

## Seat No.

## S.E. (E&E) (Part – I) (Old CGPA) Examination, 2018 **ENGINEERING MATHEMATICS – III**

Day and Date: Thursday, 3-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

- N. B. : 1) Figures to extreme **right** indicates marks.
  - 2) Use of 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:

 $(14 \times 1 = 14)$ 

- 1) The complementary function of  $(D-2)^2y = e^{2x}$  is
- - a)  $2C_1e^{2x}$  b)  $(C_1 + C_2x)e^x$  c)  $(C_1 + C_2x + C_3x^2)C^{2x}$  d)  $C_1e^{2x} + xC_2e^{2x}$
- 2) The particular integral of  $(D^2 + 2D + 1)y = \sqrt{x} e^{-x}$  is

  - a)  $\frac{2}{15}e^{x}x^{5/2}$  b)  $\frac{8}{15}e^{-x}x^{5/2}$  c)  $\frac{4}{15}e^{-x}x^{5/2}$  d)  $3e^{-x}x^{3/2}$

- 3) The solution of the differential equation  $x^2 \frac{d^2y}{dx^2} x \frac{dy}{dx} + 2y = 0$  is

  - a)  $x(C_1 \cos \log x + C_2 \sin \log x)$  b)  $x^2(C_1 \cos \log x + C_2 \sin \log x)$
  - c)  $C_1\cos^2 + C_2\sin^2$

- d)  $(C_1 + C_2 z) \cos z$
- 4) The solution of  $\sqrt{p} + \sqrt{q} = 2x$  is z =
  - a)  $(a + 2x)^3 + c$

b)  $\frac{(a+2x)^3}{6} + a^2y + c$ 

c)  $2(a + 2x)^3 + a^2v + c$ 

d) none of these



- 5) The solution of 2p + 3q = 1 is
  - a) 4(3x 2y, y 3z) = 0
- b) 4(3x + 2y, y + 3z) = 0

- c) 4(3x 2v, v z) = 0
- d) 4(3x + 2v, v 3z) = 0
- 6) If  $x_k = 3^k$ ,  $k \ge 0$ , then  $z(x_k) =$ \_\_\_\_ with |z| > 3.
  - a)  $\frac{1}{-2}$
- b)  $\frac{z}{z^{-3}}$  c)  $\frac{z-3}{z}$  d)  $\frac{z}{3-z}$

- 7) If  $z(x_{k}) = F(z)$  then  $z(a^{k}x_{k}) =$ \_\_\_\_
- a)  $F\left(\frac{a}{z}\right)$  b)  $F\left(\frac{z}{a}\right)$  c)  $\frac{1}{a}F\left(\frac{z}{a}\right)$  d)  $F(e^az)$
- 8) In the Fourier expansion of  $f(x) = 4 x^2$  in the interval (0, 2) the constant term is
  - a)  $\frac{4}{3}$

- b)  $\frac{8}{8}$
- c)  $\frac{16}{3\pi}$
- d) 0
- 9) The Fourier series of  $f(x) = 1 x^2$  in (-1, 1) contains
  - a) only sine terms

- b) only cosine terms
- c) both sine and cosine terms
- d) expansion does not exist
- 10) The Fourier cosine transform of  $f(x) = e^{-x}$ ,  $x \ge 0$  is \_\_\_\_
  - a)  $\frac{S}{1 + S^2}$

- b)  $\frac{1}{1+S^2}$  c)  $\frac{2}{\pi} \frac{1}{1+S^2}$  d)  $\sqrt{\frac{2}{\pi}} \cdot \frac{1}{1+S^2}$
- 11)  $L^{-1} \left| \frac{S-3}{S^2-6s+13} \right| =$ 
  - a) e<sup>3t</sup>cos2t
- b) e<sup>t</sup>cos3t
- c) e<sup>t</sup>cos6t
- d) e<sup>3t</sup>cos6t

- 12)  $L[e^{-t} \sin 4t] =$

- a)  $\frac{4}{S^2 + 17}$  b)  $\frac{S+1}{(S+1)^2 + 4^2}$  c)  $\frac{4}{(S-1)^2 + 4^2}$  d)  $\frac{4}{(S+1)^2 + 4^2}$
- 13) A unit normal to the surface 2xy = Z at the point (2, 1, 2) is \_\_\_\_\_
  - a)  $\frac{1}{\sqrt{21}}(2i+4j-k)$  b)  $\frac{1}{\sqrt{21}}(4i+2j)$  c)  $\frac{1}{3}(2i+4j-k)$  d) None of these

14) Find 'a' such that the vector field

 $\overline{F} = (ax + 4y^2z)i + (x^3sinz - 3y)j - (e^x + 4cos (x^2y))k$  is solenoidal

- a) a = 0
- b) a = 1
- c) a = 4
- d) a = 3



Seat No.

# S.E. (E&E) (Part – I) (Old CGPA) Examination, 2018 ENGINEERING MATHEMATICS – III

Day and Date: Thursday, 3-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

- N. B.: 1) Solve any three questions from each Section.
  - 2) Figures to the right indicate full marks.
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SECTION - I

2. a) Solve 
$$(D^3 - 1)y = (e^x + 1)^2$$
.

b) Solve 
$$(D^2 + 4)y = x \sin x$$
.

c) An electric circuit consists of an inductance L, a condenser of capacity C and an emf  $E = E_o \cos \omega t$ , so that the charge Q satisfies the differential equation  $\frac{d^2Q}{dt^2} + \frac{Q}{CL} = \frac{E_o}{L} \cos \omega t$ .

If 
$$\omega = \frac{1}{\sqrt{LC}}$$
 and initially  $Q = Q_0$  and the current  $i = i_0$  at  $t = 0$ , show that the charge at any time t is given by  $Q = Q_0 \cos \omega t + \frac{i_0}{\omega} \sin \omega t + \frac{E_0}{2L\omega} t \sin \omega t$ .

3. a) Solve the Legendre's equation

$$(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = 2\sin\log(1+x).$$

b) Solve 
$$z^2 = (p^2 + q^2 + 1)$$
.

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



4. a) Find the z-transform of the following functions:

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i) 
$$x_k = \left(\frac{1}{4}\right)^{|k|}$$
 for all k.

- ii)  $x_k = \frac{ak}{k}, k \ge 1$
- iii) Find z-transform of unit step function U(k) = 1,  $k \ge 0$ .
- b) Find  $z^{-1} \left( \frac{z}{(z-3)(z-2)} \right)$  for 2 < |z| < 3.
- 5. Attempt any three:
  - a) Solve the following partial differential equation by the method of

separation of variables 
$$\frac{\partial z}{\partial x} = K \frac{\partial z}{\partial y}$$
.

- b) Solve  $(D^2 + 5D + 4)y = 3 2x$ .
- c) Solve  $xzp + yzq = z^2$ .
- d) Solve  $x^2 \frac{d^2y}{dx^2} 3x \frac{dy}{dx} + 4y = 2x^2$ .

SECTION - II

6. a) Find half range sine series for f(x), where

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$$f(x) = \begin{cases} x & \text{for } 0 < x < \frac{\pi}{2} \\ (\pi - x) & \text{for } \frac{\pi}{2} < x < \pi \end{cases}$$

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

b) Find Fourier series for  $f(x) = x^2$  in  $(-\pi, \pi)$ .

4

7. a) Express the function  $f(x) = \begin{cases} \frac{\pi}{2} & \text{for } 0 < x < \pi \\ 0 & \text{for } x < \pi \end{cases}$  as Fourier sine integral.

Hence show that  $\int_{0}^{\infty} \frac{1 - \cos \pi \omega}{\omega} \cdot \sin \omega x = \frac{\pi}{2} \text{ when } 0 < x < \pi.$ 



3

4

3

3



- b) Find the Inverse Laplace transform of  $\frac{S}{(S^2 + 16)^2}$  by convolution theorem. 3
- c) Find Inverse Laplace transform of  $\frac{(S+29)}{(S+4)(S^2+9)}$  by partial fractions or otherwise.
- 8. a) Find the directional derivative of  $\phi = xy^2 + yz^3$  at (1, -1, 1) along:
  - i) The vector i + 2j + 2k
  - ii) Towards the point (2, 1, -1)
  - iii) Along the direction of normal to the surface  $x^2 + y^2 + z^2 = 9$  at (1, 2, 2). 5
  - b) For a constant vector  $\bar{\mathbf{a}}$  show that
    - i)  $\nabla(\overline{\mathbf{a}}\cdot\overline{\mathbf{r}})=\overline{\mathbf{a}}$
    - ii)  $\nabla \times (\overline{a} \times \overline{r}) = 2\overline{a}$ .

## 9. Attempt any 3:

- a) Solve by using Laplace Transform  $\frac{d^2y}{dx^2} + 25y = 10 \cos 5t$ , with y(0) = 2, y'(0) = 0.
- b) If the directional derivative of  $\phi = axy + byz + czx$  at (1, 1, 1) has maximum magnitude and in the direction parallel to x-axis, find the values of a, b and c.
- c) Find the Fourier series expansion of  $f(x) = \frac{1}{2}(\pi x)$  in  $(0, 2\pi)$ .
- d) If  $f_s(S) = \frac{e^{-as}}{S}$ , find f(x). Hence obtain the inverse Fourier sine

transform of  $\frac{1}{S}$ .



Max. Marks: 70

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## MCQ/Objective Type Questions

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1. Choose the correct answer:

 $(14 \times 1 = 14)$ 

- 1) In the Fourier expansion of  $f(x) = 4 x^2$  in the interval (0, 2) the constant term is
  - a)  $\frac{4}{3}$

- b)  $\frac{8}{3}$  c)  $\frac{16}{3\pi}$
- d) 0
- 2) The Fourier series of  $f(x) = 1 x^2$  in (-1, 1) contains
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4) 
$$L^{-1} \left[ \frac{S-3}{S^2-6s+13} \right] =$$

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



- 5)  $L[e^{-t} \sin 4t] =$

- a)  $\frac{4}{S^2 + 17}$  b)  $\frac{S+1}{(S+1)^2 + 4^2}$  c)  $\frac{4}{(S-1)^2 + 4^2}$  d)  $\frac{4}{(S+1)^2 + 4^2}$
- 6) A unit normal to the surface 2xy = Z at the point (2, 1, 2) is \_\_\_\_\_
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- 7) Find 'a' such that the vector field  $\overline{F} = (ax + 4y^2z)i + (x^3sinz - 3y)j - (e^x + 4cos (x^2y))k$  is solenoidal
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SECTION - I

2. a) Solve 
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3. a) Solve the Legendre's equation

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b) Solve 
$$z^2 = (p^2 + q^2 + 1)$$
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separation of variables 
$$\frac{\partial z}{\partial x} = K \frac{\partial z}{\partial y}$$
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b) Solve 
$$(D^2 + 5D + 4)y = 3 - 2x$$
.

c) Solve 
$$xzp + yzq = z^2$$
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d) Solve 
$$x^2 \frac{d^2y}{dx^2} - 3x \frac{dy}{dx} + 4y = 2x^2$$
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#### SECTION - II

6. a) Find half range sine series for f(x), where

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$$f(x) = \begin{cases} x & \text{for } 0 < x < \frac{\pi}{2} \\ (\pi - x) & \text{for } \frac{\pi}{2} < x < \pi \end{cases}$$

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7. a) Express the function  $f(x) = \begin{cases} \frac{\pi}{2} & \text{for } 0 < x < \pi \\ 0 & \text{for } x < \pi \end{cases}$  as Fourier sine integral.

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  - b) For a constant vector  $\bar{\mathbf{a}}$  show that
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## MCQ/Objective Type Questions

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1. Choose the correct answer:

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1) The solution of 2p + 3q = 1 is

a) 
$$4(3x - 2y, y - 3z) = 0$$

b) 
$$4(3x + 2y, y + 3z) = 0$$

c) 
$$4(3x - 2y, y - z) = 0$$

d) 
$$4(3x + 2y, y - 3z) = 0$$

2) If  $x_k = 3^k$ ,  $k \ge 0$ , then  $z(x_k) =$  with |z| > 3.

a) 
$$\frac{1}{z-3}$$

b) 
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b)  $\frac{(a+2x)^3}{6} + a^2y + c$ 

c)  $2(a + 2x)^3 + a^2v + c$ 

d) none of these



Seat No.

# S.E. (E&E) (Part – I) (Old CGPA) Examination, 2018 ENGINEERING MATHEMATICS – III

Day and Date: Thursday, 3-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

- N. B.: 1) Solve any three questions from each Section.
  - 2) Figures to the right indicate full marks.
  - 3) Use of calculator is allowed.

#### SECTION - I

2. a) Solve 
$$(D^3 - 1)y = (e^x + 1)^2$$
.

b) Solve 
$$(D^2 + 4)y = x \sin x$$
.

c) An electric circuit consists of an inductance L, a condenser of capacity C and an emf  $E = E_o \cos \omega t$ , so that the charge Q satisfies the differential equation  $\frac{d^2Q}{dt^2} + \frac{Q}{CL} = \frac{E_o}{L} \cos \omega t$ .

If 
$$\omega = \frac{1}{\sqrt{LC}}$$
 and initially  $Q = Q_0$  and the current  $i = i_0$  at  $t = 0$ , show that the charge at any time t is given by  $Q = Q_0 \cos \omega t + \frac{i_0}{\omega} \sin \omega t + \frac{E_0}{2L\omega} t \sin \omega t$ .

3. a) Solve the Legendre's equation

$$(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = 2\sin\log(1+x).$$

b) Solve 
$$z^2 = (p^2 + q^2 + 1)$$
.

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



4. a) Find the z-transform of the following functions:

5

i) 
$$x_k = \left(\frac{1}{4}\right)^{|k|}$$
 for all k.

ii) 
$$x_k = \frac{ak}{k}, k \ge 1$$

- iii) Find z-transform of unit step function U(k) = 1,  $k \ge 0$ .
- b) Find  $z^{-1} \left( \frac{z}{(z-3)(z-2)} \right)$  for 2 < |z| < 3.
- 5. Attempt any three:
  - a) Solve the following partial differential equation by the method of

separation of variables 
$$\frac{\partial z}{\partial x} = K \frac{\partial z}{\partial y}$$
.

b) Solve 
$$(D^2 + 5D + 4)y = 3 - 2x$$
.

c) Solve 
$$xzp + yzq = z^2$$
.

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

6. a) Find half range sine series for f(x), where

5

$$f(x) = \begin{cases} x & \text{for } 0 < x < \frac{\pi}{2} \\ (\pi - x) & \text{for } \frac{\pi}{2} < x < \pi \end{cases}$$

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

b) Find Fourier series for  $f(x) = x^2$  in  $(-\pi, \pi)$ .

4

7. a) Express the function  $f(x) = \begin{cases} \frac{\pi}{2} & \text{for } 0 < x < \pi \\ 0 & \text{for } x < \pi \end{cases}$  as Fourier sine integral.

Hence show that 
$$\int_{0}^{\infty} \frac{1 - \cos \pi \omega}{\omega} \cdot \sin \omega x = \frac{\pi}{2} \text{ when } 0 < x < \pi.$$



3



b) Find the Inverse Laplace transform of  $\frac{S}{(S^2 + 16)^2}$  by convolution theorem. 3

c) Find Inverse Laplace transform of  $\frac{(S+29)}{(S+4)(S^2+9)}$  by partial fractions or otherwise.

- 8. a) Find the directional derivative of  $\phi = xy^2 + yz^3$  at (1, -1, 1) along :
  - i) The vector i + 2j + 2k
  - ii) Towards the point (2, 1, -1)
  - iii) Along the direction of normal to the surface  $x^2 + y^2 + z^2 = 9$  at (1, 2, 2). 5
  - b) For a constant vector  $\bar{\mathbf{a}}$  show that
    - i)  $\nabla(\overline{a}\cdot\overline{r}) = \overline{a}$
    - ii)  $\nabla \times (\overline{a} \times \overline{r}) = 2\overline{a}$ .
- 9. Attempt any 3:
  - a) Solve by using Laplace Transform  $\frac{d^2y}{dx^2} + 25y = 10 \cos 5t$ , with y(0) = 2, y'(0) = 0.
  - b) If the directional derivative of  $\phi = axy + byz + czx$  at (1, 1, 1) has maximum magnitude and in the direction parallel to x-axis, find the values of a, b and c.
  - c) Find the Fourier series expansion of  $f(x) = \frac{1}{2}(\pi x)$  in  $(0, 2\pi)$ .
  - d) If  $f_s(S) = \frac{e^{-as}}{S}$ , find f(x). Hence obtain the inverse Fourier sine

transform of  $\frac{1}{S}$ .



Max. Marks: 70

## Seat No.

## S.E. (E&E) (Part – I) (Old CGPA) Examination, 2018 **ENGINEERING MATHEMATICS - III**

Day and Date: Thursday, 3-5-2018

Time: 2.30 p.m. to 5.30 p.m.

- 1) Figures to extreme **right** indicates marks.
  - 2) Use of 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:

 $(14 \times 1 = 14)$ 

1) The Fourier cosine transform of  $f(x) = e^{-x}$ ,  $x \ge 0$  is \_\_\_\_

a) 
$$\frac{S}{1+S^2}$$

b) 
$$\frac{1}{1+S^2}$$

c) 
$$\frac{2}{\pi} \frac{1}{1+S^2}$$

a) 
$$\frac{S}{1+S^2}$$
 b)  $\frac{1}{1+S^2}$  c)  $\frac{2}{\pi} \frac{1}{1+S^2}$  d)  $\sqrt{\frac{2}{\pi}} \cdot \frac{1}{1+S^2}$ 

2) 
$$L^{-1} \left[ \frac{S-3}{S^2-6s+13} \right] =$$

- a) e<sup>3t</sup>cos2t
- b) e<sup>t</sup>cos3t
- c) e<sup>t</sup>cos6t d) e<sup>3t</sup>cos6t

3)  $L[e^{-t} \sin 4t] =$ 

a) 
$$\frac{4}{S^2 + 17}$$

b) 
$$\frac{S+1}{(S+1)^2+4^2}$$

c) 
$$\frac{4}{(S-1)^2+4^2}$$

a) 
$$\frac{4}{S^2 + 17}$$
 b)  $\frac{S+1}{(S+1)^2 + 4^2}$  c)  $\frac{4}{(S-1)^2 + 4^2}$  d)  $\frac{4}{(S+1)^2 + 4^2}$ 

4) A unit normal to the surface 2xy = Z at the point (2, 1, 2) is \_\_\_\_\_

a) 
$$\frac{1}{\sqrt{21}}(2i+4j-k)$$
 b)  $\frac{1}{\sqrt{21}}(4i+2j)$  c)  $\frac{1}{3}(2i+4j-k)$  d) None of these

b) 
$$\frac{1}{\sqrt{21}}(4i+2j)$$

c) 
$$\frac{1}{3}(2i+4j-k)$$



- 5) Find 'a' such that the vector field  $\overline{F} = (ax + 4y^2z)i + (x^3sinz - 3y)j - (e^x + 4cos (x^2y))k$  is solenoidal
  - a) a = 0
- b) a = 1
- c) a = 4
- d) a = 3
- 6) The complementary function of  $(D-2)^2y = e^{2x}$  is
- a)  $2C_1e^{2x}$  b)  $(C_1 + C_2x)e^x$  c)  $(C_1 + C_2x + C_2x^2)C^{2x}$  d)  $C_1e^{2x} + xC_2e^{2x}$
- 7) The particular integral of  $(D^2 + 2D + 1)y = \sqrt{x} e^{-x}$  is

  - a)  $\frac{2}{15}e^{x}x^{5/2}$  b)  $\frac{8}{15}e^{-x}x^{5/2}$  c)  $\frac{4}{15}e^{-x}x^{5/2}$  d)  $3e^{-x}x^{3/2}$
- 8) The solution of the differential equation  $x^2 \frac{d^2y}{dx^2} x \frac{dy}{dx} + 2y = 0$  is

  - a)  $x(C_1 \cos \log x + C_2 \sin \log x)$  b)  $x^2(C_1 \cos \log x + C_2 \sin \log x)$
  - c)  $C_1 \cos^2 + C_2 \sin^2$

- d)  $(C_1 + C_2 z) \cos z$
- 9) The solution of  $\sqrt{p} + \sqrt{q} = 2x$  is z =
  - a)  $(a + 2x)^3 + c$

b)  $\frac{(a+2x)^3}{6} + a^2y + c$ 

c)  $2(a + 2x)^3 + a^2y + c$ 

- d) none of these
- 10) The solution of 2p + 3q = 1 is
  - a) 4(3x 2y, y 3z) = 0
- b) 4(3x + 2v, v + 3z) = 0
- c) 4(3x 2y, y z) = 0
- d) 4(3x + 2y, y 3z) = 0
- 11) If  $x_{k} = 3^{k}$ ,  $k \ge 0$ , then  $z(x_{k}) =$ \_\_\_\_\_ with |z| > 3.
  - a)  $\frac{1}{7}$

- b)  $\frac{z}{z-3}$  c)  $\frac{z-3}{z}$  d)  $\frac{z}{3-z}$
- 12) If  $z(x_{i}) = F(z)$  then  $z(a^{k}x_{i}) =$ \_\_\_\_\_
- a)  $F\left(\frac{a}{z}\right)$  b)  $F\left(\frac{z}{a}\right)$  c)  $\frac{1}{a}F\left(\frac{z}{a}\right)$  d)  $F(e^az)$
- 13) In the Fourier expansion of  $f(x) = 4 x^2$  in the interval (0, 2) the constant term is
  - a)  $\frac{4}{3}$

- b)  $\frac{8}{3}$
- c)  $\frac{16}{3\pi}$
- d) 0
- 14) The Fourier series of  $f(x) = 1 x^2$  in (-1, 1) contains
  - a) only sine terms

- b) only cosine terms
- c) both sine and cosine terms
- d) expansion does not exist



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#### SECTION - I

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$$(D^3 - 1)y = (e^x + 1)^2$$
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c) An electric circuit consists of an inductance L, a condenser of capacity C and an emf  $E = E_o \cos \omega t$ , so that the charge Q satisfies the differential equation  $\frac{d^2Q}{dt^2} + \frac{Q}{CL} = \frac{E_o}{L} \cos \omega t$ .

If 
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 and initially  $Q = Q_0$  and the current  $i = i_0$  at  $t = 0$ , show that the charge at any time t is given by  $Q = Q_0 \cos \omega t + \frac{i_0}{\omega} \sin \omega t + \frac{E_0}{2L\omega} t \sin \omega t$ .

