parks C) Airports D) All of the above

5) The Act which has been enacted to provide for efficient use of energy and its conservation and for matters connected therewith is
A) Indian Electricity Act 2003 B) Energy Conservation Act 2001
C) Indian Electricity Act 2010 D) Energy Conservation Act 2007

P.T.O.

6) In a steam locomotive electric power is provided through
   A) Battery system
   B) Diesel engine generator
   C) Overhead wire
   D) Small turbo generator

7) Radiant efficiency of the luminous source depends on
   A) Shape of the source
   B) Wavelength of light rays
   C) Temperature of the source
   D) All of the above

8) A submarine while moving under water, is provided driving power through
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   C) gas turbine
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   A) Acceleration
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   A) 0.32
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   C) 0.245
   D) 0.15

11) Distance between the rails for meter gauge track is
   A) $2' - 6\ 3/8''$
   B) $3' - 4\ 3/4''$
   C) $4' - 6\ 1/2''$
   D) One meter

12) Over head lines for power supply to tramcars are at a minimum height of
   A) 2 m
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   D) 15 m

13) The temperature inside a furnace is usually measured by which of the following ?
   A) Optical pyrometer
   B) Mercury thermometer
   C) Alcohol thermometer
   D) All of the above

14) In induction heating _____ is abnormally high.
   A) Phase angle
   B) Frequency
   C) Current
   D) Voltage

Seat No.	

B.E. (Electrical Engineering) (Part – I) (New) Examination, 2017
ELECTRICAL UTILIZATION
(CGPA)

Day and Date : Monday, 4-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

***Instruction** : Assume the **suitable** data **whenever** necessary.*

2. Solve **any four** : **(4×4=16)**

1) Explain the procedure of calculating the specific energy consumption of an electric train.

2) Explain the working of multiple unit system and point out its merits.

3) A train is weighing 120 tonnes is to be driven up an incline of 2% at a speed of 36 kmph. If the train resistance is at this speed is 2 kg per tonne, find the current required at 1500 V dc, if the efficiency of motor and gearing is 88%. If current were cut-off, how long would the train take to come to rest.

4) Write a short note on mechanics of train movement.

5) Explain mechanical regenerative braking.

6) An electric train has quadrilateral speed-time curve as follows :
   i) Uniform acceleration from rest at 2 kmphps for 30 seconds
   ii) Coasting for 50 seconds
   iii) Braking period of 20 seconds.

The train is moving a uniform down gradient of 1%, tractive resistance 40 N/tone, rotational inertia effect 10% of dead weight, duration of stop 15 seconds and overall efficiency of transmission gear and motor as 75%. Calculate its schedule speed and specific energy consumption of run.

3. Solve **any two** : **(6×2=12)**

   1) Draw and explain the complete view of drum controller giving shunt transition between two series traction motors.

   2) An electric train weighing 100 tonnes has a rotational inertia of 10%. This train while Running between two stations which are 2.5 km apart has an average speed of 50 kmph. The acceleration and retardation during braking are 1 kmphps and 2 kmphps respectively. Train has an up gradient is 1% and the train is move up the incline track resistance is 40 N/Tonne, if the combined efficiency of train is 60% find
      i) maximum power from driving axle
      ii) Total energy consumption and
      iii) Specific energy consumption.

      Assume Trapezoidal speed-time curve.

   3) Explain the starting of DC series motor type traction motors and prove that with the series-parallel method of starting the efficiency of starter is increased from 50% in case of normal rheostatic starting to 66.67%.

4. Solve **any four** : **(4×4=16)**

   1) Explain the comparison between DC welding and AC welding.

   2) Write short note on energy conservation in small scale industries.

   3) Write short note on motor selection in cement factory.

   4) With the help of neat diagram explain butt welding.

   5) Define the terms : maintenance factor, depreciation factor, waste light factor, absorption factor, reflection factor.

   6) Write short note on integrating sphere.

5. Solve **any two** : **(6×2=12)**

   1) Explain the construction and working of direct arc furnace.

   2) Draw and explain circuit of mercury vapour discharge lamp.

   3) Write short note on :
      a) Energy Conservation Legislation.
      b) Energy conservation in Agriculture.

SLR-TJ – 382

Seat No.	

Set **P**

B.E. (Electrical Engineering) (Part – I) (New-CGPA) Examination, 2017
PLC AND SCADA (Elective – I)

Day and Date : Wednesday, 6-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Make suitable assumptions ***if*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose correct answer : **14**

1) How is the speed of operation of conventional relay system as compared to digital controllers ?
   a) Very slow b) Very fast
   c) Same d) Almost similar

2) The PLC is used in
   a) Machine tools b) Automated assembly equipment
   c) Moulding and extrusion machines d) All of the above

3) _____ is a method used to observe the operation or execution of a control program one time.
   a) Step scan b) Test rung scan
   c) Single scan d) All of the above

4) A down counter CTD undergoes a count action
   a) Each time a rung is true; decreases the accumulated value by one
   b) Each time a rung is false; decreases the accumulated value by one
   c) Each time a rung is true; increases the accumulated value by one
   d) None of these

5) _____ of PLCs can be done in very little time.
   a) Programming b) Installation
   c) Commissioning d) All of the above

6) An up-counter CTU counts
   a) Upward from 0 to – 32767 and then wraps around to + 32768
   b) Upward from + 32767 to 0 and then wraps around to – 32768
   c) Upward from 0 to + 32767 and then wraps around to – 32768
   d) Upward from – 32767 to 0 and then wraps around to + 32768

7) How do the variations in an average value get affected by PWM period ?
   a) Longer the PWM period, faster will be the variation in an average value
   b) Shorter the PWM period, faster will be the variation in an average value
   c) Shorter the PWM period, slower will be the variation in an average value
   d) Longer the PWM period, slower will be the variation in an average value

8) In OSI model layer No. 6 consist of
   a) Physical layer b) Presentation layer
   c) Network layer d) Transport layer

9) Which layer is responsible for process to process delivery ?
   a) Network layer b) Transport layer
   c) Session layer d) Data link layer

10) The important function of SCADA is
   a) Data acquistion b) Information display
   c) Alarm processing d) All the above

11) Ethernet frame consists of
   a) MAC address b) IP address
   c) Both a) and b) d) None of the mentioned

12) _____ helps to transfer of files between computers.
   a) FTP b) SMTP c) SNMP d) Telnet

13) Which of the following protocol used for HVAC control, building automation ?
   a) Modbus b) Device Net c) DNP 3.0 d) BACNet

14) High speed Ethernet works on
   a) Coaxial cable b) Twisted pair cable
   c) Optical fibre d) None of the mentioned

_____

SLR-TJ – 382

Seat No.	

B.E. (Electrical Engineering) (Part – I) (New-CGPA)
Examination, 2017
PLC AND SCADA (Elective – I)

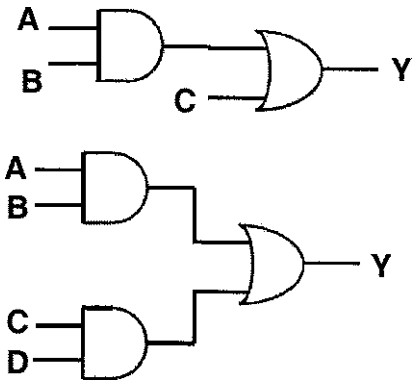
Day and Date : Wednesday, 6-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***if*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   a) What are the different types of PLC timer ? Explain OFF Delay (TOFF) timer.
   b) Define programmable logic controller. Explain central processing unit in detail along with the three important parts in it.
   c) State and explain advantages and disadvantages of PLC in details.
   d) Explain brief history of PLC along with some important names.
   e) Explain PID controller.
   f) Explain variable speed (variable frequency) AC motor drive.

3. Solve **any two** : **(6×2=12)**
   a) Draw relay logic, ladder diagram for given logic diagram and also write Boolean Expression.



b) Draw the ladder and relay logic diagram for the following table :

Input – I1, I2

Output – Q1, Q2, Q3, Q4

I1	I2	Q1	Q2	Q3	Q4
0	0	1	1	1	0
0	1	0	1	1	1
1	0	1	0	1	1
1	1	1	1	0	1

c) Draw relay, ladder and timing diagram for,

Three motors can be started automatically in sequence with 20 sec. time delay between each motor startup when push button is starts. Stops all motors when push button is stops.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) What are the security implementation of the SCADA protocols ?

b) Draw and explain basic SCADA architecture.

c) With block diagram explain how SCADA system is used in automatic sub station control.

d) Write a note on the TCP/IP protocols.

e) List various functions of SCADA.

f) Explain SCADA data transfer through PLCC.

5. Solve **any two** : **(6×2=12)**

a) Explain with e.g. how SCADA system is used in conventional electric power generation.

b) Explain first generation SCADA system in detail.

c) Draw and explain seven layers of OSI model and their functions.

SLR-TJ – 382

Seat No.	

Set **Q**

B.E. (Electrical Engineering) (Part – I) (New-CGPA) Examination, 2017
PLC AND SCADA (Elective – I)

Day and Date : Wednesday, 6-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose correct answer : **14**

1) In OSI model layer No. 6 consist of
a) Physical layer b) Presentation layer
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2) Which layer is responsible for process to process delivery ?
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   a) Upward from 0 to – 32767 and then wraps around to + 32768
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   c) Upward from 0 to + 32767 and then wraps around to – 32768
   d) Upward from – 32767 to 0 and then wraps around to + 32768

14) How do the variations in an average value get affected by PWM period ?
   a) Longer the PWM period, faster will be the variation in an average value
   b) Shorter the PWM period, faster will be the variation in an average value
   c) Shorter the PWM period, slower will be the variation in an average value
   d) Longer the PWM period, slower will be the variation in an average value

SLR-TJ – 382

Seat No.	

B.E. (Electrical Engineering) (Part – I) (New-CGPA)
Examination, 2017
PLC AND SCADA (Elective – I)

Day and Date : Wednesday, 6-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***if*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   a) What are the different types of PLC timer ? Explain OFF Delay (TOFF) timer.
   b) Define programmable logic controller. Explain central processing unit in detail along with the three important parts in it.
   c) State and explain advantages and disadvantages of PLC in details.
   d) Explain brief history of PLC along with some important names.
   e) Explain PID controller.
   f) Explain variable speed (variable frequency) AC motor drive.

3. Solve **any two** : **(6×2=12)**
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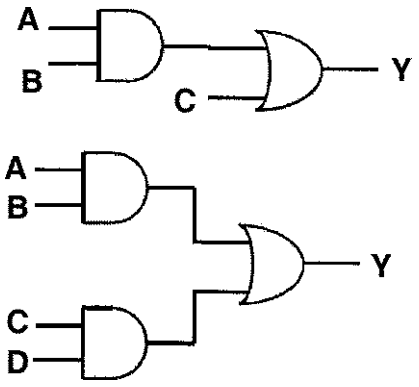


b) Draw the ladder and relay logic diagram for the following table :

Input – I1, I2

Output – Q1, Q2, Q3, Q4

I1	I2	Q1	Q2	Q3	Q4
0	0	1	1	1	0
0	1	0	1	1	1
1	0	1	0	1	1
1	1	1	1	0	1

c) Draw relay, ladder and timing diagram for,

Three motors can be started automatically in sequence with 20 sec. time delay between each motor startup when push button is starts. Stops all motors when push button is stops.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) What are the security implementation of the SCADA protocols ?

b) Draw and explain basic SCADA architecture.

c) With block diagram explain how SCADA system is used in automatic sub station control.

d) Write a note on the TCP/IP protocols.

e) List various functions of SCADA.

f) Explain SCADA data transfer through PLCC.

5. Solve **any two** : **(6×2=12)**

a) Explain with e.g. how SCADA system is used in conventional electric power generation.

b) Explain first generation SCADA system in detail.

c) Draw and explain seven layers of OSI model and their functions.

SLR-TJ – 382

Seat No.	

Set **R**

B.E. (Electrical Engineering) (Part – I) (New-CGPA) Examination, 2017
PLC AND SCADA (Elective – I)

Day and Date : Wednesday, 6-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Make suitable assumptions ***if*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose correct answer : **14**

1) _____ of PLCs can be done in very little time.
   a) Programming b) Installation
   c) Commissioning d) All of the above

2) An up-counter CTU counts
   a) Upward from 0 to – 32767 and then wraps around to + 32768
   b) Upward from + 32767 to 0 and then wraps around to – 32768
   c) Upward from 0 to + 32767 and then wraps around to – 32768
   d) Upward from – 32767 to 0 and then wraps around to + 32768

3) How do the variations in an average value get affected by PWM period ?
   a) Longer the PWM period, faster will be the variation in an average value
   b) Shorter the PWM period, faster will be the variation in an average value
   c) Shorter the PWM period, slower will be the variation in an average value
   d) Longer the PWM period, slower will be the variation in an average value

4) In OSI model layer No. 6 consist of
   a) Physical layer b) Presentation layer
   c) Network layer d) Transport layer

5) Which layer is responsible for process to process delivery ?
   a) Network layer b) Transport layer
   c) Session layer d) Data link layer

6) The important function of SCADA is
   a) Data acquistion
   b) Information display
   c) Alarm processing
   d) All the above

7) Ethernet frame consists of
   a) MAC address
   b) IP address
   c) Both a) and b)
   d) None of the mentioned

8) _____ helps to transfer of files between computers.
   a) FTP
   b) SMTP
   c) SNMP
   d) Telnet

9) Which of the following protocol used for HVAC control, building automation ?
   a) Modbus
   b) Device Net
   c) DNP 3.0
   d) BACNet

10) High speed Ethernet works on
   a) Coaxial cable
   b) Twisted pair cable
   c) Optical fibre
   d) None of the mentioned

11) How is the speed of operation of conventional relay system as compared to digital controllers ?
   a) Very slow
   b) Very fast
   c) Same
   d) Almost similar

12) The PLC is used in
   a) Machine tools
   b) Automated assembly equipment
   c) Moulding and extrusion machines
   d) All of the above

13) _____ is a method used to observe the operation or execution of a control program one time.
   a) Step scan
   b) Test rung scan
   c) Single scan
   d) All of the above

14) A down counter CTD undergoes a count action
   a) Each time a rung is true; decreases the accumulated value by one
   b) Each time a rung is false; decreases the accumulated value by one
   c) Each time a rung is true; increases the accumulated value by one
   d) None of these

_____

SLR-TJ – 382

Seat No.	

B.E. (Electrical Engineering) (Part – I) (New-CGPA)
Examination, 2017
PLC AND SCADA (Elective – I)

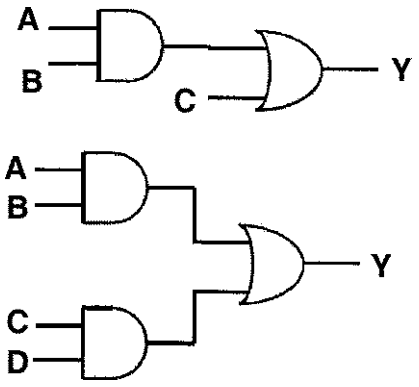
Day and Date : Wednesday, 6-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***if*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   a) What are the different types of PLC timer ? Explain OFF Delay (TOFF) timer.
   b) Define programmable logic controller. Explain central processing unit in detail along with the three important parts in it.
   c) State and explain advantages and disadvantages of PLC in details.
   d) Explain brief history of PLC along with some important names.
   e) Explain PID controller.
   f) Explain variable speed (variable frequency) AC motor drive.

3. Solve **any two** : **(6×2=12)**
   a) Draw relay logic, ladder diagram for given logic diagram and also write Boolean Expression.



b) Draw the ladder and relay logic diagram for the following table :

Input – I1, I2

Output – Q1, Q2, Q3, Q4

I1	I2	Q1	Q2	Q3	Q4
0	0	1	1	1	0
0	1	0	1	1	1
1	0	1	0	1	1
1	1	1	1	0	1

c) Draw relay, ladder and timing diagram for,

Three motors can be started automatically in sequence with 20 sec. time delay between each motor startup when push button is starts. Stops all motors when push button is stops.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) What are the security implementation of the SCADA protocols ?

b) Draw and explain basic SCADA architecture.

c) With block diagram explain how SCADA system is used in automatic sub station control.

d) Write a note on the TCP/IP protocols.

e) List various functions of SCADA.

f) Explain SCADA data transfer through PLCC.

5. Solve **any two** : **(6×2=12)**

a) Explain with e.g. how SCADA system is used in conventional electric power generation.

b) Explain first generation SCADA system in detail.

c) Draw and explain seven layers of OSI model and their functions.

SLR-TJ – 382

Seat No.	

Set **S**

B.E. (Electrical Engineering) (Part – I) (New-CGPA) Examination, 2017
PLC AND SCADA (Elective – I)

Day and Date : Wednesday, 6-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Make suitable assumptions ***if*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose correct answer : **14**

1) The important function of SCADA is
   a) Data acquistion b) Information display
   c) Alarm processing d) All the above

2) Ethernet frame consists of
   a) MAC address b) IP address
   c) Both a) and b) d) None of the mentioned

3) _____ helps to transfer of files between computers.
   a) FTP b) SMTP c) SNMP d) Telnet

4) Which of the following protocol used for HVAC control, building automation ?
   a) Modbus b) Device Net c) DNP 3.0 d) BACNet

5) High speed Ethernet works on
   a) Coaxial cable b) Twisted pair cable
   c) Optical fibre d) None of the mentioned

6) How is the speed of operation of conventional relay system as compared to digital controllers ?
   a) Very slow b) Very fast
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   a) Step scan
   b) Test rung scan
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   a) Each time a rung is true; decreases the accumulated value by one
   b) Each time a rung is false; decreases the accumulated value by one
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   a) Programming
   b) Installation
   c) Commissioning
   d) All of the above

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   a) Upward from 0 to – 32767 and then wraps around to + 32768
   b) Upward from + 32767 to 0 and then wraps around to – 32768
   c) Upward from 0 to + 32767 and then wraps around to – 32768
   d) Upward from – 32767 to 0 and then wraps around to + 32768

12) How do the variations in an average value get affected by PWM period ?
   a) Longer the PWM period, faster will be the variation in an average value
   b) Shorter the PWM period, faster will be the variation in an average value
   c) Shorter the PWM period, slower will be the variation in an average value
   d) Longer the PWM period, slower will be the variation in an average value

13) In OSI model layer No. 6 consist of
   a) Physical layer
   b) Presentation layer
   c) Network layer
   d) Transport layer

14) Which layer is responsible for process to process delivery ?
   a) Network layer
   b) Transport layer
   c) Session layer
   d) Data link layer

_____

SLR-TJ – 382

Seat No.	

B.E. (Electrical Engineering) (Part – I) (New-CGPA)
Examination, 2017
PLC AND SCADA (Elective – I)

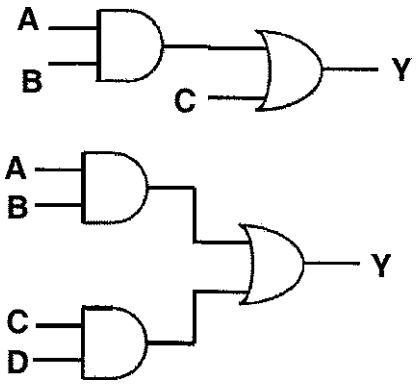
Day and Date : Wednesday, 6-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***if*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   a) What are the different types of PLC timer ? Explain OFF Delay (TOFF) timer.
   b) Define programmable logic controller. Explain central processing unit in detail along with the three important parts in it.
   c) State and explain advantages and disadvantages of PLC in details.
   d) Explain brief history of PLC along with some important names.
   e) Explain PID controller.
   f) Explain variable speed (variable frequency) AC motor drive.

3. Solve **any two** : **(6×2=12)**
   a) Draw relay logic, ladder diagram for given logic diagram and also write Boolean Expression.



b) Draw the ladder and relay logic diagram for the following table :

Input – I1, I2

Output – Q1, Q2, Q3, Q4

I1	I2	Q1	Q2	Q3	Q4
0	0	1	1	1	0
0	1	0	1	1	1
1	0	1	0	1	1
1	1	1	1	0	1

c) Draw relay, ladder and timing diagram for,

Three motors can be started automatically in sequence with 20 sec. time delay between each motor startup when push button is starts. Stops all motors when push button is stops.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) What are the security implementation of the SCADA protocols ?

b) Draw and explain basic SCADA architecture.

c) With block diagram explain how SCADA system is used in automatic sub station control.

d) Write a note on the TCP/IP protocols.

e) List various functions of SCADA.

f) Explain SCADA data transfer through PLCC.

5. Solve **any two** : **(6×2=12)**

a) Explain with e.g. how SCADA system is used in conventional electric power generation.

b) Explain first generation SCADA system in detail.

c) Draw and explain seven layers of OSI model and their functions.

SLR-TJ – 384

Seat No.	

Set P

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
Elective – I : ENERGY AUDIT AND MANAGEMENT

Day and Date : Wednesday, 6-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) LNG stands for
A) Liquefied Natural Gas B) Liquid Natural Gas
C) Low Nitrogen Content Gas D) Liquid Nitrogen Gas

2) Which is the major energy source to meet the Indian energy demand ?
A) Coal B) Lignite C) Oil D) Natural gas

3) Energy management is a key component of
A) Environmental management B) Carbon management
C) Nitrogen management D) Water management

4) Projected temperature increase in degree centigrade 2100 due to climate change is
A) 2 B) 3 C) 4 D) 5

5) Which country has highest energy usage per capita ?
A) Iceland B) Qatar
C) Kuwait D) United Arab Emirates

6) Which country has the biggest coal reserves ?
A) Russia B) US C) China D) India

7) Maximum demand charges are given in
A) kWh B) kVA
C) kVAr D) All of the above

8) The pay-back period is defined as the ratio of
   A) Net investment to the capital cost
   B) Net annual cash flow to the capital cost
   C) Net investment to the net annual cash flow
   D) Net annual savings to the capital cost

9) Phase advancer are used to improve the power factor of
   A) Induction generator
   B) Synchronous motor
   C) Synchronous generator
   D) Induction motor

10) The objective of energy management includes
   A) Minimum energy cost
   B) Minimizing environmental degradation
   C) Minimize waste
   D) All the above

11) Replacement of steam based hot water generation by solar system is an example of
   A) Matching energy usage to the requirement
   B) Energy substitution
   C) Maximizing system efficiency
   D) Performance improvement

12) The capital cost of generating equipment, transmission system and distribution system comes under
   A) Running capital
   B) Both fixed and running capital
   C) Fixed capital
   D) All of these

13) If load current decrease then the power factor
   A) Will also decrease
   B) Will increase
   C) Will remain unchanged
   D) None of these

14) The benchmarking parameter for air conditioning equipment is
   A) kW/Ton of Refrigeration
   B) kW/kg of refrigerant handled
   C) kcal/m^3 of chilled water
   D) Differential temperature across chiller

SLR-TJ – 384

Seat No.	

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
Elective – I : ENERGY AUDIT AND MANAGEMENT

Day and Date : Wednesday, 6-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

   1) What is mean by green building ?

   2) What are necessary skills of energy manager ?

   3) Explain demand side management concept with advantages and disadvantages.

   4) Write note on apparent energy tariff.

   5) Write short notes on Kyoto protocol.

   6) Write the notes on force field analysis.

3. Attempt **any two** : **(6×2=12)**

   1) Write a short note on solar thermal technology as a energy source.

   2) What is energy management ? Discuss the principles of energy management.

   3) What is energy conservation building code ? List salient features of ECBC.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) What is Sankey diagram ? Explain with suitable examples.

   2) What are the principles of writing a report of energy audit ?

3) Discuss the cash flow diagram. What is the significance ?

4) Explain various types of energy audit.

5) Enlist energy conservation opportunities in pumping system.

5. Attempt **any two** : **(6×2=12)**

1) Explain various instruments with functions of each used to carry out energy audit.

2) How cogeneration leads the energy conservation ?

3) What are the various costing techniques ?

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Seat No.	

Set Q

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
Elective – I : ENERGY AUDIT AND MANAGEMENT

Day and Date : Wednesday, 6-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) The pay-back period is defined as the ratio of
   A) Net investment to the capital cost
   B) Net annual cash flow to the capital cost
   C) Net investment to the net annual cash flow
   D) Net annual savings to the capital cost

2) Phase advancer are used to improve the power factor of
   A) Induction generator B) Synchronous motor
   C) Synchronous generator D) Induction motor

3) The objective of energy management includes
   A) Minimum energy cost
   B) Minimizing environmental degradation
   C) Minimize waste
   D) All the above

4) Replacement of steam based hot water generation by solar system is an example of
   A) Matching energy usage to the requirement
   B) Energy substitution
   C) Maximizing system efficiency
   D) Performance improvement

5) The capital cost of generating equipment, transmission system and distribution system comes under
   A) Running capital
   B) Both fixed and running capital
   C) Fixed capital
   D) All of these

6) If load current decrease then the power factor
   A) Will also decrease
   B) Will increase
   C) Will remain unchanged
   D) None of these

7) The benchmarking parameter for air conditioning equipment is
   A) kW/Ton of Refrigeration
   B) kW/kg of refrigerant handled
   C) kcal/m^3 of chilled water
   D) Differential temperature across chiller

8) LNG stands for
   A) Liquefied Natural Gas
   B) Liquid Natural Gas
   C) Low Nitrogen Content Gas
   D) Liquid Nitrogen Gas

9) Which is the major energy source to meet the Indian energy demand ?
   A) Coal
   B) Lignite
   C) Oil
   D) Natural gas

10) Energy management is a key component of
   A) Environmental management
   B) Carbon management
   C) Nitrogen management
   D) Water management

11) Projected temperature increase in degree centigrade 2100 due to climate change is
   A) 2
   B) 3
   C) 4
   D) 5

12) Which country has highest energy usage per capita ?
   A) Iceland
   B) Qatar
   C) Kuwait
   D) United Arab Emirates

13) Which country has the biggest coal reserves ?
   A) Russia
   B) US
   C) China
   D) India

14) Maximum demand charges are given in
   A) kWh
   B) kVA
   C) kVAr
   D) All of the above

SLR-TJ – 384

Seat No.	

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
Elective – I : ENERGY AUDIT AND MANAGEMENT

Day and Date : Wednesday, 6-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

   1) What is mean by green building ?

   2) What are necessary skills of energy manager ?

   3) Explain demand side management concept with advantages and disadvantages.

   4) Write note on apparent energy tariff.

   5) Write short notes on Kyoto protocol.

   6) Write the notes on force field analysis.

3. Attempt **any two** : **(6×2=12)**

   1) Write a short note on solar thermal technology as a energy source.

   2) What is energy management ? Discuss the principles of energy management.

   3) What is energy conservation building code ? List salient features of ECBC.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) What is Sankey diagram ? Explain with suitable examples.

   2) What are the principles of writing a report of energy audit ?

3) Discuss the cash flow diagram. What is the significance ?

4) Explain various types of energy audit.

5) Enlist energy conservation opportunities in pumping system.

5. Attempt **any two** : **(6×2=12)**

1) Explain various instruments with functions of each used to carry out energy audit.

2) How cogeneration leads the energy conservation ?

3) What are the various costing techniques ?

SLR-TJ – 384

Seat No.	

Set R

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
Elective – I : ENERGY AUDIT AND MANAGEMENT

Day and Date : Wednesday, 6-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) Which country has highest energy usage per capita ?
A) Iceland B) Qatar
C) Kuwait D) United Arab Emirates

2) Which country has the biggest coal reserves ?
A) Russia B) US C) China D) India

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4) The pay-back period is defined as the ratio of
A) Net investment to the capital cost
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A) Induction generator B) Synchronous motor
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C) Minimize waste
D) All the above

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   A) Matching energy usage to the requirement
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   D) Performance improvement

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   A) kW/Ton of Refrigeration
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14) Projected temperature increase in degree centigrade 2100 due to climate change is
   A) 2
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SLR-TJ – 384

Seat No.	

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
Elective – I : ENERGY AUDIT AND MANAGEMENT

Day and Date : Wednesday, 6-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

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   1) What is mean by green building ?

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   4) Write note on apparent energy tariff.

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   6) Write the notes on force field analysis.

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SECTION – II

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   1) What is Sankey diagram ? Explain with suitable examples.

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3) Discuss the cash flow diagram. What is the significance ?

4) Explain various types of energy audit.

5) Enlist energy conservation opportunities in pumping system.

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1) Explain various instruments with functions of each used to carry out energy audit.

2) How cogeneration leads the energy conservation ?

3) What are the various costing techniques ?

SLR-TJ – 384

Seat No.	

Set S

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
Elective – I : ENERGY AUDIT AND MANAGEMENT

Day and Date : Wednesday, 6-12-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1×14=14)**

1) The objective of energy management includes
   A) Minimum energy cost
   B) Minimizing environmental degradation
   C) Minimize waste
   D) All the above

2) Replacement of steam based hot water generation by solar system is an example of
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P.T.O.

5) The benchmarking parameter for air conditioning equipment is
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   C) kcal/m^3 of chilled water
   D) Differential temperature across chiller

6) LNG stands for
   A) Liquefied Natural Gas
   B) Liquid Natural Gas
   C) Low Nitrogen Content Gas
   D) Liquid Nitrogen Gas

7) Which is the major energy source to meet the Indian energy demand ?
   A) Coal
   B) Lignite
   C) Oil
   D) Natural gas

8) Energy management is a key component of
   A) Environmental management
   B) Carbon management
   C) Nitrogen management
   D) Water management

9) Projected temperature increase in degree centigrade 2100 due to climate change is
   A) 2
   B) 3
   C) 4
   D) 5

10) Which country has highest energy usage per capita ?
   A) Iceland
   B) Qatar
   C) Kuwait
   D) United Arab Emirates

11) Which country has the biggest coal reserves ?
   A) Russia
   B) US
   C) China
   D) India

12) Maximum demand charges are given in
   A) kWh
   B) kVA
   C) kVAr
   D) All of the above

13) The pay-back period is defined as the ratio of
   A) Net investment to the capital cost
   B) Net annual cash flow to the capital cost
   C) Net investment to the net annual cash flow
   D) Net annual savings to the capital cost

14) Phase advancer are used to improve the power factor of
   A) Induction generator
   B) Synchronous motor
   C) Synchronous generator
   D) Induction motor

SLR-TJ – 384

Seat No.	

B.E. (Electrical) (Part – I) (New CGPA) Examination, 2017
Elective – I : ENERGY AUDIT AND MANAGEMENT

Day and Date : Wednesday, 6-12-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

   1) What is mean by green building ?

   2) What are necessary skills of energy manager ?

   3) Explain demand side management concept with advantages and disadvantages.

   4) Write note on apparent energy tariff.

   5) Write short notes on Kyoto protocol.

   6) Write the notes on force field analysis.

3. Attempt **any two** : **(6×2=12)**

   1) Write a short note on solar thermal technology as a energy source.

   2) What is energy management ? Discuss the principles of energy management.

   3) What is energy conservation building code ? List salient features of ECBC.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

   1) What is Sankey diagram ? Explain with suitable examples.

   2) What are the principles of writing a report of energy audit ?

3) Discuss the cash flow diagram. What is the significance ?

4) Explain various types of energy audit.

5) Enlist energy conservation opportunities in pumping system.

5. Attempt **any two** : **(6×2=12)**

1) Explain various instruments with functions of each used to carry out energy audit.

2) How cogeneration leads the energy conservation ?

3) What are the various costing techniques ?

SLR-TJ – 386

Seat No.	

Set P

B.E. (Electrical Engineering) (Part – I) (Old) Examination, 2017
MICROCONTROLLER AND APPLICATION

Day and Date : Tuesday, 12-12-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3. Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Assume ***suitable*** *data* ***wherever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternatives : **(20×1=20)**

1) For selection of banks the bits used are
   a) PSW. 3 and PSW. 4 b) PSW. 7 and PSW. 6
   c) PSW. 1 and PSW. 0 d) SCON. 4 and SCON. 3

2) The SP is of _____ wide register and may be defined any where in the _____.
   a) 8 byte, on chip 128 byte RAM b) 8 byte, on chip 128 byte ROM
   c) 8 bit, on chip 128 byte RAM d) 16 bit , on chip 128 byte RAM

3) Which of the following is invalid instruction ?
   a) ADD A, #30h b) MOV A, @A + DPTR
   c) DEC DPTR d) MOV A, 40 H

4) Which of the following is not bit operated SFR ?
   a) IP b) TCON c) SBUF d) P_0

5) OV flag will set for
   a) No carry from D6 to D7 but carry from D7
   b) Carry from D3 to D4
   c) Carry from D6 to D7 and also carry from D7
   d) None of these

6) Timer overflow flag bit is available in
   a) TCON b) TMOD c) PCON d) SCON

7) The PORT3 pins used to access memory are
   a) P3.0 and P3.1 b) P3.2 and P3.3 c) P3.4 and P3.5 d) P3.6 and P3.7

P.T.O.

8) To double the baud rate the bits used are
   a) SMOD bit from SCON b) SMOD bit from PCON
   c) SM0 and SM1 bit from SCON d) SM2 bit from SCON

9) Following is 8 bit timer for PIC 16F877
   a) Timer 0 b) Timer 1 c) Timer 2 d) Both a) and c)

10) In PIC 16F877 Port A and D are _____ bits wide respectively.
   a) 6, 3 b) 3, 8 c) 8, 8 d) 6, 8

11) CCP module used with
   a) Timer 0 b) Timer 1 c) Timer 2 d) Both b) and c)

12) PIC 16F877 A consist of _____ channel _____ bit of ADC.
   a) 8, 8 b) 8, 10 c) 10, 8 d) None of these

13) DS 1307 RTC IC supports
   a) USART b) SPI c) I^2C d) None of these

14) PIC 16F877 has internal flash memory of _____ and data memory of ____
   a) 8 KB, 64 KB b) 8 KB, 368 KB c) 8 KB, 368 byte d) None of these

15) The reset vector and interrupt vector for PIC 16F877 respectively are
   a) 0000h, 0004h b) 0000h, 0007h c) 0000h, 30h d) 0007h, 0000h

16) _____ pin is used to select the external program ROM.
   a) EA b) $\overline{PSEN}$ c) ALE d) RESET

17) _____ number of address line required to select registers of internal 4K byte of ROM.
   a) 10 b) 14 c) 12 d) 16

18) In the 8051, a stack is implemented in
   a) External RAM b) External ROM c) Internal RAM d) Internal ROM

19) ISR ends with
   a) IE b) RET c) RETI d) RI, TI

20) Identify the invalid instruction
   a) MOV A,@ R_0 b) MOVX A, @ DPTR
   c) MOVC A, @ A + PC d) MOV A, @R_2

SLR-TJ – 386

Seat No.	

B.E. (Electrical Engineering) (Part – I) (Old) Examination, 2017
MICROCONTROLLER AND APPLICATION

Day and Date : Tuesday, 12-12-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***complusory****.*
2) Figure to the ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***wherever*** *necessary.*

2. Solve **any four** : **(4×5=20)**

a) Explain the general purpose registers of 8051.

b) Explain the following instructions
i) MOVC A, @A +PC ii) JNB TF_0, radd

c) Explain the memory organization of the 8051.

d) Write ALP in 8051 to find EVEN and ODD numbers from the block of TEN numbers.

e) Explain the function of following pins of microcontroller 8051.
i) $\overline{INTO}$ ii) $\overline{PSEN}$ iii) $\overline{EA}$

3. a) Interface 8K × 8 Program ROM to 8051. Determine the initial and final address. **10**

b) Explain the interrupt structure of 8051. Explain the SFRs associated with interrupt. **10**

OR

b) Interface ADC0809 to 8051 and write a assembly language program to display a converted data on Port P1. **10**

4. Solve **any four** : **(4×5=20)**

   a) Explain the following instructions
      i) sleep ii) btfsc iii) decfsz

   b) Give steps to be followed for ADC conversion in PIC 16F877.

   c) Explain the features of PIC 16F877.

   d) With neat diagram explain Timer2 and its control register.

   e) Explain the features of RTC DS1307.

5. Solve **any two** : **(2×10=20)**

   a) Explain the addressing mode of PIC16f877. Write a assembly language program for addition of two 16bit numbers.

   b) Explain the port structure of PIC16f877.

   c) Interface LCD to 8051 and write a assembly language program to display "BEST" on it.

SLR-TJ – 386

Seat No.	

Set Q

B.E. (Electrical Engineering) (Part – I) (Old) Examination, 2017
MICROCONTROLLER AND APPLICATION

Day and Date : Tuesday, 12-12-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3. Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Assume ***suitable*** *data* ***wherever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternatives : **(20×1=20)**

1) _____ pin is used to select the external program ROM.
a) EA b) $\overline{PSEN}$ c) ALE d) RESET

2) _____ number of address line required to select registers of internal 4K byte of ROM.
a) 10 b) 14 c) 12 d) 16

3) In the 8051, a stack is implemented in
a) External RAM b) External ROM c) Internal RAM d) Internal ROM

4) ISR ends with
a) IE b) RET c) RETI d) RI, TI

5) Identify the invalid instruction
a) MOV A,@ R_0 b) MOVX A, @ DPTR
c) MOVC A, @ A + PC d) MOV A, @R_2

6) For selection of banks the bits used are
a) PSW. 3 and PSW. 4 b) PSW. 7 and PSW. 6
c) PSW. 1 and PSW. 0 d) SCON. 4 and SCON. 3

7) The SP is of _____ wide register and may be defined any where in the _____.
a) 8 byte, on chip 128 byte RAM b) 8 byte, on chip 128 byte ROM
c) 8 bit, on chip 128 byte RAM d) 16 bit , on chip 128 byte RAM

8) Which of the following is invalid instruction ?
   a) ADD A, #30h
   b) MOV A, @A + DPTR
   c) DEC DPTR
   d) MOV A, 40 H

9) Which of the following is not bit operated SFR ?
   a) IP
   b) TCON
   c) SBUF
   d) P_0

10) OV flag will set for
   a) No carry from D6 to D7 but carry from D7
   b) Carry from D3 to D4
   c) Carry from D6 to D7 and also carry from D7
   d) None of these

11) Timer overflow flag bit is available in
   a) TCON
   b) TMOD
   c) PCON
   d) SCON

12) The PORT3 pins used to access memory are
   a) P3.0 and P3.1
   b) P3.2 and P3.3
   c) P3.4 and P3.5
   d) P3.6 and P3.7

13) To double the baud rate the bits used are
   a) SMOD bit from SCON
   b) SMOD bit from PCON
   c) SM0 and SM1 bit from SCON
   d) SM2 bit from SCON

14) Following is 8 bit timer for PIC 16F877
   a) Timer 0
   b) Timer 1
   c) Timer 2
   d) Both a) and c)

15) In PIC 16F877 Port A and D are _____ bits wide respectively.
   a) 6, 3
   b) 3, 8
   c) 8, 8
   d) 6, 8

16) CCP module used with
   a) Timer 0
   b) Timer 1
   c) Timer 2
   d) Both b) and c)

17) PIC 16F877 A consist of _____ channel _____ bit of ADC.
   a) 8, 8
   b) 8, 10
   c) 10, 8
   d) None of these

18) DS 1307 RTC IC supports
   a) USART
   b) SPI
   c) I^2C
   d) None of these

19) PIC 16F877 has internal flash memory of _____ and data memory of ____
   a) 8 KB, 64 KB
   b) 8 KB, 368 KB
   c) 8 KB, 368 byte
   d) None of these

20) The reset vector and interrupt vector for PIC 16F877 respectively are
   a) 0000h, 0004h
   b) 0000h, 0007h
   c) 0000h, 30h
   d) 0007h, 0000h

_____

SLR-TJ – 386

Seat No.	

B.E. (Electrical Engineering) (Part – I) (Old) Examination, 2017
MICROCONTROLLER AND APPLICATION

Day and Date : Tuesday, 12-12-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***complusory****.*
2) Figure to the ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***wherever*** *necessary.*

2. Solve **any four** : **(4×5=20)**

a) Explain the general purpose registers of 8051.

b) Explain the following instructions
i) MOVC A, @A +PC ii) JNB TF_0, radd

c) Explain the memory organization of the 8051.

d) Write ALP in 8051 to find EVEN and ODD numbers from the block of TEN numbers.

e) Explain the function of following pins of microcontroller 8051.
i) $\overline{INTO}$ ii) $\overline{PSEN}$ iii) $\overline{EA}$

3. a) Interface 8K × 8 Program ROM to 8051. Determine the initial and final address. **10**

b) Explain the interrupt structure of 8051. Explain the SFRs associated with interrupt. **10**

OR

b) Interface ADC0809 to 8051 and write a assembly language program to display a converted data on Port P1. **10**

4. Solve **any four** : **(4×5=20)**

   a) Explain the following instructions
      i) sleep ii) btfsc iii) decfsz

   b) Give steps to be followed for ADC conversion in PIC 16F877.

   c) Explain the features of PIC 16F877.

   d) With neat diagram explain Timer2 and its control register.

   e) Explain the features of RTC DS1307.

5. Solve **any two** : **(2×10=20)**

   a) Explain the addressing mode of PIC16f877. Write a assembly language program for addition of two 16bit numbers.

   b) Explain the port structure of PIC16f877.

   c) Interface LCD to 8051 and write a assembly language program to display "BEST" on it.

SLR-TJ – 386

Seat No.	

Set R

B.E. (Electrical Engineering) (Part – I) (Old) Examination, 2017
MICROCONTROLLER AND APPLICATION

Day and Date : Tuesday, 12-12-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3. Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Assume ***suitable*** *data* ***wherever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternatives : **(20×1=20)**

1) CCP module used with
a) Timer 0 b) Timer 1 c) Timer 2 d) Both b) and c)

2) PIC 16F877 A consist of _____ channel _____ bit of ADC.
a) 8, 8 b) 8, 10 c) 10, 8 d) None of these

3) DS 1307 RTC IC supports
a) USART b) SPI c) I^2C d) None of these

4) PIC 16F877 has internal flash memory of _____ and data memory of ____
a) 8 KB, 64 KB b) 8 KB, 368 KB c) 8 KB, 368 byte d) None of these

5) The reset vector and interrupt vector for PIC 16F877 respectively are
a) 0000h, 0004h b) 0000h, 0007h c) 0000h, 30h d) 0007h, 0000h

6) _____ pin is used to select the external program ROM.
a) EA b) $\overline{PSEN}$ c) ALE d) RESET

7) _____ number of address line required to select registers of internal 4K byte of ROM.
a) 10 b) 14 c) 12 d) 16

8) In the 8051, a stack is implemented in
a) External RAM b) External ROM c) Internal RAM d) Internal ROM

9) ISR ends with
a) IE b) RET c) RETI d) RI, TI

P.T.O.

10) Identify the invalid instruction
a) MOV A,@ R_0 b) MOVX A, @ DPTR
c) MOVC A, @ A + PC d) MOV A, @R_2

11) For selection of banks the bits used are
a) PSW. 3 and PSW. 4 b) PSW. 7 and PSW. 6
c) PSW. 1 and PSW. 0 d) SCON. 4 and SCON. 3

12) The SP is of _____ wide register and may be defined any where in the _____.
a) 8 byte, on chip 128 byte RAM b) 8 byte, on chip 128 byte ROM
c) 8 bit, on chip 128 byte RAM d) 16 bit , on chip 128 byte RAM

13) Which of the following is invalid instruction ?
a) ADD A, #30h b) MOV A, @A + DPTR
c) DEC DPTR d) MOV A, 40 H

14) Which of the following is not bit operated SFR ?
a) IP b) TCON c) SBUF d) P_0

15) OV flag will set for
a) No carry from D6 to D7 but carry from D7
b) Carry from D3 to D4
c) Carry from D6 to D7 and also carry from D7
d) None of these

16) Timer overflow flag bit is available in
a) TCON b) TMOD c) PCON d) SCON

17) The PORT3 pins used to access memory are
a) P3.0 and P3.1 b) P3.2 and P3.3 c) P3.4 and P3.5 d) P3.6 and P3.7

18) To double the baud rate the bits used are
a) SMOD bit from SCON b) SMOD bit from PCON
c) SM0 and SM1 bit from SCON d) SM2 bit from SCON

19) Following is 8 bit timer for PIC 16F877
a) Timer 0 b) Timer 1 c) Timer 2 d) Both a) and c)

20) In PIC 16F877 Port A and D are _____ bits wide respectively.
a) 6, 3 b) 3, 8 c) 8, 8 d) 6, 8

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Seat No.	

B.E. (Electrical Engineering) (Part – I) (Old) Examination, 2017
MICROCONTROLLER AND APPLICATION

Day and Date : Tuesday, 12-12-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***complusory****.*
2) Figure to the ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***wherever*** *necessary.*

2. Solve **any four** : **(4×5=20)**

a) Explain the general purpose registers of 8051.

b) Explain the following instructions
i) MOVC A, @A +PC ii) JNB TF_0, radd

c) Explain the memory organization of the 8051.

d) Write ALP in 8051 to find EVEN and ODD numbers from the block of TEN numbers.

e) Explain the function of following pins of microcontroller 8051.
i) $\overline{INTO}$ ii) $\overline{PSEN}$ iii) $\overline{EA}$

3. a) Interface 8K × 8 Program ROM to 8051. Determine the initial and final address. **10**

b) Explain the interrupt structure of 8051. Explain the SFRs associated with interrupt. **10**

OR

b) Interface ADC0809 to 8051 and write a assembly language program to display a converted data on Port P1. **10**

4. Solve **any four** : **(4×5=20)**

   a) Explain the following instructions
      i) sleep ii) btfsc iii) decfsz

   b) Give steps to be followed for ADC conversion in PIC 16F877.

   c) Explain the features of PIC 16F877.

   d) With neat diagram explain Timer2 and its control register.

   e) Explain the features of RTC DS1307.

5. Solve **any two** : **(2×10=20)**

   a) Explain the addressing mode of PIC16f877. Write a assembly language program for addition of two 16bit numbers.

   b) Explain the port structure of PIC16f877.

   c) Interface LCD to 8051 and write a assembly language program to display "BEST" on it.

SLR-TJ – 386

Seat No.	

Set S

B.E. (Electrical Engineering) (Part – I) (Old) Examination, 2017
MICROCONTROLLER AND APPLICATION

Day and Date : Tuesday, 12-12-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3. Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Assume ***suitable*** *data* ***wherever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternatives : **(20×1=20)**

1) Timer overflow flag bit is available in
a) TCON b) TMOD c) PCON d) SCON

2) The PORT3 pins used to access memory are
a) P3.0 and P3.1 b) P3.2 and P3.3 c) P3.4 and P3.5 d) P3.6 and P3.7

3) To double the baud rate the bits used are
a) SMOD bit from SCON b) SMOD bit from PCON
c) SM0 and SM1 bit from SCON d) SM2 bit from SCON

4) Following is 8 bit timer for PIC 16F877
a) Timer 0 b) Timer 1 c) Timer 2 d) Both a) and c)

5) In PIC 16F877 Port A and D are _____ bits wide respectively.
a) 6, 3 b) 3, 8 c) 8, 8 d) 6, 8

6) CCP module used with
a) Timer 0 b) Timer 1 c) Timer 2 d) Both b) and c)

7) PIC 16F877 A consist of _____ channel _____ bit of ADC.
a) 8, 8 b) 8, 10 c) 10, 8 d) None of these

8) DS 1307 RTC IC supports
a) USART b) SPI c) I^2C d) None of these

9) PIC 16F877 has internal flash memory of _____ and data memory of ____
a) 8 KB, 64 KB b) 8 KB, 368 KB c) 8 KB, 368 byte d) None of these

P.T.O.

10) The reset vector and interrupt vector for PIC 16F877 respectively are
a) 0000h, 0004h b) 0000h, 0007h c) 0000h, 30h d) 0007h, 0000h

11) _____ pin is used to select the external program ROM.
a) EA b) $\overline{PSEN}$ c) ALE d) RESET

12) _____ number of address line required to select registers of internal 4K byte of ROM.
a) 10 b) 14 c) 12 d) 16

13) In the 8051, a stack is implemented in
a) External RAM b) External ROM c) Internal RAM d) Internal ROM

14) ISR ends with
a) IE b) RET c) RETI d) RI, TI

15) Identify the invalid instruction
a) MOV A,@ R_0 b) MOVX A, @ DPTR
c) MOVC A, @ A + PC d) MOV A, @R_2

16) For selection of banks the bits used are
a) PSW. 3 and PSW. 4 b) PSW. 7 and PSW. 6
c) PSW. 1 and PSW. 0 d) SCON. 4 and SCON. 3

17) The SP is of _____ wide register and may be defined any where in the _____.
a) 8 byte, on chip 128 byte RAM b) 8 byte, on chip 128 byte ROM
c) 8 bit, on chip 128 byte RAM d) 16 bit , on chip 128 byte RAM

18) Which of the following is invalid instruction ?
a) ADD A, #30h b) MOV A, @A + DPTR
c) DEC DPTR d) MOV A, 40 H

19) Which of the following is not bit operated SFR ?
a) IP b) TCON c) SBUF d) P_0

20) OV flag will set for
a) No carry from D6 to D7 but carry from D7
b) Carry from D3 to D4
c) Carry from D6 to D7 and also carry from D7
d) None of these

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Seat No.	

B.E. (Electrical Engineering) (Part – I) (Old) Examination, 2017
MICROCONTROLLER AND APPLICATION

Day and Date : Tuesday, 12-12-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***complusory****.*
2) Figure to the ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data ***wherever*** *necessary.*

2. Solve **any four** : **(4×5=20)**

a) Explain the general purpose registers of 8051.

b) Explain the following instructions
i) MOVC A, @A +PC ii) JNB TF_0, radd

c) Explain the memory organization of the 8051.

d) Write ALP in 8051 to find EVEN and ODD numbers from the block of TEN numbers.

e) Explain the function of following pins of microcontroller 8051.
i) $\overline{INTO}$ ii) $\overline{PSEN}$ iii) $\overline{EA}$

3. a) Interface 8K × 8 Program ROM to 8051. Determine the initial and final address. **10**

b) Explain the interrupt structure of 8051. Explain the SFRs associated with interrupt. **10**

OR

b) Interface ADC0809 to 8051 and write a assembly language program to display a converted data on Port P1. **10**

4. Solve **any four** : **(4×5=20)**

   a) Explain the following instructions
      i) sleep ii) btfsc iii) decfsz

   b) Give steps to be followed for ADC conversion in PIC 16F877.

   c) Explain the features of PIC 16F877.

   d) With neat diagram explain Timer2 and its control register.

   e) Explain the features of RTC DS1307.

5. Solve **any two** : **(2×10=20)**

   a) Explain the addressing mode of PIC16f877. Write a assembly language program for addition of two 16bit numbers.

   b) Explain the port structure of PIC16f877.

   c) Interface LCD to 8051 and write a assembly language program to display "BEST" on it.

SLR-TJ – 387

Seat No.	

Set P

B.E. (Electrical) (Part – I) (Old) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 14-12-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Open circuit test on a transformer is conducted to obtain
A) the leakage impedances B) the ohmic loss
C) hysteresis loss only D) core loss only

2) Transformer-core laminations are made of
A) cast iron B) wrought iron C) silicon steel D) cast steel

3) Transformer action requires a
A) constant magnetic flux B) increasing magnetic flux
C) alternating magnetic flux D) alternating electric flux

4) Which component of the no load current of the transformer is opposite in phase to the induced emf ?
A) magnetizing component B) core loss component
C) both A) and B) above D) none of the above

5) In transformers, the cylindrical winding with rectangular conductors is generally used for
A) low voltage winding B) high voltage winding
C) tertiary voltage winding D) any of the above

6) Yokes with rectangular cross-section are used for
A) small capacity transformers B) medium capacity transformers
C) large capacity transformers D) any of the above

7) The length of air gap to be provided in _____ is primarily determined by power factor consideration.
A) d.c. series motor B) d.c. shunt motor
C) induction motor D) synchronous motor

P.T.O.

8) The power factor of the induction motor will be _____ if the magnetizing current is _____
A) low ... low B) high ... high C) high ... low D) low ... high

9) In the design of induction motors, normally the number of slots per pole per phase is taken as
A) two B) three C) three or more D) three or less

10) Normally open type stator slots in induction motors are not provided because
A) exciting current increases
B) coils cannot be slid through the top
C) time required for the winding will be large
D) none of the above

11) In induction motors, the difference between the number of stator and rotor slots should not be
A) P B) 2P C) 5P D) Any of the above

12) Skewing of rotor slots helps in
A) improving beat transfer B) reducing noise
C) suppressing undesirable harmonics D) all of the above

13) Air gap of three phase induction motor is kept small to
A) reduce noise B) obtain high torque
C) reduce magnetizing current D) reduce crawling

14) The number of turns in the starting winding of a capacitor start motor as compared to that for split phase motor is
A) same B) more C) less D) none of the above

15) A single phase motor generally used for small air compressor is
A) capacitor start capacitor run motor B) reluctance motor
C) universal motor D) shaded pole motor

16) Turbo-alternators of rating _____ and above are normally hydrogen cooled.
A) 10 MW B) 20 MW C) 25 MW D) 50 MW

17) If a synchronous motor fails to start, the probable cause could be
A) low voltage B) too much load at starting
C) single phasing D) any of the above

18) In case a synchronous motor starts but fails to develop full torque, the probable cause could be
A) low excited voltage B) reverse field winding
C) open or short circuit D) any of the above

19) Out of the following motors, which will give the highest starting torque ?
A) Universal motor B) Capacitor start motor
C) Shaded pole motor D) All have zero starting torque

20) The starting capacitor of a single phase motor is
A) Electrolytic capacitor B) Ceramic capacitor
C) Paper capacitor D) None of the above

SLR-TJ – 387

Seat No.	

B.E. (Electrical) (Part – I) (Old) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 14-12-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(5×4=20)**

   a) Find the expression for KVA rating of single phase shell type transformer.

   b) The ratio of flux to full load mmf in a 400 KVA, 50 Hz, 1-phase core type power t/f is 2.4×10^{-6}. Calculate the net iron area and the window area of the t/f. Maximum flux density in the core is 1.3 wb/m^2, current density 2.7 A/mm^2 and window space factor 0.26. Also calculate full load mmf.

   c) Explain different types of windings used in a transformer.

   d) Explain the procedure to draw the circle diagram.

   e) Find the expression for overload capacity of 3 phase IM in terms of dispersion co-efficient.

3. Solve **any two** : **(10×2=20)**

   a) What are the different methods of cooling in transformer ? Explain any one method.

   b) Derive the output equation for 3 phase core type transformer with usual notations.

   c) Find the main dimensions of a 15 kW, 3-phase, 400 V, 50 Hz, 2810 rpm squirrel cage I.M. having an efficiency of 0.88 and a full load power factor of 0.9. Specific magnetic loading = 0.5 wb/m^2, specific electric loading = 25000 A/m. Take the peripheral speed as approximately 20 m/s at synchronous speed.

SECTION – II

4. Solve **any four** : **(5×4=20)**

   a) Explain how synchronous motor is a synchronous condenser.

   b) Explain double revolving field theory of single phase induction motor.

   c) Derive the output equation of single phase induction motor.

   d) Why 1-phase I.M. is not self-starting ?

   e) Draw torque slip characteristics of single phase induction motor on the basis of double revolving field theory and explain.

5. Solve **any two** : **(10×2=20)**

   a) Explain how you estimate equivalent circuit parameters by conducting O.C. and S.C. test on single phase induction motor.

   b) Find the main dimensions of a 2500 KVA, 187.5 rpm, 50 Hz, 3-phase, 3kV, salient pole synchronous machine. The alternator is to be vertical, water wheel type. The specific magnetic loading is 0.6 wb/m^2 and the specific electric loading is 34000 A/m. Use circular poles with ratio of core length to pole pitch = 0.65. Specify the type of pole construction used if the run-away speed is about 2 times the normal speed.

   c) Draw the vector diagram of salient pole alternator and find power equation.

SLR-TJ – 387

Seat No.	

Set Q

B.E. (Electrical) (Part – I) (Old) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 14-12-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Turbo-alternators of rating _____ and above are normally hydrogen cooled.
A) 10 MW B) 20 MW C) 25 MW D) 50 MW

2) If a synchronous motor fails to start, the probable cause could be
A) low voltage B) too much load at starting
C) single phasing D) any of the above

3) In case a synchronous motor starts but fails to develop full torque, the probable cause could be
A) low excited voltage B) reverse field winding
C) open or short circuit D) any of the above

4) Out of the following motors, which will give the highest starting torque ?
A) Universal motor B) Capacitor start motor
C) Shaded pole motor D) All have zero starting torque

5) The starting capacitor of a single phase motor is
A) Electrolytic capacitor B) Ceramic capacitor
C) Paper capacitor D) None of the above

6) Open circuit test on a transformer is conducted to obtain
A) the leakage impedances B) the ohmic loss
C) hysteresis loss only D) core loss only

7) Transformer-core laminations are made of
A) cast iron B) wrought iron C) silicon steel D) cast steel

8) Transformer action requires a
A) constant magnetic flux B) increasing magnetic flux
C) alternating magnetic flux D) alternating electric flux

P.T.O.

9) Which component of the no load current of the transformer is opposite in phase to the induced emf ?
   A) magnetizing component B) core loss component
   C) both A) and B) above D) none of the above
10) In transformers, the cylindrical winding with rectangular conductors is generally used for
   A) low voltage winding B) high voltage winding
   C) tertiary voltage winding D) any of the above
11) Yokes with rectangular cross-section are used for
   A) small capacity transformers B) medium capacity transformers
   C) large capacity transformers D) any of the above
12) The length of air gap to be provided in _____ is primarily determined by power factor consideration.
   A) d.c. series motor B) d.c. shunt motor
   C) induction motor D) synchronous motor
13) The power factor of the induction motor will be _____ if the magnetizing current is _____
   A) low ... low B) high ... high C) high ... low D) low ... high
14) In the design of induction motors, normally the number of slots per pole per phase is taken as
   A) two B) three C) three or more D) three or less
15) Normally open type stator slots in induction motors are not provided because
   A) exciting current increases
   B) coils cannot be slid through the top
   C) time required for the winding will be large
   D) none of the above
16) In induction motors, the difference between the number of stator and rotor slots should not be
   A) P B) 2P C) 5P D) Any of the above
17) Skewing of rotor slots helps in
   A) improving beat transfer B) reducing noise
   C) suppressing undesirable harmonics D) all of the above
18) Air gap of three phase induction motor is kept small to
   A) reduce noise B) obtain high torque
   C) reduce magnetizing current D) reduce crawling
19) The number of turns in the starting winding of a capacitor start motor as compared to that for split phase motor is
   A) same B) more C) less D) none of the above
20) A single phase motor generally used for small air compressor is
   A) capacitor start capacitor run motor B) reluctance motor
   C) universal motor D) shaded pole motor

SLR-TJ – 387

Seat No.	

B.E. (Electrical) (Part – I) (Old) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 14-12-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(5×4=20)**

   a) Find the expression for KVA rating of single phase shell type transformer.

   b) The ratio of flux to full load mmf in a 400 KVA, 50 Hz, 1-phase core type power t/f is 2.4×10^{-6}. Calculate the net iron area and the window area of the t/f. Maximum flux density in the core is 1.3 wb/m^2, current density 2.7 A/mm^2 and window space factor 0.26. Also calculate full load mmf.

   c) Explain different types of windings used in a transformer.

   d) Explain the procedure to draw the circle diagram.

   e) Find the expression for overload capacity of 3 phase IM in terms of dispersion co-efficient.

3. Solve **any two** : **(10×2=20)**

   a) What are the different methods of cooling in transformer ? Explain any one method.

   b) Derive the output equation for 3 phase core type transformer with usual notations.

   c) Find the main dimensions of a 15 kW, 3-phase, 400 V, 50 Hz, 2810 rpm squirrel cage I.M. having an efficiency of 0.88 and a full load power factor of 0.9. Specific magnetic loading = 0.5 wb/m^2, specific electric loading = 25000 A/m. Take the peripheral speed as approximately 20 m/s at synchronous speed.

SECTION – II

4. Solve **any four** : **(5×4=20)**

   a) Explain how synchronous motor is a synchronous condenser.

   b) Explain double revolving field theory of single phase induction motor.

   c) Derive the output equation of single phase induction motor.

   d) Why 1-phase I.M. is not self-starting ?

   e) Draw torque slip characteristics of single phase induction motor on the basis of double revolving field theory and explain.

5. Solve **any two** : **(10×2=20)**

   a) Explain how you estimate equivalent circuit parameters by conducting O.C. and S.C. test on single phase induction motor.

   b) Find the main dimensions of a 2500 KVA, 187.5 rpm, 50 Hz, 3-phase, 3kV, salient pole synchronous machine. The alternator is to be vertical, water wheel type. The specific magnetic loading is 0.6 wb/m^2 and the specific electric loading is 34000 A/m. Use circular poles with ratio of core length to pole pitch = 0.65. Specify the type of pole construction used if the run-away speed is about 2 times the normal speed.

   c) Draw the vector diagram of salient pole alternator and find power equation.