3. a) Solve the Legendre's equation

$$(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = 2\sin\log(1+x).$$

b) Solve 
$$z^2 = (p^2 + q^2 + 1)$$
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c) Solve 
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4. a) Find the z-transform of the following functions:

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i) 
$$x_k = \left(\frac{1}{4}\right)^{|k|}$$
 for all k.

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- iii) Find z-transform of unit step function U(k) = 1,  $k \ge 0$ .

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 for  $2 < |z| < 3$ .

- 5. Attempt any three:
  - a) Solve the following partial differential equation by the method of

separation of variables 
$$\frac{\partial z}{\partial x} = K \frac{\partial z}{\partial y}$$
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b) Solve 
$$(D^2 + 5D + 4)y = 3 - 2x$$
.

c) Solve 
$$xzp + yzq = z^2$$
.

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

SECTION - II

6. a) Find half range sine series for f(x), where

5

$$f(x) = \begin{cases} x & \text{for } 0 < x < \frac{\pi}{2} \\ (\pi - x) & \text{for } \frac{\pi}{2} < x < \pi \end{cases}$$

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

b) Find Fourier series for  $f(x) = x^2$  in  $(-\pi, \pi)$ .

4

7. a) Express the function  $f(x) = \begin{cases} \frac{\pi}{2} & \text{for } 0 < x < \pi \\ 0 & \text{for } x < \pi \end{cases}$  as Fourier sine integral.

Hence show that 
$$\int_{0}^{\infty} \frac{1 - \cos \pi \omega}{\omega} \cdot \sin \omega x = \frac{\pi}{2} \text{ when } 0 < x < \pi.$$



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- b) Find the Inverse Laplace transform of  $\frac{S}{(S^2 + 16)^2}$  by convolution theorem. 3
- c) Find Inverse Laplace transform of  $\frac{(S+29)}{(S+4)(S^2+9)}$  by partial fractions or otherwise.
- 8. a) Find the directional derivative of  $\phi = xy^2 + yz^3$  at (1, -1, 1) along :
  - i) The vector i + 2j + 2k
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  - iii) Along the direction of normal to the surface  $x^2 + y^2 + z^2 = 9$  at (1, 2, 2). 5
  - b) For a constant vector  $\bar{\mathbf{a}}$  show that
    - i)  $\nabla(\overline{\mathbf{a}}\cdot\overline{\mathbf{r}})=\overline{\mathbf{a}}$
    - ii)  $\nabla \times (\overline{a} \times \overline{r}) = 2\overline{a}$ .

### 9. Attempt any 3:

- a) Solve by using Laplace Transform  $\frac{d^2y}{dx^2} + 25y = 10 \cos 5t$ , with y(0) = 2, y'(0) = 0.
- b) If the directional derivative of  $\phi = axy + byz + czx$  at (1, 1, 1) has maximum magnitude and in the direction parallel to x-axis, find the values of a, b and c.
- c) Find the Fourier series expansion of  $f(x) = \frac{1}{2}(\pi x)$  in  $(0, 2\pi)$ .
- d) If  $f_s(S) = \frac{e^{-as}}{S}$ , find f(x). Hence obtain the inverse Fourier sine

transform of  $\frac{1}{S}$ .



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## S.E. (E & E) (Part – I) (Old CGPA) Examination, 2018 DC MACHINES AND TRANSFORMERS

Day and Date: Friday, 4-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 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

1. Choose the correct alternative:

1) In Dc generator armature reaction is produced actually by

a) Its field current

b) Field pole winding

c) Armature conductor

d) Load current in armature

2) Back E.M.F. in a DC motor
a) Opposes the applied voltage
b) Aids the applied voltage
c) Aids the armature current
d) None of the above

3) \_\_\_\_\_ motor should be never started at no load.

a) Seriesb) Shuntc) Long compoundd) Short compound

4) Which of the load would be best driven by DC compound motor?

a) Reciprocating pump b) Electric locomotive

c) Centrifugal pump d) Fan

5) The speed of DC motor can be controlled by varying

a) Its flux per pole b) Resistance of armature circuit

c) Applied voltage d) All of the above

6) Which of the following is power equation?

a)  $VI_a = E_bI_a + I_a ^2R_a$ b)  $V = E_bI_a + I_a ^2R_a$ c)  $I_a ^2V = E_bI_a ^2 + I_a ^2R_a$ d)  $V = E_b + I_aR_a$ 

7)	The E.M.F. induced in DC machine i	s E.M.F.	
	a) Dynamically	b) Statically	
	c) Both a) and b)	d) None of the above	
8)	-	er from primary to secondary usually	
	with change in	12.37.16	
	a) Frequency	b) Voltage	
0)	c) Power	d) Time period	
9)		ss of 400 W, the Cu loss at half load is	
	a) 100 W c) 200 W	b) 1000 W d) 400 W	
10)	,	,	
10)	The efficiency of single phase transfer a) $n = (VA rating*cos\phi)/[(VA rating*cos\phi)/(VA rat$	_ ·	
	b) $n = (V_2 I_2 \cos \phi)/[(V_2 I_2 \cos \phi) + Pi + Pi$	- · ·	
	c) Both a) and b)	•	
	d) None of the above		
11)	A Universal motor is one which		
	a) Is available universally		
	b) Can be marketed internationally		
	c) Can be operated either on DC or	• • •	
4.0\	d) Runs at dangerously high speed		
12)	. ,	urns is connected to 200 V AC supply,	
	for a secondary voltage of 400 V, the n a) 1600	b) 2000	
	c) 2500	d) 1250	
13)	In parallel operation of 3 ph transform	,	
. • ,	phase sequence.		
	a) 120	b) 90	
	c) same	d) opposite	
14)	The primary and secondary of a tran	sformer are coupled.	
	a) Electrically	b) Magnetically	
	c) Electrically and Magnetically	d) None of the above	



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## S.E. (E & E) (Part – I) (Old CGPA) Examination, 2018 DC MACHINES AND TRANSFORMERS

Day and Date: Friday, 4-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

#### SECTION - I

#### 2. Solve any four:

 $(4 \times 4 = 16)$ 

- a) Draw and explain the power stages of a DC machine.
- b) Explain three point starter with neat diagram.
- c) Why DC series motor should not be started on no-load?
- d) What is armature reaction? Explain its two important effects in case of 2 pole generator.
- e) A 250 V, 4 pole, wave wound series motor has 782 conductors on its armature. It has armature and series field resistance of  $0.75\Omega$ . The motor takes a current of 40 A. Find its speed and gross torque developed if it has a flux per pole of 25 mwb.

## 3. Solve any two:

 $(2 \times 6 = 12)$ 

- a) Draw and explain torque-speed, armature current-torque and armature current-speed characteristics of DC shunt and series motor.
- b) A 250 V, 14.9 kW, 8 pole DC motor has single turn coils. The armature is wave wound with 94 commutator segments. If the brushes are given a lead of 2 commutator segments at full load, calculate
  - a) Total armature reaction ampere turns per pole
  - b) Cross magnetizing ampere turns per pole. Assume efficiency of 80%.
- c) What is back E.M.F. ? Explain its significance and derive equation for it.

#### SECTION - II

## 4. Solve any four:

 $(4 \times 4 = 16)$ 

- a) Why transformer is called constant flux machine?
- b) Explain operation of universal motor on both AC and DC.
- c) Draw phaser diagram of single phase transformer on resistive and capacitive load.



- d) Explain the construction and working principle of single phase transformer.
- e) A 150 kVA transformer has iron loss of 1.4 kW and full load Cu loss of 2.8 kW at 0.8 p.f. lagging. Calculate
  - i) Efficiency of transformer at full load.
  - ii) The maximum efficiency of the transformer.
- 5. Solve the following questions:

 $(2 \times 6 = 12)$ 

- a) Explain use of transformer having vector group YY 0, DY 1, DD 0 and DY 11. Draw the vector group with connection diagram for each group.
- b) Two single phase transformers with equal voltage ratios have impedances of  $(0.5 + j3)\Omega$  and  $(0.6 + j10) \Omega$  with respect to the secondary. If they operate in parallel, determine how they share a total load of 100 kW at p.f. 0.8 lagging.

OR

b) A 100 kVA,  $3\phi$ , 50 Hz, 3300/400 V transformer is delta connected on the H.V. side and star connected on the L.V. side. The resistance of the H.V. winding is  $3.5~\Omega$  per phase and that of L.V. winding  $0.02~\Omega$  per phase. Calculate the iron losses of the transformer at normal voltage and frequency if its full load efficiency is 95.8% at 0.8~p.f. lagging.

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### MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct alternative:

 $(1 \times 14 = 14)$ 

- A transformer transfers electric power from primary to secondary usually with change in
  - a) Frequency

b) Voltage

c) Power

- d) Time period
- 2) The transformer has a full load Cu loss of 400 W, the Cu loss at half load is
  - a) 100 W

b) 1000 W

c) 200 W

- d) 400 W
- 3) The efficiency of single phase transformer is given by
  - a)  $n = (VA \ rating^*cos\phi)/[(VA \ rating^*cos\phi) + Pi + Pcu]$
  - b)  $n = (V_2 I_2 \cos \phi)/[(V_2 I_2 \cos \phi) + Pi + Pcu]$
  - c) Both a) and b)
  - d) None of the above
- 4) A Universal motor is one which
  - a) Is available universally
  - b) Can be marketed internationally
  - c) Can be operated either on DC or AC supply
  - d) Runs at dangerously high speed on no load
- 5) A transformer having 1000 primary turns is connected to 200 V AC supply, for a secondary voltage of 400 V, the no. of turns for the secondary should be
  - a) 1600

b) 2000

c) 2500

d) 1250

6)	In parallel operation of 3 ph transformer it is essential to have		
	phase sequence.		
	a) 120	b) 90	
	c) same	d) opposite	
7)	The primary and secondary of a tran	sformer are coupled.	
,	a) Electrically	b) Magnetically	
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	a) Opposes the applied voltage	b) Aids the applied voltage	
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	a) Series	b) Shunt	
	c) Long compound	d) Short compound	
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12)	The speed of DC motor can be contr	olled by varying	
	a) Its flux per pole	b) Resistance of armature circuit	
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	c) $I_a^{a} 2V = E_b I_a^{a} 2 + I_a^{a} 2R_a$	d) $V = E_b + I_a R_a$	
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## 3. Solve any two:

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- b) A 250 V, 14.9 kW, 8 pole DC motor has single turn coils. The armature is wave wound with 94 commutator segments. If the brushes are given a lead of 2 commutator segments at full load, calculate
  - a) Total armature reaction ampere turns per pole
  - b) Cross magnetizing ampere turns per pole. Assume efficiency of 80%.
- c) What is back E.M.F. ? Explain its significance and derive equation for it.

#### SECTION - II

## 4. Solve any four:

 $(4 \times 4 = 16)$ 

- a) Why transformer is called constant flux machine?
- b) Explain operation of universal motor on both AC and DC.
- c) Draw phaser diagram of single phase transformer on resistive and capacitive load.



- d) Explain the construction and working principle of single phase transformer.
- e) A 150 kVA transformer has iron loss of 1.4 kW and full load Cu loss of 2.8 kW at 0.8 p.f. lagging. Calculate
  - i) Efficiency of transformer at full load.
  - ii) The maximum efficiency of the transformer.
- 5. Solve the following questions:

 $(2 \times 6 = 12)$ 

- a) Explain use of transformer having vector group YY 0, DY 1, DD 0 and DY 11. Draw the vector group with connection diagram for each group.
- b) Two single phase transformers with equal voltage ratios have impedances of  $(0.5 + j3)\Omega$  and  $(0.6 + j10) \Omega$  with respect to the secondary. If they operate in parallel, determine how they share a total load of 100 kW at p.f. 0.8 lagging.

OR

b) A 100 kVA,  $3\phi$ , 50 Hz, 3300/400 V transformer is delta connected on the H.V. side and star connected on the L.V. side. The resistance of the H.V. winding is  $3.5~\Omega$  per phase and that of L.V. winding  $0.02~\Omega$  per phase. Calculate the iron losses of the transformer at normal voltage and frequency if its full load efficiency is 95.8% at 0.8~p.f. lagging.

Seat	
No.	

Set

R

## S.E. (E & E) (Part – I) (Old CGPA) Examination, 2018 DC MACHINES AND TRANSFORMERS

Day and Date : Friday, 4-5-2018 Time : 2.30 p.m. to 5.30 p.m.	Max. Marks: 70
Instructions : 1) Q. No. 1 minutes carries o 2) Answer	is compulsory. It should be solved in first 30 in Answer Book Page No. 3. Each question ne mark.  MCQ/Objective type questions on Page No. 3 n't forget to mention, Q.P. Set (P/Q/R/S) on Top
MCQ/O	bjective Type Questions
Duration: 30 Minutes	Marks: 14
1. Choose the correct alternative	(1×14=14)
<ol> <li>The speed of DC motor ca</li> <li>a) Its flux per pole</li> <li>c) Applied voltage</li> </ol>	n be controlled by varying b) Resistance of armature circuit d) All of the above
2) Which of the following is p a) $VI_a = E_bI_a + I_a ^2R_a$ c) $I_a ^2V = E_bI_a ^2 + I_a ^2$	ower equation ? b) $V = E_b I_a + I_a ^2 R_a$ $2R_a$ d) $V = E_b + I_a R_a$
	machine is E.M.F. b) Statically d) None of the above
<ul><li>4) A transformer transfers el with change in</li><li>a) Frequency</li><li>c) Power</li></ul>	ectric power from primary to secondary usually b) Voltage d) Time period

5) The transformer has a full load Cu loss of 400 W, the Cu loss at half load is

b) 1000 W d) 400 W

- 6) The efficiency of single phase transformer is given by
  - a)  $n = (VA \ rating^*cos\phi)/[(VA \ rating^*cos\phi) + Pi + Pcu]$
  - b)  $n = (V_2 I_2 \cos\phi)/[(V_2 I_2 \cos\phi) + Pi + Pcu]$
  - c) Both a) and b)

a) 100 W

c) 200 W

d) None of the above

7)	A Universal motor is one which	
	a) Is available universally	
	b) Can be marketed internationally	
	c) Can be operated either on DC or	
	d) Runs at dangerously high speed	
8)	A transformer having 1000 primary to for a secondary voltage of 400 V, the notal 1600 c) 2500	urns is connected to 200 V AC supply, o. of turns for the secondary should be b) 2000 d) 1250
9)	In parallel operation of 3 ph transform	ner it is essential to have
	phase sequence.	
	a) 120	b) 90
	c) same	d) opposite
10)	The primary and secondary of a tran	•
	a) Electrically	b) Magnetically
	c) Electrically and Magnetically	·
11)	In Dc generator armature reaction is	
	a) Its field current	b) Field pole winding
	c) Armature conductor	d) Load current in armature
12)	Back E.M.F. in a DC motor	12 4:1 11 12 12 12
	a) Opposes the applied voltage	,
\	,	d) None of the above
13)	motor should be never	
	a) Series	b) Shunt
	c) Long compound	d) Short compound
14)	Which of the load would be best drive	
	a) Reciprocating pump	b) Electric locomotive
	c) Centrifugal pump	d) Fan



Seat	
No.	

## S.E. (E & E) (Part – I) (Old CGPA) Examination, 2018 DC MACHINES AND TRANSFORMERS

Day and Date: Friday, 4-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

#### SECTION - I

#### 2. Solve any four:

 $(4 \times 4 = 16)$ 

- a) Draw and explain the power stages of a DC machine.
- b) Explain three point starter with neat diagram.
- c) Why DC series motor should not be started on no-load?
- d) What is armature reaction? Explain its two important effects in case of 2 pole generator.
- e) A 250 V, 4 pole, wave wound series motor has 782 conductors on its armature. It has armature and series field resistance of  $0.75\Omega$ . The motor takes a current of 40 A. Find its speed and gross torque developed if it has a flux per pole of 25 mwb.

## 3. Solve any two:

 $(2 \times 6 = 12)$ 

- a) Draw and explain torque-speed, armature current-torque and armature current-speed characteristics of DC shunt and series motor.
- b) A 250 V, 14.9 kW, 8 pole DC motor has single turn coils. The armature is wave wound with 94 commutator segments. If the brushes are given a lead of 2 commutator segments at full load, calculate
  - a) Total armature reaction ampere turns per pole
  - b) Cross magnetizing ampere turns per pole. Assume efficiency of 80%.
- c) What is back E.M.F. ? Explain its significance and derive equation for it.

#### SECTION - II

## 4. Solve any four:

 $(4 \times 4 = 16)$ 

- a) Why transformer is called constant flux machine?
- b) Explain operation of universal motor on both AC and DC.
- c) Draw phaser diagram of single phase transformer on resistive and capacitive load.



- d) Explain the construction and working principle of single phase transformer.
- e) A 150 kVA transformer has iron loss of 1.4 kW and full load Cu loss of 2.8 kW at 0.8 p.f. lagging. Calculate
  - i) Efficiency of transformer at full load.
  - ii) The maximum efficiency of the transformer.
- 5. Solve the following questions:

 $(2 \times 6 = 12)$ 

- a) Explain use of transformer having vector group YY 0, DY 1, DD 0 and DY 11. Draw the vector group with connection diagram for each group.
- b) Two single phase transformers with equal voltage ratios have impedances of  $(0.5 + j3)\Omega$  and  $(0.6 + j10) \Omega$  with respect to the secondary. If they operate in parallel, determine how they share a total load of 100 kW at p.f. 0.8 lagging.

OR

b) A 100 kVA,  $3\phi$ , 50 Hz, 3300/400 V transformer is delta connected on the H.V. side and star connected on the L.V. side. The resistance of the H.V. winding is  $3.5~\Omega$  per phase and that of L.V. winding  $0.02~\Omega$  per phase. Calculate the iron losses of the transformer at normal voltage and frequency if its full load efficiency is 95.8% at 0.8~p.f. lagging.

**SLR-TC - 475** 

# S.E. (E & E) (Part – I) (Old CGPA) Examination, 2018 DC MACHINES AND TRANSFORMERS

	DC MAC	HINES AND TRANSFO	RMERS
-	d Date : Friday, 4-5-201 2.30 p.m. to 5.30 p.m.	8	Max. Marks: 70
,	<b>minut</b> carries 2) <b>Answ</b>	tes in Answer Book Pag s one mark. er MCQ/Objective type Don't forget to mention,	ould be solved in first 30 ye No. 3. Each question questions on Page No. 3 Q.P. Set (P/Q/R/S) on Top
		O/Objective Type Question	
Duratio	n : 30 Minutes		Marks: 14
1. Ch	oose the correct alterna	tive:	(1×14=14)
·	<ul> <li>a) n = (VA rating*cosφ)</li> <li>b) n = (V<sub>2</sub>I<sub>2</sub>cosφ)/[(V<sub>2</sub>I<sub>2</sub>cosφ)/[(V<sub>2</sub>I<sub>2</sub>cosφ)]</li> <li>c) Both a) and b)</li> <li>d) None of the above</li> <li>A Universal motor is or</li> <li>a) Is available universal</li> <li>b) Can be marketed in</li> <li>c) Can be operated eit</li> </ul>	ne which ally	-
3)		000 primary turns is conne of 400 V, the no. of turns for b) 2000 d) 1250	ected to 200 V AC supply, the secondary should be
4)	In parallel operation of phase sequence. a) 120 c) same	3 ph transformer it is esse b) 90 d) opposite	
5)	The primary and secona) Electrically	dary of a transformer are b) Magneti	

c) Electrically and Magnetically

d) None of the above



6)	In Dc generator armature reaction is produced actually by				
	a) Its field current	b)	Field pole winding		
	c) Armature conductor	d)	Load current in armature		
7)	Back E.M.F. in a DC motor				
,	a) Opposes the applied voltage	b)	Aids the applied voltage		
	c) Aids the armature current				
8)	motor should be never	rst	arted at no load.		
,	a) Series		Shunt		
	c) Long compound	ď)	Short compound		
9)	Which of the load would be best drive	en	by DC compound motor?		
,	a) Reciprocating pump	b)	Electric locomotive		
	c) Centrifugal pump	d)	Fan		
10)	The speed of DC motor can be contr	olle	ed by varying		
	a) Its flux per pole	b)	Resistance of armature circuit		
	c) Applied voltage	d)	All of the above		
11)	Which of the following is power equa	tior	າ ?		
	a) $VI_a = E_b I_a + I_a ^ 2R_a$	b)	$V = E_b I_a + I_a \wedge 2R_a$		
	a) $VI_a = E_bI_a + I_a ^2R_a$ c) $I_a ^2V = E_bI_a ^2 + I_a ^2R_a$	d)	$V = E_b + I_a R_a$		
12)	The E.M.F. induced in DC machine is				
	a) Dynamically	b)	Statically		
	c) Both a) and b)	d)	None of the above		
13)	A transformer transfers electric power with change in	er f	rom primary to secondary usually		
	a) Frequency	b)	Voltage		
	c) Power	,	Time period		
14)	The transformer has a full load Cu los	s o	of 400 W, the Cu loss at half load is		
.,	a) 100 W		1000 W		
	c) 200 W	,	400 W		
	J, 200 VV	u)	100 44		



Seat	
No.	

# S.E. (E & E) (Part – I) (Old CGPA) Examination, 2018 DC MACHINES AND TRANSFORMERS

Day and Date: Friday, 4-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

#### SECTION - I

#### 2. Solve any four:

 $(4 \times 4 = 16)$ 

- a) Draw and explain the power stages of a DC machine.
- b) Explain three point starter with neat diagram.
- c) Why DC series motor should not be started on no-load?
- d) What is armature reaction? Explain its two important effects in case of 2 pole generator.
- e) A 250 V, 4 pole, wave wound series motor has 782 conductors on its armature. It has armature and series field resistance of  $0.75\Omega$ . The motor takes a current of 40 A. Find its speed and gross torque developed if it has a flux per pole of 25 mwb.

## 3. Solve any two:

 $(2 \times 6 = 12)$ 

- a) Draw and explain torque-speed, armature current-torque and armature current-speed characteristics of DC shunt and series motor.
- b) A 250 V, 14.9 kW, 8 pole DC motor has single turn coils. The armature is wave wound with 94 commutator segments. If the brushes are given a lead of 2 commutator segments at full load, calculate
  - a) Total armature reaction ampere turns per pole
  - b) Cross magnetizing ampere turns per pole. Assume efficiency of 80%.
- c) What is back E.M.F. ? Explain its significance and derive equation for it.

#### SECTION - II

# 4. Solve any four:

 $(4 \times 4 = 16)$ 

- a) Why transformer is called constant flux machine?
- b) Explain operation of universal motor on both AC and DC.
- c) Draw phaser diagram of single phase transformer on resistive and capacitive load.



- d) Explain the construction and working principle of single phase transformer.
- e) A 150 kVA transformer has iron loss of 1.4 kW and full load Cu loss of 2.8 kW at 0.8 p.f. lagging. Calculate
  - i) Efficiency of transformer at full load.
  - ii) The maximum efficiency of the transformer.
- 5. Solve the following questions:

 $(2 \times 6 = 12)$ 

- a) Explain use of transformer having vector group YY 0, DY 1, DD 0 and DY 11. Draw the vector group with connection diagram for each group.
- b) Two single phase transformers with equal voltage ratios have impedances of  $(0.5 + j3)\Omega$  and  $(0.6 + j10) \Omega$  with respect to the secondary. If they operate in parallel, determine how they share a total load of 100 kW at p.f. 0.8 lagging.

OR

b) A 100 kVA,  $3\phi$ , 50 Hz, 3300/400 V transformer is delta connected on the H.V. side and star connected on the L.V. side. The resistance of the H.V. winding is  $3.5~\Omega$  per phase and that of L.V. winding  $0.02~\Omega$  per phase. Calculate the iron losses of the transformer at normal voltage and frequency if its full load efficiency is 95.8% at 0.8~p.f. lagging.



Seat	Set	D
No.	Sei	L

Day and Date: Saturday, 5-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

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

- ii) Figures to right indicate full marks.
- iii) Assume suitable data whenever necessary.
- iv) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book Page No. 3. Each question carries one mark.
- v) 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.

Duratio	n : 30 Minutes	Marks:	14
1. Ch	oose the correct answer:	(14×1=1	4)
1)	Which law plays a significant role in a) KCL c) Law of superposition theorem	b) KVL	
2)	resistance?	cuit is removed, what happens to total	
	<ul><li>a) Decreases</li><li>c) Remains constant</li></ul>	<ul><li>b) Increases</li><li>d) Exactly doubles</li></ul>	
3)	What will be the value of a rectanguassociated branch is oriented toward	ular (complete incidence) matrix, if and ds the node?	
	a) 1 c) 0	b) –1 d) Not defined (∞)	
	C1 U	$\alpha$ ) Not defined ( $\infty$ )	



4)	Which is the correct sequential order of steps to be undertaken while applying Thevenin's theorem?					
	<ul> <li>A) Calculation of Thevenin's equivalent voltage</li> <li>B) Removal of branch impedance through which required current is to be estimated</li> </ul>					
	C) Estimation of equivalent impedance	ce between two terminals of the branch schematic representation of Thevenin's				
	a) A, C, B, D c) D, A, C, B	b) B, A, C, D d) B, C, D, A				
5)	A tree has a) closed path b) no closed path	c) single path d) none				
6)	An ideal current source has zero a) Internal resistance c) Ripple	<ul><li>b) Internal conductance</li><li>d) Voltage on the load</li></ul>				
7)	Superposition theorem can be applicated elements.	-				
8)	Which among the following condition  a) Xc > XL  c) Xc < XL	<ul> <li>c) Resistive d) Linear bilateral</li> <li>is true at the resonance?</li> <li>b) Xc = XL</li> <li>d) None of the above</li> </ul>				
9)	The transient response occurs a) only in resistive networks c) only in inductive circuits	<ul><li>b) only in capacitive circuits</li><li>d) both b) and c)</li></ul>				
10)	An ideal voltage source should have a) Large value of E.M.F. c) Zero source resistance	<ul><li>b) Small value of E.M.F.</li><li>d) Infinite source resistance</li></ul>				
11)	With zero initial condition at $t = 0 + $ circuit.					
12)	<ul><li>a) Resistor</li><li>b) Inductor</li><li>For a 2 port network, the condition AE</li><li>a) Unilateral element network</li><li>c) Lossless</li></ul>	c) Capacitor d) All of the above D-BC = 1 implies that the network is b) Lumped element network d) Reciprocal				
13)	When a network function is expressed output to input variables of a system, a) System function c) Both a) and b)					
14)	In series RLC circuit if C is increased what a) It increases	at happens to resonance frequency ? b) It remains same				
	c) It decreases	d) It is zero				



Seat	
No.	

Day and Date: Saturday, 5-5-2018

Time: 2.30 p.m. to 5.30 p.m.

Instructions: i) All questions are compulsory.

ii) Figures to **right** indicate **full** marks.

iii) Assume suitable data whenever necessary.

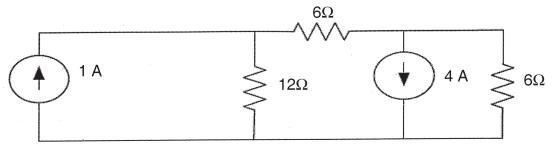
#### SECTION - I

2. Solve any three of the followings:

 $(4 \times 3 = 12)$ 

Marks: 56

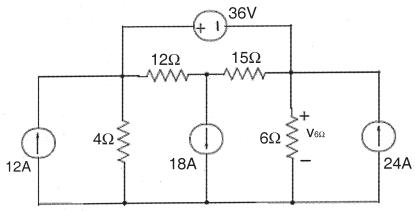
- 1) State and explain Thevenin's theorem for DC circuit.
- 2) Determine node voltages of the following circuit.



- 3) Define the terms : Tree, Cotree, Twigs and links.
- 4) What is source transformation? Explain the process step by step.
- 3. Solve any two of the followings:

 $(8 \times 2 = 16)$ 

1) Use superposition principle to compute voltage across  $6\Omega$  resistance  $(V_{_{6\Omega}})$ 





- 2) Derive necessary and sufficient condition for maximum power transfer condition from a voltage source with source impedance  $R_s + JX_s$  to a load  $R_l + JX_l$ . What is the value of power transferred in this case ?
- 3) What is incidence matrix? Explain generation of incidence matrix by taking an example. Compare with reduced incidence matrix.

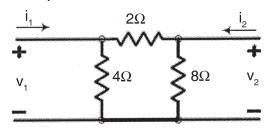
4. Solve any three of the followings:

 $(4 \times 3 = 12)$ 

- 1) Derive transmissions parameters with suitable diagram.
- 2) Differentiate between series and parallel resonance.
- 3) Obtain the Z parameters in terms of Y parameters.
- 4) An inductance 0.5H, a resistance of  $5\Omega$  and capacitance of  $8\mu F$  are in series across a 220V AC supply. Calculate frequency at which the circuit impedance become minimum. Find the current at resonance.
- 5. Solve any two of the followings:

 $(8 \times 2 = 16)$ 

- 1) What is parallel resonance ? State the properties of parallel resonance. A coil resistance  $20\Omega$  and inductance 0.2 H is connected in parallel with a capacitor of  $100\mu F$ . Determine resonant frequency and input impedance at resonance.
- 2) Find Y-parameter for the network shown.



3) Derive the DC transient response of RL series circuit.

Set P



Seat No.	Set	Q
140.		

Day and Date : Saturday, 5-5-2018	Max. Marks: 70
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Time: 2.30 p.m. to 5.30 p.m.

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

- ii) Figures to right indicate full marks.
- iii) Assume suitable data whenever necessary.
- iv) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book Page No. 3. Each question carries one mark.
- v) 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/O	bjective Type	Questions		
Duration : 30 Minutes				Marks: 14
<ol> <li>Choose the correct answer :</li> <li>Which among the following the fo</li></ol>	•		ance ?	(14×1=14)
a) Xc > XL c) Xc < XL	,	Xc = XL None of the ab	ove	
<ul><li>2) The transient response of a) only in resistive netwo</li><li>c) only in inductive circuit</li></ul>	orks b)	only in capaciti both b) and c)	ve circuits	
<ul><li>3) An ideal voltage source sl</li><li>a) Large value of E.M.F.</li><li>c) Zero source resistance</li></ul>	b)	Small value of Infinite source		
4) With zero initial condition circuit.  a) Resistor  b) Ind				
5) For a 2 port network, the a Unilateral element net	condition AD-B work b)	•	at the netw	



6)	When a network function is expressed output to input variables of a system, a) System function c) Both a) and b)	•	as on	
7)	In series RLC circuit if C is increased what a) It increases c) It decreases	,		
8)	Which law plays a significant role in the a) KCL c) Law of superposition theorem	b) KVL		
9)	If one of the resistors in a parallel circuresistance?  a) Decreases c) Remains constant	uit is removed, what b) Increases d) Exactly doubles		
10)	What will be the value of a rectangular associated branch is oriented towards a) 1 c) 0	` .	ŕ	
11)	<ul> <li>Which is the correct sequential order of Thevenin's theorem?</li> <li>A) Calculation of Thevenin's equivalent</li> <li>B) Removal of branch impedance to estimated</li> <li>C) Estimation of equivalent impedance</li> <li>D) Estimation of branch current by equivalent circuit</li> <li>a) A, C, B, D</li> <li>c) D, A, C, B</li> </ul>	ent voltage hrough which requ ce between two ter	uired current is to be minals of the branch	
12)	A tree has a) closed path b) no closed path	c) single path	d) none	
,	<ul> <li>An ideal current source has zero</li> <li>a) Internal resistance</li> <li>b) Internal conductance</li> <li>c) Ripple</li> <li>d) Voltage on the load</li> </ul>			
14)	Superposition theorem can be applicated elements.	able only to circuits	having	
	a) Non-linear b) Passive	c) Resistive	d) Linear bilateral	



Seat	
No.	

Day and Date: Saturday, 5-5-2018

Time: 2.30 p.m. to 5.30 p.m.

Instructions: i) All questions are compulsory.

ii) Figures to **right** indicate **full** marks.

iii) Assume suitable data whenever necessary.

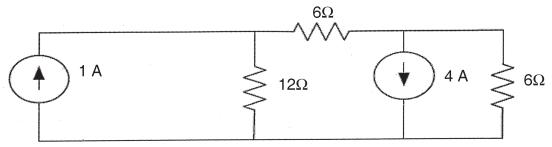
#### SECTION - I

2. Solve any three of the followings:

 $(4 \times 3 = 12)$ 

Marks: 56

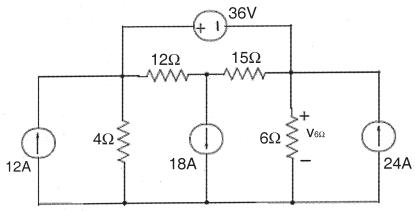
- 1) State and explain Thevenin's theorem for DC circuit.
- 2) Determine node voltages of the following circuit.



- 3) Define the terms : Tree, Cotree, Twigs and links.
- 4) What is source transformation? Explain the process step by step.
- 3. Solve any two of the followings:

 $(8 \times 2 = 16)$ 

1) Use superposition principle to compute voltage across  $6\Omega$  resistance  $(V_{_{6\Omega}})$ 





- 2) Derive necessary and sufficient condition for maximum power transfer condition from a voltage source with source impedance  $R_s + JX_s$  to a load  $R_i + JX_i$ . What is the value of power transferred in this case ?
- 3) What is incidence matrix? Explain generation of incidence matrix by taking an example. Compare with reduced incidence matrix.

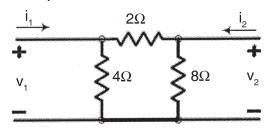
4. Solve any three of the followings:

 $(4 \times 3 = 12)$ 

- 1) Derive transmissions parameters with suitable diagram.
- 2) Differentiate between series and parallel resonance.
- 3) Obtain the Z parameters in terms of Y parameters.
- 4) An inductance 0.5H, a resistance of  $5\Omega$  and capacitance of  $8\mu F$  are in series across a 220V AC supply. Calculate frequency at which the circuit impedance become minimum. Find the current at resonance.
- 5. Solve any two of the followings:

 $(8 \times 2 = 16)$ 

- 1) What is parallel resonance ? State the properties of parallel resonance. A coil resistance  $20\Omega$  and inductance 0.2 H is connected in parallel with a capacitor of  $100\mu F$ . Determine resonant frequency and input impedance at resonance.
- 2) Find Y-parameter for the network shown.



3) Derive the DC transient response of RL series circuit.

Set Q



Seat	Set	R
No.	Set	n

Day and Date: Saturday, 5-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

Instructions: i) All questions are compulsory.

- ii) Figures to right indicate full marks.
- iii) Assume suitable data whenever necessary.
- iv) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book Page No. 3. Each question carries one mark.
- v) 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.

Duratio	n : 30 Minutes					Marks: 14
1. Ch	oose the correct an	swer:				(14×1=14)
1)	A tree has a) closed path	b) no closed path	c)	single path	d) none	
2)	An ideal current so a) Internal resista c) Ripple		,	Internal conduct Voltage on the		
3)	Superposition theo elements.			-		
	a) Non-linear	b) Passive	C)	Resistive	d) Linear	bilateral
4)	Which among the f a) Xc > XL c) Xc < XL	following condition	b)	ue at the reson Xc = XL None of the ab		
5)	The transient responsible a) only in resistive c) only in inductive	enetworks	,	only in capaciti both b) and c)	ve circuits	



6)	a) Large value of	source should have f E.M.F. esistance	b) Small value of	
7)	With zero initial circuit.	condition at t = 0	+ ,	_ acts as an open
	a) Resistor	b) Inductor	c) Capacitor	d) All of the above
8)	•		AD-BC = 1 implies to b) Lumped elem d) Reciprocal	
9)		riables of a system on	ed as a ratio of Lap n, then it is regarde b) Transfer func d) None of the a	tion
10)	In series RLC circu a) It increases c) It decreases	it if C is increased w	hat happens to resor b) It remains sa d) It is zero	
11)	a) KCL	C	the loop analysis of b) KVL d) None of the a	
12)	If one of the resistance?		cuit is removed, wh	nat happens to total
	<ul><li>a) Decreases</li><li>c) Remains cons</li></ul>	stant	<ul><li>b) Increases</li><li>d) Exactly doub</li></ul>	lee
13)	What will be the		ular (complete incid	dence) matrix, if an
	a) 1	i is offerfied towar	b) -1	
	c) 0		d) Not defined (	∞)
14)	Which is the correct Thevenin's theorem	em?	of steps to be under	taken while applying
	•	Thevenin's equiva eranch impedance		quired current is to be
	•	branch current by		erminals of the branch sentation of Thevenin's
	a) A, C, B, D		b) B, A, C, D	
	c) D, A, C, B		d) B, C, D, A	



Seat	
No.	

Day and Date: Saturday, 5-5-2018

Time: 2.30 p.m. to 5.30 p.m.

Marks: 56

. . .

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

ii) Figures to **right** indicate **full** marks.

iii) Assume suitable data whenever necessary.

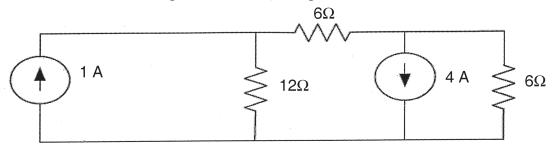
#### SECTION - I

# 2. Solve any three of the followings:

 $(4 \times 3 = 12)$ 

1) State and explain Thevenin's theorem for DC circuit.

2) Determine node voltages of the following circuit.

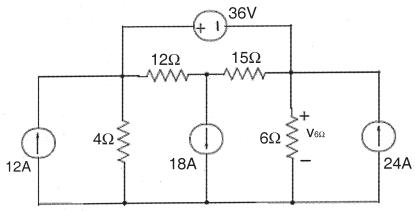


- 3) Define the terms : Tree, Cotree, Twigs and links.
- 4) What is source transformation? Explain the process step by step.

# 3. Solve any two of the followings:

 $(8 \times 2 = 16)$ 

1) Use superposition principle to compute voltage across  $6\Omega$  resistance  $(V_{_{6\Omega}})$ 





- 2) Derive necessary and sufficient condition for maximum power transfer condition from a voltage source with source impedance  $R_{\rm s} + JX_{\rm s}$  to a load  $R_{\rm l} + JX_{\rm l}$ . What is the value of power transferred in this case ?
- 3) What is incidence matrix? Explain generation of incidence matrix by taking an example. Compare with reduced incidence matrix.

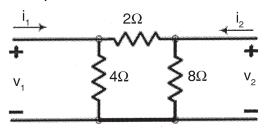
4. Solve any three of the followings:

 $(4 \times 3 = 12)$ 

- 1) Derive transmissions parameters with suitable diagram.
- 2) Differentiate between series and parallel resonance.
- 3) Obtain the Z parameters in terms of Y parameters.
- 4) An inductance 0.5H, a resistance of  $5\Omega$  and capacitance of  $8\mu F$  are in series across a 220V AC supply. Calculate frequency at which the circuit impedance become minimum. Find the current at resonance.
- 5. Solve any two of the followings:

 $(8 \times 2 = 16)$ 

- 1) What is parallel resonance ? State the properties of parallel resonance. A coil resistance  $20\Omega$  and inductance 0.2 H is connected in parallel with a capacitor of  $100\mu F$ . Determine resonant frequency and input impedance at resonance.
- 2) Find Y-parameter for the network shown.



3) Derive the DC transient response of RL series circuit.

Set R



Seat No.		Set	S
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Day and Date: Saturday, 5-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

### **Instructions**: i) **All** questions are **compulsory**.

- ii) Figures to right indicate full marks.
- iii) Assume suitable data whenever necessary.
- iv) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book Page No. 3. Each question carries one mark.
- v) 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.

Dur	ation : 30 Minute	S		Marks: 14
1.	Choose the corr	ect answer:		(14×1=14)
	a) Large va	age source should have lue of E.M.F. rce resistance	b) Small value d) Infinite source	
	circuit.	b) Inductor		acts as an open d) All of the above
	3) For a 2 port	network, the condition A I element network	D-BC = 1 implies	that the network is
	,			ed as ction



5)	In series RLC circuit if C is increased what a) It increases c) It decreases	t happens to resonal b) It remains same d) It is zero	
6)	Which law plays a significant role in that a) KCL c) Law of superposition theorem	b) KVL	
7)	If one of the resistors in a parallel circuresistance?	,	
	a) Decreases	b) Increases	
	c) Remains constant	d) Exactly doubles	3
8)	What will be the value of a rectangula	•	nce) matrix, if an
	associated branch is oriented towards		
	a) 1	b) -1	
٥)	c) 0 Which is the correct sequential order of	d) Not defined (∞)	
10)	<ul> <li>Thevenin's theorem?</li> <li>A) Calculation of Thevenin's equivale</li> <li>B) Removal of branch impedance the estimated</li> <li>C) Estimation of equivalent impedance</li> <li>D) Estimation of branch current by sequivalent circuit</li> <li>a) A, C, B, D</li> <li>c) D, A, C, B</li> </ul>	hrough which require between two terr	minals of the branch
10)	A tree has a) closed path b) no closed path	c) single path	d) none
11)	An ideal current source has zero a) Internal resistance c) Ripple	<ul><li>b) Internal conduct</li><li>d) Voltage on the</li></ul>	
12)	Superposition theorem can be applicated elements.		-
40\	a) Non-linear b) Passive	c) Resistive	d) Linear bilateral
13)	Which among the following condition i a) Xc > XL c) Xc < XL	b) Xc = XL d) None of the abo	
14)	The transient response occurs a) only in resistive networks	b) only in capacitive	ve circuits
	c) only in inductive circuits	d) both b) and c)	



Seat	
No.	

Day and Date: Saturday, 5-5-2018

Time: 2.30 p.m. to 5.30 p.m.

Instructions: i) All questions are compulsory.

ii) Figures to **right** indicate **full** marks.

iii) Assume suitable data whenever necessary.

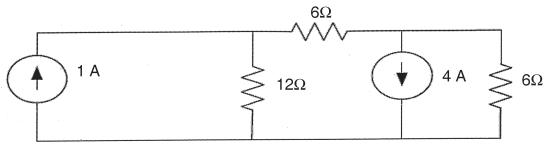
#### SECTION - I

2. Solve any three of the followings:

 $(4 \times 3 = 12)$ 

Marks: 56

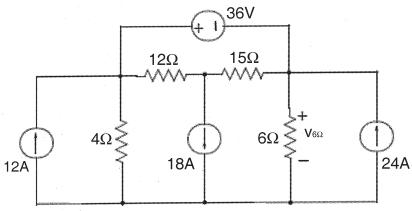
- 1) State and explain Thevenin's theorem for DC circuit.
- 2) Determine node voltages of the following circuit.



- 3) Define the terms : Tree, Cotree, Twigs and links.
- 4) What is source transformation? Explain the process step by step.
- 3. Solve any two of the followings:

 $(8 \times 2 = 16)$ 

1) Use superposition principle to compute voltage across  $6\Omega$  resistance  $(V_{_{6\Omega}})$ 





- 2) Derive necessary and sufficient condition for maximum power transfer condition from a voltage source with source impedance  $R_s + JX_s$  to a load  $R_i + JX_i$ . What is the value of power transferred in this case ?
- 3) What is incidence matrix? Explain generation of incidence matrix by taking an example. Compare with reduced incidence matrix.

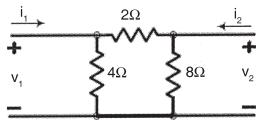
4. Solve any three of the followings:

 $(4 \times 3 = 12)$ 

- 1) Derive transmissions parameters with suitable diagram.
- 2) Differentiate between series and parallel resonance.
- 3) Obtain the Z parameters in terms of Y parameters.
- 4) An inductance 0.5H, a resistance of  $5\Omega$  and capacitance of  $8\mu F$  are in series across a 220V AC supply. Calculate frequency at which the circuit impedance become minimum. Find the current at resonance.
- 5. Solve any two of the followings:

 $(8 \times 2 = 16)$ 

- 1) What is parallel resonance ? State the properties of parallel resonance. A coil resistance  $20\Omega$  and inductance 0.2 H is connected in parallel with a capacitor of  $100\mu F$ . Determine resonant frequency and input impedance at resonance.
- 2) Find Y-parameter for the network shown.



3) Derive the DC transient response of RL series circuit.

Set S



**SLR-TC - 477** 

Seat	
No.	

Set P

# S.E. (Electrical & Electronics Engineering) (Part – I) (Old CGPA) Examination, 2018 ANALOG ELECTRONICS

Day and Date: Monday, 7-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 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) If necessary, assume suitable data.
- 4) Figure to right indicate full marks.