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Seat No.	

Set R

B.E. (Electrical) (Part – I) (Old) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 14-12-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) In induction motors, the difference between the number of stator and rotor slots should not be
A) P B) 2P C) 5P D) Any of the above

2) Skewing of rotor slots helps in
A) improving beat transfer B) reducing noise
C) suppressing undesirable harmonics D) all of the above

3) Air gap of three phase induction motor is kept small to
A) reduce noise B) obtain high torque
C) reduce magnetizing current D) reduce crawling

4) The number of turns in the starting winding of a capacitor start motor as compared to that for split phase motor is
A) same B) more C) less D) none of the above

5) A single phase motor generally used for small air compressor is
A) capacitor start capacitor run motor B) reluctance motor
C) universal motor D) shaded pole motor

6) Turbo-alternators of rating _____ and above are normally hydrogen cooled.
A) 10 MW B) 20 MW C) 25 MW D) 50 MW

7) If a synchronous motor fails to start, the probable cause could be
A) low voltage B) too much load at starting
C) single phasing D) any of the above

8) In case a synchronous motor starts but fails to develop full torque, the probable cause could be
A) low excited voltage B) reverse field winding
C) open or short circuit D) any of the above

9) Out of the following motors, which will give the highest starting torque ?
   A) Universal motor B) Capacitor start motor
   C) Shaded pole motor D) All have zero starting torque
10) The starting capacitor of a single phase motor is
   A) Electrolytic capacitor B) Ceramic capacitor
   C) Paper capacitor D) None of the above
11) Open circuit test on a transformer is conducted to obtain
   A) the leakage impedances B) the ohmic loss
   C) hysteresis loss only D) core loss only
12) Transformer-core laminations are made of
   A) cast iron B) wrought iron C) silicon steel D) cast steel
13) Transformer action requires a
   A) constant magnetic flux B) increasing magnetic flux
   C) alternating magnetic flux D) alternating electric flux
14) Which component of the no load current of the transformer is opposite in phase to the induced emf ?
   A) magnetizing component B) core loss component
   C) both A) and B) above D) none of the above
15) In transformers, the cylindrical winding with rectangular conductors is generally used for
   A) low voltage winding B) high voltage winding
   C) tertiary voltage winding D) any of the above
16) Yokes with rectangular cross-section are used for
   A) small capacity transformers B) medium capacity transformers
   C) large capacity transformers D) any of the above
17) The length of air gap to be provided in _____ is primarily determined by power factor consideration.
   A) d.c. series motor B) d.c. shunt motor
   C) induction motor D) synchronous motor
18) The power factor of the induction motor will be _____ if the magnetizing current is _____
   A) low ... low B) high ... high C) high ... low D) low ... high
19) In the design of induction motors, normally the number of slots per pole per phase is taken as
   A) two B) three C) three or more D) three or less
20) Normally open type stator slots in induction motors are not provided because
   A) exciting current increases
   B) coils cannot be slid through the top
   C) time required for the winding will be large
   D) none of the above

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Seat No.	

B.E. (Electrical) (Part – I) (Old) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 14-12-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(5×4=20)**

   a) Find the expression for KVA rating of single phase shell type transformer.

   b) The ratio of flux to full load mmf in a 400 KVA, 50 Hz, 1-phase core type power t/f is 2.4×10^{-6}. Calculate the net iron area and the window area of the t/f. Maximum flux density in the core is 1.3 wb/m^2, current density 2.7 A/mm^2 and window space factor 0.26. Also calculate full load mmf.

   c) Explain different types of windings used in a transformer.

   d) Explain the procedure to draw the circle diagram.

   e) Find the expression for overload capacity of 3 phase IM in terms of dispersion co-efficient.

3. Solve **any two** : **(10×2=20)**

   a) What are the different methods of cooling in transformer ? Explain any one method.

   b) Derive the output equation for 3 phase core type transformer with usual notations.

   c) Find the main dimensions of a 15 kW, 3-phase, 400 V, 50 Hz, 2810 rpm squirrel cage I.M. having an efficiency of 0.88 and a full load power factor of 0.9. Specific magnetic loading = 0.5 wb/m^2, specific electric loading = 25000 A/m. Take the peripheral speed as approximately 20 m/s at synchronous speed.

SECTION – II

4. Solve **any four** : **(5×4=20)**

   a) Explain how synchronous motor is a synchronous condenser.

   b) Explain double revolving field theory of single phase induction motor.

   c) Derive the output equation of single phase induction motor.

   d) Why 1-phase I.M. is not self-starting ?

   e) Draw torque slip characteristics of single phase induction motor on the basis of double revolving field theory and explain.

5. Solve **any two** : **(10×2=20)**

   a) Explain how you estimate equivalent circuit parameters by conducting O.C. and S.C. test on single phase induction motor.

   b) Find the main dimensions of a 2500 KVA, 187.5 rpm, 50 Hz, 3-phase, 3kV, salient pole synchronous machine. The alternator is to be vertical, water wheel type. The specific magnetic loading is 0.6 wb/m^2 and the specific electric loading is 34000 A/m. Use circular poles with ratio of core length to pole pitch = 0.65. Specify the type of pole construction used if the run-away speed is about 2 times the normal speed.

   c) Draw the vector diagram of salient pole alternator and find power equation.

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Seat No.	

Set S

B.E. (Electrical) (Part – I) (Old) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 14-12-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Yokes with rectangular cross-section are used for
   A) small capacity transformers B) medium capacity transformers
   C) large capacity transformers D) any of the above

2) The length of air gap to be provided in _____ is primarily determined by power factor consideration.
   A) d.c. series motor B) d.c. shunt motor
   C) induction motor D) synchronous motor

3) The power factor of the induction motor will be _____ if the magnetizing current is _____
   A) low ... low B) high ... high C) high ... low D) low ... high

4) In the design of induction motors, normally the number of slots per pole per phase is taken as
   A) two B) three C) three or more D) three or less

5) Normally open type stator slots in induction motors are not provided because
   A) exciting current increases
   B) coils cannot be slid through the top
   C) time required for the winding will be large
   D) none of the above

6) In induction motors, the difference between the number of stator and rotor slots should not be
   A) P B) 2P C) 5P D) Any of the above

7) Skewing of rotor slots helps in
   A) improving beat transfer B) reducing noise
   C) suppressing undesirable harmonics D) all of the above

P.T.O.

8) Air gap of three phase induction motor is kept small to
   A) reduce noise B) obtain high torque
   C) reduce magnetizing current D) reduce crawling
9) The number of turns in the starting winding of a capacitor start motor as compared to that for split phase motor is
   A) same B) more C) less D) none of the above
10) A single phase motor generally used for small air compressor is
   A) capacitor start capacitor run motor B) reluctance motor
   C) universal motor D) shaded pole motor
11) Turbo-alternators of rating _____ and above are normally hydrogen cooled.
   A) 10 MW B) 20 MW C) 25 MW D) 50 MW
12) If a synchronous motor fails to start, the probable cause could be
   A) low voltage B) too much load at starting
   C) single phasing D) any of the above
13) In case a synchronous motor starts but fails to develop full torque, the probable cause could be
   A) low excited voltage B) reverse field winding
   C) open or short circuit D) any of the above
14) Out of the following motors, which will give the highest starting torque ?
   A) Universal motor B) Capacitor start motor
   C) Shaded pole motor D) All have zero starting torque
15) The starting capacitor of a single phase motor is
   A) Electrolytic capacitor B) Ceramic capacitor
   C) Paper capacitor D) None of the above
16) Open circuit test on a transformer is conducted to obtain
   A) the leakage impedances B) the ohmic loss
   C) hysteresis loss only D) core loss only
17) Transformer-core laminations are made of
   A) cast iron B) wrought iron C) silicon steel D) cast steel
18) Transformer action requires a
   A) constant magnetic flux B) increasing magnetic flux
   C) alternating magnetic flux D) alternating electric flux
19) Which component of the no load current of the transformer is opposite in phase to the induced emf ?
   A) magnetizing component B) core loss component
   C) both A) and B) above D) none of the above
20) In transformers, the cylindrical winding with rectangular conductors is generally used for
   A) low voltage winding B) high voltage winding
   C) tertiary voltage winding D) any of the above

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Seat No.	

B.E. (Electrical) (Part – I) (Old) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 14-12-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(5×4=20)**

   a) Find the expression for KVA rating of single phase shell type transformer.

   b) The ratio of flux to full load mmf in a 400 KVA, 50 Hz, 1-phase core type power t/f is 2.4×10^{-6}. Calculate the net iron area and the window area of the t/f. Maximum flux density in the core is 1.3 wb/m^2, current density 2.7 A/mm^2 and window space factor 0.26. Also calculate full load mmf.

   c) Explain different types of windings used in a transformer.

   d) Explain the procedure to draw the circle diagram.

   e) Find the expression for overload capacity of 3 phase IM in terms of dispersion co-efficient.

3. Solve **any two** : **(10×2=20)**

   a) What are the different methods of cooling in transformer ? Explain any one method.

   b) Derive the output equation for 3 phase core type transformer with usual notations.

   c) Find the main dimensions of a 15 kW, 3-phase, 400 V, 50 Hz, 2810 rpm squirrel cage I.M. having an efficiency of 0.88 and a full load power factor of 0.9. Specific magnetic loading = 0.5 wb/m^2, specific electric loading = 25000 A/m. Take the peripheral speed as approximately 20 m/s at synchronous speed.

SECTION – II

4. Solve **any four** : **(5×4=20)**

   a) Explain how synchronous motor is a synchronous condenser.

   b) Explain double revolving field theory of single phase induction motor.

   c) Derive the output equation of single phase induction motor.

   d) Why 1-phase I.M. is not self-starting ?

   e) Draw torque slip characteristics of single phase induction motor on the basis of double revolving field theory and explain.

5. Solve **any two** : **(10×2=20)**

   a) Explain how you estimate equivalent circuit parameters by conducting O.C. and S.C. test on single phase induction motor.

   b) Find the main dimensions of a 2500 KVA, 187.5 rpm, 50 Hz, 3-phase, 3kV, salient pole synchronous machine. The alternator is to be vertical, water wheel type. The specific magnetic loading is 0.6 wb/m^2 and the specific electric loading is 34000 A/m. Use circular poles with ratio of core length to pole pitch = 0.65. Specify the type of pole construction used if the run-away speed is about 2 times the normal speed.

   c) Draw the vector diagram of salient pole alternator and find power equation.

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Seat No.	

Set P

B.E. (Part – I) (Old) (Electrical Engineering) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Saturday, 16-12-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *:1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume the suitable data ***whenever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :
   1) A condenser in a thermal power plant condenses steam combing out of
      A) Boiler B) Super-heater C) Economizer D) Turbine
   2) Which of the following, is not a high pressure boiler ?
      A) Loeffler boiler B) Lancashire boiler
      C) Velox boiler D) Lamont boiler
   3) For low head and high discharge, the hydraulic turbine used is
      A) Kaplan turbine B) Francis turbine
      C) Pelton wheel D) Jonual turbine
   4) Overall thermal efficiency of a steam power station is in the range
      A) 18 – 24% B) 30 – 40% C) 44 – 62% D) 68 – 79%
   5) A gas turbine works on
      A) Carnot cycle B) Brayton cycle C) Dual cycle D) Rankine cycle
   6) The performance of engines of different HP, RPM and sizes can be compared on the basis of
      A) Specific fuel consumption B) Compression ratio
      C) Clearance volume D) Cylinder volume
   7) What is the maximum size of steam turbine usually being installed, for thermal power plants ?
      A) 120 MW B) 250 MW C) 500 MW D) 1000 MW
   8) In pumped storage
      A) Power is produced by means of pumps
      B) Water is stored by pumping to high pressures
      C) Downstream water is pumped up-stream during off load periods
      D) Water is re circulated through turbine

9) Ash content of most of the Indian coals is around
A) 1% B) 5% C) 10% D) 20%

10) Most of the generators in thermal power plants run at
A) 3000 rpm B) 1500 rpm C) 1000 rpm D) 750 rpm

11) A Pelton wheel is
A) inward flow impulse turbine B) outward flow impulse turbine
C) inward flow reaction turbine D) axial flow impulse turbine

12) The steam consumption per k Wh of electricity generated in a modem power plant is of the order of
A) 1 – 2 kgs B) 2 – 4 kgs C) 5 – 7 kgs D) 10 – 12 kgs

13) Particles having the same atomic number but different mass numbers are called
A) Positrons B) Beta particles
C) Isotopes D) Decayed panicles

14) Soot is virtually nothing but
A) ash B) cinder C) gas D) carbon

15) Compressor used in gas turbines is
A) reciprocating compressor B) plunger type compressor
C) screw compressor D) multistage axial flow compressor

16) IN Francis turbine runner, the number of blades is usually of the order of
A) 16 – 24 B) 8 – 10 C) 6 – 8 D) 3 – 6

17) Fuel cells are
A) Carbon cells B) Hydrogen battery
C) Nuclear cell D) Chromium cell

18) The boilers using lignite as fuel do not use
A) under feed stoker B) traveling grate stoker
C) spreader stoker D) all of the above

19) In a steam power plant water is used for cooling purposes in
A) boiler B) economizer C) condenser D) super-heaters

20) Dam : Hydro plant ::
A) Chimney : Gases B) Coal : Steam plant
C) Gas turbine : Steam turbine D) Reactor : Nuclear plant

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Seat No.	

B.E. (Part – I) (Old) (Electrical Engineering) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Saturday, 16-12-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **20**
   1) Draw typical layout of nuclear power plant.
   2) What do you understand by load curve ? What information's are conveyed by a load curve ?
   3) Define the following :
      Diversity factor, demand factor, maximum demand, connected load.
   4) Why is the overall efficiency of a steam power station is very low ?
   5) Explain with a neat plots the thermodynamics cycle related to power plant.
3. Solve **any two** : **20**
   1) Draw a neat schematic diagram of a Hydro Power Plant and explain the function of various components.
   2) Explain in brief different types of tariff.
   3) With neat sketches explain briefly the solar power plant and wind power plant.

SECTION – II

4. Solve **any four** : **20**
   1) What are the factors influencing co-generating choice ?
   2) Explain Pelton wheel hydro turbine.
   3) Write short note on ash handling system.
   4) Explain nuclear fission reaction.
   5) Discuss the harmful effect of emission and steps taken for and their impact.
5. Solve **any two** : **20**
   1) Discuss the different areas responsible for environmental pollution.
   2) With a neat diagram explain PWR type and CANDU type reactor.
   3) Draw typical layout of thermal power plant and explain it briefly.

Set P

Set P

SLR-TJ – 388

Seat No.	

Set Q

B.E. (Part – I) (Old) (Electrical Engineering) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Saturday, 16-12-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume the suitable data ***whenever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :
   1) IN Francis turbine runner, the number of blades is usually of the order of
      A) 16 – 24 B) 8 – 10 C) 6 – 8 D) 3 – 6
   2) Fuel cells are
      A) Carbon cells B) Hydrogen battery
      C) Nuclear cell D) Chromium cell
   3) The boilers using lignite as fuel do not use
      A) under feed stoker B) traveling grate stoker
      C) spreader stoker D) all of the above
   4) In a steam power plant water is used for cooling purposes in
      A) boiler B) economizer C) condenser D) super-heaters
   5) Dam : Hydro plant ::
      A) Chimney : Gases B) Coal : Steam plant
      C) Gas turbine : Steam turbine D) Reactor : Nuclear plant
   6) A condenser in a thermal power plant condenses steam combing out of
      A) Boiler B) Super-heater C) Economizer D) Turbine
   7) Which of the following, is not a high pressure boiler ?
      A) Loeffler boiler B) Lancashire boiler
      C) Velox boiler D) Lamont boiler
   8) For low head and high discharge, the hydraulic turbine used is
      A) Kaplan turbine B) Francis turbine
      C) Pelton wheel D) Jonual turbine

9) Overall thermal efficiency of a steam power station is in the range
A) 18 – 24% B) 30 – 40% C) 44 – 62% D) 68 – 79%

10) A gas turbine works on
A) Carnot cycle B) Brayton cycle C) Dual cycle D) Rankine cycle

11) The performance of engines of different HP, RPM and sizes can be compared on the basis of
A) Specific fuel consumption B) Compression ratio
C) Clearance volume D) Cylinder volume

12) What is the maximum size of steam turbine usually being installed, for thermal power plants ?
A) 120 MW B) 250 MW C) 500 MW D) 1000 MW

13) In pumped storage
A) Power is produced by means of pumps
B) Water is stored by pumping to high pressures
C) Downstream water is pumped up-stream during off load periods
D) Water is re circulated through turbine

14) Ash content of most of the Indian coals is around
A) 1% B) 5% C) 10% D) 20%

15) Most of the generators in thermal power plants run at
A) 3000 rpm B) 1500 rpm C) 1000 rpm D) 750 rpm

16) A Pelton wheel is
A) inward flow impulse turbine B) outward flow impulse turbine
C) inward flow reaction turbine D) axial flow impulse turbine

17) The steam consumption per k Wh of electricity generated in a modem power plant is of the order of
A) 1 – 2 kgs B) 2 – 4 kgs C) 5 – 7 kgs D) 10 – 12 kgs

18) Particles having the same atomic number but different mass numbers are called
A) Positrons B) Beta particles
C) Isotopes D) Decayed panicles

19) Soot is virtually nothing but
A) ash B) cinder C) gas D) carbon

20) Compressor used in gas turbines is
A) reciprocating compressor B) plunger type compressor
C) screw compressor D) multistage axial flow compressor

SLR-TJ – 388

Seat No.	

B.E. (Part – I) (Old) (Electrical Engineering) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Saturday, 16-12-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **20**
   1) Draw typical layout of nuclear power plant.
   2) What do you understand by load curve ? What information's are conveyed by a load curve ?
   3) Define the following :
      Diversity factor, demand factor, maximum demand, connected load.
   4) Why is the overall efficiency of a steam power station is very low ?
   5) Explain with a neat plots the thermodynamics cycle related to power plant.
3. Solve **any two** : **20**
   1) Draw a neat schematic diagram of a Hydro Power Plant and explain the function of various components.
   2) Explain in brief different types of tariff.
   3) With neat sketches explain briefly the solar power plant and wind power plant.

SECTION – II

4. Solve **any four** : **20**
   1) What are the factors influencing co-generating choice ?
   2) Explain Pelton wheel hydro turbine.
   3) Write short note on ash handling system.
   4) Explain nuclear fission reaction.
   5) Discuss the harmful effect of emission and steps taken for and their impact.
5. Solve **any two** : **20**
   1) Discuss the different areas responsible for environmental pollution.
   2) With a neat diagram explain PWR type and CANDU type reactor.
   3) Draw typical layout of thermal power plant and explain it briefly.

Set Q

Set Q

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Seat No.	

Set R

B.E. (Part – I) (Old) (Electrical Engineering) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Saturday, 16-12-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume the suitable data ***whenever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

1) A Pelton wheel is
   A) inward flow impulse turbine B) outward flow impulse turbine
   C) inward flow reaction turbine D) axial flow impulse turbine

2) The steam consumption per k Wh of electricity generated in a modem power plant is of the order of
   A) 1 – 2 kgs B) 2 – 4 kgs C) 5 – 7 kgs D) 10 – 12 kgs

3) Particles having the same atomic number but different mass numbers are called
   A) Positrons B) Beta particles
   C) Isotopes D) Decayed panicles

4) Soot is virtually nothing but
   A) ash B) cinder C) gas D) carbon

5) Compressor used in gas turbines is
   A) reciprocating compressor B) plunger type compressor
   C) screw compressor D) multistage axial flow compressor

6) IN Francis turbine runner, the number of blades is usually of the order of
   A) 16 – 24 B) 8 – 10 C) 6 – 8 D) 3 – 6

7) Fuel cells are
   A) Carbon cells B) Hydrogen battery
   C) Nuclear cell D) Chromium cell

8) The boilers using lignite as fuel do not use
   A) under feed stoker B) traveling grate stoker
   C) spreader stoker D) all of the above
9) In a steam power plant water is used for cooling purposes in
   A) boiler B) economizer C) condenser D) super-heaters
10) Dam : Hydro plant ::
   A) Chimney : Gases B) Coal : Steam plant
   C) Gas turbine : Steam turbine D) Reactor : Nuclear plant
11) A condenser in a thermal power plant condenses steam combing out of
   A) Boiler B) Super-heater C) Economizer D) Turbine
12) Which of the following, is not a high pressure boiler ?
   A) Loeffler boiler B) Lancashire boiler
   C) Velox boiler D) Lamont boiler
13) For low head and high discharge, the hydraulic turbine used is
   A) Kaplan turbine B) Francis turbine
   C) Pelton wheel D) Jonual turbine
14) Overall thermal efficiency of a steam power station is in the range
   A) 18 – 24% B) 30 – 40% C) 44 – 62% D) 68 – 79%
15) A gas turbine works on
   A) Carnot cycle B) Brayton cycle C) Dual cycle D) Rankine cycle
16) The performance of engines of different HP, RPM and sizes can be compared on the basis of
   A) Specific fuel consumption B) Compression ratio
   C) Clearance volume D) Cylinder volume
17) What is the maximum size of steam turbine usually being installed, for thermal power plants ?
   A) 120 MW B) 250 MW C) 500 MW D) 1000 MW
18) In pumped storage
   A) Power is produced by means of pumps
   B) Water is stored by pumping to high pressures
   C) Downstream water is pumped up-stream during off load periods
   D) Water is re circulated through turbine
19) Ash content of most of the Indian coals is around
   A) 1% B) 5% C) 10% D) 20%
20) Most of the generators in thermal power plants run at
   A) 3000 rpm B) 1500 rpm C) 1000 rpm D) 750 rpm

Seat No.	

B.E. (Part – I) (Old) (Electrical Engineering) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Saturday, 16-12-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **20**
   1) Draw typical layout of nuclear power plant.
   2) What do you understand by load curve ? What information's are conveyed by a load curve ?
   3) Define the following :
      Diversity factor, demand factor, maximum demand, connected load.
   4) Why is the overall efficiency of a steam power station is very low ?
   5) Explain with a neat plots the thermodynamics cycle related to power plant.
3. Solve **any two** : **20**
   1) Draw a neat schematic diagram of a Hydro Power Plant and explain the function of various components.
   2) Explain in brief different types of tariff.
   3) With neat sketches explain briefly the solar power plant and wind power plant.

SECTION – II

4. Solve **any four** : **20**
   1) What are the factors influencing co-generating choice ?
   2) Explain Pelton wheel hydro turbine.
   3) Write short note on ash handling system.
   4) Explain nuclear fission reaction.
   5) Discuss the harmful effect of emission and steps taken for and their impact.
5. Solve **any two** : **20**
   1) Discuss the different areas responsible for environmental pollution.
   2) With a neat diagram explain PWR type and CANDU type reactor.
   3) Draw typical layout of thermal power plant and explain it briefly.

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Set R

SLR-TJ – 388

Seat No.	

Set S

B.E. (Part – I) (Old) (Electrical Engineering) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Saturday, 16-12-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume the suitable data ***whenever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

1) The performance of engines of different HP, RPM and sizes can be compared on the basis of
   A) Specific fuel consumption B) Compression ratio
   C) Clearance volume D) Cylinder volume
2) What is the maximum size of steam turbine usually being installed, for thermal power plants ?
   A) 120 MW B) 250 MW C) 500 MW D) 1000 MW
3) In pumped storage
   A) Power is produced by means of pumps
   B) Water is stored by pumping to high pressures
   C) Downstream water is pumped up-stream during off load periods
   D) Water is re circulated through turbine
4) Ash content of most of the Indian coals is around
   A) 1% B) 5% C) 10% D) 20%
5) Most of the generators in thermal power plants run at
   A) 3000 rpm B) 1500 rpm C) 1000 rpm D) 750 rpm
6) A Pelton wheel is
   A) inward flow impulse turbine B) outward flow impulse turbine
   C) inward flow reaction turbine D) axial flow impulse turbine
7) The steam consumption per k Wh of electricity generated in a modem power plant is of the order of
   A) 1 – 2 kgs B) 2 – 4 kgs C) 5 – 7 kgs D) 10 – 12 kgs

8) Particles having the same atomic number but different mass numbers are called
A) Positrons B) Beta particles
C) Isotopes D) Decayed panicles

9) Soot is virtually nothing but
A) ash B) cinder C) gas D) carbon

10) Compressor used in gas turbines is
A) reciprocating compressor B) plunger type compressor
C) screw compressor D) multistage axial flow compressor

11) IN Francis turbine runner, the number of blades is usually of the order of
A) 16 – 24 B) 8 – 10 C) 6 – 8 D) 3 – 6

12) Fuel cells are
A) Carbon cells B) Hydrogen battery
C) Nuclear cell D) Chromium cell

13) The boilers using lignite as fuel do not use
A) under feed stoker B) traveling grate stoker
C) spreader stoker D) all of the above

14) In a steam power plant water is used for cooling purposes in
A) boiler B) economizer C) condenser D) super-heaters

15) Dam : Hydro plant ::
A) Chimney : Gases B) Coal : Steam plant
C) Gas turbine : Steam turbine D) Reactor : Nuclear plant

16) A condenser in a thermal power plant condenses steam combing out of
A) Boiler B) Super-heater C) Economizer D) Turbine

17) Which of the following, is not a high pressure boiler ?
A) Loeffler boiler B) Lancashire boiler
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18) For low head and high discharge, the hydraulic turbine used is
A) Kaplan turbine B) Francis turbine
C) Pelton wheel D) Jonual turbine

19) Overall thermal efficiency of a steam power station is in the range
A) 18 – 24% B) 30 – 40% C) 44 – 62% D) 68 – 79%

20) A gas turbine works on
A) Carnot cycle B) Brayton cycle C) Dual cycle D) Rankine cycle

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Seat No.	

B.E. (Part – I) (Old) (Electrical Engineering) Examination, 2017
POWER PLANT ENGINEERING

Day and Date : Saturday, 16-12-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **20**
   1) Draw typical layout of nuclear power plant.
   2) What do you understand by load curve ? What information's are conveyed by a load curve ?
   3) Define the following :
      Diversity factor, demand factor, maximum demand, connected load.
   4) Why is the overall efficiency of a steam power station is very low ?
   5) Explain with a neat plots the thermodynamics cycle related to power plant.
3. Solve **any two** : **20**
   1) Draw a neat schematic diagram of a Hydro Power Plant and explain the function of various components.
   2) Explain in brief different types of tariff.
   3) With neat sketches explain briefly the solar power plant and wind power plant.

SECTION – II

4. Solve **any four** : **20**
   1) What are the factors influencing co-generating choice ?
   2) Explain Pelton wheel hydro turbine.
   3) Write short note on ash handling system.
   4) Explain nuclear fission reaction.
   5) Discuss the harmful effect of emission and steps taken for and their impact.
5. Solve **any two** : **20**
   1) Discuss the different areas responsible for environmental pollution.
   2) With a neat diagram explain PWR type and CANDU type reactor.
   3) Draw typical layout of thermal power plant and explain it briefly.

Set S

Set S

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Seat No.	

Set **P**

B.E. (Electrical Engineering) (Part – II) Examination, 2017
FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day and Date : Tuesday, 21-11-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume suitable data ***wherever*** *necessary.*
4) Non-programmable calculators are ***permitted****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) UPFC is an example of
   a) Combined series-shunt controller b) Combined series-series controller
   c) Series controller d) Shunt controller

2) Transient stability improvement can be conveniently evaluated by
   a) Static VAR compensation b) Midpoint compensation
   c) a) and b) d) Equal area criteria

3) The real and reactive power transfer depends on
   a) Line impedance
   b) Magnitude of sending end voltage
   c) Phase angle between sending end and receiving end voltage
   d) All of these

4) For better series compensating K should be using
   a) 1 < = k < D b) 0 < = K < 1 c) – 1 < = K < = 1 d) 1 > = K > D

5) A thyristor value commutates naturally that, it turns off when the current crosses
   a) π b) $\pi/2$ c) 2π d) 0

6) The losses produced by compensator is very loss in
   a) TCSC b) SSSC c) TSSC d) GCSC

7) Induction regulators are employed for voltage control in
   a) Distribution systems b) Transmission lines
   c) Alternators d) Anywhere in the line

P.T.O.

8) The best location for use of a booster transformer in a transmission line is
   a) At the sending end
   b) At the receiving end
   c) At the intermediate point
   d) Anywhere in the line

9) A combination of different _____ compensator whose outputs are co-ordinated.
   a) Static and mechanically coupled
   b) Static and mechanically switched
   c) Static and dynamic switched
   d) None

10) In power oscillating damping the Var output is controlled in a
   a) Linear manner
   b) Non-linear manner
   c) Bang Bang manner
   d) None

11) In AC transmission, the existence of ground currents cannot be permitted in steady-state due to
   a) high magnitude of ground impedance
   b) low magnitude of ground impedance
   c) zero magnitude of ground impedance
   d) none of the above

12) The "break even" distance can vary from _____ in overhead lines.
   a) 300 to 500 km b) 500 to 800 km c) 100 to 300 km d) all of the above

13) The AC system is said to week if SCR is
   a) Equal to 3
   b) Less than 3
   c) Greater than 3
   d) None of the above

14) CCC stands for
   a) Capacitor Compressed Converter
   b) Capacitor Commutator Converter
   c) Capacitor Commutated Converter
   d) None of the above

15) UHV DC transmission is being considered more than
   a) $\pm$ 500 KV b) $\pm$ 800 KV c) $\pm$ 800 MV d) $\pm$ 800 V

16) One of the system is more reliable
   a) Radial b) Mesh c) Series System d) All of the above

17) In MTDC system, series connection is appropriate for taps of rating
   a) More than 20% b) Equal to 20% c) Less than 20% d) All of the above

18) The correct rating of valve is given by
   a) $I_v = 2\, I_d/r\sqrt{q}$ b) $I_r = I_v/r\ \sqrt{2q}$ c) $I_v = I_v/q\ \sqrt{r}$ d) $I_v = I_d/r\ \sqrt{q}$

19) Insulation co-ordination is problem in _____ system as voltage varies along the line.
   a) Parallel type b) Radial type c) Mesh type d) Series system

20) The main advantage of inverse cosine control scheme is that
   a) avg. dc voltage across bridge varies linearly with the control voltage
   b) avg. dc voltage across bridge becomes equal to the control voltage
   c) the delay angle is nominally proportional to the inverse cosine of the control voltage
   d) b) and c) only

_____

SLR-TJ – 389

Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day and Date : Tuesday, 21-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Assume suitable data* ***wherever*** *necessary*
2) Non-programmable calculators are ***permitted****.*

SECTION – I

2. Solve **any four** of the following : **20**

   1) Discuss harmonics reduction method in TCR bank.