Dur	ation: 30 Minutes				Marks: 14
1.	Choose the correct a	Iternative :			
	1) The average value	e of load voltage	e for half wave re	ctifier is	
	a) $V_m/\pi$	b) $2V_m/\pi$	c) $\pi/V_m$	d) $\pi/2V_{m}$	
	2) The gain of cascaded amplifier is equ		equal to		
	a) Product of individual gain		b) Sum of individual gain		
	c) Ratio of stage	c) Ratio of stage gain		d) None of these	
	3) In class A amplifier the collector cur		current flows for		
	a) Less than half	cycle	b) For half c	ycle	
	c) Less than full o	cycle	d) For comp	lete cycle	
	4) MOSFET can be used as a				
	a) current control	led capacitor	b) voltage co	ontrolled capaci	tor
	c) current control	led inductor	d) voltage co	ontrolled inducto	or



5)	The output of class	B amplifier			
	a) is distortion free				
	b) consist of positiv	e half cycle only			
	c) is like a output of	f FWR			
	d) comprise short d	luration of current	pu	lses	
6)	When transistor is u	ısed as amplifier i	ts c	operation is co	nfines in
	a) saturation region	1	b)	cutoff region	
	c) active region		d)	both a & b	
7)	The main job of cur	rent mirror circuit	is t	o provide	output current.
	a) sinusoidal	b) constant	c)	smooth	d) fluctuating
8)	Two input terminals	of op-amp are			
	a) Positive & negat	ive	b)	Differential &	non-differential
	c) Inverting & non-i	nverting	d)	High & low	
9)	An ideal op-amp ha	S			
	a) Zero output resis	stance	b)	Infinite resista	ince
	c) Zero input resista	ance	d)	Both a & c	
10)	For inverting amplifi	er if $R_f = 10K\Omega$ , F	R <sub>1</sub> =	1K $\Omega$ then gain	n is
	a) -11	b) -10	c)	<b>-9</b>	d) -1
11)	For sine input, outpo	ut of an integrator	is		
	a) cosine wave		b)	pulse	
	c) triangular wave		d)	square wave	
12)	A monostable multiv	vibrator is called a	as		
	a) one shot	b) two shot	c)	unibrator	d) both a & c
13)	The Schmitt trigger	circuit			
	a) converts irregula	r waveform into p	uls	e waveform	
	b) uses positive fee	edback			
	c) is fast operating	voltage level dete	ecto	or	
	d) all of above				
14)	The change in op-a voltage called as	ımp input offset v	olta	age causes by	variation in supply
	a) SVRR	b) PSS	c)	PSRR	d) All



Seat	
No.	

# S.E. (Electrical & Electronics Engineering) (Part – I) (Old CGPA) Examination, 2018 **ANALOG ELECTRONICS**

Day and Date: Monday, 7-5-2018

Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) If necessary, assume suitable data. 2) Figure to right indicate full marks.

#### SECTION - I

2. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) What is clamper? Explain positive clamper.
- 2) What is load line analysis? Explain Q-point.
- 3) Explain class A amplifier.
- 4) Explain the working of depletion type MOSFET.

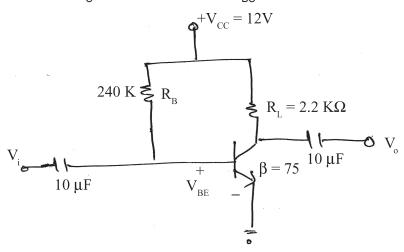
# 3. Solve any two:

 $(2 \times 8 = 16)$ 

- 1) For fixed bias configuration shown below, calculate
  - a)  $I_{BO}$  and  $I_{CO}$
- b) V<sub>CFO</sub> e)  $V_{BC}$
- c)  $V_{R}$

d)  $V_{c}$ 

f)  $\alpha$ 





- 2) Explain working of unijunction transistor. Also discuss its VI characteristics.
- 3) What is rectifier? State its types. Explain operation of bridge rectifier.

### 4. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) Draw general block diagram of op-amp and pin diagram of IC 741.
- 2) Explain op-amp as a integrator.
- 3) Explain peak detector using op-amp.
- 4) What are closed loop inverting and non-inverting amplifiers?

5. Solve any two:

 $(2 \times 8 = 16)$ 

- 1) Explain instrumentation amplifier using transducer bridge.
- 2) Explain with neat diagram and waveforms of IC 555 as a stable multivibrator. Also derive expression for frequency of oscillation.
- 3) What are ideal characteristics of op-amp? Explain following terms in op-amp.
  - a) CMRR
- b) PSRR
- c) Slew rate.

**SLR-TC - 477** 

Seat	
No.	

Set

# S.E. (Electrical & Electronics Engineering) (Part – I) (Old CGPA) Examination, 2018 ANALOG ELECTRONICS

Day and Date: Monday, 7-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 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.

c) unibrator

- 3) If necessary, assume suitable data.
- 4) Figure to **right** indicate **full** marks.

### MCQ/Objective Type Questions

**Duration: 30 Minutes** Marks: 14 Choose the correct alternative : 1) Two input terminals of op-amp are a) Positive & negative b) Differential & non-differential c) Inverting & non-inverting d) High & low 2) An ideal op-amp has a) Zero output resistance b) Infinite resistance c) Zero input resistance d) Both a & c 3) For inverting amplifier if  $R_f = 10K\Omega$ ,  $R_1 = 1K\Omega$  then gain is b) -10c) -9d) -1a) -11 4) For sine input, output of an integrator is a) cosine wave b) pulse d) square wave c) triangular wave

5) A monostable multivibrator is called as

b) two shot

a) one shot

d) both a & c

6)	The Schmitt trigger	circuit		
	a) converts irregula	ır waveform into p	oulse waveform	
	b) uses positive fee	edback		
	c) is fast operating	voltage level dete	ector	
	d) all of above			
7)	The change in op-a voltage called as	amp input offset v	oltage causes b	y variation in supply
	a) SVRR	b) PSS	c) PSRR	d) All
8)	The average value	of load voltage fo	r half wave rectif	ier is
	a) $V_m/\pi$	b) $2V_m/\pi$	c) $\pi/V_m$	d) $\pi/2V_{m}$
9)	The gain of cascade	ed amplifier is equ	ual to	
	a) Product of individual	dual gain	b) Sum of indiv	idual gain
	c) Ratio of stage ga	ain	d) None of thes	se
10)	In class A amplifier	the collector curre	ent flows for	
	a) Less than half cy	/cle	b) For half cycle	е
	c) Less than full cy	cle	d) For complete	e cycle
11)	MOSFET can be us	sed as a		
	a) current controlle	d capacitor	b) voltage cont	rolled capacitor
	c) current controlle	d inductor	d) voltage cont	rolled inductor
12)	The output of class	B amplifier		
	a) is distortion free			
	b) consist of positive	e half cycle only		
	c) is like a output o	f FWR		
	d) comprise short of	luration of current	pulses	
13)	When transistor is u	ised as amplifier i	its operation is co	onfines in
	a) saturation region	1	b) cutoff region	
	c) active region		d) both a & b	
14)	The main job of cur	rent mirror circuit	is to provide	output current.
	a) sinusoidal	b) constant	c) smooth	d) fluctuating



Seat	
No.	

# S.E. (Electrical & Electronics Engineering) (Part – I) (Old CGPA) Examination, 2018 **ANALOG ELECTRONICS**

Day and Date: Monday, 7-5-2018

Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

**Instructions**: 1) **If necessary**, assume suitable data. 2) Figure to right indicate full marks.

#### SECTION - I

2. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) What is clamper? Explain positive clamper.
- 2) What is load line analysis? Explain Q-point.
- 3) Explain class A amplifier.
- 4) Explain the working of depletion type MOSFET.

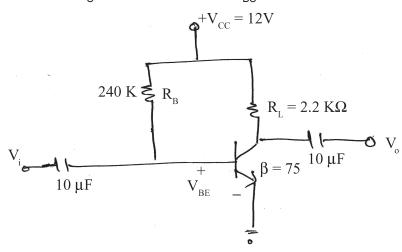
3. Solve any two:

 $(2 \times 8 = 16)$ 

- 1) For fixed bias configuration shown below, calculate
  - a)  $I_{BO}$  and  $I_{CO}$
- b) V<sub>CFO</sub> e)  $V_{BC}$
- c)  $V_{R}$

d)  $V_{c}$ 

f)  $\alpha$ 





- 2) Explain working of unijunction transistor. Also discuss its VI characteristics.
- 3) What is rectifier? State its types. Explain operation of bridge rectifier.

### 4. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) Draw general block diagram of op-amp and pin diagram of IC 741.
- 2) Explain op-amp as a integrator.
- 3) Explain peak detector using op-amp.
- 4) What are closed loop inverting and non-inverting amplifiers?

5. Solve any two:

 $(2 \times 8 = 16)$ 

- 1) Explain instrumentation amplifier using transducer bridge.
- 2) Explain with neat diagram and waveforms of IC 555 as a stable multivibrator. Also derive expression for frequency of oscillation.
- 3) What are ideal characteristics of op-amp? Explain following terms in op-amp.
  - a) CMRR
- b) PSRR
- c) Slew rate.


**SLR-TC - 477** 

Seat	
No.	

Set R

# S.E. (Electrical & Electronics Engineering) (Part – I) (Old CGPA) Examination, 2018 ANALOG ELECTRONICS

Day	and Date : Monday, 7-5-2018	Total Marks: 70

Time: 2.30 p.m. to 5.30 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) If necessary, assume suitable data.
- 4) Figure to **right** indicate **full** marks.

Dura	ation : 30 Minutes	Marks: 14
1.	Choose the correct alternative :	
	1) The output of class B amplifier	
	a) is distortion free	
	b) consist of positive half cycle on	ly
	c) is like a output of FWR	
	d) comprise short duration of curre	ent pulses
	2) When transistor is used as amplific	er its operation is confines in
	a) saturation region	b) cutoff region
	c) active region	d) both a & b
	3) The main job of current mirror circ	uit is to provide output current.
	a) sinusoidal b) constant	c) smooth d) fluctuating
	4) Two input terminals of op-amp are	
	a) Positive & negative	b) Differential & non-differential
	c) Inverting & non-inverting	d) High & low

5)	An ideal op-amp has	
	a) Zero output resistance	b) Infinite resistance
	c) Zero input resistance	d) Both a & c
6)	For inverting amplifier if $R_f = 10K\Omega$ , F	$R_1 = 1 \text{K}\Omega$ then gain is
	a) -11 b) -10	c) -9 d) -1
7)	For sine input, output of an integrator	is
	a) cosine wave	b) pulse
	c) triangular wave	d) square wave
8)	A monostable multivibrator is called a	as
	a) one shot b) two shot	c) unibrator d) both a & c
9)	The Schmitt trigger circuit	
	a) converts irregular waveform into p	oulse waveform
	b) uses positive feedback	
	c) is fast operating voltage level dete	ector
	d) all of above	
10)	The change in op-amp input offset v voltage called as	oltage causes by variation in supply
	a) SVRR b) PSS	c) PSRR d) All
11)	The average value of load voltage for	r half wave rectifier is
	a) $V_m/\pi$ b) $2V_m/\pi$	c) $\pi/V_m$ d) $\pi/2V_m$
12)	The gain of cascaded amplifier is equ	ual to
	a) Product of individual gain	b) Sum of individual gain
	c) Ratio of stage gain	d) None of these
13)	In class A amplifier the collector curre	ent flows for
	a) Less than half cycle	b) For half cycle
	c) Less than full cycle	d) For complete cycle
14)	MOSFET can be used as a	
,	a) current controlled capacitor	b) voltage controlled capacitor
	c) current controlled inductor	d) voltage controlled inductor



Seat	
No.	

# S.E. (Electrical & Electronics Engineering) (Part – I) (Old CGPA) Examination, 2018 ANALOG ELECTRONICS

Day and Date: Monday, 7-5-2018

Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) If necessary, assume suitable data.
2) Figure to right indicate full marks.

#### SECTION - I

2. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) What is clamper? Explain positive clamper.
- 2) What is load line analysis? Explain Q-point.
- 3) Explain class A amplifier.
- 4) Explain the working of depletion type MOSFET.

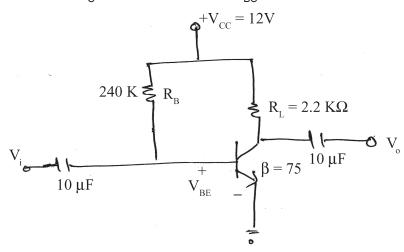
# 3. Solve any two:

 $(2 \times 8 = 16)$ 

- 1) For fixed bias configuration shown below, calculate
  - a)  $I_{BO}$  and  $I_{CO}$
- b) V<sub>CEQ</sub>e) V<sub>BC</sub>
- c)  $V_B$

d)  $V_{c}$ 

f)  $\alpha$ 





- 2) Explain working of unijunction transistor. Also discuss its VI characteristics.
- 3) What is rectifier? State its types. Explain operation of bridge rectifier.

### 4. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) Draw general block diagram of op-amp and pin diagram of IC 741.
- 2) Explain op-amp as a integrator.
- 3) Explain peak detector using op-amp.
- 4) What are closed loop inverting and non-inverting amplifiers?

5. Solve any two:

 $(2 \times 8 = 16)$ 

- 1) Explain instrumentation amplifier using transducer bridge.
- 2) Explain with neat diagram and waveforms of IC 555 as a stable multivibrator. Also derive expression for frequency of oscillation.
- 3) What are ideal characteristics of op-amp? Explain following terms in op-amp.
  - a) CMRR
- b) PSRR
- c) Slew rate.



**SLR-TC - 477** 

Seat	
No.	

Set

Marks: 14

# S.E. (Electrical & Electronics Engineering) (Part – I) (Old CGPA) Examination, 2018 ANALOG ELECTRONICS

Day and Date: Monday, 7-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

**Duration: 30 Minutes** 

d) all of above

1.

- 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) If necessary, assume suitable data.
  - 4) Figure to right indicate full marks.

Choose the correct	alternative :		
1) For inverting am	plifier if $R_f = 10K\Omega$	$R_1 = 1K\Omega$ then ga	ain is
a) -11	b) -10	c) -9	d) -1
2) For sine input, o	utput of an integrat	tor is	
a) cosine wave		b) pulse	
c) triangular wa	ve	d) square wave	е
3) A monostable m	ultivibrator is called	d as	
a) one shot	b) two shot	c) unibrator	d) both a & c
4) The Schmitt trigg	ger circuit		
a) converts irreg	jular waveform into	pulse waveform	
b) uses positive	feedback		
c) is fast operati	ng voltage level de	etector	

5)	The change in op-amp input offset voltage causes by variation in supply voltage called as					
	a) SVRR	b) PSS	c)	PSRR	d) All	
6)	The average value of	of load voltage for	r ha	alf wave rectifie	er is	
	a) $V_m/\pi$	b) $2V_m/\pi$	c)	$\pi/V_{m}$	d) $\pi/2V_m$	
7)	The gain of cascade	ed amplifier is equ	ıal	to		
	a) Product of individ	dual gain	b)	Sum of individ	lual gain	
	c) Ratio of stage ga	in	d)	None of these	•	
8)	8) In class A amplifier the collector curre			ent flows for		
<ul> <li>a) Less than half cyc</li> </ul>		rcle	b)	o) For half cycle		
	c) Less than full cycle		d)	d) For complete cycle		
9)	MOSFET can be us	ed as a				
	a) current controlled	•	•	voltage contro	•	
	c) current controlled		d)	voltage contro	olled inductor	
10)	The output of class	B amplifier				
	a) is distortion free	a la alfantal a andri				
<ul><li>b) consist of positive half cycle only</li><li>c) is like a output of FWR</li><li>d) comprise short duration of current</li></ul>						
			nu	lses		
11)	d) comprise short duration of current pulses  When transistor is used as amplifier its operation is confines in					
,	a) saturation region	-		cutoff region		
	c) active region		•	both a & b		
12)	The main job of curr	ent mirror circuit	is t	o provide	output current.	
	a) sinusoidal	b) constant		smooth	d) fluctuating	
13)	Two input terminals	of op-amp are				
	a) Positive & negati	ive	b)	Differential &	non-differential	
	c) Inverting & non-in	nverting	d)	High & low		
14)	An ideal op-amp has	S				
	a) Zero output resis	stance	b)	Infinite resista	ince	
	c) Zero input resista	ance	d)	Both a & c		



Seat	
No.	

# S.E. (Electrical & Electronics Engineering) (Part – I) (Old CGPA) Examination, 2018 ANALOG ELECTRONICS

Day and Date: Monday, 7-5-2018

Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) If necessary, assume suitable data.
2) Figure to right indicate full marks.

#### SECTION - I

2. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) What is clamper? Explain positive clamper.
- 2) What is load line analysis? Explain Q-point.
- 3) Explain class A amplifier.
- 4) Explain the working of depletion type MOSFET.

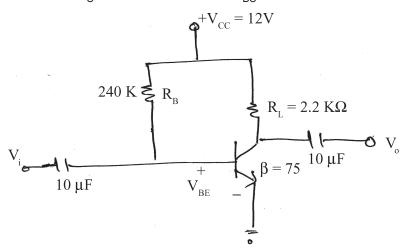
# 3. Solve any two:

 $(2 \times 8 = 16)$ 

- 1) For fixed bias configuration shown below, calculate
  - a)  $I_{BO}$  and  $I_{CO}$
- b) V<sub>CEQ</sub>e) V<sub>BC</sub>
- c)  $V_B$

d)  $V_{c}$ 

f)  $\alpha$ 





- 2) Explain working of unijunction transistor. Also discuss its VI characteristics.
- 3) What is rectifier? State its types. Explain operation of bridge rectifier.

### 4. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) Draw general block diagram of op-amp and pin diagram of IC 741.
- 2) Explain op-amp as a integrator.
- 3) Explain peak detector using op-amp.
- 4) What are closed loop inverting and non-inverting amplifiers?

5. Solve any two:

 $(2 \times 8 = 16)$ 

- 1) Explain instrumentation amplifier using transducer bridge.
- 2) Explain with neat diagram and waveforms of IC 555 as a stable multivibrator. Also derive expression for frequency of oscillation.
- 3) What are ideal characteristics of op-amp? Explain following terms in op-amp.
  - a) CMRR
- b) PSRR
- c) Slew rate.

Seat	
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### S.E. (E and E) (Part – I) (Old CGPA) Examination, 2018 **ELECTRICAL POWER GENERATION**

Day ar	nd Date:	Tuesday,	8-5-2018	Total Marks: 70
<del></del> -				

Time: 2.30 p.m. to 5.30 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	
Dur	ation : 30 Minutes			Marks: 14
1.	Choose the correct ar	nswer:		(14×1=14)
	<ol> <li>Out of the following</li> <li>A) Tidal power</li> <li>C) Nuclear energy</li> </ol>		ot a unconvention  B) Geotherma  D) Wind powe	
	<ul><li>2) Pulverized coal is</li><li>A) Coal free from a</li><li>C) Coal which bun</li></ul>		B) Non-smokii D) Coal broke	ng coal n into fine particles
	Coal used in power     A) Steam coal	•	own as C) Coke	D) Soft coal
	<ul><li>4) Live storage of coa</li><li>A) Coal ready for o</li><li>B) Preheated coal</li><li>C) Storage of coal</li><li>D) Coal in transit</li></ul>	combustion		d of the plant
	5) In a power plant, o means of	oal is carried fror	n storage place t	o boilers generally by
	A) Bucket	B) V-belts	C) Trolleys	D) Manually

6)	Advantage of hydro-electric power st	ation is
	<ul><li>A) Low operating cost</li><li>C) No fuel transportation problems</li></ul>	B) Free from pollution problems D) All of the above
7)	A two stroke engine may be identified	
	<ul><li>A) Piston size</li><li>C) Cooling system</li></ul>	<ul><li>B) Absence of valves</li><li>D) Lubrication system</li></ul>
8)	Most of the heat generated in internal A) Cooling water C) Lubricating oil	I combustion engine is lost in B) Exhaust gases D) Radiation
9)	In a super-heater  A) Pressure rises, temperature drops B) Pressure rises, temperature rema C) Pressure remains constant and te D) Both pressure and temperature re-	ins constant mperature rises
10)	Photovoltaic solar energy conversion  A) Fuel cell  B) Solar cell	system makes use of C) Solar pond D) None of the above
11)	Batteries used for electrical energy so A) Laclanche cells C) Lead acid cells	torage are B) Edison cells D) Any of the above
12)	Biogas consist of A) Only methane B) Methane and carbon dioxide with C) Only ethane D) A special organic gas	
13)	In thermal power plants the size of the A) 300 mm C) 40 mm	e coal after crushing B) 200 – 205 mm D) 20 – 25 mm
14)	Uses of power station  A) Peak load plant  C) Stand by plants	B) Emergency plants D) All of the above



## S.E. (E and E) (Part – I) (Old CGPA) Examination, 2018 ELECTRICAL POWER GENERATION

Day and Date: Tuesday, 8-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

#### 2. Solve any four:

 $(4\times4)$ 

- 1) Explain fuels and their handling in thermal power plant.
- 2) Explain the process of nuclear fission.
- 3) Discuss factors to be considered for selection of site for thermal power plant.
- 4) Explain pelton turbine with neat diagram.
- 5) Write a short note on hydrology.

### 3. Solve **any two**:

 $(6\times2)$ 

- 1) Explain CANDU type reactor with neat diagram, also state its advantages and disadvantages.
- 2) Explain single line diagram of typical AC power system.
- 3) Draw typical layout of hydroelectric power plant and explain it briefly.

## 4. Solve any four:

 $(4\times4)$ 

- 1) Write a short note on load curve.
- 2) State application of diesel power stations.
- 3) Explain geo-thermal power plant with neat diagram also state its application.
- 4) Define bio-gas and bio-mass energy.
- 5) Explain wind power plant with block diagram also state its application.



5. Solve any two:

 $(6 \times 2)$ 

- 1) Define bio-gas and explain common circular digester with floating gas holder (KVIC digester) with neat diagram.
- 2) Explain the working of diesel power plant with the help of block diagram.
- 3) Explain the following:
  - a) Load factor
  - b) Plant capacity factor
  - c) Diversity factor
  - d) Demand factor.

Set P


Seat	
No.	

### S.E. (E and E) (Part – I) (Old CGPA) Examination, 2018 **ELECTRICAL POWER GENERATION**

Day and Date: Tuesday, 8-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 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

	•		
Dur	ation : 30 Minutes		Marks: 14
1.	Choose the correct answer:		(14×1=14)
	<ol> <li>Most of the heat generated in internal</li> <li>Cooling water</li> <li>Lubricating oil</li> </ol>	al combustion engine is lost in B) Exhaust gases D) Radiation	
	2) In a super-heater  A) Pressure rises temperature drop	9	

- 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
- 3) Photovoltaic solar energy conversion system makes use of
  - A) Fuel cell
- B) Solar cell
- C) Solar pond
- D) None of the above
- 4) Batteries used for electrical energy storage are
  - A) Laclanche cells

B) Edison cells

C) Lead acid cells

D) Any of the above

- 5) Biogas consist of
  - A) Only methane
  - B) Methane and carbon dioxide with some impurities
  - C) Only ethane
  - D) A special organic gas

6) In thermal power plants the size of the coal after crushing



	A) 300 mm C) 40 mm	B) 200 – 205 mm D) 20 – 25 mm
7)	Uses of power station  A) Peak load plant  C) Stand by plants	B) Emergency plants D) All of the above
-	Out of the following which one is not A) Tidal power C) Nuclear energy	a unconventional source of energy?  B) Geothermal energy  D) Wind power
9)	Pulverized coal is  A) Coal free from ash  C) Coal which bums for long time	<ul><li>B) Non-smoking coal</li><li>D) Coal broken into fine particles</li></ul>
10)	Coal used in power plant is also known A) Steam coal B) Charcoal	wn as C) Coke D) Soft coal
11)	Live storage of coal in a power plant A) Coal ready for combustion B) Preheated coal C) Storage of coal sufficient to meet D) Coal in transit	
12)	In a power plant, coal is carried from means of	
	,	C) Trolleys D) Manually
13)	<ul><li>Advantage of hydro-electric power st</li><li>A) Low operating cost</li><li>C) No fuel transportation problems</li></ul>	B) Free from pollution problems
14)	A two stroke engine may be identified A) Piston size C) Cooling system	d by B) Absence of valves D) Lubrication system



## S.E. (E and E) (Part – I) (Old CGPA) Examination, 2018 ELECTRICAL POWER GENERATION

Day and Date: Tuesday, 8-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

#### 2. Solve any four:

 $(4\times4)$ 

- 1) Explain fuels and their handling in thermal power plant.
- 2) Explain the process of nuclear fission.
- 3) Discuss factors to be considered for selection of site for thermal power plant.
- 4) Explain pelton turbine with neat diagram.
- 5) Write a short note on hydrology.

### 3. Solve **any two**:

 $(6 \times 2)$ 

- 1) Explain CANDU type reactor with neat diagram, also state its advantages and disadvantages.
- 2) Explain single line diagram of typical AC power system.
- 3) Draw typical layout of hydroelectric power plant and explain it briefly.

## 4. Solve any four:

 $(4\times4)$ 

- 1) Write a short note on load curve.
- 2) State application of diesel power stations.
- 3) Explain geo-thermal power plant with neat diagram also state its application.
- 4) Define bio-gas and bio-mass energy.
- 5) Explain wind power plant with block diagram also state its application.



5. Solve any two:

 $(6 \times 2)$ 

- 1) Define bio-gas and explain common circular digester with floating gas holder (KVIC digester) with neat diagram.
- 2) Explain the working of diesel power plant with the help of block diagram.
- 3) Explain the following:
  - a) Load factor
  - b) Plant capacity factor
  - c) Diversity factor
  - d) Demand factor.

Set Q

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### S.E. (E and E) (Part – I) (Old CGPA) Examination, 2018 **ELECTRICAL POWER GENERATION**

Day and Date : Tuesday, 8-5-2018	Total Marks : 70
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Time: 2.30 p.m. to 5.30 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 T	ype Questions	
Dur	ation : 30 Minutes		Marks: 14
1.	Choose the correct answer:		(14×1=14)
	<ol> <li>In a power plant, coal is carried from means of</li> </ol>	storage place to	b boilers generally by
	A) Bucket B) V-belts	C) Trolleys	D) Manually
	<ul> <li>2) Advantage of hydro-electric power s</li> <li>A) Low operating cost</li> <li>C) No fuel transportation problems</li> <li>3) A two stroke engine may be identified</li> <li>A) Piston size</li> <li>C) Cooling system</li> </ul>	B) Free from po D) All of the ab	valves
<ul> <li>4) Most of the heat generated in internal combustion engine is lost in</li> <li>A) Cooling water</li> <li>B) Exhaust gases</li> <li>C) Lubricating oil</li> <li>D) Radiation</li> </ul>			
	<ul><li>5) In a super-heater</li><li>A) Pressure rises, temperature drop</li><li>B) Pressure rises, temperature rema</li><li>C) Pressure remains constant and temperature</li></ul>	ains constant	

D) Both pressure and temperature remains constant

6)	Photovoltaic solar e	energy conversion	sy	stem makes u	se o	of
	A) Fuel cell	B) Solar cell	C)	Solar pond	D)	None of the above
7)	Batteries used for e A) Laclanche cells C) Lead acid cells	lectrical energy s	B)	ge are Edison cells Any of the ab	ove	
8)	Biogas consist of A) Only methane B) Methane and ca C) Only ethane D) A special organi		sor	ne impurities		
9)	In thermal power pl A) 300 mm C) 40 mm	ants the size of th	B)	oal after crush 200 – 205 mr 20 – 25 mm		
10)	Uses of power stati A) Peak load plant C) Stand by plants	on	,	Emergency p		S
11)	Out of the following  A) Tidal power  C) Nuclear energy	which one is not	B)	nconventional Geothermal e Wind power		
12)	Pulverized coal is  A) Coal free from a  C) Coal which bum		•	Non-smoking Coal broken i		
13)	Coal used in power A) Steam coal	plant is also known B) Charcoal		as Coke	D)	Soft coal
14)	Live storage of coal A) Coal ready for coal B) Preheated coal C) Storage of coal D) Coal in transit	ombustion			of th	ne plant



## S.E. (E and E) (Part – I) (Old CGPA) Examination, 2018 ELECTRICAL POWER GENERATION

Day and Date: Tuesday, 8-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

#### 2. Solve any four:

 $(4\times4)$ 

- 1) Explain fuels and their handling in thermal power plant.
- 2) Explain the process of nuclear fission.
- 3) Discuss factors to be considered for selection of site for thermal power plant.
- 4) Explain pelton turbine with neat diagram.
- 5) Write a short note on hydrology.

### 3. Solve **any two**:

 $(6 \times 2)$ 

- 1) Explain CANDU type reactor with neat diagram, also state its advantages and disadvantages.
- 2) Explain single line diagram of typical AC power system.
- 3) Draw typical layout of hydroelectric power plant and explain it briefly.

## 4. Solve any four:

 $(4\times4)$ 

- 1) Write a short note on load curve.
- 2) State application of diesel power stations.
- 3) Explain geo-thermal power plant with neat diagram also state its application.
- 4) Define bio-gas and bio-mass energy.
- 5) Explain wind power plant with block diagram also state its application.



5. Solve any two:

 $(6 \times 2)$ 

- 1) Define bio-gas and explain common circular digester with floating gas holder (KVIC digester) with neat diagram.
- 2) Explain the working of diesel power plant with the help of block diagram.
- 3) Explain the following:
  - a) Load factor
  - b) Plant capacity factor
  - c) Diversity factor
  - d) Demand factor.

Set R



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### S.E. (E and E) (Part – I) (Old CGPA) Examination, 2018 **ELECTRICAL POWER GENERATION**

Day and Date: Tuesday, 8-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

5) Uses of power station A) Peak load plant

C) Stand by plants

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 Ton of Page

> > B) Emergency plants

D) All of the above

	70	p of Fage.		
	ľ	/ICQ/Objective T	ype Questions	
Duration	n : 30 Minutes			Marks: 14
1. Ch	oose the correct an	swer:		(14×1=14)
,	Photovoltaic solar e A) Fuel cell	•		use of D) None of the above
	Batteries used for e A) Laclanche cells C) Lead acid cells	electrical energy s	storage are B) Edison cells D) Any of the at	oove
<ul> <li>3) Biogas consist of</li> <li>A) Only methane</li> <li>B) Methane and carbon dioxide with some impurities</li> <li>C) Only ethane</li> <li>D) A special organic gas</li> </ul>				
,	In thermal power pl A) 300 mm C) 40 mm	ants the size of th	ne coal after crusl B) 200 – 205 m D) 20 – 25 mm	•

Out of the following which one is r A) Tidal power C) Nuclear energy	<ul><li>a unconventional source of energy ?</li><li>B) Geothermal energy</li><li>D) Wind power</li></ul>			
Pulverized coal is  A) Coal free from ash  C) Coal which bums for long time	<ul><li>B) Non-smoking coal</li><li>D) Coal broken into fine particles</li></ul>			
Coal used in power plant is also k A) Steam coal B) Charcoal	nown as C) Coke D) Soft coal			
<ul> <li>Live storage of coal in a power plant means</li> <li>A) Coal ready for combustion</li> <li>B) Preheated coal</li> <li>C) Storage of coal sufficient to meet 24 hour demand of the plant</li> <li>D) Coal in transit</li> </ul>				
means of	om storage place to boilers generally by  C) Trolleys  D) Manually			
Advantage of hydro-electric powe A) Low operating cost C) No fuel transportation problems	B) Free from pollution problems			
<ul><li>A two stroke engine may be identified.</li><li>A) Piston size</li><li>C) Cooling system</li></ul>	ified by B) Absence of valves D) Lubrication system			
Most of the heat generated in inte A) Cooling water C) Lubricating oil	rnal combustion engine is lost in B) Exhaust gases D) Radiation			
<ul> <li>In a super-heater</li> <li>A) Pressure rises, temperature drops</li> <li>B) Pressure rises, temperature remains constant</li> <li>C) Pressure remains constant and temperature rises</li> <li>D) Both pressure and temperature remains constant</li> </ul>				
	A) Tidal power C) Nuclear energy Pulverized coal is A) Coal free from ash C) Coal which bums for long time Coal used in power plant is also k A) Steam coal B) Charcoal Live storage of coal in a power plant A) Coal ready for combustion B) Preheated coal C) Storage of coal sufficient to me D) Coal in transit In a power plant, coal is carried from eans of A) Bucket B) V-belts Advantage of hydro-electric powe A) Low operating cost C) No fuel transportation problem A two stroke engine may be ident A) Piston size C) Cooling system Most of the heat generated in inte A) Cooling water C) Lubricating oil In a super-heater A) Pressure rises, temperature dr B) Pressure rises, temperature re C) Pressure remains constant and			

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## S.E. (E and E) (Part – I) (Old CGPA) Examination, 2018 ELECTRICAL POWER GENERATION

Day and Date: Tuesday, 8-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

#### 2. Solve any four:

 $(4\times4)$ 

- 1) Explain fuels and their handling in thermal power plant.
- 2) Explain the process of nuclear fission.
- 3) Discuss factors to be considered for selection of site for thermal power plant.
- 4) Explain pelton turbine with neat diagram.
- 5) Write a short note on hydrology.

### 3. Solve **any two**:

 $(6\times2)$ 

- 1) Explain CANDU type reactor with neat diagram, also state its advantages and disadvantages.
- 2) Explain single line diagram of typical AC power system.
- 3) Draw typical layout of hydroelectric power plant and explain it briefly.

## 4. Solve any four:

 $(4\times4)$ 

- 1) Write a short note on load curve.
- 2) State application of diesel power stations.
- 3) Explain geo-thermal power plant with neat diagram also state its application.
- 4) Define bio-gas and bio-mass energy.
- 5) Explain wind power plant with block diagram also state its application.



## 5. Solve any two:

 $(6 \times 2)$ 

- 1) Define bio-gas and explain common circular digester with floating gas holder (KVIC digester) with neat diagram.
- 2) Explain the working of diesel power plant with the help of block diagram.
- 3) Explain the following:
  - a) Load factor
  - b) Plant capacity factor
  - c) Diversity factor
  - d) Demand factor.

Set S

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# S.E. (Electrical and Electronics) (Part – I) Examination, 2018 DATA STRUCTURES (Old)

Day and Date: Saturday, 12-5-2018 Max. Marks: 100

Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Figures to **right** indicate **full** marks.
- 3) Assume **suitable** data if necessary.
- 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.

	ı	MCQ/Objective Ty	ype Questions		
Duration	on: 30 Minutes		•		Marks: 20
1. Ch	noose the correct an	swer:			(1×20=20)
1)	Recursive function a) Stack	can be implemen b) Queue		d) None	
2)	Node of linked list a) Information field c) Both a) and b)		<ul><li>b) Pointer field</li><li>d) None</li></ul>		
3)	The freenode() ope a) Delete first node c) Insert last node	е	b) Insert first noded d) Delete last noded	е	
4)	Queue elements a a) Rear end		c) Top end	d) None	
5)	Which operator haaa) ++	s lowest priority? b) %	c) +	d)	
6)	Polynomial manipua) Stack	lation is one of the b) Structure	• •	d) Tree	
7)	Elements of stacks a) Ordered		c) Sequential	d) None	

8)	POP operation of s a) 1 <sup>st</sup> inserted elem c) Any element		,	Last inserted e	lem	ent
9)	Which is the correct a) A + B	t form of infix nota b) +AB			d)	None of these
10)	This type of linked li a) Circular linked li c) Doubly linked lis	st	b)	st and last node Singly linked lis Static list	st	
11)	Overflow condition a) Front = $max - 1$		c)	Top = max - 1	d)	None
12)	The term "push" an a) Array	d "pop" is related b) Lists		the Stacks	d)	All of above
13)	Which of the follow a) Trees c) Arrays	ing data structure	b)	inear data struc Graphs None of above	tur	e ?
14)	The situation when from queue is called a) Overflow	d as		, -		delete elements  None of these
15)	Tower of Hanoi car	•	ng		,	Recursion
16)	The complexity of ba a) O(n)	oinary search algo	rith	ım is	d)	O(n log n)
17)	An expression conta a) Priority of opera c) From left to right	tors	b)	operation are se Priority of opera From right to le	and	_
18)	Free function is use a) Release memor c) To unlink first ar	y for node	,	To unlink the no	ode	)
19)	The complexity of Ea) O(n)	Bubble sort algorit b) O(log n)		is O(n2)	d)	O(n log n)
20)	The complexity of $li$ a) $O(n)$	near search algor b) O(log n)		m is O(n2)	d)	O(n log n)



Seat	
No.	

# S.E. (Electrical and Electronics) (Part – I) Examination, 2018 DATA STRUCTURES (Old)

Day and Date: Saturday, 12-5-2018

Marks: 80

Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

#### SECTION - I

2. Solve any four:

 $(5 \times 4 = 20)$ 

- a) Write and explain storage classes.
- b) Write a short note on data types in C.
- c) Write a short note on:
  - i) Type conversion.
  - ii) Structures and union.
- d) Evaluate the following postfix expressions :
  - i) 98 + 382 / \* 2 + -
  - ii) 546 + \* 493 / + \*
- e) Write a short note on conversion of infix to prefix with example.

3. Solve any one:

 $(1 \times 10 = 10)$ 

- i) Write and explain algorithm for evaluation postfix expression.
- ii) Explain implementation of stack using linked list.

4. Write a short note on:

 $(2 \times 5 = 10)$ 

- i) Stack applications.
- ii) Pointer to structure.

## 

#### SECTION - II

5. Solve any four:

 $(4 \times 5 = 20)$ 

- a) Write a short note on priority queue.
- b) Explain selection sort with example.
- c) Explain Doubly linked list.
- d) Differentiate between linear and binary search.
- e) Explain merge sort with example.

6. Solve any one:

 $(1 \times 10 = 10)$ 

- i) Explain in brief about bubble sort.
- ii) Write a program to add, delete, search, display and count number of node using singly linked list.
- 7. Explain the concept of static storage allocation and dynamic storage allocation in case of recursion. (1×10=10)

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## S.E. (Electrical and Electronics) (Part – I) Examination, 2018 DATA STRUCTURES (Old)

Day	and Date:	Saturday,	12-5-2018	Max.	Marks:	100
	0.00					

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

- 2) Figures to **right** indicate **full** marks.
- 3) Assume **suitable** data if necessary.
- 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 T	ype	e Questions		
Duratio	n : 30 Minutes	-	-			Marks: 20
1. Ch	oose the correct ar	iswer:				(1×20=20)
1)	The complexity of a) O(n)	binary search algo b) O (log n)			d)	O(n log n)
2)	An expression con a) Priority of opera c) From left to righ	ators	b)	operation are s Priority of oper From right to le	anc	•
3)	Free function is us a) Release memo c) To unlink first a	ry for node	,		ode	)
4)	The complexity of a) O(n)	Bubble sort algorit b) O(log n)		is O(n2)	d)	O(n log n)
5)	The complexity of a) O(n)	_		m is O(n2)	d)	O(n log n)
6)	Recursive function a) Stack	can be implemen b) Queue		by using Linked list	d)	None
7)	Node of linked list a) Information field c) Both a) and b)		,	Pointer field None		

8)	The freenode() ope a) Delete first node c) Insert last node	е	b)	es Insert first node Delete last nod	Э	lgorithm.
9)	Queue elements a a) Rear end		c)	Top end	d)	None
10)	Which operator ha	s lowest priority? b) %	c)	+	d)	
11)	Polynomial manipua) Stack	ulation is one of the b) Structure		pplications of Linked list	d)	Tree
12)	Elements of stacks a) Ordered		c)	Sequential	d)	None
13)	POP operation of s a) 1 <sup>st</sup> inserted elem c) Any element		,	Last inserted e None	lem	nent
14)	Which is the correct a) A + B	ot form of infix note b) +AB		n ? AB+	d)	None of these
15)	This type of linked a) Circular linked I c) Doubly linked lis	ist	b)	st and last node Singly linked lis Static list		
16)	Overflow condition a) Front = max - 1		c)	Top = max - 1	d)	None
17)	The term "push" ar a) Array	nd "pop" is related b) Lists		the Stacks	d)	All of above
18)	Which of the follow a) Trees c) Arrays	ring data structure	b)	linear data struc Graphs None of above	tur	e ?
19)	The situation when from queue is calle a) Overflow			still we are trying Empty		delete elements  None of these
20)	Tower of Hanoi car a) Queue	,	ng	Structure	,	Recursion



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# S.E. (Electrical and Electronics) (Part – I) Examination, 2018 DATA STRUCTURES (Old)

Day and Date: Saturday, 12-5-2018

Marks: 80

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

#### SECTION - I

2. Solve any four:

 $(5 \times 4 = 20)$ 

- a) Write and explain storage classes.
- b) Write a short note on data types in C.
- c) Write a short note on:
  - i) Type conversion.
  - ii) Structures and union.
- d) Evaluate the following postfix expressions :
  - i) 98 + 382 / \* 2 + -
  - ii) 546 + \* 493 / + \*
- e) Write a short note on conversion of infix to prefix with example.

3. Solve any one:

 $(1 \times 10 = 10)$ 

- i) Write and explain algorithm for evaluation postfix expression.
- ii) Explain implementation of stack using linked list.

4. Write a short note on:

 $(2 \times 5 = 10)$ 

- i) Stack applications.
- ii) Pointer to structure.

## 

#### SECTION - II

5. Solve any four:

 $(4 \times 5 = 20)$ 

- a) Write a short note on priority queue.
- b) Explain selection sort with example.
- c) Explain Doubly linked list.
- d) Differentiate between linear and binary search.
- e) Explain merge sort with example.

6. Solve any one:

 $(1 \times 10 = 10)$ 

- i) Explain in brief about bubble sort.
- ii) Write a program to add, delete, search, display and count number of node using singly linked list.
- 7. Explain the concept of static storage allocation and dynamic storage allocation in case of recursion. (1×10=10)

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# S.E. (Electrical and Electronics) (Part – I) Examination, 2018 DATA STRUCTURES (Old)

Day and Date : Saturday, 12-5-2018	Max. Marks: 100
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Time: 2.30 p.m. to 5.30 p.m.

a) Priority of operators

c) From left to right

Instructions: 1) All questions are compulsory.

- 2) Figures to **right** indicate **full** marks.
- 3) Assume suitable data if necessary.
- 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

		wod/objective i	ype ducations		
Duratio	n : 30 Minutes				Marks: 20
1. Ch	oose the correct an	swer:			(1×20=20)
1)	Overflow condition				
	a) Front = $max - 1$	b) Front $= 0$	c) Top = $max - 1$	d) None	
2)	The term "push" ar	nd "pop" is related	to the		
,	a) Array	• •	c) Stacks	d) All of ab	oove
3)	Which of the follow a) Trees	ring data structure	b) Graphs		
	c) Arrays		d) None of above		
4)	The situation when from queue is calle		nd still we are trying	to delete ele	ements
	a) Overflow	b) Underflow	c) Empty	d) None of	these
5)	Tower of Hanoi car	n be solved by usi	ng		
	a) Queue	b) Tree	c) Structure	d) Recursi	on
6)	The complexity of I	oinary search algo	orithm is		
,	a) O(n)	b) O (log n)	c) O(n2)	d) O(n log	n)

7) An expression containing more than one operation are solved according to

b) Priority of operands

d) From right to left

8)	Free function is use a) Release memory c) To unlink first a	ry for node	-		ode	<del>)</del>
9)	The complexity of a) O(n)	Bubble sort algorit b) O(log n)			d)	O(n log n)
10)	The complexity of a) O(n)	_		m is O(n2)	d)	O(n log n)
11)	Recursive function a) Stack	can be implement b) Queue			d)	None
12)	Node of linked list a) Information field c) Both a) and b)		,	Pointer field None		
13)	The freenode() ope a) Delete first node c) Insert last node		b)	es Insert first node Delete last nod	)	lgorithm.
14)	Queue elements a a) Rear end		c)	Top end	d)	None
15)	Which operator ha	s lowest priority? b) %	c)	+	d)	II
16)	Polynomial manipua) Stack	llation is one of the b) Structure			d)	Tree
17)	Elements of stacks a) Ordered		c)	Sequential	d)	None
18)	POP operation of s a) 1st inserted elem c) Any element	• •	,	Last inserted e None	lem	ent
19)	Which is the correct a) A + B	ct form of infix nota b) +AB		n ? AB+	d)	None of these
20)	This type of linked  a) Circular linked I  c) Doubly linked list	list does not have ist	firs		,	. 13.10 01 11000



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# S.E. (Electrical and Electronics) (Part – I) Examination, 2018 DATA STRUCTURES (Old)

Day and Date: Saturday, 12-5-2018

Marks: 80

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

#### SECTION - I

2. Solve any four:

 $(5 \times 4 = 20)$ 

- a) Write and explain storage classes.
- b) Write a short note on data types in C.
- c) Write a short note on:
  - i) Type conversion.
  - ii) Structures and union.
- d) Evaluate the following postfix expressions :
  - i) 98 + 382 / \* 2 + -
  - ii) 546 + \* 493 / + \*
- e) Write a short note on conversion of infix to prefix with example.

3. Solve any one:

 $(1 \times 10 = 10)$ 

- i) Write and explain algorithm for evaluation postfix expression.
- ii) Explain implementation of stack using linked list.