   2) Explain reactive shunt compensation helps to damp power oscillation in power system.

   3) Give the objectives of series compensator.

   4) What are the limits of loading stability ?

   5) Explain hybrid phase angle regulator.

3. Solve **any two** : **20**

   1) Explain how to prevent voltage instability by supporting end line voltage with shunt compensation.

   2) Explain power flow in an AC transmission system. What are the relative importances of controllable parameters in an AC transmission system ?

   3) Discuss the power oscillation damping by using series compensation and shunt compensation.

SECTION – II

4. Solve **any four** of the following : **20**

   1) Explain the basic faults that occur in converters.

   2) Explain pulse frequency control and pulse phase control.

   3) What is necessity of valve blocking and bypassing ?

   4) Compare UPFC and IPFC.

   5) Explain starting and stopping of valves in converter stations.

5. Solve **any two** : **20**

   1) What is meant by individual phase control and what are the drawbacks of this control and explain how these drawbacks can be eliminated ?

   2) Explain control and protection of MTDC in detail.

   3) State necessity of filter and also explain types of filter.

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Seat No.	

Set **Q**

B.E. (Electrical Engineering) (Part – II) Examination, 2017
FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day and Date : Tuesday, 21-11-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume suitable data ***wherever*** *necessary.*
4) Non-programmable calculators are ***permitted****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) One of the system is more reliable
a) Radial b) Mesh c) Series System d) All of the above

2) In MTDC system, series connection is appropriate for taps of rating
a) More than 20% b) Equal to 20% c) Less than 20% d) All of the above

3) The correct rating of valve is given by
a) $I_v = 2\ I_d/r\sqrt{q}$ b) $I_r = I_v/r\ \sqrt{2q}$ c) $I_v = I_v/q\ \sqrt{r}$ d) $I_v = I_d/r\ \sqrt{q}$

4) Insulation co-ordination is problem in _____ system as voltage varies along the line.
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5) The main advantage of inverse cosine control scheme is that
a) avg. dc voltage across bridge varies linearly with the control voltage
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c) the delay angle is nominally proportional to the inverse cosine of the control voltage
d) b) and c) only

6) UPFC is an example of
a) Combined series-shunt controller b) Combined series-series controller
c) Series controller d) Shunt controller

7) Transient stability improvement can be conveniently evaluated by
a) Static VAR compensation b) Midpoint compensation
c) a) and b) d) Equal area criteria

P.T.O.

8) The real and reactive power transfer depends on
   a) Line impedance
   b) Magnitude of sending end voltage
   c) Phase angle between sending end and receiving end voltage
   d) All of these

9) For better series compensating K should be using
   a) 1 < = k < D b) 0 < = K < 1 c) – 1 < = K < = 1 d) 1 > = K > D

10) A thyristor value commutates naturally that, it turns off when the current crosses
   a) π b) $\pi/2$ c) 2π d) 0

11) The losses produced by compensator is very loss in
   a) TCSC b) SSSC c) TSSC d) GCSC

12) Induction regulators are employed for voltage control in
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13) The best location for use of a booster transformer in a transmission line is
   a) At the sending end b) At the receiving end
   c) At the intermediate point d) Anywhere in the line

14) A combination of different _____ compensator whose outputs are co-ordinated.
   a) Static and mechanically coupled b) Static and mechanically switched
   c) Static and dynamic switched d) None

15) In power oscillating damping the Var output is controlled in a
   a) Linear manner b) Non-linear manner
   c) Bang Bang manner d) None

16) In AC transmission, the existence of ground currents cannot be permitted in steady-state due to
   a) high magnitude of ground impedance
   b) low magnitude of ground impedance
   c) zero magnitude of ground impedance
   d) none of the above

17) The "break even" distance can vary from _____ in overhead lines.
   a) 300 to 500 km b) 500 to 800 km c) 100 to 300 km d) all of the above

18) The AC system is said to week if SCR is
   a) Equal to 3 b) Less than 3
   c) Greater than 3 d) None of the above

19) CCC stands for
   a) Capacitor Compressed Converter b) Capacitor Commutator Converter
   c) Capacitor Commutated Converter d) None of the above

20) UHV DC transmission is being considered more than
   a) $\pm$ 500 KV b) $\pm$ 800 KV c) $\pm$ 800 MV d) $\pm$ 800 V

SLR-TJ – 389

Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day and Date : Tuesday, 21-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Assume suitable data* ***wherever*** *necessary*
2) Non-programmable calculators are ***permitted****.*

SECTION – I

2. Solve **any four** of the following : **20**

   1) Discuss harmonics reduction method in TCR bank.

   2) Explain reactive shunt compensation helps to damp power oscillation in power system.

   3) Give the objectives of series compensator.

   4) What are the limits of loading stability ?

   5) Explain hybrid phase angle regulator.

3. Solve **any two** : **20**

   1) Explain how to prevent voltage instability by supporting end line voltage with shunt compensation.

   2) Explain power flow in an AC transmission system. What are the relative importances of controllable parameters in an AC transmission system ?

   3) Discuss the power oscillation damping by using series compensation and shunt compensation.

SECTION – II

4. Solve **any four** of the following : **20**

   1) Explain the basic faults that occur in converters.

   2) Explain pulse frequency control and pulse phase control.

   3) What is necessity of valve blocking and bypassing ?

   4) Compare UPFC and IPFC.

   5) Explain starting and stopping of valves in converter stations.

5. Solve **any two** : **20**

   1) What is meant by individual phase control and what are the drawbacks of this control and explain how these drawbacks can be eliminated ?

   2) Explain control and protection of MTDC in detail.

   3) State necessity of filter and also explain types of filter.

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Seat No.	

Set R

B.E. (Electrical Engineering) (Part – II) Examination, 2017
FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day and Date : Tuesday, 21-11-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume suitable data ***wherever*** *necessary.*
4) Non-programmable calculators are ***permitted****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) In AC transmission, the existence of ground currents cannot be permitted in steady-state due to
   a) high magnitude of ground impedance
   b) low magnitude of ground impedance
   c) zero magnitude of ground impedance
   d) none of the above

2) The "break even" distance can vary from _____ in overhead lines.
   a) 300 to 500 km b) 500 to 800 km c) 100 to 300 km d) all of the above

3) The AC system is said to week if SCR is
   a) Equal to 3 b) Less than 3
   c) Greater than 3 d) None of the above

4) CCC stands for
   a) Capacitor Compressed Converter b) Capacitor Commutator Converter
   c) Capacitor Commutated Converter d) None of the above

5) UHV DC transmission is being considered more than
   a) $\pm$ 500 KV b) $\pm$ 800 KV c) $\pm$ 800 MV d) $\pm$ 800 V

6) One of the system is more reliable
   a) Radial b) Mesh c) Series System d) All of the above

7) In MTDC system, series connection is appropriate for taps of rating
   a) More than 20% b) Equal to 20% c) Less than 20% d) All of the above

P.T.O.

8) The correct rating of valve is given by
a) $I_v = 2\ I_d/r\sqrt{q}$ b) $I_r = I_v/r\ \sqrt{2q}$ c) $I_v = I_v/q\ \sqrt{r}$ d) $I_v = I_d/r\ \sqrt{q}$

9) Insulation co-ordination is problem in _____ system as voltage varies along the line.
a) Parallel type b) Radial type c) Mesh type d) Series system

10) The main advantage of inverse cosine control scheme is that
a) avg. dc voltage across bridge varies linearly with the control voltage
b) avg. dc voltage across bridge becomes equal to the control voltage
c) the delay angle is nominally proportional to the inverse cosine of the control voltage
d) b) and c) only

11) UPFC is an example of
a) Combined series-shunt controller b) Combined series-series controller
c) Series controller d) Shunt controller

12) Transient stability improvement can be conveniently evaluated by
a) Static VAR compensation b) Midpoint compensation
c) a) and b) d) Equal area criteria

13) The real and reactive power transfer depends on
a) Line impedance
b) Magnitude of sending end voltage
c) Phase angle between sending end and receiving end voltage
d) All of these

14) For better series compensating K should be using
a) $1 <= k < D$ b) $0 <= K < 1$ c) $-1 <= K <= 1$ d) $1 >= K > D$

15) A thyristor value commutates naturally that, it turns off when the current crosses
a) π b) $\pi/2$ c) 2π d) 0

16) The losses produced by compensator is very loss in
a) TCSC b) SSSC c) TSSC d) GCSC

17) Induction regulators are employed for voltage control in
a) Distribution systems b) Transmission lines
c) Alternators d) Anywhere in the line

18) The best location for use of a booster transformer in a transmission line is
a) At the sending end b) At the receiving end
c) At the intermediate point d) Anywhere in the line

19) A combination of different _____ compensator whose outputs are co-ordinated.
a) Static and mechanically coupled b) Static and mechanically switched
c) Static and dynamic switched d) None

20) In power oscillating damping the Var output is controlled in a
a) Linear manner b) Non-linear manner
c) Bang Bang manner d) None

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Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day and Date : Tuesday, 21-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Assume suitable data* ***wherever*** *necessary*
2) Non-programmable calculators are ***permitted****.*

SECTION – I

2. Solve **any four** of the following : **20**

   1) Discuss harmonics reduction method in TCR bank.

   2) Explain reactive shunt compensation helps to damp power oscillation in power system.

   3) Give the objectives of series compensator.

   4) What are the limits of loading stability ?

   5) Explain hybrid phase angle regulator.

3. Solve **any two** : **20**

   1) Explain how to prevent voltage instability by supporting end line voltage with shunt compensation.

   2) Explain power flow in an AC transmission system. What are the relative importances of controllable parameters in an AC transmission system ?

   3) Discuss the power oscillation damping by using series compensation and shunt compensation.

SECTION – II

4. Solve **any four** of the following : **20**

   1) Explain the basic faults that occur in converters.

   2) Explain pulse frequency control and pulse phase control.

   3) What is necessity of valve blocking and bypassing ?

   4) Compare UPFC and IPFC.

   5) Explain starting and stopping of valves in converter stations.

5. Solve **any two** : **20**

   1) What is meant by individual phase control and what are the drawbacks of this control and explain how these drawbacks can be eliminated ?

   2) Explain control and protection of MTDC in detail.

   3) State necessity of filter and also explain types of filter.

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Seat No.	

Set **S**

B.E. (Electrical Engineering) (Part – II) Examination, 2017
FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day and Date : Tuesday, 21-11-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Assume suitable data ***wherever*** *necessary.*
4) Non-programmable calculators are ***permitted****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) The losses produced by compensator is very loss in
a) TCSC b) SSSC c) TSSC d) GCSC

2) Induction regulators are employed for voltage control in
a) Distribution systems b) Transmission lines
c) Alternators d) Anywhere in the line

3) The best location for use of a booster transformer in a transmission line is
a) At the sending end b) At the receiving end
c) At the intermediate point d) Anywhere in the line

4) A combination of different _____ compensator whose outputs are co-ordinated.
a) Static and mechanically coupled b) Static and mechanically switched
c) Static and dynamic switched d) None

5) In power oscillating damping the Var output is controlled in a
a) Linear manner b) Non-linear manner
c) Bang Bang manner d) None

6) In AC transmission, the existence of ground currents cannot be permitted in steady-state due to
a) high magnitude of ground impedance
b) low magnitude of ground impedance
c) zero magnitude of ground impedance
d) none of the above

7) The "break even" distance can vary from _____ in overhead lines.
a) 300 to 500 km b) 500 to 800 km c) 100 to 300 km d) all of the above

8) The AC system is said to week if SCR is
a) Equal to 3 b) Less than 3
c) Greater than 3 d) None of the above

9) CCC stands for
a) Capacitor Compressed Converter b) Capacitor Commutator Converter
c) Capacitor Commutated Converter d) None of the above

10) UHV DC transmission is being considered more than
a) $\pm$ 500 KV b) $\pm$ 800 KV c) $\pm$ 800 MV d) $\pm$ 800 V

11) One of the system is more reliable
a) Radial b) Mesh c) Series System d) All of the above

12) In MTDC system, series connection is appropriate for taps of rating
a) More than 20% b) Equal to 20% c) Less than 20% d) All of the above

13) The correct rating of valve is given by
a) $I_v = 2\ I_d/r\sqrt{q}$ b) $I_r = I_v/r\ \sqrt{2q}$ c) $I_v = I_v/q\ \sqrt{r}$ d) $I_v = I_d/r\ \sqrt{q}$

14) Insulation co-ordination is problem in _____ system as voltage varies along the line.
a) Parallel type b) Radial type c) Mesh type d) Series system

15) The main advantage of inverse cosine control scheme is that
a) avg. dc voltage across bridge varies linearly with the control voltage
b) avg. dc voltage across bridge becomes equal to the control voltage
c) the delay angle is nominally proportional to the inverse cosine of the control voltage
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16) UPFC is an example of
a) Combined series-shunt controller b) Combined series-series controller
c) Series controller d) Shunt controller

17) Transient stability improvement can be conveniently evaluated by
a) Static VAR compensation b) Midpoint compensation
c) a) and b) d) Equal area criteria

18) The real and reactive power transfer depends on
a) Line impedance
b) Magnitude of sending end voltage
c) Phase angle between sending end and receiving end voltage
d) All of these

19) For better series compensating K should be using
a) $1 <= k < D$ b) $0 <= K < 1$ c) $-1 <= K <= 1$ d) $1 >= K > D$

20) A thyristor value commutates naturally that, it turns off when the current crosses
a) π b) $\pi/2$ c) 2π d) 0

_____

SLR-TJ – 389

Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day and Date : Tuesday, 21-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Assume suitable data* ***wherever*** *necessary*
2) Non-programmable calculators are ***permitted****.*

SECTION – I

2. Solve **any four** of the following : **20**

   1) Discuss harmonics reduction method in TCR bank.

   2) Explain reactive shunt compensation helps to damp power oscillation in power system.

   3) Give the objectives of series compensator.

   4) What are the limits of loading stability ?

   5) Explain hybrid phase angle regulator.

3. Solve **any two** : **20**

   1) Explain how to prevent voltage instability by supporting end line voltage with shunt compensation.

   2) Explain power flow in an AC transmission system. What are the relative importances of controllable parameters in an AC transmission system ?

   3) Discuss the power oscillation damping by using series compensation and shunt compensation.

SECTION – II

4. Solve **any four** of the following : **20**

   1) Explain the basic faults that occur in converters.

   2) Explain pulse frequency control and pulse phase control.

   3) What is necessity of valve blocking and bypassing ?

   4) Compare UPFC and IPFC.

   5) Explain starting and stopping of valves in converter stations.

5. Solve **any two** : **20**

   1) What is meant by individual phase control and what are the drawbacks of this control and explain how these drawbacks can be eliminated ?

   2) Explain control and protection of MTDC in detail.

   3) State necessity of filter and also explain types of filter.

SLR-TJ – 390

Seat No.	

Set P

B.E. (Electrical Engg.) (Part – II) Examination, 2017
ELECTRICAL INSTALLATION TESTING AND MAINTENANCE

Day and Date : Wednesday, 22-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternatives : **(20×1=20)**

1) Do's and Don'ts are observed carefully in safety precautions as per _____
   a) IS 5216-1962 b) IS 5216-1964 c) IS 5216-1966 d) IS 5216-1969
2) In fire extinguisher we use
   a) CO_2 b) SO_2 c) O_2 d) H_2O
3) The torque of induction motor is
   a) Directly proportional to V b) Directly proportional to V^2
   c) Inversely proportional to V d) Inversely proportional to V^2
4) Brake test is _____ method of testing machine.
   a) Regenerative b) Direct c) Indirect d) All of these
5) Swinburne test is also called as _____
   a) Load test b) Brake test c) No load test d) Full load test
6) Swinburne test is
   a) Direct test b) Indirect test c) Special test d) All of these
7) While conducting momentary overload test on induction motor, the duration of excess load 50 H.P. motor is ?
   a) 2 sec b) 5 sec c) 8 sec d) 9.5 sec
8) While conducting momentary overload test on induction motor, the duration of excess load above 500 H.P. motor is
   a) 5 sec b) 10 sec c) 15 sec d) 20 sec

9) Out of different methods available for testing of d.c. motors, Swinburne's test and Hopkinson's test are commonly used in practice on
   a) Shunt generators b) Series motors
   c) Shunt motors d) All of these

10) Swinburne's test and brake tests
   a) Both are direct method of testing
   b) Direct method of testing, indirect method of testing
   c) Indirect method of testing, direct method of testing
   d) Both are indirect method of testing

11) The impulse test level is determined by operating level is _____ times normal operating value.
   a) 1 to 2 b) 2 to 2.5 c) 4 to 5 d) 7 to 9

12) As per I.E.C. for 66 kv system voltage, the impulse withstand voltage is
   a) 100 kv b) 150 kv c) 220 kv d) 325 kv

13) In insulation resistance test of 132 kv transformer, minimum insulation resistance is
   a) 250 M Ω b) 500 M Ω c) 750 M Ω d) 1000 M Ω

14) For induced type transformer test, test voltage is equal to _____ highest system voltage + 1000 volt.
   a) Twice b) Thrice c) Four times d) None of these

15) In moisture proofness test, humidity is maintained to _____
   a) 70% b) 80% c) 90% d) 110%

16) In dielectric absorption test by using megger, insulation resistance is measured at regular interval of _____ and recorded.
   a) 24 hour b) 12 hour c) 30 min d) 5 min

17) For class A insulating material, maximum operating temperature is
   a) 60°C b) 90°C c) 95°C d) 105°C

18) Polarization index is greater than _____ for class A insulation.
   a) 1 b) 1.5 c) 2 d) 2.5

19) While installing electrical machines, checking of foundation for correct level is to be carried out then, we use
   a) Spirit level b) Dial indicator c) Bearing puller d) Filler gauge

20) Thermal relays are used for the protection of motors against over-current owing to
   a) Short circuit b) Heavy loads c) Earth fault d) All the above

_____

SLR-TJ – 390

Seat No.	

B.E. (Electrical Engg.) (Part – II) Examination, 2017
ELECTRICAL INSTALLATION TESTING AND MAINTENANCE

Day and Date : Wednesday, 22-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) What are the objectives of testing of machine ?
   2) Explain the term :
      a) Safety
      b) Accountability
      c) Authority
      d) Responsibility.
   3) Write the factors on which severity of shock is depends.
   4) What precautions to be taken to avoid the fire due to electric reason.
   5) Write the procedure for developing preventive maintenance.
   6) Explain routine and breakdown maintenance of transformer.

3. Solve **any two** : **(2×10=20)**
   1) What is indirect testing of machine ? Explain the Swinburne test in detail.
   2) Explain the back to back test for transformer.
   3) Explain test for determination of magnetizing current and core losses.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   1) State factors on which life of insulation depends.

   2) List the properties of transformer oil.

   3) What are the effects of mis-alignment ?

   4) State the various methods of revarnishing.

   5) How will you interpret about the condition of insulation ?

   6) List the common trouble in electrical installation.

5. Attempt **any two** : **(2×10=20)**

   1) What are the requirements of foundations for installing rotating electrical machines as per IS 900-1992.

   2) Classify insulating materials in details as per IS.

   3) Explain with neat sketch the vacuum impregnation method of varnishing the insulation.

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Seat No.	

Set Q

B.E. (Electrical Engg.) (Part – II) Examination, 2017
ELECTRICAL INSTALLATION TESTING AND MAINTENANCE

Day and Date : Wednesday, 22-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternatives : **(20×1=20)**

1) In dielectric absorption test by using megger, insulation resistance is measured at regular interval of _____ and recorded.
   a) 24 hour b) 12 hour c) 30 min d) 5 min

2) For class A insulating material, maximum operating temperature is
   a) 60°C b) 90°C c) 95°C d) 105°C

3) Polarization index is greater than _____ for class A insulation.
   a) 1 b) 1.5 c) 2 d) 2.5

4) While installing electrical machines, checking of foundation for correct level is to be carried out then, we use
   a) Spirit level b) Dial indicator c) Bearing puller d) Filler gauge

5) Thermal relays are used for the protection of motors against over-current owing to
   a) Short circuit b) Heavy loads c) Earth fault d) All the above

6) Do's and Don'ts are observed carefully in safety precautions as per _____
   a) IS 5216-1962 b) IS 5216-1964 c) IS 5216-1966 d) IS 5216-1969

7) In fire extinguisher we use
   a) CO_2 b) SO_2 c) O_2 d) H_2O

8) The torque of induction motor is
   a) Directly proportional to V b) Directly proportional to V^2
   c) Inversely proportional to V d) Inversely proportional to V^2

P.T.O.

9) Brake test is _____ method of testing machine.
a) Regenerative b) Direct c) Indirect d) All of these

10) Swinburne test is also called as _____
a) Load test b) Brake test c) No load test d) Full load test

11) Swinburne test is
a) Direct test b) Indirect test c) Special test d) All of these

12) While conducting momentary overload test on induction motor, the duration of excess load 50 H.P. motor is ?
a) 2 sec b) 5 sec c) 8 sec d) 9.5 sec

13) While conducting momentary overload test on induction motor, the duration of excess load above 500 H.P. motor is
a) 5 sec b) 10 sec c) 15 sec d) 20 sec

14) Out of different methods available for testing of d.c. motors, Swinburne's test and Hopkinson's test are commonly used in practice on
a) Shunt generators b) Series motors
c) Shunt motors d) All of these

15) Swinburne's test and brake tests
a) Both are direct method of testing
b) Direct method of testing, indirect method of testing
c) Indirect method of testing, direct method of testing
d) Both are indirect method of testing

16) The impulse test level is determined by operating level is _____ times normal operating value.
a) 1 to 2 b) 2 to 2.5 c) 4 to 5 d) 7 to 9

17) As per I.E.C. for 66 kv system voltage, the impulse withstand voltage is
a) 100 kv b) 150 kv c) 220 kv d) 325 kv

18) In insulation resistance test of 132 kv transformer, minimum insulation resistance is
a) 250 M Ω b) 500 MΩ c) 750 MΩ d) 1000 MΩ

19) For induced type transformer test, test voltage is equal to _____ highest system voltage + 1000 volt.
a) Twice b) Thrice c) Four times d) None of these

20) In moisture proofness test, humidity is maintained to _____
a) 70% b) 80% c) 90% d) 110%

_____

SLR-TJ – 390

Seat No.	

B.E. (Electrical Engg.) (Part – II) Examination, 2017
ELECTRICAL INSTALLATION TESTING AND MAINTENANCE

Day and Date : Wednesday, 22-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) What are the objectives of testing of machine ?
   2) Explain the term :
      a) Safety
      b) Accountability
      c) Authority
      d) Responsibility.
   3) Write the factors on which severity of shock is depends.
   4) What precautions to be taken to avoid the fire due to electric reason.
   5) Write the procedure for developing preventive maintenance.
   6) Explain routine and breakdown maintenance of transformer.

3. Solve **any two** : **(2×10=20)**
   1) What is indirect testing of machine ? Explain the Swinburne test in detail.
   2) Explain the back to back test for transformer.
   3) Explain test for determination of magnetizing current and core losses.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   1) State factors on which life of insulation depends.

   2) List the properties of transformer oil.

   3) What are the effects of mis-alignment ?

   4) State the various methods of revarnishing.

   5) How will you interpret about the condition of insulation ?

   6) List the common trouble in electrical installation.

5. Attempt **any two** : **(2×10=20)**

   1) What are the requirements of foundations for installing rotating electrical machines as per IS 900-1992.

   2) Classify insulating materials in details as per IS.

   3) Explain with neat sketch the vacuum impregnation method of varnishing the insulation.

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Seat No.	

Set R

B.E. (Electrical Engg.) (Part – II) Examination, 2017
ELECTRICAL INSTALLATION TESTING AND MAINTENANCE

Day and Date : Wednesday, 22-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternatives : **(20×1=20)**

1) The impulse test level is determined by operating level is _____ times normal operating value.
   a) 1 to 2 b) 2 to 2.5 c) 4 to 5 d) 7 to 9

2) As per I.E.C. for 66 kv system voltage, the impulse withstand voltage is
   a) 100 kv b) 150 kv c) 220 kv d) 325 kv

3) In insulation resistance test of 132 kv transformer, minimum insulation resistance is
   a) 250 M Ω b) 500 M Ω c) 750 M Ω d) 1000 M Ω

4) For induced type transformer test, test voltage is equal to _____ highest system voltage + 1000 volt.
   a) Twice b) Thrice c) Four times d) None of these

5) In moisture proofness test, humidity is maintained to _____
   a) 70% b) 80% c) 90% d) 110%

6) In dielectric absorption test by using megger, insulation resistance is measured at regular interval of _____ and recorded.
   a) 24 hour b) 12 hour c) 30 min d) 5 min

7) For class A insulating material, maximum operating temperature is
   a) 60°C b) 90°C c) 95°C d) 105°C

8) Polarization index is greater than _____ for class A insulation.
   a) 1 b) 1.5 c) 2 d) 2.5

9) While installing electrical machines, checking of foundation for correct level is to be carried out then, we use
   a) Spirit level b) Dial indicator c) Bearing puller d) Filler gauge
10) Thermal relays are used for the protection of motors against over-current owing to
   a) Short circuit b) Heavy loads c) Earth fault d) All the above
11) Do's and Don'ts are observed carefully in safety precautions as per _____
   a) IS 5216-1962 b) IS 5216-1964 c) IS 5216-1966 d) IS 5216-1969
12) In fire extinguisher we use
   a) CO_2 b) SO_2 c) O_2 d) H_2O
13) The torque of induction motor is
   a) Directly proportional to V b) Directly proportional to V^2
   c) Inversely proportional to V d) Inversely proportional to V^2
14) Brake test is _____ method of testing machine.
   a) Regenerative b) Direct c) Indirect d) All of these
15) Swinburne test is also called as _____
   a) Load test b) Brake test c) No load test d) Full load test
16) Swinburne test is
   a) Direct test b) Indirect test c) Special test d) All of these
17) While conducting momentary overload test on induction motor, the duration of excess load 50 H.P. motor is ?
   a) 2 sec b) 5 sec c) 8 sec d) 9.5 sec
18) While conducting momentary overload test on induction motor, the duration of excess load above 500 H.P. motor is
   a) 5 sec b) 10 sec c) 15 sec d) 20 sec
19) Out of different methods available for testing of d.c. motors, Swinburne's test and Hopkinson's test are commonly used in practice on
   a) Shunt generators b) Series motors
   c) Shunt motors d) All of these
20) Swinburne's test and brake tests
   a) Both are direct method of testing
   b) Direct method of testing, indirect method of testing
   c) Indirect method of testing, direct method of testing
   d) Both are indirect method of testing

_____

SLR-TJ – 390

Seat No.	

B.E. (Electrical Engg.) (Part – II) Examination, 2017
ELECTRICAL INSTALLATION TESTING AND MAINTENANCE

Day and Date : Wednesday, 22-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) What are the objectives of testing of machine ?
   2) Explain the term :
      a) Safety
      b) Accountability
      c) Authority
      d) Responsibility.
   3) Write the factors on which severity of shock is depends.
   4) What precautions to be taken to avoid the fire due to electric reason.
   5) Write the procedure for developing preventive maintenance.
   6) Explain routine and breakdown maintenance of transformer.

3. Solve **any two** : **(2×10=20)**
   1) What is indirect testing of machine ? Explain the Swinburne test in detail.
   2) Explain the back to back test for transformer.
   3) Explain test for determination of magnetizing current and core losses.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   1) State factors on which life of insulation depends.

   2) List the properties of transformer oil.

   3) What are the effects of mis-alignment ?

   4) State the various methods of revarnishing.

   5) How will you interpret about the condition of insulation ?

   6) List the common trouble in electrical installation.

5. Attempt **any two** : **(2×10=20)**

   1) What are the requirements of foundations for installing rotating electrical machines as per IS 900-1992.

   2) Classify insulating materials in details as per IS.

   3) Explain with neat sketch the vacuum impregnation method of varnishing the insulation.

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Seat No.	

Set S

B.E. (Electrical Engg.) (Part – II) Examination, 2017
ELECTRICAL INSTALLATION TESTING AND MAINTENANCE

Day and Date : Wednesday, 22-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternatives : **(20×1=20)**

1) Swinburne test is
a) Direct test b) Indirect test c) Special test d) All of these

2) While conducting momentary overload test on induction motor, the duration of excess load 50 H.P. motor is ?
a) 2 sec b) 5 sec c) 8 sec d) 9.5 sec

3) While conducting momentary overload test on induction motor, the duration of excess load above 500 H.P. motor is
a) 5 sec b) 10 sec c) 15 sec d) 20 sec

4) Out of different methods available for testing of d.c. motors, Swinburne's test and Hopkinson's test are commonly used in practice on
a) Shunt generators b) Series motors
c) Shunt motors d) All of these

5) Swinburne's test and brake tests
a) Both are direct method of testing
b) Direct method of testing, indirect method of testing
c) Indirect method of testing, direct method of testing
d) Both are indirect method of testing

6) The impulse test level is determined by operating level is _____ times normal operating value.
a) 1 to 2 b) 2 to 2.5 c) 4 to 5 d) 7 to 9

7) As per I.E.C. for 66 kv system voltage, the impulse withstand voltage is
a) 100 kv b) 150 kv c) 220 kv d) 325 kv

8) In insulation resistance test of 132 kv transformer, minimum insulation resistance is
   a) 250 M Ω b) 500 M Ω c) 750 M Ω d) 1000 M Ω
9) For induced type transformer test, test voltage is equal to _____ highest system voltage + 1000 volt.
   a) Twice b) Thrice c) Four times d) None of these
10) In moisture proofness test, humidity is maintained to _____
   a) 70% b) 80% c) 90% d) 110%
11) In dielectric absorption test by using megger, insulation resistance is measured at regular interval of _____ and recorded.
   a) 24 hour b) 12 hour c) 30 min d) 5 min
12) For class A insulating material, maximum operating temperature is
   a) 60°C b) 90°C c) 95°C d) 105°C
13) Polarization index is greater than _____ for class A insulation.
   a) 1 b) 1.5 c) 2 d) 2.5
14) While installing electrical machines, checking of foundation for correct level is to be carried out then, we use
   a) Spirit level b) Dial indicator c) Bearing puller d) Filler gauge
15) Thermal relays are used for the protection of motors against over-current owing to
   a) Short circuit b) Heavy loads c) Earth fault d) All the above
16) Do's and Don'ts are observed carefully in safety precautions as per _____
   a) IS 5216-1962 b) IS 5216-1964 c) IS 5216-1966 d) IS 5216-1969
17) In fire extinguisher we use
   a) CO_2 b) SO_2 c) O_2 d) H_2O
18) The torque of induction motor is
   a) Directly proportional to V b) Directly proportional to V^2
   c) Inversely proportional to V d) Inversely proportional to V^2
19) Brake test is _____ method of testing machine.
   a) Regenerative b) Direct c) Indirect d) All of these
20) Swinburne test is also called as _____
   a) Load test b) Brake test c) No load test d) Full load test

SLR-TJ – 390

Seat No.	