4. Write a short note on:

 $(2 \times 5 = 10)$ 

- i) Stack applications.
- ii) Pointer to structure.

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#### SECTION - II

5. Solve any four:

 $(4 \times 5 = 20)$ 

- a) Write a short note on priority queue.
- b) Explain selection sort with example.
- c) Explain Doubly linked list.
- d) Differentiate between linear and binary search.
- e) Explain merge sort with example.

6. Solve any one:

 $(1 \times 10 = 10)$ 

- i) Explain in brief about bubble sort.
- ii) Write a program to add, delete, search, display and count number of node using singly linked list.
- 7. Explain the concept of static storage allocation and dynamic storage allocation in case of recursion. (1×10=10)

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## S.E. (Electrical and Electronics) (Part – I) Examination, 2018 **DATA STRUCTURES (Old)**

Day and Date: Saturday, 12-5-2018 Max. Marks: 100

Time: 2.30 p.m. to 5.30 p.m.

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

a) Front = max - 1b) Front = 0

a) Array

7) The term "push" and "pop" is related to the

b) Lists

- 2) Figures to **right** indicate **full** marks.
- 3) Assume **suitable** data if necessary.
- 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.

c) Top = max - 1 d) None

c) Stacks

			MCQ/Objective T	ype	e Questions		
Du	ratio	n : 30 Minutes	-				Marks: 20
1.	Ch	oose the correct an	iswer:				(1×20=20)
	1)	Polynomial manipua) Stack	ulation is one of th b) Structure		pplications of Linked list	d)	Tree
	2)	Elements of stacks a) Ordered		c)	Sequential	d)	None
	3)	POP operation of s a) 1st inserted elem c) Any element		,	Last inserted e	lem	nent
	4)	Which is the correct a) A + B	ct form of infix nota b) +AB		on ? AB+	d)	None of these
	5)	This type of linked a) Circular linked lic) Doubly linked li	list	b)	st and last node Singly linked lis Static list		
	6)	Overflow condition	of stack is				

d) All of above

8)	Which of the follow a) Trees c) Arrays	ving data structure	b)	inear data struc Graphs None of above	eture	e ?
9)	The situation when from queue is called	ed as				
	a) Overflow	b) Underflow	•	Empty	d)	None of these
10)	Tower of Hanoi ca a) Queue	n be solved by usi b) Tree	_	Structure	d)	Recursion
11)	The complexity of a) O(n)	binary search algo b) O (log n)			d)	O(n log n)
12)	An expression conta) Priority of opera c) From left to right	ators	b)	operation are s Priority of opera From right to le	and	_
13)	Free function is us a) Release memo c) To unlink first a	ry for node	•	To unlink the n None	ode	)
14)	The complexity of a) O(n)	Bubble sort algorit b) O(log n)		is O(n2)	d)	O(n log n)
15)	The complexity of a) O(n)	linear search algoi b) O(log n)		m is O(n2)	d)	O(n log n)
16)	Recursive function a) Stack	can be implement		by using Linked list	d)	None
17)	Node of linked list a) Information field c) Both a) and b)		,	Pointer field None		
18)	The freenode() ope a) Delete first node c) Insert last node	e	b)	es Insert first node Delete last nod	Э	lgorithm.
19)	Queue elements a a) Rear end	re added at b) Front end	c)	Top end	d)	None
20)	Which operator ha a) ++	s lowest priority? b) %	c)	+	d)	II



Seat	
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## S.E. (Electrical and Electronics) (Part – I) Examination, 2018 DATA STRUCTURES (Old)

Day and Date: Saturday, 12-5-2018

Marks: 80

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

#### SECTION - I

2. Solve any four:

 $(5 \times 4 = 20)$ 

- a) Write and explain storage classes.
- b) Write a short note on data types in C.
- c) Write a short note on:
  - i) Type conversion.
  - ii) Structures and union.
- d) Evaluate the following postfix expressions :
  - i) 98 + 382 / \* 2 + -
  - ii) 546 + \* 493 / + \*
- e) Write a short note on conversion of infix to prefix with example.

3. Solve any one:

 $(1 \times 10 = 10)$ 

- i) Write and explain algorithm for evaluation postfix expression.
- ii) Explain implementation of stack using linked list.

4. Write a short note on:

 $(2 \times 5 = 10)$ 

- i) Stack applications.
- ii) Pointer to structure.

## 

#### SECTION - II

5. Solve any four:

 $(4 \times 5 = 20)$ 

- a) Write a short note on priority queue.
- b) Explain selection sort with example.
- c) Explain Doubly linked list.
- d) Differentiate between linear and binary search.
- e) Explain merge sort with example.

6. Solve any one:

 $(1 \times 10 = 10)$ 

- i) Explain in brief about bubble sort.
- ii) Write a program to add, delete, search, display and count number of node using singly linked list.
- 7. Explain the concept of static storage allocation and dynamic storage allocation in case of recursion. (1×10=10)

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## S.E. (E&E) (Part – II) (Old CGPA) Examination, 2018 LINEAR ALGEBRA

Max. Marks: 70 Day and Date: Tuesday, 15-5-2018

Time: 10.00 a.m. to 1.00 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 guestion carries one mark.
  - 2) Attempt any three questions from each Section.
  - 3) Figures to the **right** indicate **full** marks.
  - 4) Use of calculator is allowed.
  - 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:

 $(1 \times 14 = 14)$ 

- 1) The system of non-homogeneous equations AX = B has infinitely many solutions if
  - a) r = n
- b) r > n
- c) r < n
- d) None of these

- 2) Rank of the matrix | 1 1 1 is a) 1
- c) 3
- d) None of these
- 3) Given a scalar r, the transformation T :  $R^2 \rightarrow R^2$  defined by T(X) = rX when r > 1 is called
  - a) Dialation
- b) Translation c) Contraction
- d) Linear

- 4) The dimension of NulA is
  - a) The number of columns in A
  - b) The number of basic variables in the equation AX = 0
  - c) The number of rows in A
  - d) The number of free variables in the equation AX = 0

- 5) If vector space V has a basis of n vectors then every basis of V must consist
  - a) Less than n vectors
- b) 2n vectors
- c) Greater than n vectors
- d) Exactly n vectors
- 6) The eigen values of the matrix A are 2, 5, 8. Then eigen values of A<sup>-1</sup> are
  - a)  $\sqrt{2}$ ,  $\sqrt{5}$ ,  $2\sqrt{2}$  b)  $\frac{1}{2}$ ,  $\frac{1}{5}$ ,  $\frac{1}{8}$
- c) 2, 5, 8
- d) None of these
- 7) The eigen values of matrix  $A = \begin{bmatrix} 1 & -2 \\ 1 & 3 \end{bmatrix}$  are
  - a) 1 ± i
- b)  $2 \pm i$
- c)  $\pm i$
- d) 4 ± 2i
- 8) If u = [3 4 6] and v = [0 1 1] then u.v. = \_\_\_\_\_ a) 1 0 b) 1 5 c) [0 4 6] d) None of these

- 9) Let  $\phi(n) = x_1^2 8x_1x_2 5x_2^2$ , then  $\phi(n) =$ \_\_\_\_\_ for  $x = \begin{bmatrix} -3 \\ 1 \end{bmatrix}$ .
  - a) -20
- b) 16
- c) 20
- 10) Let u be a non-zero vector. Then a unit vector in the direction of u is
  - a) ||u||
- b) ||u|| · u
- c)  $\frac{u}{\|u\|}$
- d) None of the above
- 11) The equations of lines of regression are x + 2y = 5 and 2x + 3y = 8. Then  $\bar{x}$  and  $\bar{y}$  are
  - a) 1 and 3
- b) 2 and 3
- c) 2 and 5
- d) 1 and 2
- 12) If  $b_{yx} = \frac{6}{5}$ ,  $b_{xy} = \frac{15}{8}$  then r =\_\_\_\_\_
  - a) 2.5
- b) 1.5
- c) 0.5
- d) 1
- 13) Which of the following equation is called Laplace equation?
  - a)  $\frac{\partial^2 \phi}{\partial \mathbf{v}^2} \frac{\partial^2 \phi}{\partial \mathbf{v}^2} = 0$

b)  $\frac{\partial^2 \phi}{\partial \mathbf{v}^2} + \frac{\partial^2 \phi}{\partial \mathbf{v}^2} = 0$ 

c)  $\frac{\partial \phi}{\partial \mathbf{x}} + \frac{\partial \phi}{\partial \mathbf{y}} = \mathbf{0}$ 

- d)  $\frac{\partial \phi}{\partial \mathbf{x}} \frac{\partial \phi}{\partial \mathbf{v}} = \mathbf{0}$



Seat No.

## S.E. (E&E) (Part – II) (Old CGPA) Examination, 2018 LINEAR ALGEBRA

Day and Date: Tuesday, 15-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

N. B.: 1) Attempt any three questions from each Section.

- 2) Figures to the right indicate full marks.
- 3) Use of calculator is allowed.

SECTION - I

2. Attempt any three from the following:

a) Solve the system:

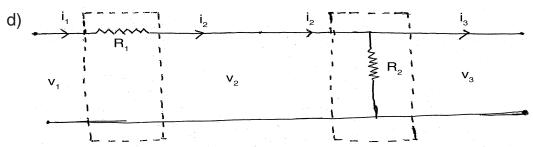
$$x_1 - 3x_2 = 5,$$
  
 $-x_1 + x_2 + 5x_3 = 2,$   
 $x_2 + x_3 = 0.$ 

b) Let 
$$a_1 = \begin{bmatrix} 1 \\ -2 \\ -5 \end{bmatrix}$$
,  $a_2 = \begin{bmatrix} 2 \\ 5 \\ 6 \end{bmatrix}$  and  $b = \begin{bmatrix} 7 \\ 4 \\ -3 \end{bmatrix}$ . Determine whether 'b' can be

generated as a linear combination of  $a_1$  and  $a_2$ .

c) Let 
$$A = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$$
, and define transformation  $T : R^2 \to R^2$  by  $T(X) = AX$ . Find

the images under T of  $u = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$  and  $v = \begin{bmatrix} a \\ b \end{bmatrix}$ .



Compute the transfer matrix of the ladder network.

9

4

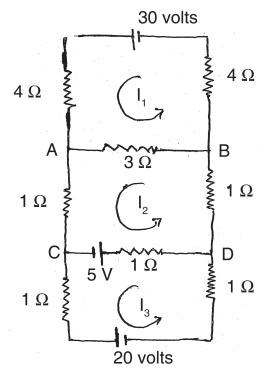
3

3. a) Using LU factorization method, solve the equation AX = b where

$$A = \begin{bmatrix} 2 & -2 & 4 \\ 1 & -3 & 1 \\ 3 & 7 & 5 \end{bmatrix}, b = \begin{bmatrix} 0 \\ -5 \\ 7 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & 0 & 0 \\ \frac{1}{2} & 1 & 0 \\ \frac{3}{2} & -5 & 1 \end{bmatrix} \cdot \begin{bmatrix} 2 & -2 & 4 \\ 0 & -2 & -1 \\ 0 & 0 & -6 \end{bmatrix} = L.U.$$

- b) Show that T is linear transformation and find standard matrix of  $T(x_1, x_2)$ . Where  $T(x_1, x_2) = (2x_2 - 3x_1, x_1 - 4x_2, 0, x_2)$ .
- c) Write the matrix equation that determines the loop currents for the circuit.



4. a) Assume that A is row equivalent to B. Find bases for NulA and ColA.

$$A = \begin{bmatrix} 1 & -4 & 9 & -7 \\ -1 & 2 & -4 & 1 \\ 5 & -6 & 10 & 7 \end{bmatrix}, B = \begin{bmatrix} 1 & 0 & -1 & 5 \\ 0 & -2 & 5 & -6 \\ 0 & 0 & 0 & 0 \end{bmatrix}.$$



b) Find basis and state the dimension of

$$\left\{ \begin{bmatrix} s - 2t \\ s + t \\ 3t \end{bmatrix} : s, t \text{ in R} \right\}$$

3

3

c) Consider a basis B =  $\{b_1, b_2\}$  for R<sup>2</sup>, where  $b_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$  and  $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ , suppose

-5-

an X in R<sup>2</sup> has the co-ordinate vector  $[X]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$ , find X.

- 5. a) Diagonalize the matrix if possible  $A = \begin{bmatrix} -3 & 12 \\ -2 & 7 \end{bmatrix}$ .
  - b) Apply power method to  $A = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$  with  $x_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$  stop when K = 4 and estimate the dominant eigen value and corresponding eigen vector for A. 3
  - c) Find the characteristic equation of

$$A = \begin{bmatrix} 5 & -2 & 6 & -1 \\ 0 & 3 & -8 & 0 \\ 0 & 0 & 5 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix}.$$

3

SECTION - II

6. a) Write down the quadratic form corresponding to the following matrices:

i) 
$$\begin{bmatrix} 4 & 0 \\ 0 & 3 \end{bmatrix}$$

ii) 
$$\begin{bmatrix} 0 & 5 & -1 \\ 5 & 1 & 6 \\ -1 & 6 & 2 \end{bmatrix}$$
.



b) Let 
$$a = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$$
,  $b = \begin{bmatrix} -3 \\ 1 \end{bmatrix}$ ,  $c = \begin{bmatrix} \frac{4}{3} \\ -1 \\ \frac{2}{3} \end{bmatrix}$  and  $d = \begin{bmatrix} 5 \\ 6 \\ -1 \end{bmatrix}$ .  
i) Compute  $\frac{a \cdot b}{a \cdot a}$ 

- ii) Find ||c||.
- iii) Show that d is orthogonal to c.
- c) Show that {u<sub>1</sub>, u<sub>2</sub>, u<sub>3</sub>} is an orthogonal set where,

$$u_{1} = \begin{bmatrix} 3 \\ 1 \\ 1 \end{bmatrix}, u_{2} = \begin{bmatrix} -1 \\ 2 \\ 1 \end{bmatrix}, u_{3} = \begin{bmatrix} -\frac{1}{2} \\ -2 \\ \frac{7}{2} \end{bmatrix}.$$
OR

- c) Let u = [1, 2, 4]', v = [2, -3, 5]', w = [4, 2, -3]' be the vectors in  $\mathbb{R}^3$ , find
  - i)  $(u + v) \cdot w$
  - ii)  $\| u + v \|$ .

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7. a) Find the equations of the lines of regression from the following data, also find the coefficient of correlation r.

										75	
<b>y</b> :	82	56	50	48	60	62	64	65	70	74	90

b) Calculate the coefficient of correlation between height of father and height of son from the following data:

70 Height of father (x): 64 65 66 67 68 69 Height of son (y): 66 67 65 68 70 68 71

8. a) The equations of the two lines of regression are 6y = 5x + 90 and 15x = 8y + 130.

Find:

- i) The means of x and y.
- ii) The coefficient of correlation.
- iii) If variance of x is 16, also find the standard deviation of y.



3

3

b) Given Mean of x = 50.07 Mean of y = 9.98

S.D. of 
$$x = 5.26$$

S.D. of 
$$y = 2.59$$

$$r = 0.898$$

Find the equations of the lines of regression.

- c) Is  $Q(x) = 3x_1^2 + 2x_2^2 + x_3^2 + 4x_1x_2 + 4x_2 \cdot x_3$  positive definite?
- 9. a) Verify that the real and imaginary parts of  $f(z) = e^{2z}$  are harmonic functions.
  - b) Find the image of following under the transformation  $W = \frac{1}{z}$ .

$$i) \quad z = \frac{\sqrt{5}}{2} + i$$

ii) 
$$z = \frac{2\sqrt{5}}{9} + \frac{4}{9}i$$
.

c) Find the bilinear transformation which maps the points z=1, i, -1 into the points W=i, 0, -i.

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### S.E. (E&E) (Part – II) (Old CGPA) Examination, 2018 LINEAR ALGEBRA

Day and Date: Tuesday, 15-5-2018 Max. Marks: 70

Time: 10.00 a.m. to 1.00 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) Attempt any three questions from each Section.
  - 3) Figures to the right indicate full marks.
  - 4) **Use** of calculator is **allowed**.
  - 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

 $(1 \times 14 = 14)$ 1. Choose the correct answer:

- 1) If u = [3 4 6] and v = [0 1 1] then u.v. = \_\_\_\_ a) 1 0 b) 1 5 c) [0 4 6] d) None of these
- 2) Let  $\phi(n) = x_1^2 8x_1x_2 5x_2^2$ , then  $\phi(n) =$ \_\_\_\_\_ for  $x = \begin{bmatrix} -3 \\ 1 \end{bmatrix}$ .
  - b) 16 c) 20 a) -20d) 28
- 3) Let u be a non-zero vector. Then a unit vector in the direction of u is
  - c)  $\frac{u}{\|u\|}$ a) u d) None of the above
- 4) The equations of lines of regression are x + 2y = 5 and 2x + 3y = 8. Then  $\bar{x}$  and  $\bar{y}$  are
  - b) 2 and 3 c) 2 and 5 a) 1 and 3 d) 1 and 2
- 5) If  $b_{yx} = \frac{6}{5}$ ,  $b_{xy} = \frac{15}{8}$  then r =\_\_\_\_\_ a) 2.5 b) 1.5 d) 1

- 6) Which of the following equation is called Laplace equation?
  - a)  $\frac{\partial^2 \phi}{\partial \mathbf{v}^2} \frac{\partial^2 \phi}{\partial \mathbf{v}^2} = 0$

b)  $\frac{\partial^2 \phi}{\partial \mathbf{v}^2} + \frac{\partial^2 \phi}{\partial \mathbf{v}^2} = 0$ 

c)  $\frac{\partial \phi}{\partial x} + \frac{\partial \phi}{\partial y} = 0$ 

- d)  $\frac{\partial \phi}{\partial x} \frac{\partial \phi}{\partial y} = 0$
- 7) If an analytic function f(z) = u(x, y) + i v(x, y) then  $f'(z) = \underline{\qquad}$ a)  $u_x + v_x$  b)  $u_y + u_y$  c)  $u_x + i v_x$  d)  $u_x i v_x$

- 8) The system of non-homogeneous equations AX = B has infinitely many solutions if
  - a) r = n
- b) r > n
- c) r < n
- d) None of these

- - a) 1
- c) 3
- d) None of these
- 10) Given a scalar r, the transformation T :  $R^2 \rightarrow R^2$  defined by T(X) = rX when r > 1 is called
  - a) Dialation
- b) Translation c) Contraction
- d) Linear

- 11) The dimension of NulA is
  - a) The number of columns in A
  - b) The number of basic variables in the equation AX = 0
  - c) The number of rows in A
  - d) The number of free variables in the equation AX = 0
- 12) If vector space V has a basis of n vectors then every basis of V must consist
  - a) Less than n vectors
- b) 2n vectors
- c) Greater than n vectors
- d) Exactly n vectors
- 13) The eigen values of the matrix A are 2, 5, 8. Then eigen values of A<sup>-1</sup> are
  - a)  $\sqrt{2}$ ,  $\sqrt{5}$ ,  $2\sqrt{2}$  b)  $\frac{1}{2}$ ,  $\frac{1}{5}$ ,  $\frac{1}{8}$
- c) 2, 5, 8
- d) None of these
- 14) The eigen values of matrix  $A = \begin{bmatrix} 1 & -2 \\ 1 & 3 \end{bmatrix}$  are
  - a) 1 ± i
- b)  $2 \pm i$
- c) ±i
- d)  $4 \pm 2i$



Seat No.

## S.E. (E&E) (Part – II) (Old CGPA) Examination, 2018 LINEAR ALGEBRA

Day and Date: Tuesday, 15-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

N. B.: 1) Attempt any three questions from each Section.

- 2) Figures to the right indicate full marks.
- 3) Use of calculator is allowed.

2. Attempt any three from the following:

a) Solve the system:

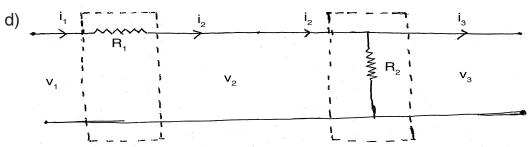
$$x_1 - 3x_2 = 5,$$
  
 $-x_1 + x_2 + 5x_3 = 2,$   
 $x_2 + x_3 = 0.$ 

b) Let 
$$a_1 = \begin{bmatrix} 1 \\ -2 \\ -5 \end{bmatrix}$$
,  $a_2 = \begin{bmatrix} 2 \\ 5 \\ 6 \end{bmatrix}$  and  $b = \begin{bmatrix} 7 \\ 4 \\ -3 \end{bmatrix}$ . Determine whether 'b' can be

generated as a linear combination of  $a_1$  and  $a_2$ .

c) Let 
$$A = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$$
, and define transformation  $T : R^2 \to R^2$  by  $T(X) = AX$ . Find

the images under T of 
$$u = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$$
 and  $v = \begin{bmatrix} a \\ b \end{bmatrix}$ .



Compute the transfer matrix of the ladder network.

9

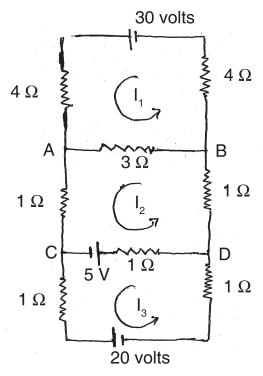


3. a) Using LU factorization method, solve the equation AX = b where

$$A = \begin{bmatrix} 2 & -2 & 4 \\ 1 & -3 & 1 \\ 3 & 7 & 5 \end{bmatrix}, b = \begin{bmatrix} 0 \\ -5 \\ 7 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & 0 & 0 \\ \frac{1}{2} & 1 & 0 \\ \frac{3}{2} & -5 & 1 \end{bmatrix} \cdot \begin{bmatrix} 2 & -2 & 4 \\ 0 & -2 & -1 \\ 0 & 0 & -6 \end{bmatrix} = L.U.$$

- b) Show that T is linear transformation and find standard matrix of  $T(x_1, x_2)$ . Where  $T(x_1, x_2) = (2x_2 - 3x_1, x_1 - 4x_2, 0, x_2)$ .
- c) Write the matrix equation that determines the loop currents for the circuit. 3



4. a) Assume that A is row equivalent to B. Find bases for NulA and ColA.

$$A = \begin{bmatrix} 1 & -4 & 9 & -7 \\ -1 & 2 & -4 & 1 \\ 5 & -6 & 10 & 7 \end{bmatrix}, B = \begin{bmatrix} 1 & 0 & -1 & 5 \\ 0 & -2 & 5 & -6 \\ 0 & 0 & 0 & 0 \end{bmatrix}.$$

b) Find basis and state the dimension of

$$\left\{ \begin{bmatrix} s - 2t \\ s + t \\ 3t \end{bmatrix} : s, t \text{ in R} \right\}$$

3

3

c) Consider a basis B =  $\{b_1, b_2\}$  for R<sup>2</sup>, where  $b_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$  and  $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ , suppose

an X in R<sup>2</sup> has the co-ordinate vector  $[X]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$ , find X.

- 5. a) Diagonalize the matrix if possible  $A = \begin{bmatrix} -3 & 12 \\ -2 & 7 \end{bmatrix}$ .
  - b) Apply power method to  $A = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$  with  $x_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$  stop when K = 4 and estimate the dominant eigen value and corresponding eigen vector for A. 3
  - c) Find the characteristic equation of

$$A = \begin{bmatrix} 5 & -2 & 6 & -1 \\ 0 & 3 & -8 & 0 \\ 0 & 0 & 5 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix}.$$

3

SECTION - II

- 6. a) Write down the quadratic form corresponding to the following matrices:
  - i)  $\begin{bmatrix} 4 & 0 \\ 0 & 3 \end{bmatrix}$
  - ii)  $\begin{bmatrix} 0 & 5 & -1 \\ 5 & 1 & 6 \\ -1 & 6 & 2 \end{bmatrix}$ .



b) Let 
$$a = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$$
,  $b = \begin{bmatrix} -3 \\ 1 \end{bmatrix}$ ,  $c = \begin{bmatrix} \frac{4}{3} \\ -1 \\ \frac{2}{3} \end{bmatrix}$  and  $d = \begin{bmatrix} 5 \\ 6 \\ -1 \end{bmatrix}$ .

i) Compute  $\frac{a \cdot b}{a \cdot a}$ 

- ii) Find ||c||.
- iii) Show that d is orthogonal to c.
- c) Show that {u<sub>1</sub>, u<sub>2</sub>, u<sub>3</sub>} is an orthogonal set where,

$$u_{1} = \begin{bmatrix} 3 \\ 1 \\ 1 \end{bmatrix}, u_{2} = \begin{bmatrix} -1 \\ 2 \\ 1 \end{bmatrix}, u_{3} = \begin{bmatrix} -\frac{1}{2} \\ -2 \\ \frac{7}{2} \end{bmatrix}.$$
OR

- c) Let u = [1, 2, 4]', v = [2, -3, 5]', w = [4, 2, -3]' be the vectors in  $\mathbb{R}^3$ , find
  - i)  $(u + v) \cdot w$
  - ii)  $\| u + v \|$ .

4

7. a) Find the equations of the lines of regression from the following data, also find the coefficient of correlation r.

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<b>x</b> :											
<b>y</b> :	82	56	50	48	60	62	64	65	70	74	90

b) Calculate the coefficient of correlation between height of father and height of son from the following data:

65

Height of father (x):

64

66

68

70

70 69

Height of son (y):

66

67 65 68

67

68 71

8. a) The equations of the two lines of regression are 6y = 5x + 90 and 15x = 8y + 130.

3

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Find:

- i) The means of x and y.
- ii) The coefficient of correlation.
- iii) If variance of x is 16, also find the standard deviation of y.



b) Given Mean of x = 50.07 Mean of y = 9.98

S.D. of 
$$x = 5.26$$

S.D. of y = 2.59

$$r = 0.898$$

Find the equations of the lines of regression.

3

c) Is  $Q(x) = 3x_1^2 + 2x_2^2 + x_3^2 + 4x_1x_2 + 4x_2 \cdot x_3$  positive definite ?

3

9. a) Verify that the real and imaginary parts of  $f(z) = e^{2z}$  are harmonic functions.

3

b) Find the image of following under the transformation  $W = \frac{1}{z}$ .

$$i) \quad z = \frac{\sqrt{5}}{2} + i$$

ii) 
$$z = \frac{2\sqrt{5}}{9} + \frac{4}{9}i$$
.

3

3

c) Find the bilinear transformation which maps the points z = 1, i, -1 into the points W = i, 0, -i.

Seat	
No.	

### S.E. (E&E) (Part – II) (Old CGPA) Examination, 2018 LINEAR ALGEBRA

Day and Date: Tuesday, 15-5-2018 Max. Marks: 70

Time: 10.00 a.m. to 1.00 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) Attempt any three questions from each Section.
  - 3) Figures to the **right** indicate **full** marks.
  - 4) Use of calculator is allowed.
  - 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:

 $(1 \times 14 = 14)$ 

- 1) If vector space V has a basis of n vectors then every basis of V must consist
  - a) Less than n vectors
- b) 2n vectors
- c) Greater than n vectors
- d) Exactly n vectors
- 2) The eigen values of the matrix A are 2, 5, 8. Then eigen values of A<sup>-1</sup> are
  - a)  $\sqrt{2}$ ,  $\sqrt{5}$ ,  $2\sqrt{2}$  b)  $\frac{1}{2}$ ,  $\frac{1}{5}$ ,  $\frac{1}{8}$  c) 2, 5, 8 d) None of these
- 3) The eigen values of matrix  $A = \begin{bmatrix} 1 & -2 \\ 1 & 3 \end{bmatrix}$  are
  - a) 1 ± i
- b)  $2 \pm i$
- c)  $\pm i$  d)  $4 \pm 2i$
- 4) If u = [3 4 6] and v = [0 1 1] then u.v. = \_\_\_\_\_ a) 1 0 b) 1 5 c) [0 4 6] d) None of these

- 5) Let  $\phi(n) = x_1^2 8x_1x_2 5x_2^2$ , then  $\phi(n) =$ \_\_\_\_\_ for  $x = \begin{bmatrix} -3 \\ 1 \end{bmatrix}$ .
  - a) -20 b) 16 c) 20 d) 28



- 6) Let u be a non-zero vector. Then a unit vector in the direction of u is
  - a) u
- b) ||u||·u
- c)  $\frac{u}{\|u\|}$
- d) None of the above
- 7) The equations of lines of regression are x + 2y = 5 and 2x + 3y = 8. Then  $\bar{x}$  and  $\bar{y}$  are
  - a) 1 and 3
- b) 2 and 3
- c) 2 and 5
- d) 1 and 2
- 8) If  $b_{yx} = \frac{6}{5}$ ,  $b_{xy} = \frac{15}{8}$  then r =\_\_\_\_\_
  - a) 2.5
- b) 1.5

- 9) Which of the following equation is called Laplace equation?
  - a)  $\frac{\partial^2 \phi}{\partial \mathbf{v}^2} \frac{\partial^2 \phi}{\partial \mathbf{v}^2} = 0$

b)  $\frac{\partial^2 \phi}{\partial \mathbf{v}^2} + \frac{\partial^2 \phi}{\partial \mathbf{v}^2} = 0$ 

c)  $\frac{\partial \phi}{\partial x} + \frac{\partial \phi}{\partial y} = 0$ 

- d)  $\frac{\partial \phi}{\partial \mathbf{x}} \frac{\partial \phi}{\partial \mathbf{v}} = \mathbf{0}$
- 10) If an analytic function f(z) = u(x, y) + i v(x, y) then f'(z) =
  - a)  $u_x + v_x$

- b)  $u_y + u_y$  c)  $u_x + i v_x$  d)  $u_x i v_x$
- 11) The system of non-homogeneous equations AX = B has infinitely many solutions if
  - a) r = n
- b) r > n
- c) r < n
- d) None of these

- 12) Rank of the matrix \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix} is \\ a) & 1
- c) 3
- d) None of these
- 13) Given a scalar r, the transformation T :  $R^2 \rightarrow R^2$  defined by T(X) = rX when r > 1 is called
  - a) Dialation
- b) Translation
- c) Contraction
- d) Linear

- 14) The dimension of NulA is
  - a) The number of columns in A
  - b) The number of basic variables in the equation AX = 0
  - c) The number of rows in A
  - d) The number of free variables in the equation AX = 0



Seat No.

## S.E. (E&E) (Part – II) (Old CGPA) Examination, 2018 LINEAR ALGEBRA

Day and Date: Tuesday, 15-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

N. B.: 1) Attempt any three questions from each Section.

- 2) Figures to the right indicate full marks.
- 3) Use of calculator is allowed.

2. Attempt any three from the following:

a) Solve the system:

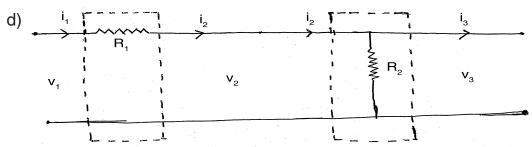
$$x_1 - 3x_2 = 5,$$
  
 $-x_1 + x_2 + 5x_3 = 2,$   
 $x_2 + x_3 = 0.$ 

b) Let 
$$a_1 = \begin{bmatrix} 1 \\ -2 \\ -5 \end{bmatrix}$$
,  $a_2 = \begin{bmatrix} 2 \\ 5 \\ 6 \end{bmatrix}$  and  $b = \begin{bmatrix} 7 \\ 4 \\ -3 \end{bmatrix}$ . Determine whether 'b' can be

generated as a linear combination of  $a_1$  and  $a_2$ .

c) Let 
$$A = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$$
, and define transformation  $T : R^2 \to R^2$  by  $T(X) = AX$ . Find

the images under T of 
$$u = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$$
 and  $v = \begin{bmatrix} a \\ b \end{bmatrix}$ .



Compute the transfer matrix of the ladder network.

9

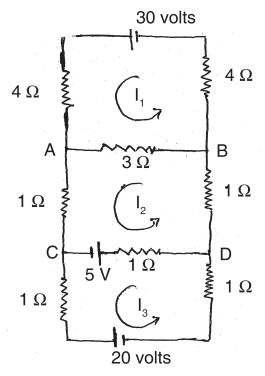
3

3. a) Using LU factorization method, solve the equation AX = b where

$$A = \begin{bmatrix} 2 & -2 & 4 \\ 1 & -3 & 1 \\ 3 & 7 & 5 \end{bmatrix}, b = \begin{bmatrix} 0 \\ -5 \\ 7 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & 0 & 0 \\ \frac{1}{2} & 1 & 0 \\ \frac{3}{2} & -5 & 1 \end{bmatrix} \cdot \begin{bmatrix} 2 & -2 & 4 \\ 0 & -2 & -1 \\ 0 & 0 & -6 \end{bmatrix} = L.U.$$

- b) Show that T is linear transformation and find standard matrix of  $T(x_1, x_2)$ . Where  $T(x_1, x_2) = (2x_2 - 3x_1, x_1 - 4x_2, 0, x_2)$ .
- c) Write the matrix equation that determines the loop currents for the circuit.



4. a) Assume that A is row equivalent to B. Find bases for NulA and ColA.

$$A = \begin{bmatrix} 1 & -4 & 9 & -7 \\ -1 & 2 & -4 & 1 \\ 5 & -6 & 10 & 7 \end{bmatrix}, B = \begin{bmatrix} 1 & 0 & -1 & 5 \\ 0 & -2 & 5 & -6 \\ 0 & 0 & 0 & 0 \end{bmatrix}.$$

b) Find basis and state the dimension of

$$\left\{ \begin{bmatrix} s - 2t \\ s + t \\ 3t \end{bmatrix} : s, t \text{ in R} \right\}$$

3

c) Consider a basis B =  $\{b_1, b_2\}$  for R², where  $b_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$  and  $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ , suppose

an X in R<sup>2</sup> has the co-ordinate vector  $[X]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$ , find X.

3

5. a) Diagonalize the matrix if possible  $A = \begin{bmatrix} -3 & 12 \\ -2 & 7 \end{bmatrix}$ .

3

b) Apply power method to  $A = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$  with  $x_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$  stop when K = 4 and estimate the dominant eigen value and corresponding eigen vector for A.

3

c) Find the characteristic equation of

$$A = \begin{bmatrix} 5 & -2 & 6 & -1 \\ 0 & 3 & -8 & 0 \\ 0 & 0 & 5 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix}.$$

3

SECTION - II

6. a) Write down the quadratic form corresponding to the following matrices:

i) 
$$\begin{bmatrix} 4 & 0 \\ 0 & 3 \end{bmatrix}$$

ii) 
$$\begin{bmatrix} 0 & 5 & -1 \\ 5 & 1 & 6 \\ -1 & 6 & 2 \end{bmatrix}$$
.



b) Let 
$$a = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$$
,  $b = \begin{bmatrix} -3 \\ 1 \end{bmatrix}$ ,  $c = \begin{bmatrix} \frac{4}{3} \\ -1 \\ \frac{2}{3} \end{bmatrix}$  and  $d = \begin{bmatrix} 5 \\ 6 \\ -1 \end{bmatrix}$ .  
i) Compute  $\frac{a \cdot b}{a \cdot a}$ 

- ii) Find ||c||.
- iii) Show that d is orthogonal to c.
- c) Show that {u<sub>1</sub>, u<sub>2</sub>, u<sub>3</sub>} is an orthogonal set where,

$$u_{1} = \begin{bmatrix} 3 \\ 1 \\ 1 \end{bmatrix}, u_{2} = \begin{bmatrix} -1 \\ 2 \\ 1 \end{bmatrix}, u_{3} = \begin{bmatrix} -\frac{1}{2} \\ -2 \\ \frac{7}{2} \end{bmatrix}.$$
OR

- c) Let u = [1, 2, 4]', v = [2, -3, 5]', w = [4, 2, -3]' be the vectors in  $\mathbb{R}^3$ , find
  - i)  $(u + v) \cdot w$
  - ii)  $\| u + v \|$ .

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7. a) Find the equations of the lines of regression from the following data, also find the coefficient of correlation r.

										75	
<b>y</b> :	82	56	50	48	60	62	64	65	70	74	90

b) Calculate the coefficient of correlation between height of father and height of son from the following data:

70 Height of father (x): 64 65 66 67 68 69 Height of son (y): 66 67 65 68 70 68 71

8. a) The equations of the two lines of regression are 6y = 5x + 90 and 15x = 8y + 130.

Find:

- i) The means of x and y.
- ii) The coefficient of correlation.
- iii) If variance of x is 16, also find the standard deviation of y.



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b) Given Mean of x = 50.07 Mean of y = 9.98

S.D. of 
$$x = 5.26$$

S.D. of 
$$y = 2.59$$

$$r = 0.898$$

Find the equations of the lines of regression.

- c) Is  $Q(x) = 3x_1^2 + 2x_2^2 + x_3^2 + 4x_1x_2 + 4x_2 \cdot x_3$  positive definite?
- 9. a) Verify that the real and imaginary parts of  $f(z) = e^{2z}$  are harmonic functions.
  - b) Find the image of following under the transformation  $W = \frac{1}{z}$ .

$$i) \quad z = \frac{\sqrt{5}}{2} + i$$

ii) 
$$z = \frac{2\sqrt{5}}{9} + \frac{4}{9}i$$
.

c) Find the bilinear transformation which maps the points z = 1, i, -1 into the points W = i, 0, -i.

\_\_\_\_\_

Seat No.

Set S

Max. Marks: 70

## S.E. (E&E) (Part – II) (Old CGPA) Examination, 2018 LINEAR ALGEBRA

Day and Date: Tuesday, 15-5-2018

Time: 10.00 a.m. to 1.00 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) Attempt any three questions from each Section.
- 3) Figures to the right indicate full marks.
- 4) Use of calculator is allowed.
- 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:

 $(1 \times 14 = 14)$ 

- 1) Let u be a non-zero vector. Then a unit vector in the direction of u is
  - a) ||u||
- b)  $\|u\| \cdot u$
- c)  $\frac{u}{\|u\|}$
- d) None of the above
- 2) The equations of lines of regression are x + 2y = 5 and 2x + 3y = 8. Then  $\overline{x}$  and  $\overline{y}$  are
  - a) 1 and 3
- b) 2 and 3
  - c) 2 and 5
- d) 1 and 2
- 3) If  $b_{yx} = \frac{6}{5}$ ,  $b_{xy} = \frac{15}{8}$  then r =\_\_\_\_\_
  - a) 2.5
- b) 1.5
- c) 0.5
- d) 1
- 4) Which of the following equation is called Laplace equation?
  - a)  $\frac{\partial^2 \phi}{\partial x^2} \frac{\partial^2 \phi}{\partial y^2} = 0$

b)  $\frac{\partial^2 \phi}{\partial x^2} + \frac{\partial^2 \phi}{\partial v^2} = 0$ 

c)  $\frac{\partial \phi}{\partial x} + \frac{\partial \phi}{\partial y} = 0$ 

d)  $\frac{\partial \phi}{\partial x} - \frac{\partial \phi}{\partial y} = 0$ 



- 5) If an analytic function f(z) = u(x, y) + i v(x, y) then  $f'(z) = \underline{\hspace{1cm}}$ b)  $u_y + u_y$  c)  $u_x + i v_x$  d)  $u_x - i v_x$ 
  - a)  $u_x + v_x$

- 6) The system of non-homogeneous equations AX = B has infinitely many solutions if
  - a) r = n
- b) r > n
- c) r < n
- d) None of these

- - a) 1
- c) 3
- d) None of these
- 8) Given a scalar r, the transformation T :  $R^2 \rightarrow R^2$  defined by T(X) = rX when r > 1 is called
  - a) Dialation
- b) Translation
- c) Contraction
- d) Linear

- 9) The dimension of NulA is
  - a) The number of columns in A
  - b) The number of basic variables in the equation AX = 0
  - c) The number of rows in A
  - d) The number of free variables in the equation AX = 0
- 10) If vector space V has a basis of n vectors then every basis of V must consist
  - a) Less than n vectors
- b) 2n vectors
- c) Greater than n vectors
- d) Exactly n vectors
- 11) The eigen values of the matrix A are 2, 5, 8. Then eigen values of A-1 are
  - a)  $\sqrt{2}$ ,  $\sqrt{5}$ ,  $2\sqrt{2}$  b)  $\frac{1}{2}$ ,  $\frac{1}{5}$ ,  $\frac{1}{8}$  c) 2, 5, 8

- d) None of these
- 12) The eigen values of matrix  $A = \begin{bmatrix} 1 & -2 \\ 1 & 3 \end{bmatrix}$  are
  - a) 1 ± i
- b)  $2 \pm i$
- c)  $\pm i$  d)  $4 \pm 2i$
- 13) If u = [3 4 6] and v = [0 1 1] then u.v. = \_\_\_\_\_ a) 1 0 b) 1 5 c) [0 4 6] d) None of these

- 14) Let  $\phi(n) = x_1^2 8x_1x_2 5x_2^2$ , then  $\phi(n) =$ \_\_\_\_\_ for  $x = \begin{bmatrix} -3 \\ 1 \end{bmatrix}$ .
  - a) -20 b) 16 c) 20 d) 28



Seat No.

## S.E. (E&E) (Part – II) (Old CGPA) Examination, 2018 LINEAR ALGEBRA

Day and Date: Tuesday, 15-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

N. B.: 1) Attempt any three questions from each Section.

- 2) Figures to the right indicate full marks.
- 3) Use of calculator is allowed.

2. Attempt any three from the following:

a) Solve the system:

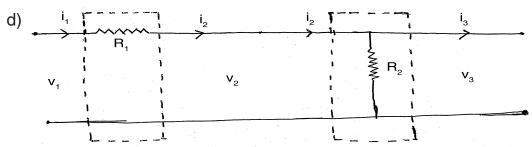
$$x_1 - 3x_2 = 5,$$
  
 $-x_1 + x_2 + 5x_3 = 2,$   
 $x_2 + x_3 = 0.$ 

b) Let 
$$a_1 = \begin{bmatrix} 1 \\ -2 \\ -5 \end{bmatrix}$$
,  $a_2 = \begin{bmatrix} 2 \\ 5 \\ 6 \end{bmatrix}$  and  $b = \begin{bmatrix} 7 \\ 4 \\ -3 \end{bmatrix}$ . Determine whether 'b' can be

generated as a linear combination of  $a_1$  and  $a_2$ .

c) Let 
$$A = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$$
, and define transformation  $T : R^2 \to R^2$  by  $T(X) = AX$ . Find

the images under T of 
$$u = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$$
 and  $v = \begin{bmatrix} a \\ b \end{bmatrix}$ .



Compute the transfer matrix of the ladder network.

9

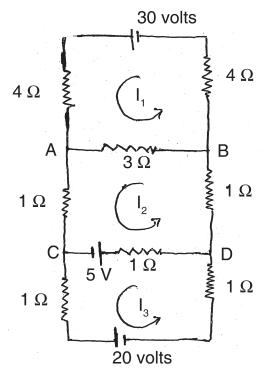


3. a) Using LU factorization method, solve the equation AX = b where

$$A = \begin{bmatrix} 2 & -2 & 4 \\ 1 & -3 & 1 \\ 3 & 7 & 5 \end{bmatrix}, b = \begin{bmatrix} 0 \\ -5 \\ 7 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & 0 & 0 \\ \frac{1}{2} & 1 & 0 \\ \frac{3}{2} & -5 & 1 \end{bmatrix} \cdot \begin{bmatrix} 2 & -2 & 4 \\ 0 & -2 & -1 \\ 0 & 0 & -6 \end{bmatrix} = L.U.$$

- b) Show that T is linear transformation and find standard matrix of  $T(x_1, x_2)$ . Where  $T(x_1, x_2) = (2x_2 - 3x_1, x_1 - 4x_2, 0, x_2)$ .
- c) Write the matrix equation that determines the loop currents for the circuit. 3



4. a) Assume that A is row equivalent to B. Find bases for NulA and ColA.

$$A = \begin{bmatrix} 1 & -4 & 9 & -7 \\ -1 & 2 & -4 & 1 \\ 5 & -6 & 10 & 7 \end{bmatrix}, B = \begin{bmatrix} 1 & 0 & -1 & 5 \\ 0 & -2 & 5 & -6 \\ 0 & 0 & 0 & 0 \end{bmatrix}.$$

b) Find basis and state the dimension of

$$\left\{ \begin{bmatrix} s - 2t \\ s + t \\ 3t \end{bmatrix} : s, t \text{ in R} \right\}$$

3

3

c) Consider a basis B =  $\{b_1, b_2\}$  for R<sup>2</sup>, where  $b_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$  and  $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ , suppose

an X in R<sup>2</sup> has the co-ordinate vector  $[X]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$ , find X.