B.E. (Electrical Engg.) (Part – II) Examination, 2017
ELECTRICAL INSTALLATION TESTING AND MAINTENANCE

Day and Date : Wednesday, 22-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) What are the objectives of testing of machine ?
   2) Explain the term :
      a) Safety
      b) Accountability
      c) Authority
      d) Responsibility.
   3) Write the factors on which severity of shock is depends.
   4) What precautions to be taken to avoid the fire due to electric reason.
   5) Write the procedure for developing preventive maintenance.
   6) Explain routine and breakdown maintenance of transformer.

3. Solve **any two** : **(2×10=20)**
   1) What is indirect testing of machine ? Explain the Swinburne test in detail.
   2) Explain the back to back test for transformer.
   3) Explain test for determination of magnetizing current and core losses.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   1) State factors on which life of insulation depends.

   2) List the properties of transformer oil.

   3) What are the effects of mis-alignment ?

   4) State the various methods of revarnishing.

   5) How will you interpret about the condition of insulation ?

   6) List the common trouble in electrical installation.

5. Attempt **any two** : **(2×10=20)**

   1) What are the requirements of foundations for installing rotating electrical machines as per IS 900-1992.

   2) Classify insulating materials in details as per IS.

   3) Explain with neat sketch the vacuum impregnation method of varnishing the insulation.

SLR-TJ – 391

Seat No.	

Set P

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER SYSTEM OPERATION AND CONTROL

Day and Date : Thursday, 23-11-2017 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****. Each question carries* ***one*** *mark.*

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer. **(20×1=20)**

1) In a power system with long transmission lines, economic dispatch means
   a) Equal incremental costs at generator buses
   b) Equal incremental costs at load buses
   c) Equal load on all generators
   d) That generators share the load proportional to their rating

2) In dynamic programming method the cost function $F_N(y)$ represents
   a) Cost of generation of NMW by y number of unit
   b) Cost of generation of y MW by N number of unit
   c) Cost of generation of y MW by N^{th} unit
   d) Cost of generation of N MW by y^{th} unit

3) In a power plant a reserve generating capacity which is in operation but not in services known as
   a) Hot reserve b) Cold reserve c) Spinning reserve d) Firm power

4) Governors for speed control of generating units provide
   a) Flat speed load characteristic
   b) An increase of speed unit's increase of load
   c) A decrease of speed with increase of load
   d) Either (b) or (c) depending on size of generator

5) In central AGC of a given control area, the change in frequency
   a) Volume control error b) Area control error
   c) Nonlinear control error d) Optimal control error

6) Two generating plants feed a load centre through a transmission network. For maximum Economy
   a) The incremental fuel cost should be the same for the two stations
   b) The two stations should share the load in the ratio of their installed capacities
   c) The more efficient plant should supply more load
   d) The incremental cost of power delivered at the load centre should be the same for both the plants

7) Power balance equation is _____ constraint.
   a) Equality b) Inequality
   c) Security d) Branch transfer capacity

8) For economic operation, the generator with highest positive incremental transmission loss will operate at
   a) The lowest positive incremental cost of production
   b) The lowest negative incremental cost of production
   c) The highest positive incremental cost of production
   d) None of the above

9) The most efficient unit is loaded first then the less efficient unit follow, is called
   a) Priority ordering b) Dynamic Programming
   c) Patton's Security d) None of these

10) The units for heat rate are
   a) Kcal/KWh b) KWh/kcal c) Kcal/hour d) KW

11) In power system reactive power is necessary
   a) For power transmission
   b) For stabilizing voltage level
   c) For stabilizing frequency
   d) For counter acting the effect of reactance in the transmission system

12) At times of peak load a power system needs
   a) Injection of lagging vars b) Injection of leading vars
   c) Injection of lagging or leading vars d) None of the above

13) The changes in reactive power at a bus have a great effect on the voltage magnitude
   a) of that bus b) of distant buses
   c) of all the buses d) none of the above

14) Two alternators A and B are operating in parallel. If excitation of A is increased
   a) Reactive power of A is increased while that of B is decreased
   b) Reactive power of A is increased while that of B is remains unchanged
   c) Reactive power of A is decreased
   d) Both real and reactive power of A are increased

15) The real power transfer over a line depends mainly on
   a) Power angle b) Sending end voltage V_s
   c) Receiving end voltage V_r d) $V_s - V_r$

16) Contingency definition gives list of components outages
   a) Which includes the contingencies with high probability of occurrence
   b) Which provide the contingency in decreasing order of severity
   c) For outage simulation
   d) All of the above

17) If a power system observes an accumulated time error, it should correct it by
   a) Increasing its own generation
   b) Decreasing its own generation
   c) Coordinating time error correction with other interconnected systems
   d) All of above

18) A security analysis program uses
   a) AC load flow b) DC load flow
   c) Both AC and DC load flow d) None

19) Voltage stability problem normally occurs
   a) Heavily stressed system b) Medium stressed system
   c) Low stressed system d) None of these

20) Energy control centre is supposed to perform the following security functions
   a) System Monitoring b) Contingency analysis
   c) Corrective action analysis d) All of these

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Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER SYSTEM OPERATION AND CONTROL

Day and Date : Thursday, 23-11-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates maximum marks.*
3) Assume the suitable data ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(5×4=20)**

1) With neat sketch explain heat rate curve of thermal power plant.

2) Define unit commitment. Explain the necessity of unit commitment task.

3) A generating station has three units having the following cost in Rs/ Mwhr

$dc_1/dp_1 = 0.24\ P_{G1} + 60$

$dc_2/dp_2 = 0.20\ P_{G2} + 45$

$dc_3/dp_3 = 0.30 P_{G3} + 75$

All the units operate all time and the permissible minimum and maximum load on each unit are 50 MW and 225 MW for total load of 500 MW on the station determine.

a) The real power to be generated by each unit

b) The station λ for most economical operation.

4) With a mathematical formulation, explain optimum generation allocation without including transmission losses.

5) Explain the following terms of unit commitment

a) Minimum up time and Minimum down time

b) Fuel constraint.

6) With the help of schematic diagram, explain turbine speed governing system.

3. Solve **any two** : **(10×2 =20)**

1) Explain the importance of maintaining the frequency constant in power system.

2) Explain lagrange relaxation method for unit commitment in detail.

3) The incremental costs for two generating plants are

$Ic_1 = 0.1P_1 + 20$ Rs/Mwhr

$Ic_2 = 0.1P_2 + 15$ Rs/Mwhr

Where P_1 and P_2 are in MW. The loss coefficient (Bmn) expressed in MW^{-1} where $B_{11} = 0.001\ MW^{-1}$, $B_{22} = 0.0024\ MW^{-1}$ and $B_{12} = -0.0005\ MW^{-1}$. Compute economic generation scheduling corresponding system load that can be met with if total load is 150 MW taking 5% change in value of λ, what should be the value of λ in next iteration ?

SECTION – II

4. Solve **any four**. **(5×4=20)**

1) How to prevent voltage collapse problem ? Explain.

2) What is meant by load compensation ? Explain briefly.

3) Explain classification of system states.

4) Explain the following

a) Voltage angle

b) Voltage stability

5) Explain methods of improving voltage stability.

6) Why reactive power compensation required in power system ?

5. Solve **any two** : **(10×2=20)**

1) Explain different types of compensation methods for transmission system also give the advantages and disadvantges of each method.

2) Explain different methods for prevention of voltage collapse.

3) What do you mean by security analysis ? Explain briefly.

SLR-TJ – 391

Seat No.	

Set Q

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER SYSTEM OPERATION AND CONTROL

Day and Date : Thursday, 23-11-2017 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****. Each question carries* ***one*** *mark.*

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer. **(20×1=20)**

1) Contingency definition gives list of components outages
   a) Which includes the contingencies with high probability of occurrence
   b) Which provide the contingency in decreasing order of severity
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6) In a power system with long transmission lines, economic dispatch means
   a) Equal incremental costs at generator buses
   b) Equal incremental costs at load buses
   c) Equal load on all generators
   d) That generators share the load proportional to their rating

7) In dynamic programming method the cost function $F_N(y)$ represents
   a) Cost of generation of NMW by y number of unit
   b) Cost of generation of y MW by N number of unit
   c) Cost of generation of y MW by N^{th} unit
   d) Cost of generation of N MW by y^{th} unit

8) In a power plant a reserve generating capacity which is in operation but not in services known as
   a) Hot reserve b) Cold reserve c) Spinning reserve d) Firm power

9) Governors for speed control of generating units provide
   a) Flat speed load characteristic
   b) An increase of speed unit's increase of load
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10) In central AGC of a given control area, the change in frequency
   a) Volume control error
   b) Area control error
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11) Two generating plants feed a load centre through a transmission network. For maximum Economy
   a) The incremental fuel cost should be the same for the two stations
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   a) Equality
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   a) Kcal/KWh
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   a) of that bus
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   a) Power angle
   b) Sending end voltage V_s
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   d) $V_s - V_r$

_____

Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER SYSTEM OPERATION AND CONTROL

Day and Date : Thursday, 23-11-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates maximum marks.*
3) Assume the suitable data ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(5×4=20)**

1) With neat sketch explain heat rate curve of thermal power plant.

2) Define unit commitment. Explain the necessity of unit commitment task.

3) A generating station has three units having the following cost in Rs/ Mwhr

$dc_1/dp_1 = 0.24\ P_{G1} + 60$

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$dc_3/dp_3 = 0.30 P_{G3} + 75$

All the units operate all time and the permissible minimum and maximum load on each unit are 50 MW and 225 MW for total load of 500 MW on the station determine.

a) The real power to be generated by each unit

b) The station λ for most economical operation.

4) With a mathematical formulation, explain optimum generation allocation without including transmission losses.

5) Explain the following terms of unit commitment

a) Minimum up time and Minimum down time

b) Fuel constraint.

6) With the help of schematic diagram, explain turbine speed governing system.

3. Solve **any two** : **(10×2 =20)**

1) Explain the importance of maintaining the frequency constant in power system.

2) Explain lagrange relaxation method for unit commitment in detail.

3) The incremental costs for two generating plants are

$Ic_1 = 0.1P_1 + 20$ Rs/Mwhr

$Ic_2 = 0.1P_2 + 15$ Rs/Mwhr

Where P_1 and P_2 are in MW. The loss coefficient (Bmn) expressed in MW^{-1} where $B_{11} = 0.001\ MW^{-1}$, $B_{22} = 0.0024\ MW^{-1}$ and $B_{12} = -0.0005\ MW^{-1}$. Compute economic generation scheduling corresponding system load that can be met with if total load is 150 MW taking 5% change in value of λ, what should be the value of λ in next iteration ?

SECTION – II

4. Solve **any four**. **(5×4=20)**

1) How to prevent voltage collapse problem ? Explain.

2) What is meant by load compensation ? Explain briefly.

3) Explain classification of system states.

4) Explain the following

a) Voltage angle

b) Voltage stability

5) Explain methods of improving voltage stability.

6) Why reactive power compensation required in power system ?

5. Solve **any two** : **(10×2=20)**

1) Explain different types of compensation methods for transmission system also give the advantages and disadvantges of each method.

2) Explain different methods for prevention of voltage collapse.

3) What do you mean by security analysis ? Explain briefly.

SLR-TJ – 391

Seat No.	

Set R

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER SYSTEM OPERATION AND CONTROL

Day and Date : Thursday, 23-11-2017 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****. Each question carries* ***one*** *mark.*

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer. **(20×1=20)**

1) In power system reactive power is necessary
   a) For power transmission
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   a) Hot reserve
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19) The most efficient unit is loaded first then the less efficient unit follow, is called
   a) Priority ordering
   b) Dynamic Programming
   c) Patton's Security
   d) None of these

20) The units for heat rate are
   a) Kcal/KWh
   b) KWh/kcal
   c) Kcal/hour
   d) KW

_____

Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER SYSTEM OPERATION AND CONTROL

Day and Date : Thursday, 23-11-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates maximum marks.*
3) Assume the suitable data ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(5×4=20)**

1) With neat sketch explain heat rate curve of thermal power plant.

2) Define unit commitment. Explain the necessity of unit commitment task.

3) A generating station has three units having the following cost in Rs/ Mwhr

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$dc_3/dp_3 = 0.30 P_{G3} + 75$

All the units operate all time and the permissible minimum and maximum load on each unit are 50 MW and 225 MW for total load of 500 MW on the station determine.

a) The real power to be generated by each unit

b) The station λ for most economical operation.

4) With a mathematical formulation, explain optimum generation allocation without including transmission losses.

5) Explain the following terms of unit commitment

a) Minimum up time and Minimum down time

b) Fuel constraint.

6) With the help of schematic diagram, explain turbine speed governing system.

3. Solve **any two** : **(10×2 =20)**

1) Explain the importance of maintaining the frequency constant in power system.

2) Explain lagrange relaxation method for unit commitment in detail.

3) The incremental costs for two generating plants are

$Ic_1 = 0.1P_1 + 20$ Rs/Mwhr

$Ic_2 = 0.1P_2 + 15$ Rs/Mwhr

Where P_1 and P_2 are in MW. The loss coefficient (Bmn) expressed in MW^{-1} where $B_{11} = 0.001\ MW^{-1}$, $B_{22} = 0.0024\ MW^{-1}$ and $B_{12} = -0.0005\ MW^{-1}$. Compute economic generation scheduling corresponding system load that can be met with if total load is 150 MW taking 5% change in value of λ, what should be the value of λ in next iteration ?

SECTION – II

4. Solve **any four**. **(5×4=20)**

1) How to prevent voltage collapse problem ? Explain.

2) What is meant by load compensation ? Explain briefly.

3) Explain classification of system states.

4) Explain the following

a) Voltage angle

b) Voltage stability

5) Explain methods of improving voltage stability.

6) Why reactive power compensation required in power system ?

5. Solve **any two** : **(10×2=20)**

1) Explain different types of compensation methods for transmission system also give the advantages and disadvantges of each method.

2) Explain different methods for prevention of voltage collapse.

3) What do you mean by security analysis ? Explain briefly.

SLR-TJ – 391

Seat No.	

Set S

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER SYSTEM OPERATION AND CONTROL

Day and Date : Thursday, 23-11-2017 Max. Marks : 100

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****. Each question carries* ***one*** *mark.*

2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer. **(20×1=20)**

1) Two generating plants feed a load centre through a transmission network. For maximum Economy
   a) The incremental fuel cost should be the same for the two stations
   b) The two stations should share the load in the ratio of their installed capacities
   c) The more efficient plant should supply more load
   d) The incremental cost of power delivered at the load centre should be the same for both the plants

2) Power balance equation is _____ constraint.
   a) Equality b) Inequality
   c) Security d) Branch transfer capacity

3) For economic operation, the generator with highest positive incremental transmission loss will operate at
   a) The lowest positive incremental cost of production
   b) The lowest negative incremental cost of production
   c) The highest positive incremental cost of production
   d) None of the above

4) The most efficient unit is loaded first then the less efficient unit follow, is called
   a) Priority ordering b) Dynamic Programming
   c) Patton's Security d) None of these

5) The units for heat rate are
   a) Kcal/KWh b) KWh/kcal c) Kcal/hour d) KW

6) In power system reactive power is necessary
   a) For power transmission
   b) For stabilizing voltage level
   c) For stabilizing frequency
   d) For counter acting the effect of reactance in the transmission system

7) At times of peak load a power system needs
   a) Injection of lagging vars b) Injection of leading vars
   c) Injection of lagging or leading vars d) None of the above

8) The changes in reactive power at a bus have a great effect on the voltage magnitude
   a) of that bus b) of distant buses
   c) of all the buses d) none of the above

9) Two alternators A and B are operating in parallel. If excitation of A is increased
   a) Reactive power of A is increased while that of B is decreased
   b) Reactive power of A is increased while that of B is remains unchanged
   c) Reactive power of A is decreased
   d) Both real and reactive power of A are increased

10) The real power transfer over a line depends mainly on
   a) Power angle
   b) Sending end voltage V_s
   c) Receiving end voltage V_r
   d) $V_s - V_r$

11) Contingency definition gives list of components outages
   a) Which includes the contingencies with high probability of occurrence
   b) Which provide the contingency in decreasing order of severity
   c) For outage simulation
   d) All of the above

12) If a power system observes an accumulated time error, it should correct it by
   a) Increasing its own generation
   b) Decreasing its own generation
   c) Coordinating time error correction with other interconnected systems
   d) All of above

13) A security analysis program uses
   a) AC load flow
   b) DC load flow
   c) Both AC and DC load flow
   d) None

14) Voltage stability problem normally occurs
   a) Heavily stressed system
   b) Medium stressed system
   c) Low stressed system
   d) None of these

15) Energy control centre is supposed to perform the following security functions
   a) System Monitoring
   b) Contingency analysis
   c) Corrective action analysis
   d) All of these

16) In a power system with long transmission lines, economic dispatch means
   a) Equal incremental costs at generator buses
   b) Equal incremental costs at load buses
   c) Equal load on all generators
   d) That generators share the load proportional to their rating

17) In dynamic programming method the cost function $F_N(y)$ represents
   a) Cost of generation of NMW by y number of unit
   b) Cost of generation of y MW by N number of unit
   c) Cost of generation of y MW by N^{th} unit
   d) Cost of generation of N MW by y^{th} unit

18) In a power plant a reserve generating capacity which is in operation but not in services known as
   a) Hot reserve
   b) Cold reserve
   c) Spinning reserve
   d) Firm power

19) Governors for speed control of generating units provide
   a) Flat speed load characteristic
   b) An increase of speed unit's increase of load
   c) A decrease of speed with increase of load
   d) Either (b) or (c) depending on size of generator

20) In central AGC of a given control area, the change in frequency
   a) Volume control error
   b) Area control error
   c) Nonlinear control error
   d) Optimal control error

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Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER SYSTEM OPERATION AND CONTROL

Day and Date : Thursday, 23-11-2017 Marks : 80

Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates maximum marks.*
3) Assume the suitable data ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(5×4=20)**

1) With neat sketch explain heat rate curve of thermal power plant.

2) Define unit commitment. Explain the necessity of unit commitment task.

3) A generating station has three units having the following cost in Rs/ Mwhr

$dc_1/dp_1 = 0.24\ P_{G1} + 60$

$dc_2/dp_2 = 0.20\ P_{G2} + 45$

$dc_3/dp_3 = 0.30 P_{G3} + 75$

All the units operate all time and the permissible minimum and maximum load on each unit are 50 MW and 225 MW for total load of 500 MW on the station determine.

a) The real power to be generated by each unit

b) The station λ for most economical operation.

4) With a mathematical formulation, explain optimum generation allocation without including transmission losses.

5) Explain the following terms of unit commitment

a) Minimum up time and Minimum down time

b) Fuel constraint.

6) With the help of schematic diagram, explain turbine speed governing system.

3. Solve **any two** : **(10×2 =20)**

1) Explain the importance of maintaining the frequency constant in power system.

2) Explain lagrange relaxation method for unit commitment in detail.

3) The incremental costs for two generating plants are

$Ic_1 = 0.1P_1 + 20$ Rs/Mwhr

$Ic_2 = 0.1P_2 + 15$ Rs/Mwhr

Where P_1 and P_2 are in MW. The loss coefficient (Bmn) expressed in MW^{-1} where $B_{11} = 0.001\ MW^{-1}$, $B_{22} = 0.0024\ MW^{-1}$ and $B_{12} = -0.0005\ MW^{-1}$. Compute economic generation scheduling corresponding system load that can be met with if total load is 150 MW taking 5% change in value of λ, what should be the value of λ in next iteration ?

SECTION – II

4. Solve **any four**. **(5×4=20)**

1) How to prevent voltage collapse problem ? Explain.

2) What is meant by load compensation ? Explain briefly.

3) Explain classification of system states.

4) Explain the following

a) Voltage angle

b) Voltage stability

5) Explain methods of improving voltage stability.

6) Why reactive power compensation required in power system ?

5. Solve **any two** : **(10×2=20)**

1) Explain different types of compensation methods for transmission system also give the advantages and disadvantges of each method.

2) Explain different methods for prevention of voltage collapse.

3) What do you mean by security analysis ? Explain briefly.

SLR-TJ – 392

Seat No.	

Set **P**

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER SYSTEM DYNAMICS (Elective – II)

Day and Date : Friday, 24-11-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume data, **if necessary**.*
*3) **All** questions are **compulsory**.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) A 50 Hz, 4 pole alternator rated at 20 MVA, 13.2 KV has an inertia constant H = 4 KW.sec./KVA. The K.E. stored in the rotor at synchronous speed is
   a) 80 KJ b) 80 MJ c) 40 MJ d) 20 MJ

2) The position of the pilot valve can be affected through linkage mechanism in _____ way
   a) Directly by the speed changer
   b) Indirectly through feedback due to position of the main system
   c) Indirectly through feedback due to position of the linkage point E resulting from a change in speed
   d) All of these

3) Transient stability of a power system is the ability of the system to
   a) Deliver power over tie lines to other systems during a disturbance
   b) Remain in synchronism, prior to governor action, following a system disturbance
   c) Maintain a continuous balance between energy input and electrical output
   d) Both b) and c)

4) What does the swing equation describe ?
   a) The relative motion of rotor with the field windings of the machine
   b) The relative motion of the rotor with respect to stator field as a function of time
   c) The relative motion of stator field with the rated frequency of the machine
   d) The performance curve of the machine

5) The Swing equation is a nonlinear second-order differential equation.
   a) true b) false

6) A salient pole synchronous generator delivering power to an infinite bus through a reactive tie line reaches its steady state stability limit. What is the power angle of generator relative to the infinite bus voltage reference ?
   a) Greater than 90° b) Equal to 90° c) Less than 90° d) Zero

7) Which among the following methods are used to improve steady state stability ?
   a) Reducing the reactance between the transmission and receiving points
   b) By using bundled conductors
   c) By increasing the excitation of generator or motor or both
   d) All of these

8) The stability of the power system is not affected by which among these ?
   a) Generator reactance
   b) Line losses
   c) Excitation of generators
   d) All of these

9) When a system is dynamically stable, oscillations of synchronous machines following sudden load changes will
   a) Diminish with time
   b) Increase with time
   c) Not occur
   d) Oscillate the machine

10) Which stability information is obtained from the equal area criterion ?
   a) Absolute stability
   b) Transient stability
   c) Steady state stability
   d) Both b) and c)

11) Which among the following buses constitute the maximum number in a power system ?
   a) Slack bus
   b) P Q bus
   c) P V bus
   d) All of these

12) A synchronous generator connected to an infinite bus delivers power at a lag p.f. If its excitation is increased
   a) The terminal voltage increases
   b) Voltage angle increases
   c) Current delivered increases
   d) Both b) and c)

13) Park's transformation matrix is
   a) A linear matrix
   b) A time dependant matrix
   c) Non-linear and time invariant matrix
   d) Both a) and b)

14) The excitation of the generators must be continuously regulated
   a) To match the reactive power generations with reactive power demand
   b) To control the variations in voltage
   c) Both a) and b)
   d) None of these

15) Real-power balance will control the variation in
   a) Voltage
   b) Frequency
   c) Both a) and b)
   d) None

16) The excitation system consists of
   a) An exciter
   b) An AVR
   c) Both an exciter and an AVR
   d) None of these

17) The self inductance of any stator phase of synchronous machine is greater when
   a) The q-axis of field coincides with the axis of armature phase
   b) The d-axis of field coincides with the axis of armature phase
   c) Both a) and b)
   d) None

18) The flexibility is more in which type of speed governing system ?
   a) mechanical- hydraulic speed governing system
   b) electro- hydraulic speed governing system
   c) both a) and b)
   d) none of these

19) Hydraulic servomotors are used in _____ type of speed governing system.
   a) mechanical-hydraulic controlled
   b) electro-hydraulic controlled
   c) both a) and b)
   d) none of these

20) What is the range of 'δ' for stable operation ?
   a) $0° < \delta < 45°$
   b) $45° < \delta < 90°$
   c) $0° < \delta < 90°$
   d) $0° < \delta < 120°$

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SLR-TJ – 392

Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER SYSTEM DYNAMICS (Elective – II)

Day and Date : Friday, 24-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume data, **if necessary**.*
*3) **All** questions are **compulsory**.*

SECTION – I

2. Attempt **any four** of the following : **(4×5=20)**

a) Formulate sub-transient and transient inductances and also write about time constants.

b) Draw and explain functional block diagram of an excitation control system.

c) Explain AC excitation system for a particular application with suitable block diagram.

d) Differentiate between stator self and stator mutual inductances

e) Draw the stator and rotor circuits of a synchronous machine and derive the basic equations of stator and rotor of synchronous machine.

f) What is an excitation control system ? Classify excitation systems based control action.

3. Attempt **any two** of the following : **(2×10=20)**

a) State types and explain with basic diagrams of following :
   i) Exciters
   ii) Voltage regulators

b) List the various factors effecting stability problem in large interconnected power system and compare transient stability with dynamic stability.

c) Develop the synchronous machine voltage and flux linkages equations in Park's coordinates.

SECTION – II

4. Attempt **any four** of the following : **(4×5=20)**

a) A 50 Hz, four pole turbo-generator rated 100 MVA , 11 KV has an inertia constant 8 MJ/MVA.
   i) Find the stored energy in the rotor at synchronous speed
   ii) Find rotor acceleration, if the mechanical input is suddenly raised 80 MW for an electrical load of 50 MW. Neglect mechanical and electrical losses.

b) Derive the swing equation for a single machine connected to infinite bus system.

c) Draw and explain general speed governing system model for hydraulic turbines.

d) Explain, how the following methods are used to improve the stability :
   i) excitation control
   ii) power stabilizing signals.

e) State the bad effects of instability. Distinguish between steady state and transient stability.

f) Write comparison between steam and hydraulic turbine responses.

5. Attempt **any two** of the following : **(2×10=20)**

a) Draw the schematic block diagram of speed-governing system and explain its components on the dynamic response of system.

b) Explain Steady state stability of two machine systems connected to an infinite bus.

c) List various methods are used to improve steady state stability and any one method in detail.

SLR-TJ – 392

Seat No.	

Set Q

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER SYSTEM DYNAMICS (Elective – II)

Day and Date : Friday, 24-11-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume data, **if necessary**.*
*3) **All** questions are **compulsory**.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) The excitation system consists of
   a) An exciter b) An AVR
   c) Both an exciter and an AVR d) None of these

2) The self inductance of any stator phase of synchronous machine is greater when
   a) The q-axis of field coincides with the axis of armature phase
   b) The d-axis of field coincides with the axis of armature phase
   c) Both a) and b)
   d) None

3) The flexibility is more in which type of speed governing system ?
   a) mechanical- hydraulic speed governing system
   b) electro- hydraulic speed governing system
   c) both a) and b)
   d) none of these

4) Hydraulic servomotors are used in _____ type of speed governing system.
   a) mechanical-hydraulic controlled b) electro-hydraulic controlled
   c) both a) and b) d) none of these

5) What is the range of 'δ' for stable operation ?
   a) $0° < \delta < 45°$ b) $45° < \delta < 90°$ c) $0° < \delta < 90°$ d) $0° < \delta < 120°$

6) A 50 Hz, 4 pole alternator rated at 20 MVA, 13.2 KV has an inertia constant H = 4 KW.sec./KVA. The K.E. stored in the rotor at synchronous speed is
   a) 80 KJ b) 80 MJ c) 40 MJ d) 20 MJ

7) The position of the pilot valve can be affected through linkage mechanism in _____ way
   a) Directly by the speed changer
   b) Indirectly through feedback due to position of the main system
   c) Indirectly through feedback due to position of the linkage point E resulting from a change in speed
   d) All of these

8) Transient stability of a power system is the ability of the system to
   a) Deliver power over tie lines to other systems during a disturbance
   b) Remain in synchronism, prior to governor action, following a system disturbance
   c) Maintain a continuous balance between energy input and electrical output
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9) What does the swing equation describe ?
   a) The relative motion of rotor with the field windings of the machine
   b) The relative motion of the rotor with respect to stator field as a function of time
   c) The relative motion of stator field with the rated frequency of the machine
   d) The performance curve of the machine

10) The Swing equation is a nonlinear second-order differential equation.
   a) true b) false

11) A salient pole synchronous generator delivering power to an infinite bus through a reactive tie line reaches its steady state stability limit. What is the power angle of generator relative to the infinite bus voltage reference ?
   a) Greater than 90° b) Equal to 90° c) Less than 90° d) Zero

12) Which among the following methods are used to improve steady state stability ?
   a) Reducing the reactance between the transmission and receiving points
   b) By using bundled conductors
   c) By increasing the excitation of generator or motor or both
   d) All of these

13) The stability of the power system is not affected by which among these ?
   a) Generator reactance b) Line losses
   c) Excitation of generators d) All of these

14) When a system is dynamically stable, oscillations of synchronous machines following sudden load changes will
   a) Diminish with time b) Increase with time
   c) Not occur d) Oscillate the machine

15) Which stability information is obtained from the equal area criterion ?
   a) Absolute stability b) Transient stability
   c) Steady state stability d) Both b) and c)

16) Which among the following buses constitute the maximum number in a power system ?
   a) Slack bus b) P Q bus c) P V bus d) All of these

17) A synchronous generator connected to an infinite bus delivers power at a lag p.f. If its excitation is increased
   a) The terminal voltage increases b) Voltage angle increases
   c) Current delivered increases d) Both b) and c)

18) Park's transformation matrix is
   a) A linear matrix b) A time dependant matrix
   c) Non-linear and time invariant matrix d) Both a) and b)

19) The excitation of the generators must be continuously regulated
   a) To match the reactive power generations with reactive power demand
   b) To control the variations in voltage
   c) Both a) and b)
   d) None of these

20) Real-power balance will control the variation in
   a) Voltage b) Frequency c) Both a) and b) d) None

SLR-TJ – 392

Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER SYSTEM DYNAMICS (Elective – II)

Day and Date : Friday, 24-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume data, **if necessary**.*
*3) **All** questions are **compulsory**.*

SECTION – I

2. Attempt **any four** of the following : **(4×5=20)**

a) Formulate sub-transient and transient inductances and also write about time constants.

b) Draw and explain functional block diagram of an excitation control system.

c) Explain AC excitation system for a particular application with suitable block diagram.

d) Differentiate between stator self and stator mutual inductances

e) Draw the stator and rotor circuits of a synchronous machine and derive the basic equations of stator and rotor of synchronous machine.

f) What is an excitation control system ? Classify excitation systems based control action.

3. Attempt **any two** of the following : **(2×10=20)**

a) State types and explain with basic diagrams of following :
   i) Exciters
   ii) Voltage regulators

b) List the various factors effecting stability problem in large interconnected power system and compare transient stability with dynamic stability.

c) Develop the synchronous machine voltage and flux linkages equations in Park's coordinates.

SECTION – II

4. Attempt **any four** of the following : **(4×5=20)**

a) A 50 Hz, four pole turbo-generator rated 100 MVA , 11 KV has an inertia constant 8 MJ/MVA.
   i) Find the stored energy in the rotor at synchronous speed
   ii) Find rotor acceleration, if the mechanical input is suddenly raised 80 MW for an electrical load of 50 MW. Neglect mechanical and electrical losses.

b) Derive the swing equation for a single machine connected to infinite bus system.

c) Draw and explain general speed governing system model for hydraulic turbines.

d) Explain, how the following methods are used to improve the stability :
   i) excitation control
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e) State the bad effects of instability. Distinguish between steady state and transient stability.

f) Write comparison between steam and hydraulic turbine responses.

5. Attempt **any two** of the following : **(2×10=20)**

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b) Explain Steady state stability of two machine systems connected to an infinite bus.

c) List various methods are used to improve steady state stability and any one method in detail.

SLR-TJ – 392

Seat No.	

Set **R**

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER SYSTEM DYNAMICS (Elective – II)

Day and Date : Friday, 24-11-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume data, **if necessary**.*
*3) **All** questions are **compulsory**.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Which among the following buses constitute the maximum number in a power system ?
a) Slack bus b) P Q bus c) P V bus d) All of these

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a) To match the reactive power generations with reactive power demand
b) To control the variations in voltage
c) Both a) and b)
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5) Real-power balance will control the variation in
a) Voltage b) Frequency c) Both a) and b) d) None

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11) A 50 Hz, 4 pole alternator rated at 20 MVA, 13.2 KV has an inertia constant H = 4 KW.sec./KVA. The K.E. stored in the rotor at synchronous speed is
   a) 80 KJ
   b) 80 MJ
   c) 40 MJ
   d) 20 MJ

12) The position of the pilot valve can be affected through linkage mechanism in _____ way
   a) Directly by the speed changer
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   c) Indirectly through feedback due to position of the linkage point E resulting from a change in speed
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13) Transient stability of a power system is the ability of the system to
   a) Deliver power over tie lines to other systems during a disturbance
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   a) The relative motion of rotor with the field windings of the machine
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15) The Swing equation is a nonlinear second-order differential equation.
   a) true
   b) false

16) A salient pole synchronous generator delivering power to an infinite bus through a reactive tie line reaches its steady state stability limit. What is the power angle of generator relative to the infinite bus voltage reference ?
   a) Greater than 90°
   b) Equal to 90°
   c) Less than 90°
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17) Which among the following methods are used to improve steady state stability ?
   a) Reducing the reactance between the transmission and receiving points
   b) By using bundled conductors
   c) By increasing the excitation of generator or motor or both
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18) The stability of the power system is not affected by which among these ?
   a) Generator reactance
   b) Line losses
   c) Excitation of generators
   d) All of these

19) When a system is dynamically stable, oscillations of synchronous machines following sudden load changes will
   a) Diminish with time
   b) Increase with time
   c) Not occur
   d) Oscillate the machine

20) Which stability information is obtained from the equal area criterion ?
   a) Absolute stability
   b) Transient stability
   c) Steady state stability
   d) Both b) and c)

_____

SLR-TJ – 392

Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER SYSTEM DYNAMICS (Elective – II)

Day and Date : Friday, 24-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume data, **if necessary**.*
*3) **All** questions are **compulsory**.*

SECTION – I

2. Attempt **any four** of the following : **(4×5=20)**

a) Formulate sub-transient and transient inductances and also write about time constants.

b) Draw and explain functional block diagram of an excitation control system.

c) Explain AC excitation system for a particular application with suitable block diagram.

d) Differentiate between stator self and stator mutual inductances

e) Draw the stator and rotor circuits of a synchronous machine and derive the basic equations of stator and rotor of synchronous machine.

f) What is an excitation control system ? Classify excitation systems based control action.

3. Attempt **any two** of the following : **(2×10=20)**

a) State types and explain with basic diagrams of following :
   i) Exciters
   ii) Voltage regulators

b) List the various factors effecting stability problem in large interconnected power system and compare transient stability with dynamic stability.

c) Develop the synchronous machine voltage and flux linkages equations in Park's coordinates.

SECTION – II

4. Attempt **any four** of the following : **(4×5=20)**

a) A 50 Hz, four pole turbo-generator rated 100 MVA , 11 KV has an inertia constant 8 MJ/MVA.
   i) Find the stored energy in the rotor at synchronous speed
   ii) Find rotor acceleration, if the mechanical input is suddenly raised 80 MW for an electrical load of 50 MW. Neglect mechanical and electrical losses.

b) Derive the swing equation for a single machine connected to infinite bus system.

c) Draw and explain general speed governing system model for hydraulic turbines.

d) Explain, how the following methods are used to improve the stability :
   i) excitation control
   ii) power stabilizing signals.

e) State the bad effects of instability. Distinguish between steady state and transient stability.

f) Write comparison between steam and hydraulic turbine responses.

5. Attempt **any two** of the following : **(2×10=20)**

a) Draw the schematic block diagram of speed-governing system and explain its components on the dynamic response of system.

b) Explain Steady state stability of two machine systems connected to an infinite bus.

c) List various methods are used to improve steady state stability and any one method in detail.

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SLR-TJ – 392

Seat No.	

Set S

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER SYSTEM DYNAMICS (Elective – II)

Day and Date : Friday, 24-11-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume data, **if necessary**.*
*3) **All** questions are **compulsory**.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) A salient pole synchronous generator delivering power to an infinite bus through a reactive tie line reaches its steady state stability limit. What is the power angle of generator relative to the infinite bus voltage reference ?
   a) Greater than 90° b) Equal to 90° c) Less than 90° d) Zero

2) Which among the following methods are used to improve steady state stability ?
   a) Reducing the reactance between the transmission and receiving points
   b) By using bundled conductors
   c) By increasing the excitation of generator or motor or both
   d) All of these

3) The stability of the power system is not affected by which among these ?
   a) Generator reactance b) Line losses
   c) Excitation of generators d) All of these

4) When a system is dynamically stable, oscillations of synchronous machines following sudden load changes will
   a) Diminish with time b) Increase with time
   c) Not occur d) Oscillate the machine

5) Which stability information is obtained from the equal area criterion ?
   a) Absolute stability b) Transient stability
   c) Steady state stability d) Both b) and c)

6) Which among the following buses constitute the maximum number in a power system ?
   a) Slack bus b) P Q bus c) P V bus d) All of these

7) A synchronous generator connected to an infinite bus delivers power at a lag p.f. If its excitation is increased
   a) The terminal voltage increases b) Voltage angle increases
   c) Current delivered increases d) Both b) and c)

8) Park's transformation matrix is
   a) A linear matrix b) A time dependant matrix
   c) Non-linear and time invariant matrix d) Both a) and b)

9) The excitation of the generators must be continuously regulated
   a) To match the reactive power generations with reactive power demand
   b) To control the variations in voltage
   c) Both a) and b)
   d) None of these

10) Real-power balance will control the variation in
   a) Voltage b) Frequency c) Both a) and b) d) None

11) The excitation system consists of
   a) An exciter b) An AVR
   c) Both an exciter and an AVR d) None of these

12) The self inductance of any stator phase of synchronous machine is greater when
   a) The q-axis of field coincides with the axis of armature phase
   b) The d-axis of field coincides with the axis of armature phase
   c) Both a) and b)
   d) None

13) The flexibility is more in which type of speed governing system ?
   a) mechanical- hydraulic speed governing system
   b) electro- hydraulic speed governing system
   c) both a) and b)
   d) none of these

14) Hydraulic servomotors are used in _____ type of speed governing system.
   a) mechanical-hydraulic controlled b) electro-hydraulic controlled
   c) both a) and b) d) none of these

15) What is the range of 'δ' for stable operation ?
   a) $0° < \delta < 45°$ b) $45° < \delta < 90°$ c) $0° < \delta < 90°$ d) $0° < \delta < 120°$

16) A 50 Hz, 4 pole alternator rated at 20 MVA, 13.2 KV has an inertia constant H = 4 KW.sec./KVA. The K.E. stored in the rotor at synchronous speed is
   a) 80 KJ b) 80 MJ c) 40 MJ d) 20 MJ

17) The position of the pilot valve can be affected through linkage mechanism in _____ way
   a) Directly by the speed changer
   b) Indirectly through feedback due to position of the main system
   c) Indirectly through feedback due to position of the linkage point E resulting from a change in speed
   d) All of these

18) Transient stability of a power system is the ability of the system to
   a) Deliver power over tie lines to other systems during a disturbance
   b) Remain in synchronism, prior to governor action, following a system disturbance
   c) Maintain a continuous balance between energy input and electrical output
   d) Both b) and c)

19) What does the swing equation describe ?
   a) The relative motion of rotor with the field windings of the machine
   b) The relative motion of the rotor with respect to stator field as a function of time
   c) The relative motion of stator field with the rated frequency of the machine
   d) The performance curve of the machine

20) The Swing equation is a nonlinear second-order differential equation.
   a) true b) false

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SLR-TJ – 392

Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER SYSTEM DYNAMICS (Elective – II)

Day and Date : Friday, 24-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Figures to the **right** indicate **full** marks.*
*2) Assume data, **if necessary**.*
*3) **All** questions are **compulsory**.*

SECTION – I

2. Attempt **any four** of the following : **(4×5=20)**

a) Formulate sub-transient and transient inductances and also write about time constants.

b) Draw and explain functional block diagram of an excitation control system.

c) Explain AC excitation system for a particular application with suitable block diagram.

d) Differentiate between stator self and stator mutual inductances

e) Draw the stator and rotor circuits of a synchronous machine and derive the basic equations of stator and rotor of synchronous machine.

f) What is an excitation control system ? Classify excitation systems based control action.

3. Attempt **any two** of the following : **(2×10=20)**

a) State types and explain with basic diagrams of following :
   i) Exciters
   ii) Voltage regulators

b) List the various factors effecting stability problem in large interconnected power system and compare transient stability with dynamic stability.

c) Develop the synchronous machine voltage and flux linkages equations in Park's coordinates.

SECTION – II

4. Attempt **any four** of the following : **(4×5=20)**

a) A 50 Hz, four pole turbo-generator rated 100 MVA , 11 KV has an inertia constant 8 MJ/MVA.
   i) Find the stored energy in the rotor at synchronous speed
   ii) Find rotor acceleration, if the mechanical input is suddenly raised 80 MW for an electrical load of 50 MW. Neglect mechanical and electrical losses.

b) Derive the swing equation for a single machine connected to infinite bus system.

c) Draw and explain general speed governing system model for hydraulic turbines.

d) Explain, how the following methods are used to improve the stability :
   i) excitation control
   ii) power stabilizing signals.

e) State the bad effects of instability. Distinguish between steady state and transient stability.

f) Write comparison between steam and hydraulic turbine responses.

5. Attempt **any two** of the following : **(2×10=20)**

a) Draw the schematic block diagram of speed-governing system and explain its components on the dynamic response of system.

b) Explain Steady state stability of two machine systems connected to an infinite bus.

c) List various methods are used to improve steady state stability and any one method in detail.

SLR-TJ – 393

Seat No.	

Set P

B.E. (Electrical) (Part – II) Examination, 2017
Elective – II : HIGH VOLTAGE ENGINEERING

Day and Date : Friday, 24-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions :
1) ***All*** *questions* ***compulsory****.*
2) *Assume suitable data* ***if necessary*** *and mention* ***it clearly****.*
3) *Figures to the* ***right*** *indicate* ***full*** *marks.*
4) *Q. No.* ***I*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) Assuming p to be Constant and Townsend's second ionization coefficure to be small during the applicability of Paschen's law. Then if (pd > $(pd)_{min}$
   a) Electrons crossing in the gap make more frequent collisions with gas molecules than at $(pd)_{min}$
   b) Energy gained between successive collisions is smaller than at $(pd)_{min}$
   c) Energy gained between successive collisions is larger than at $(pd)_{min}$
   d) None of the above

2) The accepted value of dielectric strength of transformer oil is
   a) 30 kV b) 30 kV/cm
   c) 30 kV/cm for one min. d) None of the above

3) While testing transformer oil for dielectric strength the spherical electrodes are placed in
   a) Horizontal configuration b) Vertical configuration
   c) Any configuration d) Spherical electrodes are not used

4) To determine intrinsic dielectric strength, the time of application of voltage is of the order of
   a) 10^{-8} sec b) 10^{-6} sec
   c) 10^{-4} sec d) No such consideration

5) In case of impulse thermal breakdown of insulating materials, the critical time to breakdown is
   a) Proportional to critical electric field
   b) Inversely proportional to critical electric field
   c) Proportional to square of critical absolute temperature
   d) None of the above

6) While impulse testing a power transformer, the impulse voltage is applied to
   a) One phase and the other two phases are short circuited, the secondary terminals are short circuited
   b) One phase, the other two phases grounded, the secondary short circuited
   c) One phase, two phases left open, secondary left open
   d) One phase, two phases left open, secondary short circuited

7) The magnitude of pulse currents depends upon
   a) Voltage applied b) No. of voids c) a) and b) d) None of above

8) Recurrent surge generator is used to generate
   a) Current of large magnitude
   b) Repetitive current surges
   c) Impulse voltage of smaller magnitude
   d) b) and c)

9) The impulse ratio of a rod gap is
   a) Unity
   b) Between 1.2 and 1.5
   c) Between 2.0 and 2.2
   d) Between 1.6 and 1.8

10) Standard impulse testing of a power transformer requires
   a) Two applications of chopped wave followed by one application of a full wave
   b) One application of chopped wave followed by one applications of a full wave
   c) One application of chopped wave followed by two applications of a full wave
   d) None

11) During partial discharges if pulse currents through CK and Ct are observed simultaneously on the oscilloscope, it is found that
   a) These occupy same location
   b) These have same polarity
   c) These have same magnitude
   d) None of the above

12) The pulse currents through CK and Ct are supplied by
   a) Source mainly
   b) Partial discharge mainly
   c) Partly by source and partly be partial discharge
   d) Impedance Z

13) If the source is not able to supply charging current required by the test cable, it is desirable to use
   a) Shunt capacitor
   b) Series capacitor
   c) Series inductor
   d) a) and c)

14) Sphere gap is used for measurement of
   a) a.c. voltage only
   b) d.c. voltage only
   c) impulse voltage of any wave shape
   d) None of the above

15) Sphere gap when used for measurement of high voltage, the spheres are placed
   a) In horizontal configuration if spheres are small
   b) In vertical configuration if spheres are small
   c) In horizontal configuration if spheres are large
   d) b) and c)

16) Tick out of the correct :
   a) The breakdown voltage in sphere gaps increases with increase in partial pressure of water vapour
   b) The increase in breakdown voltage as in a) increases with increase in gap length
   c) a) and b)
   d) The breakdown voltage in sphere gaps decreases with increase in partial pressure of water vapour

17) Using uniform field spark gap, the breakdown voltage for 10 mm gap length is
   a) 34.25 kV
   b) 30.30 kV
   c) 36.25 kV
   d) 32.73 kV

18) The voltage measurements using uniform spark gap are
   a) Affected by nearby earthed objects
   b) Affected by polarity of supply
   c) Affected by dust particles
   d) All of a), b) and c)

19) A generating voltmeter is used to measure a.c. voltages if the angular frequency of voltage is
   a) Half the angular frequency of motor used
   b) Twice the angular frequency of motor used
   c) Thrice the angular frequency of the motor used
   d) None of the above

20) A potential divider is normally connected
   a) Outside the generator circuit towards the load circuit
   b) Within the generator circuit
   c) At a distance V/100 metres from the generator where V is the voltage to be measured in kV
   d) None of the above

SLR-TJ – 393

Seat No.	

B.E. (Electrical) (Part – II) Examination, 2017
Elective – II : HIGH VOLTAGE ENGINEERING

Day and Date : Friday, 24-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions* ***compulsory****.*
2) Assume suitable data ***if necessary*** *and mention* ***it clearly****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

II. Solve **any four** : **(4×5=20)**

a) Explain estimation and control of electric stresses.

b) Explain Townsends criterion for break-down with the help of 3 conditions.

c) Write a short note on Cavity Breakdown in case of liquid.

d) Prove that

$$\frac{V}{d_0} = E_a = 0.6\left[\frac{\gamma}{\varepsilon_0 \varepsilon_r}\right]^{1/2}.$$

In case of Electromechanical Breakdown.

e) Prove that critical field is independent of critical temperature due to fast rise in temperature.

III. Solve **any two** : **(2×10=20)**

a) i) Describe post break-down phenomena and applications.

ii) Describe solid breakdown.

b) i) Prove the Paschen's law.

ii) Write a short note on Gas/Vacuum as insulators.

c) Explain Intrinsic break-down and thermal break-down.

SECTION – II

IV. Solve **any four** : **(4×5=20)**

a) Define the terms impulse voltage, impulse flash over voltage, impulse puncture voltage, impulse ratio for flash over, impulse ratio for puncture.

b) Explain impulse voltage measurements using voltage dividers.

c) Write a short note on Hall Generators.

d) What is the necessary arrangement required for arrangement of insulators for test ?

e) Write a short note on test facilities provided in high voltage laboratories.

V. Solve **any two** : **(2×10=20)**

a) Explain impulse current generation and analyse impulse current generator.

b) Discuss various methods of measuring high d.c. and a.c. currents.

c) Discuss the classification of high voltage laboratories, size and ratings of high voltage laboratories.

SLR-TJ – 393

Seat No.	

Set Q

B.E. (Electrical) (Part – II) Examination, 2017
Elective – II : HIGH VOLTAGE ENGINEERING

Day and Date : Friday, 24-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions :
1) ***All*** *questions* ***compulsory****.*
2) *Assume suitable data* ***if necessary*** *and mention* ***it clearly****.*
3) *Figures to the* ***right*** *indicate* ***full*** *marks.*
4) *Q. No.* ***I*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) Tick out of the correct :
   a) The breakdown voltage in sphere gaps increases with increase in partial pressure of water vapour
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   c) a) and b)
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   a) 34.25 kV b) 30.30 kV c) 36.25 kV d) 32.73 kV

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7) The accepted value of dielectric strength of transformer oil is
   a) 30 kV b) 30 kV/cm
   c) 30 kV/cm for one min. d) None of the above

8) While testing transformer oil for dielectric strength the spherical electrodes are placed in
   a) Horizontal configuration
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   c) Any configuration
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9) To determine intrinsic dielectric strength, the time of application of voltage is of the order of
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10) In case of impulse thermal breakdown of insulating materials, the critical time to breakdown is
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12) The magnitude of pulse currents depends upon
   a) Voltage applied
   b) No. of voids
   c) a) and b)
   d) None of above

13) Recurrent surge generator is used to generate
   a) Current of large magnitude
   b) Repetitive current surges
   c) Impulse voltage of smaller magnitude
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14) The impulse ratio of a rod gap is
   a) Unity
   b) Between 1.2 and 1.5
   c) Between 2.0 and 2.2
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15) Standard impulse testing of a power transformer requires
   a) Two applications of chopped wave followed by one application of a full wave
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   c) One application of chopped wave followed by two applications of a full wave
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   a) These occupy same location
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17) The pulse currents through CK and Ct are supplied by
   a) Source mainly
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18) If the source is not able to supply charging current required by the test cable, it is desirable to use
   a) Shunt capacitor
   b) Series capacitor
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   d) a) and c)

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   a) a.c. voltage only
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   c) In horizontal configuration if spheres are large
   d) b) and c)

SLR-TJ – 393

Seat No.	

B.E. (Electrical) (Part – II) Examination, 2017
Elective – II : HIGH VOLTAGE ENGINEERING

Day and Date : Friday, 24-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions* ***compulsory****.*
2) Assume suitable data ***if necessary*** *and mention* ***it clearly****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

II. Solve **any four** : **(4×5=20)**

a) Explain estimation and control of electric stresses.

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In case of Electromechanical Breakdown.

e) Prove that critical field is independent of critical temperature due to fast rise in temperature.

III. Solve **any two** : **(2×10=20)**

a) i) Describe post break-down phenomena and applications.

ii) Describe solid breakdown.

b) i) Prove the Paschen's law.

ii) Write a short note on Gas/Vacuum as insulators.

c) Explain Intrinsic break-down and thermal break-down.

SECTION – II

IV. Solve **any four** : **(4×5=20)**

a) Define the terms impulse voltage, impulse flash over voltage, impulse puncture voltage, impulse ratio for flash over, impulse ratio for puncture.

b) Explain impulse voltage measurements using voltage dividers.

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d) What is the necessary arrangement required for arrangement of insulators for test ?

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V. Solve **any two** : **(2×10=20)**

a) Explain impulse current generation and analyse impulse current generator.

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c) Discuss the classification of high voltage laboratories, size and ratings of high voltage laboratories.

SLR-TJ – 393

Seat No.	

Set R

B.E. (Electrical) (Part – II) Examination, 2017
Elective – II : HIGH VOLTAGE ENGINEERING

Day and Date : Friday, 24-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions :
1) ***All*** *questions* ***compulsory****.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

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   a) The breakdown voltage in sphere gaps increases with increase in partial pressure of water vapour
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   a) 30 kV
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   c) 10^{-4} sec
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   a) Two applications of chopped wave followed by one application of a full wave
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   c) One application of chopped wave followed by two applications of a full wave
   d) None

SLR-TJ – 393

Seat No.	

B.E. (Electrical) (Part – II) Examination, 2017
Elective – II : HIGH VOLTAGE ENGINEERING

Day and Date : Friday, 24-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions* ***compulsory****.*
2) Assume suitable data ***if necessary*** *and mention* ***it clearly****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

II. Solve **any four** : **(4×5=20)**

a) Explain estimation and control of electric stresses.

b) Explain Townsends criterion for break-down with the help of 3 conditions.

c) Write a short note on Cavity Breakdown in case of liquid.

d) Prove that

$$\frac{V}{d_0} = E_a = 0.6\left[\frac{\gamma}{\varepsilon_0 \varepsilon_r}\right]^{1/2}.$$

In case of Electromechanical Breakdown.

e) Prove that critical field is independent of critical temperature due to fast rise in temperature.

III. Solve **any two** : **(2×10=20)**

a) i) Describe post break-down phenomena and applications.

ii) Describe solid breakdown.

b) i) Prove the Paschen's law.

ii) Write a short note on Gas/Vacuum as insulators.

c) Explain Intrinsic break-down and thermal break-down.

SECTION – II

IV. Solve **any four** : **(4×5=20)**

a) Define the terms impulse voltage, impulse flash over voltage, impulse puncture voltage, impulse ratio for flash over, impulse ratio for puncture.

b) Explain impulse voltage measurements using voltage dividers.

c) Write a short note on Hall Generators.

d) What is the necessary arrangement required for arrangement of insulators for test ?

e) Write a short note on test facilities provided in high voltage laboratories.

V. Solve **any two** : **(2×10=20)**

a) Explain impulse current generation and analyse impulse current generator.

b) Discuss various methods of measuring high d.c. and a.c. currents.

c) Discuss the classification of high voltage laboratories, size and ratings of high voltage laboratories.

SLR-TJ – 393

Seat No.	

Set S

B.E. (Electrical) (Part – II) Examination, 2017
Elective – II : HIGH VOLTAGE ENGINEERING

Day and Date : Friday, 24-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions :
1) ***All*** *questions* ***compulsory****.*
2) *Assume suitable data* ***if necessary*** *and mention* ***it clearly****.*
3) *Figures to the* ***right*** *indicate* ***full*** *marks.*
4) *Q. No.* ***I*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
5) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) While impulse testing a power transformer, the impulse voltage is applied to
   a) One phase and the other two phases are short circuited, the secondary terminals are short circuited
   b) One phase, the other two phases grounded, the secondary short circuited
   c) One phase, two phases left open, secondary left open
   d) One phase, two phases left open, secondary short circuited

2) The magnitude of pulse currents depends upon
   a) Voltage applied b) No. of voids c) a) and b) d) None of above

3) Recurrent surge generator is used to generate
   a) Current of large magnitude b) Repetitive current surges
   c) Impulse voltage of smaller magnitude d) b) and c)

4) The impulse ratio of a rod gap is
   a) Unity b) Between 1.2 and 1.5
   c) Between 2.0 and 2.2 d) Between 1.6 and 1.8

5) Standard impulse testing of a power transformer requires
   a) Two applications of chopped wave followed by one application of a full wave
   b) One application of chopped wave followed by one applications of a full wave
   c) One application of chopped wave followed by two applications of a full wave
   d) None

6) During partial discharges if pulse currents through CK and Ct are observed simultaneously on the oscilloscope, it is found that
   a) These occupy same location b) These have same polarity
   c) These have same magnitude d) None of the above

7) The pulse currents through CK and Ct are supplied by
   a) Source mainly b) Partial discharge mainly
   c) Partly by source and partly be partial discharge d) Impedance Z

8) If the source is not able to supply charging current required by the test cable, it is desirable to use
   a) Shunt capacitor b) Series capacitor c) Series inductor d) a) and c)

9) Sphere gap is used for measurement of
   a) a.c. voltage only
   b) d.c. voltage only
   c) impulse voltage of any wave shape
   d) None of the above

10) Sphere gap when used for measurement of high voltage, the spheres are placed
   a) In horizontal configuration if spheres are small
   b) In vertical configuration if spheres are small
   c) In horizontal configuration if spheres are large
   d) b) and c)

11) Tick out of the correct :
   a) The breakdown voltage in sphere gaps increases with increase in partial pressure of water vapour
   b) The increase in breakdown voltage as in a) increases with increase in gap length
   c) a) and b)
   d) The breakdown voltage in sphere gaps decreases with increase in partial pressure of water vapour

12) Using uniform field spark gap, the breakdown voltage for 10 mm gap length is
   a) 34.25 kV
   b) 30.30 kV
   c) 36.25 kV
   d) 32.73 kV

13) The voltage measurements using uniform spark gap are
   a) Affected by nearby earthed objects
   b) Affected by polarity of supply
   c) Affected by dust particles
   d) All of a), b) and c)

14) A generating voltmeter is used to measure a.c. voltages if the angular frequency of voltage is
   a) Half the angular frequency of motor used
   b) Twice the angular frequency of motor used
   c) Thrice the angular frequency of the motor used
   d) None of the above

15) A potential divider is normally connected
   a) Outside the generator circuit towards the load circuit
   b) Within the generator circuit
   c) At a distance V/100 metres from the generator where V is the voltage to be measured in kV
   d) None of the above

16) Assuming p to be Constant and Townsend's second ionization coefficure to be small during the applicability of Paschen's law. Then if $(pd > (pd)_{min}$
   a) Electrons crossing in the gap make more frequent collisions with gas molecules than at $(pd)_{min}$
   b) Energy gained between successive collisions is smaller than at $(pd)_{min}$
   c) Energy gained between successive collisions is larger than at $(pd)_{min}$
   d) None of the above

17) The accepted value of dielectric strength of transformer oil is
   a) 30 kV
   b) 30 kV/cm
   c) 30 kV/cm for one min.
   d) None of the above

18) While testing transformer oil for dielectric strength the spherical electrodes are placed in
   a) Horizontal configuration
   b) Vertical configuration
   c) Any configuration
   d) Spherical electrodes are not used

19) To determine intrinsic dielectric strength, the time of application of voltage is of the order of
   a) 10^{-8} sec
   b) 10^{-6} sec
   c) 10^{-4} sec
   d) No such consideration

20) In case of impulse thermal breakdown of insulating materials, the critical time to breakdown is
   a) Proportional to critical electric field
   b) Inversely proportional to critical electric field
   c) Proportional to square of critical absolute temperature
   d) None of the above

SLR-TJ – 393

Seat No.	

B.E. (Electrical) (Part – II) Examination, 2017
Elective – II : HIGH VOLTAGE ENGINEERING

Day and Date : Friday, 24-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions* ***compulsory****.*
2) Assume suitable data ***if necessary*** *and mention* ***it clearly****.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*

SECTION – I

II. Solve **any four** : **(4×5=20)**

a) Explain estimation and control of electric stresses.

b) Explain Townsends criterion for break-down with the help of 3 conditions.

c) Write a short note on Cavity Breakdown in case of liquid.

d) Prove that

$$\frac{V}{d_0} = E_a = 0.6\left[\frac{\gamma}{\varepsilon_0 \varepsilon_r}\right]^{1/2}.$$

In case of Electromechanical Breakdown.

e) Prove that critical field is independent of critical temperature due to fast rise in temperature.

III. Solve **any two** : **(2×10=20)**

a) i) Describe post break-down phenomena and applications.

ii) Describe solid breakdown.

b) i) Prove the Paschen's law.

ii) Write a short note on Gas/Vacuum as insulators.

c) Explain Intrinsic break-down and thermal break-down.

SECTION – II

IV. Solve **any four** : **(4×5=20)**

a) Define the terms impulse voltage, impulse flash over voltage, impulse puncture voltage, impulse ratio for flash over, impulse ratio for puncture.

b) Explain impulse voltage measurements using voltage dividers.

c) Write a short note on Hall Generators.

d) What is the necessary arrangement required for arrangement of insulators for test ?

e) Write a short note on test facilities provided in high voltage laboratories.

V. Solve **any two** : **(2×10=20)**

a) Explain impulse current generation and analyse impulse current generator.

b) Discuss various methods of measuring high d.c. and a.c. currents.

c) Discuss the classification of high voltage laboratories, size and ratings of high voltage laboratories.

SLR-TJ – 394

Seat No.	

Set P

B.E. (Electrical) (Part – II) Examination, 2017
RENEWABLE ENERGY SOURCES (Elective – II)

Day and Date : Friday, 24-11-2017 Max Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) The percentage of the incoming radiation reflected back to space by the earth is
   a) 10% b) 20% c) 30% d) 40%
2) Which process is responsible for production of energy in the sun ?
   a) nuclear fission reaction b) nuclear fusion reaction
   c) exothermal chemical reaction d) all of the above
3) Which one of the following statement is not true for solar energy ?
   a) It is a dilute form of energy
   b) Its availability is diurnal
   c) Availability at any instant of time is uncertain
   d) Its harnessing at large scale is easy
4) In extraterrestrial radiation, what is the approximate percentage content of infra-red component ?
   a) 45.5% b) 55.5% c) 20% d) 80%
5) Terrestrial radiation has a wavelength in the range of
   a) 0.2 micro-meter to 4 micro-meter
   b) 0.2 micro-meter to 0.5 micro-meter
   c) 0.380 micro-meter to 0.760 micro-meters
   d) 0.29 micro-meter to 2.3 micro-meter
6) The range of wind speed suitable for wind power generator is
   a) 0 to 5 m/s b) 5 to 25 m/s c) 25 to 50 m/s d) 50 to 75 m/s
7) A two-blade wind turbine produces maximum power when the tip speed ratio is equal to
   a) π b) 2π c) 3π d) 0.593
8) Power in waves in
   a) Directly proportional to the square of its amplitude and to the period of motion
   b) Inversely proportional to the square of its amplitude and to the period of motion
   c) Directly proportional to the square of its amplitude and inversely proportional to the period of motion
   d) Inversely proportional to the square of its amplitude and directly proportional to the period of motion

9) The energy flux in waves is
   a) Less than that in wind energy
   b) More than that in wind energy
   c) Comparable to that in wind energy
   d) More than that in wind energy but less than solar energy
10) The optimum solid concentration in a biogas is
   a) 37 – 39% b) 27 – 29% c) 17 – 19% d) 7 – 9%
11) Which material should be added in the feed of a biogas plant to increase nitrogen content ?
   a) lignin b) carbohydrate
   c) chopped leguminous plants d) night soil
12) The average thickness of the crust is about
   a) 30 KM b) 3 KM c) 300 KM d) 1000 KM
13) A geothermal resource tapped for electricity generation could provide energy for about
   a) 50 years b) 1000 years c) 5 years d) 1 year
14) Compared to a conventional steam plant, the efficiency of geothermal plant is
   a) very high b) higher c) comparable d) lower
15) The tidal range
   a) Remains constant throughout the lunar month
   b) Is maximum in the middle of the lunar month and minimum by the end (also start) of the month
   c) Is minimum in the middle of the lunar month and maximum by the end (also start) of the month
   d) Is maximum in the middle and end (also start) of the lunar month and minimum in the first and third quarter of the lunar month
16) Bio-diesel is
   a) obtained from fermentation of sugars
   b) obtained from pyrolysis process
   c) exudates of plants
   d) an upgraded vegetable oil
17) Two-basin tidal schemes
   a) Are more economical than single basin schemes
   b) Operate on ebb cycles in both basins
   c) Produce less uniform power
   d) Produce more uniform power
18) A wind turbine extracts maximum power from wind, when the downstream wind speed reduces to
   a) one-third of upstream wind b) half that of upstream wind
   c) two third that of upstream wind d) zero
19) The energy payback period of wind generation is
   a) 1 year b) 2 years c) 3 years d) 4 years
20) The use of propeller turbine is desirable for the conditions of
   a) Low head and high discharge b) High head and low discharge
   c) High head and high discharge d) Low head and low discharge

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SLR-TJ – 394

Seat No.	

B.E. (Electrical) (Part – II) Examination, 2017
RENEWABLE ENERGY SOURCES (Elective – II)

Day and Date : Friday, 24-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

II. Solve **any four** : **(4×5=20)**

a) With the help of neat diagram explain physics of sun.

b) Draw and describe the working of sun-shine recorder.

c) Explain the advantages and disadvantages of concentrating collectors over flat plate type collectors.

d) Write a note on latent heat storage.

e) Write short note on Betz criteria.

III. Solve **any two** : **(2×10=20)**

a) Draw and describe the different types of horizontal axis wind mills.

b) How can solar thermal energy be used to supply potable drinking water in environmentally difficult places.

c) With the help of neat diagram explain :

i) terrestrial and

ii) extra-terrestrial solar radiation.

SECTION – II

IV. Solve **any four** : **(4×5=20)**

a) Write short note on Carnot cycle.

b) With the help of bacterial reactions explain principle of biogas generation.

c) Explain the different types of geothermal resources.

d) Write short note on types of geothermal wells.

e) Explain the need for DEC.

V. Solve **any two** : **(2×10=20)**

a) Describe the working of closed cycle OTEC system.

b) Draw and describe the binary cycle geothermal power plant.

c) Write short note on aerobic and anaerobic digestion.

SLR-TJ – 394

Seat No.	

Set Q

B.E. (Electrical) (Part – II) Examination, 2017
RENEWABLE ENERGY SOURCES (Elective – II)

Day and Date : Friday, 24-11-2017 Max Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) Bio-diesel is
   a) obtained from fermentation of sugars
   b) obtained from pyrolysis process
   c) exudates of plants
   d) an upgraded vegetable oil
2) Two-basin tidal schemes
   a) Are more economical than single basin schemes
   b) Operate on ebb cycles in both basins
   c) Produce less uniform power
   d) Produce more uniform power
3) A wind turbine extracts maximum power from wind, when the downstream wind speed reduces to
   a) one-third of upstream wind b) half that of upstream wind
   c) two third that of upstream wind d) zero
4) The energy payback period of wind generation is
   a) 1 year b) 2 years c) 3 years d) 4 years
5) The use of propeller turbine is desirable for the conditions of
   a) Low head and high discharge b) High head and low discharge
   c) High head and high discharge d) Low head and low discharge
6) The percentage of the incoming radiation reflected back to space by the earth is
   a) 10% b) 20% c) 30% d) 40%
7) Which process is responsible for production of energy in the sun ?
   a) nuclear fission reaction b) nuclear fusion reaction
   c) exothermal chemical reaction d) all of the above
8) Which one of the following statement is not true for solar energy ?
   a) It is a dilute form of energy
   b) Its availability is diurnal
   c) Availability at any instant of time is uncertain
   d) Its harnessing at large scale is easy

9) In extraterrestrial radiation, what is the approximate percentage content of infra-red component ?
   a) 45.5% b) 55.5% c) 20% d) 80%
10) Terrestrial radiation has a wavelength in the range of
   a) 0.2 micro-meter to 4 micro-meter
   b) 0.2 micro-meter to 0.5 micro-meter
   c) 0.380 micro-meter to 0.760 micro-meters
   d) 0.29 micro-meter to 2.3 micro-meter
11) The range of wind speed suitable for wind power generator is
   a) 0 to 5 m/s b) 5 to 25 m/s c) 25 to 50 m/s d) 50 to 75 m/s
12) A two-blade wind turbine produces maximum power when the tip speed ratio is equal to
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   b) More than that in wind energy
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   d) More than that in wind energy but less than solar energy
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   a) 37 – 39% b) 27 – 29% c) 17 – 19% d) 7 – 9%
16) Which material should be added in the feed of a biogas plant to increase nitrogen content ?
   a) lignin b) carbohydrate
   c) chopped leguminous plants d) night soil
17) The average thickness of the crust is about
   a) 30 KM b) 3 KM c) 300 KM d) 1000 KM
18) A geothermal resource tapped for electricity generation could provide energy for about
   a) 50 years b) 1000 years c) 5 years d) 1 year
19) Compared to a conventional steam plant, the efficiency of geothermal plant is
   a) very high b) higher c) comparable d) lower

20) The tidal range
   a) Remains constant throughout the lunar month
   b) Is maximum in the middle of the lunar month and minimum by the end (also start) of the month
   c) Is minimum in the middle of the lunar month and maximum by the end (also start) of the month
   d) Is maximum in the middle and end (also start) of the lunar month and minimum in the first and third quarter of the lunar month

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Seat No.	

B.E. (Electrical) (Part – II) Examination, 2017
RENEWABLE ENERGY SOURCES (Elective – II)

Day and Date : Friday, 24-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

II. Solve **any four** : **(4×5=20)**

a) With the help of neat diagram explain physics of sun.

b) Draw and describe the working of sun-shine recorder.

c) Explain the advantages and disadvantages of concentrating collectors over flat plate type collectors.

d) Write a note on latent heat storage.

e) Write short note on Betz criteria.

III. Solve **any two** : **(2×10=20)**

a) Draw and describe the different types of horizontal axis wind mills.

b) How can solar thermal energy be used to supply potable drinking water in environmentally difficult places.

c) With the help of neat diagram explain :

i) terrestrial and

ii) extra-terrestrial solar radiation.

SECTION – II

IV. Solve **any four** : **(4×5=20)**

a) Write short note on Carnot cycle.

b) With the help of bacterial reactions explain principle of biogas generation.

c) Explain the different types of geothermal resources.

d) Write short note on types of geothermal wells.

e) Explain the need for DEC.

V. Solve **any two** : **(2×10=20)**

a) Describe the working of closed cycle OTEC system.

b) Draw and describe the binary cycle geothermal power plant.

c) Write short note on aerobic and anaerobic digestion.

SLR-TJ – 394

Seat No.	

Set **R**

B.E. (Electrical) (Part – II) Examination, 2017
RENEWABLE ENERGY SOURCES (Elective – II)

Day and Date : Friday, 24-11-2017 Max Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) Which material should be added in the feed of a biogas plant to increase nitrogen content ?
   a) lignin b) carbohydrate
   c) chopped leguminous plants d) night soil
2) The average thickness of the crust is about
   a) 30 KM b) 3 KM c) 300 KM d) 1000 KM
3) A geothermal resource tapped for electricity generation could provide energy for about
   a) 50 years b) 1000 years c) 5 years d) 1 year
4) Compared to a conventional steam plant, the efficiency of geothermal plant is
   a) very high b) higher c) comparable d) lower
5) The tidal range
   a) Remains constant throughout the lunar month
   b) Is maximum in the middle of the lunar month and minimum by the end (also start) of the month
   c) Is minimum in the middle of the lunar month and maximum by the end (also start) of the month
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6) Bio-diesel is
   a) obtained from fermentation of sugars
   b) obtained from pyrolysis process
   c) exudates of plants
   d) an upgraded vegetable oil
7) Two-basin tidal schemes
   a) Are more economical than single basin schemes
   b) Operate on ebb cycles in both basins
   c) Produce less uniform power
   d) Produce more uniform power

8) A wind turbine extracts maximum power from wind, when the downstream wind speed reduces to
   a) one-third of upstream wind b) half that of upstream wind
   c) two third that of upstream wind d) zero
9) The energy payback period of wind generation is
   a) 1 year b) 2 years c) 3 years d) 4 years
10) The use of propeller turbine is desirable for the conditions of
   a) Low head and high discharge b) High head and low discharge
   c) High head and high discharge d) Low head and low discharge
11) The percentage of the incoming radiation reflected back to space by the earth is
   a) 10% b) 20% c) 30% d) 40%
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13) Which one of the following statement is not true for solar energy ?
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   b) 0.2 micro-meter to 0.5 micro-meter
   c) 0.380 micro-meter to 0.760 micro-meters
   d) 0.29 micro-meter to 2.3 micro-meter
16) The range of wind speed suitable for wind power generator is
   a) 0 to 5 m/s b) 5 to 25 m/s c) 25 to 50 m/s d) 50 to 75 m/s
17) A two-blade wind turbine produces maximum power when the tip speed ratio is equal to
   a) π b) 2π c) 3π d) 0.593
18) Power in waves in
   a) Directly proportional to the square of its amplitude and to the period of motion
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   c) Directly proportional to the square of its amplitude and inversely proportional to the period of motion
   d) Inversely proportional to the square of its amplitude and directly proportional to the period of motion
19) The energy flux in waves is
   a) Less than that in wind energy
   b) More than that in wind energy
   c) Comparable to that in wind energy
   d) More than that in wind energy but less than solar energy
20) The optimum solid concentration in a biogas is
   a) 37 – 39% b) 27 – 29% c) 17 – 19% d) 7 – 9%

SLR-TJ – 394

Seat No.	

B.E. (Electrical) (Part – II) Examination, 2017
RENEWABLE ENERGY SOURCES (Elective – II)

Day and Date : Friday, 24-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

II. Solve **any four** : **(4×5=20)**

a) With the help of neat diagram explain physics of sun.

b) Draw and describe the working of sun-shine recorder.

c) Explain the advantages and disadvantages of concentrating collectors over flat plate type collectors.

d) Write a note on latent heat storage.

e) Write short note on Betz criteria.

III. Solve **any two** : **(2×10=20)**

a) Draw and describe the different types of horizontal axis wind mills.

b) How can solar thermal energy be used to supply potable drinking water in environmentally difficult places.

c) With the help of neat diagram explain :

i) terrestrial and

ii) extra-terrestrial solar radiation.

SECTION – II

IV. Solve **any four** : **(4×5=20)**

a) Write short note on Carnot cycle.

b) With the help of bacterial reactions explain principle of biogas generation.

c) Explain the different types of geothermal resources.

d) Write short note on types of geothermal wells.

e) Explain the need for DEC.

V. Solve **any two** : **(2×10=20)**

a) Describe the working of closed cycle OTEC system.

b) Draw and describe the binary cycle geothermal power plant.

c) Write short note on aerobic and anaerobic digestion.

SLR-TJ – 394

Seat No.	

Set S

B.E. (Electrical) (Part – II) Examination, 2017
RENEWABLE ENERGY SOURCES (Elective – II)

Day and Date : Friday, 24-11-2017 Max Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

I. Choose the correct answer : **(20×1=20)**

1) The range of wind speed suitable for wind power generator is
   a) 0 to 5 m/s b) 5 to 25 m/s c) 25 to 50 m/s d) 50 to 75 m/s
2) A two-blade wind turbine produces maximum power when the tip speed ratio is equal to
   a) π b) 2π c) 3π d) 0.593
3) Power in waves in
   a) Directly proportional to the square of its amplitude and to the period of motion
   b) Inversely proportional to the square of its amplitude and to the period of motion
   c) Directly proportional to the square of its amplitude and inversely proportional to the period of motion
   d) Inversely proportional to the square of its amplitude and directly proportional to the period of motion
4) The energy flux in waves is
   a) Less than that in wind energy
   b) More than that in wind energy
   c) Comparable to that in wind energy
   d) More than that in wind energy but less than solar energy
5) The optimum solid concentration in a biogas is
   a) 37 – 39% b) 27 – 29% c) 17 – 19% d) 7 – 9%
6) Which material should be added in the feed of a biogas plant to increase nitrogen content ?
   a) lignin b) carbohydrate
   c) chopped leguminous plants d) night soil
7) The average thickness of the crust is about
   a) 30 KM b) 3 KM c) 300 KM d) 1000 KM
8) A geothermal resource tapped for electricity generation could provide energy for about
   a) 50 years b) 1000 years c) 5 years d) 1 year
9) Compared to a conventional steam plant, the efficiency of geothermal plant is
   a) very high b) higher c) comparable d) lower

P.T.O.

11) The tidal range
   a) Remains constant throughout the lunar month
   b) Is maximum in the middle of the lunar month and minimum by the end (also start) of the month
   c) Is minimum in the middle of the lunar month and maximum by the end (also start) of the month
   d) Is maximum in the middle and end (also start) of the lunar month and minimum in the first and third quarter of the lunar month

11) Bio-diesel is
   a) obtained from fermentation of sugars
   b) obtained from pyrolysis process
   c) exudates of plants
   d) an upgraded vegetable oil

12) Two-basin tidal schemes
   a) Are more economical than single basin schemes
   b) Operate on ebb cycles in both basins
   c) Produce less uniform power
   d) Produce more uniform power

13) A wind turbine extracts maximum power from wind, when the downstream wind speed reduces to
   a) one-third of upstream wind b) half that of upstream wind
   c) two third that of upstream wind d) zero

14) The energy payback period of wind generation is
   a) 1 year b) 2 years c) 3 years d) 4 years

15) The use of propeller turbine is desirable for the conditions of
   a) Low head and high discharge b) High head and low discharge
   c) High head and high discharge d) Low head and low discharge

16) The percentage of the incoming radiation reflected back to space by the earth is
   a) 10% b) 20% c) 30% d) 40%

17) Which process is responsible for production of energy in the sun ?
   a) nuclear fission reaction b) nuclear fusion reaction
   c) exothermal chemical reaction d) all of the above

18) Which one of the following statement is not true for solar energy ?
   a) It is a dilute form of energy
   b) Its availability is diurnal
   c) Availability at any instant of time is uncertain
   d) Its harnessing at large scale is easy

19) In extraterrestrial radiation, what is the approximate percentage content of infra-red component ?
   a) 45.5% b) 55.5% c) 20% d) 80%

20) Terrestrial radiation has a wavelength in the range of
   a) 0.2 micro-meter to 4 micro-meter
   b) 0.2 micro-meter to 0.5 micro-meter
   c) 0.380 micro-meter to 0.760 micro-meters
   d) 0.29 micro-meter to 2.3 micro-meter

SLR-TJ – 394

Seat No.	

B.E. (Electrical) (Part – II) Examination, 2017
RENEWABLE ENERGY SOURCES (Elective – II)

Day and Date : Friday, 24-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

II. Solve **any four** : **(4×5=20)**

a) With the help of neat diagram explain physics of sun.

b) Draw and describe the working of sun-shine recorder.

c) Explain the advantages and disadvantages of concentrating collectors over flat plate type collectors.

d) Write a note on latent heat storage.

e) Write short note on Betz criteria.

III. Solve **any two** : **(2×10=20)**

a) Draw and describe the different types of horizontal axis wind mills.

b) How can solar thermal energy be used to supply potable drinking water in environmentally difficult places.

c) With the help of neat diagram explain :

i) terrestrial and

ii) extra-terrestrial solar radiation.

SECTION – II

IV. Solve **any four** : **(4×5=20)**

a) Write short note on Carnot cycle.

b) With the help of bacterial reactions explain principle of biogas generation.

c) Explain the different types of geothermal resources.

d) Write short note on types of geothermal wells.

e) Explain the need for DEC.

V. Solve **any two** : **(2×10=20)**

a) Describe the working of closed cycle OTEC system.

b) Draw and describe the binary cycle geothermal power plant.

c) Write short note on aerobic and anaerobic digestion.

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Seat No.	

Set P

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER QUALITY (Elective – II)

Day and Date : Friday, 24-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) Minimum voltage sag ride through capability of equipment A and B are 80% and 50% respectively. Which device will be more immune to voltage sag ?
   a) Equipment A
   b) Equipment B
   c) Both equipments will have same sensitivity to voltage sag
   d) None of the above

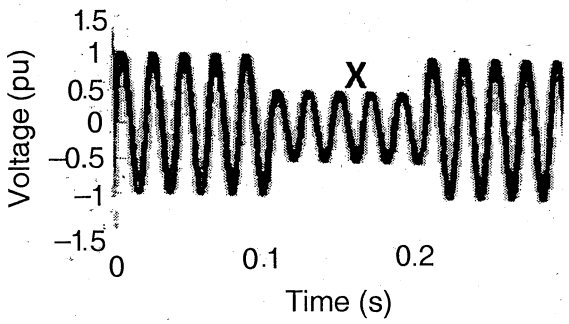
2) Dynamic Voltage Restorer is _____ connected device.
   a) Series b) Shunt
   c) Both series and shunt d) None of the above

3) The objective of any power quality study or solution is to ensure that
   a) The immunity contour is inside the boundaries of the power quality contour
   b) The immunity contour is outside the boundaries of the power quality contour
   c) The immunity contour and power quality contour are independent of each other
   d) None of these

4) Most common cause of unbalancing is
   a) Single phase loads b) Three phase loads
   c) Arc furnace d) ASDs

5) IEEE standard 1100 is related to
   a) Power Quality Monitoring b) Flicker
   c) Harmonics d) Grounding

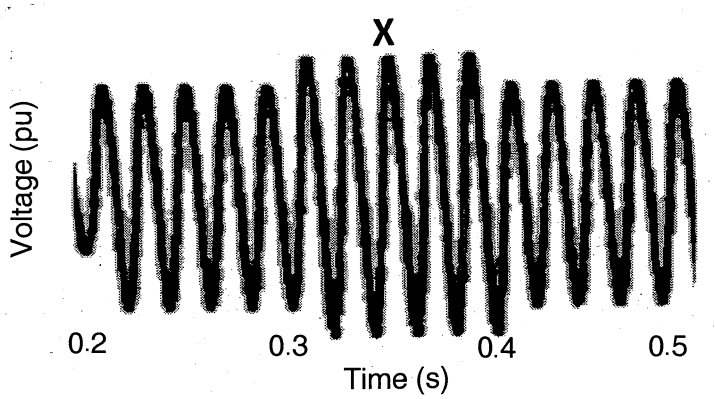
6) Part of a sine wave marked X represent



   a) Overvoltage b) Dip c) Swell d) Interruption

P.T.O.

7) Part of a sine wave marked X represents



a) Overvoltage b) Dip c) Swell d) Flicker

8) Switching off of capacitor bank can cause
a) Undervoltage b) Overvoltage c) Flicker d) Unbalance

9) Which of the following equipments can be used for mitigation of voltage sag ?
a) UPS b) Isolation transformer
c) SMES d) All of the above

10) _____ are the main causes of flicker.
a) ASD b) Arc furnace
c) Personnel Computers d) Transformer

11) According to IEEE definition, individual Harmonic Distortion of fundamental is
a) 100% b) Less than 100% c) More than 100% d) None of the above

12) Shunt passive filter provides _____ impedance path at the tuned frequency.
a) Low b) High c) Can't predict d) None of these

13) The dominant harmonics present in the 12 pulse converter is
a) Fifth b) Seventh c) Eleventh d) Thirteenth

14) Fifth harmonic has _____ phase sequence
a) Positive b) Negative c) Zero d) None of these

15) Controlling harmonic current distortion is the responsibility of
a) End-user b) Utility c) Both a) and b) d) None of these

16) Single tuned shunt passive filter will act _____ at fundamental frequency.
a) Inductive b) Resistive c) Capacitive d) None of these

17) There should be _____ neutral to ground bond in the system.
a) Two b) Three c) Only one d) Any number

18) In presence of harmonics; displacement power factor is usually
a) Less than true power factor b) More than true power factor
c) Equal to true power factor d) None of these

19) Power quality monitoring instrument should be located as close as possible to
a) Service entrance
b) Primary side of distribution transformer
c) Equipment affected due to poor power quality
d) None of these

20) High frequency power quality events usually last for _____ duration.
a) Short b) Long c) Can't predict d) None of these

_____

SLR-TJ – 395

Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER QUALITY (Elective – II)

Day and Date : Friday, 24-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** questions : **(4×5=20)**
   1) Define power quality. What are the responsibilities of utility, consumer and equipment manufacturer's regarding power quality.
   2) Explain with neat diagram fundamental principle of protection of equipment against voltage sag.
   3) Explain with neat diagram transients produced by back to back capacitor switching.
   4) With neat waveform explain how voltage sag is produced during starting of induction motor.
   5) Explain with neat diagram working of SMES.

3. Solve **any two** questions : **(2×10=20)**
   1) Explain with neat diagram working of following equipments :
      a) Dynamic Voltage Restorer (DVR).
      b) Ferroresonant transformer.
   2) With neat waveform define, explain the causes and effects of the following power quality problems :
      a) Voltage sag
      b) Overvoltage.
   3) With the help of flow chart explain the procedure of power quality problem evaluation.

SECTION – II

4. Solve **any four** questions. **(4×5=20)**
   1) Define harmonics. Explain how harmonics are characterized.
   2) Write equation of following harmonic indices :
      a) Individual Harmonic Distortion
      b) Total Harmonic Distortion
      c) Total Demand Distortion.
   3) Define and explain following terms :
      a) Displacement power factor
      b) True power factor.

4) Explain different problems associated with wiring and grounding.
5) 12 pulse PWM variable speed drive has following specifications :
   Output : 0 to 250 V, 0-150 Hz, 10A 6KVA
   Harmonic spectrum for the drive is as given in the table :

Order	1	3	11	13	15	17	23	25
Angle (Degree)	0°	25°	32°	–34°	123°	45°	27°	–56°
Magnitude r.m.s. % of Fundamental	100	4	40	30	5	3	20	15

   Calculate total harmonic distortion in current.

5. Solve **any two** questions : **(2×10=20)**
   1) Explain different sources and effects of harmonics.
   2) Explain with neat diagram following grounding systems :
      a) Properly grounded electrical system.
      b) Isolated grounded electrical system.
   3) Define power quality monitoring. Explain the windowed FFT technique for power quality monitoring and analysis.

SLR-TJ – 395

Seat No.	

Set Q

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER QUALITY (Elective – II)

Day and Date : Friday, 24-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) Single tuned shunt passive filter will act _____ at fundamental frequency.
a) Inductive b) Resistive c) Capacitive d) None of these

2) There should be _____ neutral to ground bond in the system.
a) Two b) Three c) Only one d) Any number

3) In presence of harmonics; displacement power factor is usually
a) Less than true power factor b) More than true power factor
c) Equal to true power factor d) None of these

4) Power quality monitoring instrument should be located as close as possible to
a) Service entrance
b) Primary side of distribution transformer
c) Equipment affected due to poor power quality
d) None of these

5) High frequency power quality events usually last for _____ duration.
a) Short b) Long c) Can't predict d) None of these

6) Minimum voltage sag ride through capability of equipment A and B are 80% and 50% respectively. Which device will be more immune to voltage sag ?
a) Equipment A
b) Equipment B
c) Both equipments will have same sensitivity to voltage sag
d) None of the above

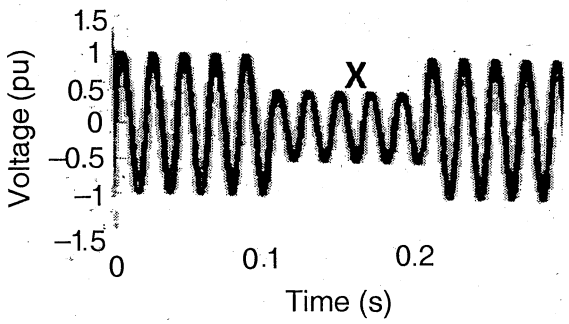
7) Dynamic Voltage Restorer is _____ connected device.
a) Series b) Shunt
c) Both series and shunt d) None of the above

8) The objective of any power quality study or solution is to ensure that
a) The immunity contour is inside the boundaries of the power quality contour
b) The immunity contour is outside the boundaries of the power quality contour
c) The immunity contour and power quality contour are independent of each other
d) None of these

9) Most common cause of unbalancing is
a) Single phase loads b) Three phase loads
c) Arc furnace d) ASDs

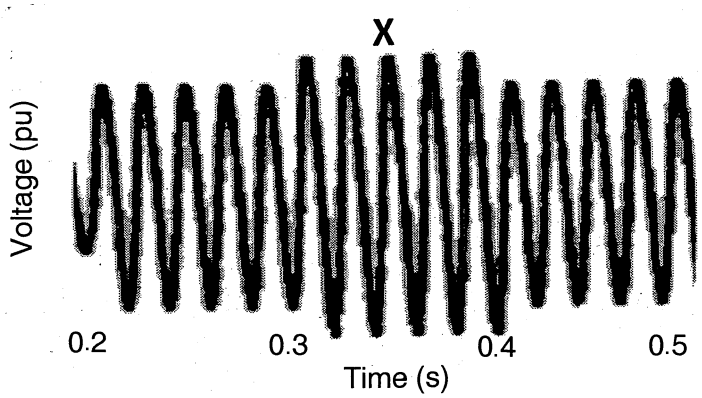
10) IEEE standard 1100 is related to
   a) Power Quality Monitoring
   b) Flicker
   c) Harmonics
   d) Grounding

11) Part of a sine wave marked X represent



   a) Overvoltage
   b) Dip
   c) Swell
   d) Interruption

12) Part of a sine wave marked X represents



   a) Overvoltage
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13) Switching off of capacitor bank can cause
   a) Undervoltage
   b) Overvoltage
   c) Flicker
   d) Unbalance

14) Which of the following equipments can be used for mitigation of voltage sag ?
   a) UPS
   b) Isolation transformer
   c) SMES
   d) All of the above

15) _____ are the main causes of flicker.
   a) ASD
   b) Arc furnace
   c) Personnel Computers
   d) Transformer

16) According to IEEE definition, individual Harmonic Distortion of fundamental is
   a) 100%
   b) Less than 100%
   c) More than 100%
   d) None of the above

17) Shunt passive filter provides _____ impedance path at the tuned frequency.
   a) Low
   b) High
   c) Can't predict
   d) None of these

18) The dominant harmonics present in the 12 pulse converter is
   a) Fifth
   b) Seventh
   c) Eleventh
   d) Thirteenth

19) Fifth harmonic has _____ phase sequence
   a) Positive
   b) Negative
   c) Zero
   d) None of these

20) Controlling harmonic current distortion is the responsibility of
   a) End-user
   b) Utility
   c) Both a) and b)
   d) None of these

SLR-TJ – 395

Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER QUALITY (Elective – II)

Day and Date : Friday, 24-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** questions : **(4×5=20)**
   1) Define power quality. What are the responsibilities of utility, consumer and equipment manufacturer's regarding power quality.
   2) Explain with neat diagram fundamental principle of protection of equipment against voltage sag.
   3) Explain with neat diagram transients produced by back to back capacitor switching.
   4) With neat waveform explain how voltage sag is produced during starting of induction motor.
   5) Explain with neat diagram working of SMES.

3. Solve **any two** questions : **(2×10=20)**
   1) Explain with neat diagram working of following equipments :
      a) Dynamic Voltage Restorer (DVR).
      b) Ferroresonant transformer.
   2) With neat waveform define, explain the causes and effects of the following power quality problems :
      a) Voltage sag
      b) Overvoltage.
   3) With the help of flow chart explain the procedure of power quality problem evaluation.

SECTION – II

4. Solve **any four** questions. **(4×5=20)**
   1) Define harmonics. Explain how harmonics are characterized.
   2) Write equation of following harmonic indices :
      a) Individual Harmonic Distortion
      b) Total Harmonic Distortion
      c) Total Demand Distortion.
   3) Define and explain following terms :
      a) Displacement power factor
      b) True power factor.

4) Explain different problems associated with wiring and grounding.
5) 12 pulse PWM variable speed drive has following specifications :
   Output : 0 to 250 V, 0-150 Hz, 10A 6KVA
   Harmonic spectrum for the drive is as given in the table :

Order	1	3	11	13	15	17	23	25
Angle (Degree)	0°	25°	32°	–34°	123°	45°	27°	–56°
Magnitude r.m.s. % of Fundamental	100	4	40	30	5	3	20	15

   Calculate total harmonic distortion in current.

5. Solve **any two** questions : **(2×10=20)**
   1) Explain different sources and effects of harmonics.
   2) Explain with neat diagram following grounding systems :
      a) Properly grounded electrical system.
      b) Isolated grounded electrical system.
   3) Define power quality monitoring. Explain the windowed FFT technique for power quality monitoring and analysis.

SLR-TJ – 395

Seat No.	

Set **R**

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER QUALITY (Elective – II)

Day and Date : Friday, 24-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) According to IEEE definition, individual Harmonic Distortion of fundamental is
a) 100% b) Less than 100% c) More than 100% d) None of the above

2) Shunt passive filter provides _____ impedance path at the tuned frequency.
a) Low b) High c) Can't predict d) None of these

3) The dominant harmonics present in the 12 pulse converter is
a) Fifth b) Seventh c) Eleventh d) Thirteenth

4) Fifth harmonic has _____ phase sequence
a) Positive b) Negative c) Zero d) None of these

5) Controlling harmonic current distortion is the responsibility of
a) End-user b) Utility c) Both a) and b) d) None of these

6) Single tuned shunt passive filter will act _____ at fundamental frequency.
a) Inductive b) Resistive c) Capacitive d) None of these

7) There should be _____ neutral to ground bond in the system.
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8) In presence of harmonics; displacement power factor is usually
a) Less than true power factor b) More than true power factor
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9) Power quality monitoring instrument should be located as close as possible to
a) Service entrance
b) Primary side of distribution transformer
c) Equipment affected due to poor power quality
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10) High frequency power quality events usually last for _____ duration.
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11) Minimum voltage sag ride through capability of equipment A and B are 80% and 50% respectively. Which device will be more immune to voltage sag ?
a) Equipment A
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12) Dynamic Voltage Restorer is _____ connected device.
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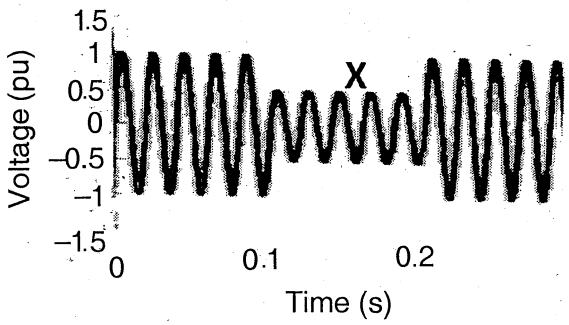
14) Most common cause of unbalancing is
a) Single phase loads
b) Three phase loads
c) Arc furnace
d) ASDs

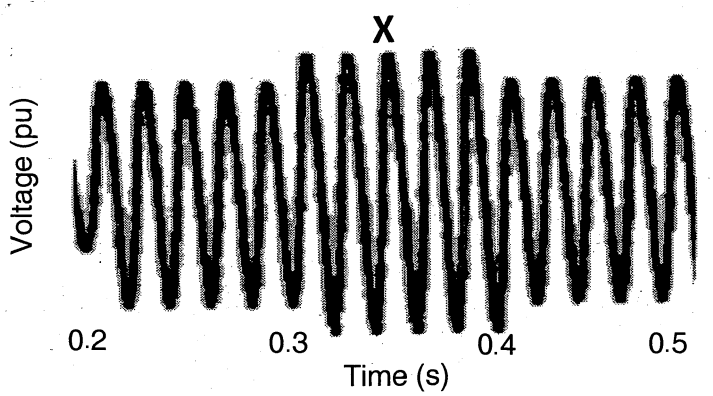
15) IEEE standard 1100 is related to
a) Power Quality Monitoring
b) Flicker
c) Harmonics
d) Grounding

16) Part of a sine wave marked X represent



a) Overvoltage
b) Dip
c) Swell
d) Interruption

17) Part of a sine wave marked X represents



a) Overvoltage
b) Dip
c) Swell
d) Flicker

18) Switching off of capacitor bank can cause
a) Undervoltage
b) Overvoltage
c) Flicker
d) Unbalance

19) Which of the following equipments can be used for mitigation of voltage sag ?
a) UPS
b) Isolation transformer
c) SMES
d) All of the above

20) _____ are the main causes of flicker.
a) ASD
b) Arc furnace
c) Personnel Computers
d) Transformer

SLR-TJ – 395

Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER QUALITY (Elective – II)

Day and Date : Friday, 24-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** questions : **(4×5=20)**
   1) Define power quality. What are the responsibilities of utility, consumer and equipment manufacturer's regarding power quality.
   2) Explain with neat diagram fundamental principle of protection of equipment against voltage sag.
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3. Solve **any two** questions : **(2×10=20)**
   1) Explain with neat diagram working of following equipments :
      a) Dynamic Voltage Restorer (DVR).
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   2) With neat waveform define, explain the causes and effects of the following power quality problems :
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      b) Overvoltage.
   3) With the help of flow chart explain the procedure of power quality problem evaluation.

SECTION – II

4. Solve **any four** questions. **(4×5=20)**
   1) Define harmonics. Explain how harmonics are characterized.
   2) Write equation of following harmonic indices :
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      b) Total Harmonic Distortion
      c) Total Demand Distortion.
   3) Define and explain following terms :
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      b) True power factor.

4) Explain different problems associated with wiring and grounding.
5) 12 pulse PWM variable speed drive has following specifications :
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   Calculate total harmonic distortion in current.

5. Solve **any two** questions : **(2×10=20)**
   1) Explain different sources and effects of harmonics.
   2) Explain with neat diagram following grounding systems :
      a) Properly grounded electrical system.
      b) Isolated grounded electrical system.
   3) Define power quality monitoring. Explain the windowed FFT technique for power quality monitoring and analysis.

SLR-TJ – 395

Seat No.	

Set S

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER QUALITY (Elective – II)

Day and Date : Friday, 24-11-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

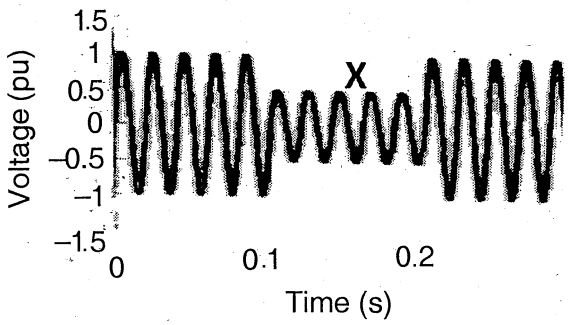
Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

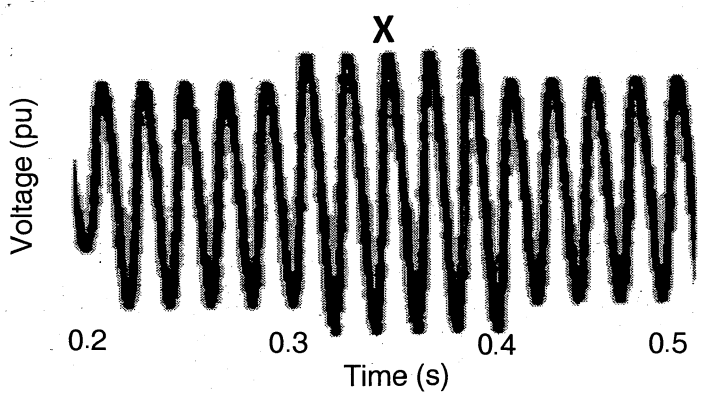
1. Choose the correct answer : **20**

1) Part of a sine wave marked X represent



a) Overvoltage b) Dip c) Swell d) Interruption

2) Part of a sine wave marked X represents



a) Overvoltage b) Dip c) Swell d) Flicker

3) Switching off of capacitor bank can cause
a) Undervoltage b) Overvoltage c) Flicker d) Unbalance

4) Which of the following equipments can be used for mitigation of voltage sag ?
a) UPS b) Isolation transformer
c) SMES d) All of the above

P.T.O.

5) _____ are the main causes of flicker.
a) ASD b) Arc furnace
c) Personnel Computers d) Transformer

6) According to IEEE definition, individual Harmonic Distortion of fundamental is
a) 100% b) Less than 100% c) More than 100% d) None of the above

7) Shunt passive filter provides _____ impedance path at the tuned frequency.
a) Low b) High c) Can't predict d) None of these

8) The dominant harmonics present in the 12 pulse converter is
a) Fifth b) Seventh c) Eleventh d) Thirteenth

9) Fifth harmonic has _____ phase sequence
a) Positive b) Negative c) Zero d) None of these

10) Controlling harmonic current distortion is the responsibility of
a) End-user b) Utility c) Both a) and b) d) None of these

11) Single tuned shunt passive filter will act _____ at fundamental frequency.
a) Inductive b) Resistive c) Capacitive d) None of these

12) There should be _____ neutral to ground bond in the system.
a) Two b) Three c) Only one d) Any number

13) In presence of harmonics; displacement power factor is usually
a) Less than true power factor b) More than true power factor
c) Equal to true power factor d) None of these

14) Power quality monitoring instrument should be located as close as possible to
a) Service entrance
b) Primary side of distribution transformer
c) Equipment affected due to poor power quality
d) None of these

15) High frequency power quality events usually last for _____ duration.
a) Short b) Long c) Can't predict d) None of these

16) Minimum voltage sag ride through capability of equipment A and B are 80% and 50% respectively. Which device will be more immune to voltage sag ?
a) Equipment A
b) Equipment B
c) Both equipments will have same sensitivity to voltage sag
d) None of the above

17) Dynamic Voltage Restorer is _____ connected device.
a) Series b) Shunt
c) Both series and shunt d) None of the above

18) The objective of any power quality study or solution is to ensure that
a) The immunity contour is inside the boundaries of the power quality contour
b) The immunity contour is outside the boundaries of the power quality contour
c) The immunity contour and power quality contour are independent of each other
d) None of these

19) Most common cause of unbalancing is
a) Single phase loads b) Three phase loads
c) Arc furnace d) ASDs

20) IEEE standard 1100 is related to
a) Power Quality Monitoring b) Flicker
c) Harmonics d) Grounding

SLR-TJ – 395

Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
POWER QUALITY (Elective – II)

Day and Date : Friday, 24-11-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** questions : **(4×5=20)**
   1) Define power quality. What are the responsibilities of utility, consumer and equipment manufacturer's regarding power quality.
   2) Explain with neat diagram fundamental principle of protection of equipment against voltage sag.
   3) Explain with neat diagram transients produced by back to back capacitor switching.
   4) With neat waveform explain how voltage sag is produced during starting of induction motor.
   5) Explain with neat diagram working of SMES.

3. Solve **any two** questions : **(2×10=20)**
   1) Explain with neat diagram working of following equipments :
      a) Dynamic Voltage Restorer (DVR).
      b) Ferroresonant transformer.
   2) With neat waveform define, explain the causes and effects of the following power quality problems :
      a) Voltage sag
      b) Overvoltage.
   3) With the help of flow chart explain the procedure of power quality problem evaluation.

SECTION – II

4. Solve **any four** questions. **(4×5=20)**
   1) Define harmonics. Explain how harmonics are characterized.
   2) Write equation of following harmonic indices :
      a) Individual Harmonic Distortion
      b) Total Harmonic Distortion
      c) Total Demand Distortion.
   3) Define and explain following terms :
      a) Displacement power factor
      b) True power factor.

4) Explain different problems associated with wiring and grounding.
5) 12 pulse PWM variable speed drive has following specifications :
   Output : 0 to 250 V, 0-150 Hz, 10A 6KVA
   Harmonic spectrum for the drive is as given in the table :

Order	1	3	11	13	15	17	23	25
Angle (Degree)	0°	25°	32°	–34°	123°	45°	27°	–56°
Magnitude r.m.s. % of Fundamental	100	4	40	30	5	3	20	15

   Calculate total harmonic distortion in current.

5. Solve **any two** questions : **(2×10=20)**
   1) Explain different sources and effects of harmonics.
   2) Explain with neat diagram following grounding systems :
      a) Properly grounded electrical system.
      b) Isolated grounded electrical system.
   3) Define power quality monitoring. Explain the windowed FFT technique for power quality monitoring and analysis.

SLR-TJ – 396

Seat No.	

Set P

B.E. (Electrical Engineering) (Part – II) Examination, 2017
HVDC TRANSMISSION (Old)

Day and Date : Tuesday, 28-11-2017 Max. Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Assume ***suitable*** *data* ***if*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternative : **(1×20=20)**

1) Bipolar link has two conductors
a) One positive and other negative b) One positive and other positive
c) One negative and other negative d) Both are negative

2) CCC stands for
a) Capacitor Compressed Converter b) Capacitor Commutator Converter
c) Capacitor Commutated Converter d) None of the above

3) UHVDC transmission is being considered more than
a) ± 500 KV b) ± 800 KV c) ± 800 MV d) ± 800 V

4) The HVDC converter
a) Does not consume reactive power
b) Consumes as much reactive power as real power
c) Consumes 50% of the real power
d) Consumes 100% of the real power

5) A 12-pulse bridge is preferred in HVDC because
a) It eliminates certain harmonics
b) It results in better power factor
c) Series connection of converters on D.C. side is better
d) None of the above

6) Pulse Phase Control (PPC) is the variations of
a) IPC b) EPC c) CC d) VGC

7) Harmonic instability problem particularly with low short circuit ratios, is the drawback of
a) IPC Scheme b) EPC Scheme
c) Current controller d) Current extinguish angle controller

8) Misfire occurs
a) The presence of an unwanted signals
b) Because of duplicated converter controls
c) The required gate pulse is missing
d) Both a) and b)

9) Tuned filters are used to filter out
a) Characteristic harmonics b) Non-characteristic harmonics
c) Both a) and b) d) Transients only

10) Passive filters acts as source of
a) Active power b) Reactive power c) Apparent power d) Only a) and c)

11) Stability of a system is not affected by
a) Reactance of line b) Losses
c) Reactance of generator d) Output torque

12) Fault on a two terminal DC link is removed by
a) Breakers on DC side b) Breakers on AC side
c) Current control of converters d) None of the above

13) A back to back HVDC link can be advantageous compared to AC primarily because
a) It is cheaper b) Of stability considerations
c) Of controlled power glow d) None of the above

14) Short gate pulse or long gate pulse used for
a) To start AC link b) To stop AC link
c) To start DC link d) To stop DC link

15) Which among these is a part of HVDC link ?
a) Two earth electrodes b) Converter valves
c) Bipolar DC line d) All of these

16) Which of the following statements is/are true regarding HVDC ?
a) There is no skin effect in dc line
b) HVDC can utilize earth for its return path
c) Corona loss is very much reduced in the dc line
d) All of the above

17) Which method of voltage control is applied for long line AC transmissions ?
a) Switching by shunt capacitors b) Tap changing transformers
c) Switching by shunt reactors d) Static Var sources

18) For what voltage is Twin conductor bundle used in India ?
a) 220 kV b) 500 kV c) 750 kV d) 330 kV

19) Bundled conductors are used in EHV lines primarily for
a) Reducing cost of the line
b) Reducing corona loss and radio interference
c) Increasing stability limit
d) None of the above

20) Economic studies have shown that D.C. transmission is cheaper than a.c. transmission for lengths.
a) Below 300 km b) Beyond 600 km c) Beyond 1200 km d) Below 100 km

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SLR-TJ – 396

Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
HVDC TRANSMISSION (Old)

Day and Date : Tuesday, 28-11-2017 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) **All** questions are **compulsory**.*
*2) Figures to **right** indicate **full** marks.*
*3) Assume **suitable** data **if** necessary.*

SECTION – I

2. Solve **any four** : **(4×5=20)**
   a) Explain the special feature of converter transformers.
   b) Write short note on surge arrestors.
   c) Explain the function Bi-polar DC link.
   d) For a fixed power of transmission explain how the economic choice of voltage level is selected in D.C. transmission system.
   e) Explain different modes of operation for converter.

3. Solve **any two** : **(2×10=20)**
   a) Why HVDC controls is necessary and explain various portions of HVDC control characteristics ?
   b) Discuss the converter firing control system.
   c) Discuss about modern trends in HVDC technology.

SECTION – II

4. Solve **any four** : **(4×5=20)**
   a) Explain the following in detail :
      i) Arc backs
      ii) Arc through.
   b) Explain non-characteristic harmonics and also explain effect of unbalanced voltages.

c) Explain protection against over currents in converter stations.

d) State necessity of filter and also explain types of filter.

e) Explain conventional control strategies of reactive power requirements in steady state condition.

5. Solve **any two** : **(2×10=20)**

a) Give the comparison between series and parallel MTDC system in detail.

b) Explain the following :

i) Harmonic distortion

ii) THF

iii) THFF

c) Explain the static VAR system.

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SLR-TJ – 396

Seat No.	

Set Q

B.E. (Electrical Engineering) (Part – II) Examination, 2017
HVDC TRANSMISSION (Old)

Day and Date : Tuesday, 28-11-2017 Max. Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Assume ***suitable*** *data* ***if*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternative : **(1×20=20)**

1) Which of the following statements is/are true regarding HVDC ?
a) There is no skin effect in dc line
b) HVDC can utilize earth for its return path
c) Corona loss is very much reduced in the dc line
d) All of the above

2) Which method of voltage control is applied for long line AC transmissions ?
a) Switching by shunt capacitors b) Tap changing transformers
c) Switching by shunt reactors d) Static Var sources

3) For what voltage is Twin conductor bundle used in India ?
a) 220 kV b) 500 kV c) 750 kV d) 330 kV

4) Bundled conductors are used in EHV lines primarily for
a) Reducing cost of the line
b) Reducing corona loss and radio interference
c) Increasing stability limit
d) None of the above

5) Economic studies have shown that D.C. transmission is cheaper than a.c. transmission for lengths.
a) Below 300 km b) Beyond 600 km c) Beyond 1200 km d) Below 100 km

6) Bipolar link has two conductors
a) One positive and other negative b) One positive and other positive
c) One negative and other negative d) Both are negative

7) CCC stands for
a) Capacitor Compressed Converter b) Capacitor Commutator Converter
c) Capacitor Commutated Converter d) None of the above

P.T.O.

8) UHVDC transmission is being considered more than
a) ± 500 KV b) ± 800 KV c) ± 800 MV d) ± 800 V

9) The HVDC converter
a) Does not consume reactive power
b) Consumes as much reactive power as real power
c) Consumes 50% of the real power
d) Consumes 100% of the real power

10) A 12-pulse bridge is preferred in HVDC because
a) It eliminates certain harmonics
b) It results in better power factor
c) Series connection of converters on D.C. side is better
d) None of the above

11) Pulse Phase Control (PPC) is the variations of
a) IPC b) EPC c) CC d) VGC

12) Harmonic instability problem particularly with low short circuit ratios, is the drawback of
a) IPC Scheme b) EPC Scheme
c) Current controller d) Current extinguish angle controller

13) Misfire occurs
a) The presence of an unwanted signals
b) Because of duplicated converter controls
c) The required gate pulse is missing
d) Both a) and b)

14) Tuned filters are used to filter out
a) Characteristic harmonics b) Non-characteristic harmonics
c) Both a) and b) d) Transients only

15) Passive filters acts as source of
a) Active power b) Reactive power c) Apparent power d) Only a) and c)

16) Stability of a system is not affected by
a) Reactance of line b) Losses
c) Reactance of generator d) Output torque

17) Fault on a two terminal DC link is removed by
a) Breakers on DC side b) Breakers on AC side
c) Current control of converters d) None of the above

18) A back to back HVDC link can be advantageous compared to AC primarily because
a) It is cheaper b) Of stability considerations
c) Of controlled power glow d) None of the above

19) Short gate pulse or long gate pulse used for
a) To start AC link b) To stop AC link
c) To start DC link d) To stop DC link

20) Which among these is a part of HVDC link ?
a) Two earth electrodes b) Converter valves
c) Bipolar DC line d) All of these

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Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
HVDC TRANSMISSION (Old)

Day and Date : Tuesday, 28-11-2017 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) **All** questions are **compulsory**.*
*2) Figures to **right** indicate **full** marks.*
*3) Assume **suitable** data **if** necessary.*

SECTION – I

2. Solve **any four** : **(4×5=20)**
   a) Explain the special feature of converter transformers.
   b) Write short note on surge arrestors.
   c) Explain the function Bi-polar DC link.
   d) For a fixed power of transmission explain how the economic choice of voltage level is selected in D.C. transmission system.
   e) Explain different modes of operation for converter.

3. Solve **any two** : **(2×10=20)**
   a) Why HVDC controls is necessary and explain various portions of HVDC control characteristics ?
   b) Discuss the converter firing control system.
   c) Discuss about modern trends in HVDC technology.

SECTION – II

4. Solve **any four** : **(4×5=20)**
   a) Explain the following in detail :
      i) Arc backs
      ii) Arc through.
   b) Explain non-characteristic harmonics and also explain effect of unbalanced voltages.

c) Explain protection against over currents in converter stations.

d) State necessity of filter and also explain types of filter.

e) Explain conventional control strategies of reactive power requirements in steady state condition.

5. Solve **any two** : **(2×10=20)**

a) Give the comparison between series and parallel MTDC system in detail.

b) Explain the following :

i) Harmonic distortion

ii) THF

iii) THFF

c) Explain the static VAR system.

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Seat No.	

Set R

B.E. (Electrical Engineering) (Part – II) Examination, 2017
HVDC TRANSMISSION (Old)

Day and Date : Tuesday, 28-11-2017 Max. Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Assume ***suitable*** *data* ***if*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternative : **(1×20=20)**

1) Stability of a system is not affected by
a) Reactance of line b) Losses
c) Reactance of generator d) Output torque

2) Fault on a two terminal DC link is removed by
a) Breakers on DC side b) Breakers on AC side
c) Current control of converters d) None of the above

3) A back to back HVDC link can be advantageous compared to AC primarily because
a) It is cheaper b) Of stability considerations
c) Of controlled power glow d) None of the above

4) Short gate pulse or long gate pulse used for
a) To start AC link b) To stop AC link
c) To start DC link d) To stop DC link

5) Which among these is a part of HVDC link ?
a) Two earth electrodes b) Converter valves
c) Bipolar DC line d) All of these

6) Which of the following statements is/are true regarding HVDC ?
a) There is no skin effect in dc line
b) HVDC can utilize earth for its return path
c) Corona loss is very much reduced in the dc line
d) All of the above

7) Which method of voltage control is applied for long line AC transmissions ?
a) Switching by shunt capacitors b) Tap changing transformers
c) Switching by shunt reactors d) Static Var sources

P.T.O.

8) For what voltage is Twin conductor bundle used in India ?
a) 220 kV b) 500 kV c) 750 kV d) 330 kV

9) Bundled conductors are used in EHV lines primarily for
a) Reducing cost of the line
b) Reducing corona loss and radio interference
c) Increasing stability limit
d) None of the above

10) Economic studies have shown that D.C. transmission is cheaper than a.c. transmission for lengths.
a) Below 300 km b) Beyond 600 km c) Beyond 1200 km d) Below 100 km

11) Bipolar link has two conductors
a) One positive and other negative b) One positive and other positive
c) One negative and other negative d) Both are negative

12) CCC stands for
a) Capacitor Compressed Converter b) Capacitor Commutator Converter
c) Capacitor Commutated Converter d) None of the above

13) UHVDC transmission is being considered more than
a) ± 500 KV b) ± 800 KV c) ± 800 MV d) ± 800 V

14) The HVDC converter
a) Does not consume reactive power
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c) Consumes 50% of the real power
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15) A 12-pulse bridge is preferred in HVDC because
a) It eliminates certain harmonics
b) It results in better power factor
c) Series connection of converters on D.C. side is better
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16) Pulse Phase Control (PPC) is the variations of
a) IPC b) EPC c) CC d) VGC

17) Harmonic instability problem particularly with low short circuit ratios, is the drawback of
a) IPC Scheme b) EPC Scheme
c) Current controller d) Current extinguish angle controller

18) Misfire occurs
a) The presence of an unwanted signals
b) Because of duplicated converter controls
c) The required gate pulse is missing
d) Both a) and b)

19) Tuned filters are used to filter out
a) Characteristic harmonics b) Non-characteristic harmonics
c) Both a) and b) d) Transients only

20) Passive filters acts as source of
a) Active power b) Reactive power c) Apparent power d) Only a) and c)

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Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
HVDC TRANSMISSION (Old)

Day and Date : Tuesday, 28-11-2017 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) **All** questions are **compulsory**.*
*2) Figures to **right** indicate **full** marks.*
*3) Assume **suitable** data **if** necessary.*

SECTION – I

2. Solve **any four** : **(4×5=20)**
   a) Explain the special feature of converter transformers.
   b) Write short note on surge arrestors.
   c) Explain the function Bi-polar DC link.
   d) For a fixed power of transmission explain how the economic choice of voltage level is selected in D.C. transmission system.
   e) Explain different modes of operation for converter.

3. Solve **any two** : **(2×10=20)**
   a) Why HVDC controls is necessary and explain various portions of HVDC control characteristics ?
   b) Discuss the converter firing control system.
   c) Discuss about modern trends in HVDC technology.

SECTION – II

4. Solve **any four** : **(4×5=20)**
   a) Explain the following in detail :
      i) Arc backs
      ii) Arc through.
   b) Explain non-characteristic harmonics and also explain effect of unbalanced voltages.

c) Explain protection against over currents in converter stations.

d) State necessity of filter and also explain types of filter.

e) Explain conventional control strategies of reactive power requirements in steady state condition.

5. Solve **any two** : **(2×10=20)**

a) Give the comparison between series and parallel MTDC system in detail.

b) Explain the following :

i) Harmonic distortion

ii) THF

iii) THFF

c) Explain the static VAR system.

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Seat No.	

Set S

B.E. (Electrical Engineering) (Part – II) Examination, 2017
HVDC TRANSMISSION (Old)

Day and Date : Tuesday, 28-11-2017 Max. Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) Assume ***suitable*** *data* ***if*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct alternative : **(1×20=20)**

1) Pulse Phase Control (PPC) is the variations of
a) IPC b) EPC c) CC d) VGC

2) Harmonic instability problem particularly with low short circuit ratios, is the drawback of
a) IPC Scheme b) EPC Scheme
c) Current controller d) Current extinguish angle controller

3) Misfire occurs
a) The presence of an unwanted signals
b) Because of duplicated converter controls
c) The required gate pulse is missing
d) Both a) and b)

4) Tuned filters are used to filter out
a) Characteristic harmonics b) Non-characteristic harmonics
c) Both a) and b) d) Transients only

5) Passive filters acts as source of
a) Active power b) Reactive power c) Apparent power d) Only a) and c)

6) Stability of a system is not affected by
a) Reactance of line b) Losses
c) Reactance of generator d) Output torque

7) Fault on a two terminal DC link is removed by
a) Breakers on DC side b) Breakers on AC side
c) Current control of converters d) None of the above

8) A back to back HVDC link can be advantageous compared to AC primarily because
a) It is cheaper b) Of stability considerations
c) Of controlled power glow d) None of the above

P.T.O.

9) Short gate pulse or long gate pulse used for
a) To start AC link b) To stop AC link
c) To start DC link d) To stop DC link

10) Which among these is a part of HVDC link ?
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a) There is no skin effect in dc line
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13) For what voltage is Twin conductor bundle used in India ?
a) 220 kV b) 500 kV c) 750 kV d) 330 kV

14) Bundled conductors are used in EHV lines primarily for
a) Reducing cost of the line
b) Reducing corona loss and radio interference
c) Increasing stability limit
d) None of the above

15) Economic studies have shown that D.C. transmission is cheaper than a.c. transmission for lengths.
a) Below 300 km b) Beyond 600 km c) Beyond 1200 km d) Below 100 km

16) Bipolar link has two conductors
a) One positive and other negative b) One positive and other positive
c) One negative and other negative d) Both are negative

17) CCC stands for
a) Capacitor Compressed Converter b) Capacitor Commutator Converter
c) Capacitor Commutated Converter d) None of the above

18) UHVDC transmission is being considered more than
a) ± 500 KV b) ± 800 KV c) ± 800 MV d) ± 800 V

19) The HVDC converter
a) Does not consume reactive power
b) Consumes as much reactive power as real power
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20) A 12-pulse bridge is preferred in HVDC because
a) It eliminates certain harmonics
b) It results in better power factor
c) Series connection of converters on D.C. side is better
d) None of the above

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Seat No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017
HVDC TRANSMISSION (Old)

Day and Date : Tuesday, 28-11-2017 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) **All** questions are **compulsory**.*
*2) Figures to **right** indicate **full** marks.*
*3) Assume **suitable** data **if** necessary.*

SECTION – I

2. Solve **any four** : **(4×5=20)**
   a) Explain the special feature of converter transformers.
   b) Write short note on surge arrestors.
   c) Explain the function Bi-polar DC link.
   d) For a fixed power of transmission explain how the economic choice of voltage level is selected in D.C. transmission system.
   e) Explain different modes of operation for converter.

3. Solve **any two** : **(2×10=20)**
   a) Why HVDC controls is necessary and explain various portions of HVDC control characteristics ?
   b) Discuss the converter firing control system.
   c) Discuss about modern trends in HVDC technology.

SECTION – II

4. Solve **any four** : **(4×5=20)**
   a) Explain the following in detail :
      i) Arc backs
      ii) Arc through.
   b) Explain non-characteristic harmonics and also explain effect of unbalanced voltages.

c) Explain protection against over currents in converter stations.

d) State necessity of filter and also explain types of filter.

e) Explain conventional control strategies of reactive power requirements in steady state condition.

5. Solve **any two** : **(2×10=20)**

a) Give the comparison between series and parallel MTDC system in detail.

b) Explain the following :

i) Harmonic distortion

ii) THF

iii) THFF

c) Explain the static VAR system.