- 5. a) Diagonalize the matrix if possible  $A = \begin{bmatrix} -3 & 12 \\ -2 & 7 \end{bmatrix}$ .
  - b) Apply power method to  $A = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$  with  $x_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$  stop when K = 4 and estimate the dominant eigen value and corresponding eigen vector for A. 3
  - c) Find the characteristic equation of

$$A = \begin{bmatrix} 5 & -2 & 6 & -1 \\ 0 & 3 & -8 & 0 \\ 0 & 0 & 5 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix}.$$

3

SECTION - II

6. a) Write down the quadratic form corresponding to the following matrices:

i) 
$$\begin{bmatrix} 4 & 0 \\ 0 & 3 \end{bmatrix}$$

ii) 
$$\begin{bmatrix} 0 & 5 & -1 \\ 5 & 1 & 6 \\ -1 & 6 & 2 \end{bmatrix}$$
.



b) Let 
$$a = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$$
,  $b = \begin{bmatrix} -3 \\ 1 \end{bmatrix}$ ,  $c = \begin{bmatrix} \frac{4}{3} \\ -1 \\ \frac{2}{3} \end{bmatrix}$  and  $d = \begin{bmatrix} 5 \\ 6 \\ -1 \end{bmatrix}$ .

i) Compute  $\frac{a \cdot b}{a \cdot a}$ 

- ii) Find ||c||.
- iii) Show that d is orthogonal to c.
- c) Show that {u<sub>1</sub>, u<sub>2</sub>, u<sub>3</sub>} is an orthogonal set where,

$$u_{1} = \begin{bmatrix} 3 \\ 1 \\ 1 \end{bmatrix}, u_{2} = \begin{bmatrix} -1 \\ 2 \\ 1 \end{bmatrix}, u_{3} = \begin{bmatrix} -\frac{1}{2} \\ -2 \\ \frac{7}{2} \end{bmatrix}.$$
OR

- c) Let u = [1, 2, 4]', v = [2, -3, 5]', w = [4, 2, -3]' be the vectors in  $\mathbb{R}^3$ , find
  - i)  $(u + v) \cdot w$
  - ii)  $\| u + v \|$ .

4

5

4

3

7. a) Find the equations of the lines of regression from the following data, also find the coefficient of correlation r.

x:											
у:	82	56	50	48	60	62	64	65	70	74	90

b) Calculate the coefficient of correlation between height of father and height of son from the following data:

70 Height of father (x): 64 65 66 67 68 69 Height of son (y): 66 67 65 68 70 68 71

8. a) The equations of the two lines of regression are 6y = 5x + 90 and 15x = 8y + 130.

Find:

- i) The means of x and y.
- ii) The coefficient of correlation.
- iii) If variance of x is 16, also find the standard deviation of y.



Mean of y = 9.98b) Given Mean of x = 50.07

S.D. of 
$$x = 5.26$$

S.D. of y = 2.59

$$r = 0.898$$

Find the equations of the lines of regression.

3

c) Is  $Q(x) = 3x_1^2 + 2x_2^2 + x_3^2 + 4x_1x_2 + 4x_2 \cdot x_3$  positive definite ?

9. a) Verify that the real and imaginary parts of  $f(z) = e^{2z}$  are harmonic functions.

3

3

b) Find the image of following under the transformation  $W = \frac{1}{2}$ .

$$i) \quad z = \frac{\sqrt{5}}{2} + i$$

ii) 
$$z = \frac{2\sqrt{5}}{9} + \frac{4}{9}i$$
.

3

c) Find the bilinear transformation which maps the points z=1, i, -1 into the points W = i, 0, -i.

3



**SLR-TC - 486** 

Set P

### Seat No.

## S.E. (Part – II) (E&E) Old-CGPA Examination, 2018 AC MACHINES

Day and Date: Thursday 17-5-2018 Total 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:

 $(1 \times 14 = 14)$ 

- The starting torque of a 3-phase induction motor can be increased by increasing
  - a) The rotor reactance

- b) The rotor resistance
- c) The stator resistance
- d) None of the above
- 2) The 'cogging' of an induction motor can be avoided by
  - a) Proper ventilation
  - b) Using DOL starter
  - c) Auto-transformer starter
  - d) Having no. of rotor slots more or less than the no. of stator slots
- 3) In case of the induction motor the torque is
  - a) Inversely proportional to V
- b) Directly proportional to S<sup>2</sup>
- c) Inversely proportional to slip
- d) Directly proportional to slip
- 4) DOL starting of induction motor is usually restricted to
  - a) Low horse power motors
- b) Variable speed motors
- c) High horse power motors
- d) High speed motors
- 5) The starting torque of a 3-phase squirrel cage induction motor is
  - a) Twice the full load torque
- b) 1.5 times the full load torque
- c) Equal to full load torque
- d) None of the above



6)	Short-circuit test on an induction mot	or cannot be used to determine							
	a) Windage losses	b) Copper losses							
	c) Transformer ratio	d) Power scale of circle diagram							
7)	In 3-phase induction motors sometim	es copper bars are placed deep in							
•	the rotor to								
	a) Improve starting torque	b) Reduce copper losses							
	c) Improve efficiency	d) Improve power factor							
8)	Which kind of rotor is most suitable for	or turbo alternators which are							
,	designed to run at high speed?								
	a) Salient pole type	b) Non-salient pole type							
	c) Both a) and b) above	d) None of the above							
9)	The frequency of voltage generated by	by an alternator having 8 poles and							
,	rotating at 250 rpm is								
	a) 60 Hz b) 50 Hz	c) 25 Hz d) 16 2/3 Hz							
10)	If the input to the prime mover of an a	alternator is kept constant but the							
-	excitation is changed, then the	•							
	a) Reactive component of the output	is changed							
	b) Active component of the output is changed								
	c) Power factor of the load remains								
	d) Power factor of the load reduces								
11)	For an alternator when the power fac	tor of the load is unity							
	a) The armature flux will have square	e waveform							
	b) The armature flux will be demagned	etizing							
	c) The armature flux will be cross ma	_							
	d) The armature flux will reduce to ze	ero							
12)	In order that two alternators be put in	parallel, which of the following							
	factors should be identical for both?								
	a) Voltage	b) Frequency							
	c) Phase sequence	d) All of the above							
13)	A three phase alternator has a phase	sequence of RYB for its three							
	output voltages. In case the field curr	ent is reversed, the phase sequence							
	will become.								
	a) RBY	b) RYB							
	c) YRB	d) None of the above							
14)	For the same power rating, a lower ve								
	a) More efficient	b) Larger in size							
	c) Operating at high rpm	d) More costly							



Seat	
No.	

# S.E. (Part – II) (E&E) Old-CGPA Examination, 2018 AC MACHINES

Day and Date: Thursday 17-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

#### SECTION - I

#### 2. Attempt any four:

 $(4 \times 4 = 16)$ 

- a) Find the ratio of maximum torque to full load torque of a 4-pole, 50 Hz, 3-phase I.M: the data required is as follows: Slip is 4%, Rotor impedance/phase =  $(0.3 + j 1.2) \Omega$  at standstill.
- b) What are the different types of 1-phase induction motors are there? Explain the principle of operation of shaded pole induction motor.
- c) Derive the expression for  $T_{\rm sf}/T_{\rm max}$  and  $T_{\rm ff}/T_{\rm max}$  with neat explanation.
- d) How the starting torque of squirrel cage induction motor can be improved? Explain with neat sketch.
- e) Explain the DOL starter with neat circuit diagram.

### 3. Attempt any two:

 $(2 \times 6 = 12)$ 

- a) Why single phase induction motor is not a self starting one? Explain with double revolving field theory and show how that backward slip  $S_B = (2-S)$  where S is forward slip.
- b) Find the mechanical power output of 185-W, 4 pole, 110-V, 50-Hz single-phase induction motor, whose constants are given below at a slip of 0.05. R1 = 1.86  $\Omega$  X1 = 2.56  $\Omega$  Xm = 53.5  $\Omega$  R2 = 3.56  $\Omega$  X2 = 2.56  $\Omega$  Core loss = 3.5 W, Friction and Windage loss = 13.5 W.
- c) Explain how rotating magnetic field is created when 3-ph supply voltage is given to the 3-ph stator winding.

#### SECTION - II

#### 4. Attempt any four:

 $(4 \times 4 = 16)$ 

- a) Give the applications of synchronous motor.
- b) Explain why synchronous motor is not self starting.
- c) Derive EMF equation of alternator with short pitched coils and distributed winding.
- d) What is armature reaction? What its effect when RL load is connected to alternators explain with phasor diagram?
- e) Explain synchronous motor as synchronous condenser. Draw neat phasor diagram.

#### 5. Attempt any two:

 $(2 \times 6 = 12)$ 

- a) Draw neat vector diagram of salient pole alternator and derive expression for power generated in alternator and draw P Vs  $\delta$  characteristics.
- b) Explain the operation of synchronous motor with constant load and following different type of excitation with phasor diagram.
  - i) Normal excitation
  - ii) Under excitation
  - iii) Over excitation.
- c) A 208 V, star connected 3-phase synchronous motor has a synchronous reactance of 4  $\Omega$ /phase and negligible armature winding resistance. At a certain load, the motor takes 7.2 kW at 0.8 p.f lagging. If the power developed by the motor remains the same while the excitation voltage is increased by 50% by raising the field excitation, determine
  - i) The new armature current and
  - ii) The power factor.



**SLR-TC - 486** 

Seat No. et Q

## S.E. (Part – II) (E&E) Old-CGPA Examination, 2018 AC MACHINES

Day and Date: Thursday 17-5-2018 Total 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:

 $(1 \times 14 = 14)$ 

- 1) Which kind of rotor is most suitable for turbo alternators which are designed to run at high speed?
  - a) Salient pole type

- b) Non-salient pole type
- c) Both a) and b) above
- d) None of the above
- 2) The frequency of voltage generated by an alternator having 8 poles and rotating at 250 rpm is
  - a) 60 Hz
- b) 50 Hz
- c) 25 Hz
- d) 16 2/3 Hz
- 3) If the input to the prime mover of an alternator is kept constant but the excitation is changed, then the
  - a) Reactive component of the output is changed
  - b) Active component of the output is changed
  - c) Power factor of the load remains
  - d) Power factor of the load reduces
- 4) For an alternator when the power factor of the load is unity
  - a) The armature flux will have square waveform
  - b) The armature flux will be demagnetizing
  - c) The armature flux will be cross magnetizing
  - d) The armature flux will reduce to zero



5)	In order that two alternators be put in factors should be identical for both?	parallel, which of the following
	a) Voltage	b) Frequency
	c) Phase sequence	d) All of the above
6)	A three phase alternator has a phase	e sequence of RYB for its three
	output voltages. In case the field curr	rent is reversed, the phase sequence
	will become.	
	a) RBY	b) RYB
٦١	c) YRB	d) None of the above
7)	For the same power rating, a lower v	
	a) More efficient	b) Larger in size
0)	c) Operating at high rpm	d) More costly
0)	The starting torque of a 3-phase induincreasing	ction motor can be increased by
	a) The rotor reactance	b) The rotor resistance
	c) The stator resistance	d) None of the above
9)	The 'cogging' of an induction motor of	,
0)	a) Proper ventilation	an se avelaca sy
	b) Using DOL starter	
	c) Auto-transformer starter	
	d) Having no. of rotor slots more or le	ess than the no. of stator slots
10)	In case of the induction motor the tor	•
	a) Inversely proportional to V	
	c) Inversely proportional to slip	d) Directly proportional to slip
11)	DOL starting of induction motor is us	-
	a) Low horse power motors	•
4.0\	c) High horse power motors	d) High speed motors
12)	The starting torque of a 3-phase squi	<u> </u>
	a) Twice the full load torque	b) 1.5 times the full load torque
10)	<ul><li>c) Equal to full load torque</li><li>Short–circuit test on an induction mot</li></ul>	d) None of the above
13)	a) Windage losses	b) Copper losses
	c) Transformer ratio	d) Power scale of circle diagram
14)	In 3-phase induction motors sometim	-
17)	the rotor to	nes copper bars are placed deep in
	a) Improve starting torque	b) Reduce copper losses
	c) Improve efficiency	d) Improve power factor
	- -	



Seat	
No.	

# S.E. (Part – II) (E&E) Old-CGPA Examination, 2018 AC MACHINES

Day and Date: Thursday 17-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

#### SECTION - I

#### 2. Attempt any four:

 $(4 \times 4 = 16)$ 

- a) Find the ratio of maximum torque to full load torque of a 4-pole, 50 Hz, 3-phase I.M: the data required is as follows: Slip is 4%, Rotor impedance/phase =  $(0.3 + j 1.2) \Omega$  at standstill.
- b) What are the different types of 1-phase induction motors are there? Explain the principle of operation of shaded pole induction motor.
- c) Derive the expression for  $T_{\rm sf}/T_{\rm max}$  and  $T_{\rm ff}/T_{\rm max}$  with neat explanation.
- d) How the starting torque of squirrel cage induction motor can be improved? Explain with neat sketch.
- e) Explain the DOL starter with neat circuit diagram.

### 3. Attempt any two:

 $(2 \times 6 = 12)$ 

- a) Why single phase induction motor is not a self starting one? Explain with double revolving field theory and show how that backward slip  $S_B = (2-S)$  where S is forward slip.
- b) Find the mechanical power output of 185-W, 4 pole, 110-V, 50-Hz single-phase induction motor, whose constants are given below at a slip of 0.05. R1 = 1.86  $\Omega$  X1 = 2.56  $\Omega$  Xm = 53.5  $\Omega$  R2 = 3.56  $\Omega$  X2 = 2.56  $\Omega$  Core loss = 3.5 W, Friction and Windage loss = 13.5 W.
- c) Explain how rotating magnetic field is created when 3-ph supply voltage is given to the 3-ph stator winding.

#### SECTION - II

#### 4. Attempt any four:

 $(4 \times 4 = 16)$ 

- a) Give the applications of synchronous motor.
- b) Explain why synchronous motor is not self starting.
- c) Derive EMF equation of alternator with short pitched coils and distributed winding.
- d) What is armature reaction? What its effect when RL load is connected to alternators explain with phasor diagram?
- e) Explain synchronous motor as synchronous condenser. Draw neat phasor diagram.

#### 5. Attempt any two:

 $(2 \times 6 = 12)$ 

- a) Draw neat vector diagram of salient pole alternator and derive expression for power generated in alternator and draw P Vs  $\delta$  characteristics.
- b) Explain the operation of synchronous motor with constant load and following different type of excitation with phasor diagram.
  - i) Normal excitation
  - ii) Under excitation
  - iii) Over excitation.
- c) A 208 V, star connected 3-phase synchronous motor has a synchronous reactance of 4  $\Omega$ /phase and negligible armature winding resistance. At a certain load, the motor takes 7.2 kW at 0.8 p.f lagging. If the power developed by the motor remains the same while the excitation voltage is increased by 50% by raising the field excitation, determine
  - i) The new armature current and
  - ii) The power factor.



Set R

## Seat No.

## S.E. (Part – II) (E&E) Old-CGPA Examination, 2018 AC MACHINES

Day and Date: Thursday 17-5-2018 Total 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:  $(1 \times 14 = 14)$ 1) The starting torque of a 3-phase squirrel cage induction motor is a) Twice the full load torque b) 1.5 times the full load torque c) Equal to full load torque d) None of the above 2) Short-circuit test on an induction motor cannot be used to determine a) Windage losses b) Copper losses c) Transformer ratio d) Power scale of circle diagram 3) In 3-phase induction motors sometimes copper bars are placed deep in the rotor to a) Improve starting torque b) Reduce copper losses c) Improve efficiency d) Improve power factor

4) Which kind of rotor is most suitable for turbo alternators which are designed to run at high speed?

designed to run at high speed ?

a) Salient pole type

b) Non-salient pole type

a) Salient pole typeb) Non-salient pole typec) Both a) and b) aboved) None of the above

5) The frequency of voltage generated by an alternator having 8 poles and rotating at 250 rpm is

a) 60 Hz b) 50 Hz c) 25 Hz d) 16 2/3 Hz



-2-6) If the input to the prime mover of an alternator is kept constant but the excitation is changed, then the a) Reactive component of the output is changed b) Active component of the output is changed c) Power factor of the load remains d) Power factor of the load reduces 7) For an alternator when the power factor of the load is unity a) The armature flux will have square waveform b) The armature flux will be demagnetizing c) The armature flux will be cross magnetizing d) The armature flux will reduce to zero 8) In order that two alternators be put in parallel, which of the following factors should be identical for both? a) Voltage b) Frequency c) Phase sequence d) All of the above 9) A three phase alternator has a phase sequence of RYB for its three output voltages. In case the field current is reversed, the phase sequence

will become. a) RBY b) RYB c) YRB d) None of the above 10) For the same power rating, a lower voltage alternator will be a) More efficient b) Larger in size c) Operating at high rpm d) More costly

- 11) The starting torque of a 3-phase induction motor can be increased by increasing
  - a) The rotor reactance

b) The rotor resistance

c) The stator resistance

- d) None of the above
- 12) The 'cogging' of an induction motor can be avoided by
  - a) Proper ventilation
  - b) Using DOL starter
  - c) Auto-transformer starter
  - d) Having no. of rotor slots more or less than the no. of stator slots
- 13) In case of the induction motor the torque is
  - a) Inversely proportional to V

b) Directly proportional to S<sup>2</sup>

c) Inversely proportional to slip

- d) Directly proportional to slip
- 14) DOL starting of induction motor is usually restricted to
  - a) Low horse power motors

b) Variable speed motors

c) High horse power motors

d) High speed motors



Seat	
No.	

## S.E. (Part – II) (E&E) Old-CGPA Examination, 2018 AC MACHINES

Day and Date: Thursday 17-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

#### SECTION - I

#### 2. Attempt any four:

 $(4 \times 4 = 16)$ 

- a) Find the ratio of maximum torque to full load torque of a 4-pole, 50 Hz, 3-phase I.M: the data required is as follows: Slip is 4%, Rotor impedance/phase =  $(0.3 + j 1.2) \Omega$  at standstill.
- b) What are the different types of 1-phase induction motors are there? Explain the principle of operation of shaded pole induction motor.
- c) Derive the expression for  $T_{\rm sf}/T_{\rm max}$  and  $T_{\rm ff}/T_{\rm max}$  with neat explanation.
- d) How the starting torque of squirrel cage induction motor can be improved? Explain with neat sketch.
- e) Explain the DOL starter with neat circuit diagram.

### 3. Attempt any two:

 $(2 \times 6 = 12)$ 

- a) Why single phase induction motor is not a self starting one? Explain with double revolving field theory and show how that backward slip  $S_B = (2-S)$  where S is forward slip.
- b) Find the mechanical power output of 185-W, 4 pole, 110-V, 50-Hz single-phase induction motor, whose constants are given below at a slip of 0.05. R1 = 1.86  $\Omega$  X1 = 2.56  $\Omega$  Xm = 53.5  $\Omega$  R2 = 3.56  $\Omega$  X2 = 2.56  $\Omega$  Core loss = 3.5 W, Friction and Windage loss = 13.5 W.
- c) Explain how rotating magnetic field is created when 3-ph supply voltage is given to the 3-ph stator winding.

#### SECTION - II

#### 4. Attempt any four:

 $(4 \times 4 = 16)$ 

- a) Give the applications of synchronous motor.
- b) Explain why synchronous motor is not self starting.
- c) Derive EMF equation of alternator with short pitched coils and distributed winding.
- d) What is armature reaction? What its effect when RL load is connected to alternators explain with phasor diagram?
- e) Explain synchronous motor as synchronous condenser. Draw neat phasor diagram.

#### 5. Attempt any two:

 $(2 \times 6 = 12)$ 

- a) Draw neat vector diagram of salient pole alternator and derive expression for power generated in alternator and draw P Vs  $\delta$  characteristics.
- b) Explain the operation of synchronous motor with constant load and following different type of excitation with phasor diagram.
  - i) Normal excitation
  - ii) Under excitation
  - iii) Over excitation.
- c) A 208 V, star connected 3-phase synchronous motor has a synchronous reactance of 4  $\Omega$ /phase and negligible armature winding resistance. At a certain load, the motor takes 7.2 kW at 0.8 p.f lagging. If the power developed by the motor remains the same while the excitation voltage is increased by 50% by raising the field excitation, determine
  - i) The new armature current and
  - ii) The power factor.



Set S

### Seat No.

## S.E. (Part – II) (E&E) Old-CGPA Examination, 2018 AC MACHINES

Day and Date: Thursday 17-5-2018 Total 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:

 $(1 \times 14 = 14)$ 

- 1) If the input to the prime mover of an alternator is kept constant but the excitation is changed, then the
  - a) Reactive component of the output is changed
  - b) Active component of the output is changed
  - c) Power factor of the load remains
  - d) Power factor of the load reduces
- 2) For an alternator when the power factor of the load is unity
  - a) The armature flux will have square waveform
  - b) The armature flux will be demagnetizing
  - c) The armature flux will be cross magnetizing
  - d) The armature flux will reduce to zero
- 3) In order that two alternators be put in parallel, which of the following factors should be identical for both?

a) Voltage

b) Frequency

c) Phase sequence

- d) All of the above
- 4) A three phase alternator has a phase sequence of RYB for its three output voltages. In case the field current is reversed, the phase sequence will become.
  - a) RBY

b) RYB

c) YRB

d) None of the above

P.T.O.



5)	For the same power	er rating, a lower v		_	
	a) More efficient		,	Larger in size	
٥)	c) Operating at hig	•	,	More costly	
6)	The starting torque increasing	of a 3-phase indu	ictio	on motor can b	be increased by
	a) The rotor reacta	ince	b)	The rotor resi	istance
	c) The stator resist	tance	d)	None of the a	lbove
7)	The 'cogging' of an a) Proper ventilation	on	an	be avoided by	,
	b) Using DOL start				
	c) Auto-transforme				
	d) Having no. of ro				of stator slots
8)	In case of the induc		•		
	a) Inversely propor		-		
	c) Inversely propor	rtional to slip	d)	Directly propo	ortional to slip
9)	DOL starting of ind			-	
	a) Low horse power		•	Variable spee	
	c) High horse pow		,	High speed n	
10)	The starting torque	•		_	
	a) Twice the full loa	•	•		full load torque
	c) Equal to full load	•	,	None of the a	
11)	Short-circuit test of				
	a) Windage losses		,	Copper losse	
10\	c) Transformer ratio				of circle diagram
12)	In 3-phase induction the rotor to	n motors sometim	ies	copper pars a	re placed deep in
	a) Improve starting	n torque	h)	Reduce copp	er losses
	c) Improve efficien	· ·	-	Improve power	
13)	Which kind of rotor	•	,		
,	designed to run at				
	a) Salient pole type	е	b)	Non-salient p	ole type
	c) Both a) and b) a	above	d)	None of the a	lbove
14)	The frequency of ve		оу а	an alternator h	aving 8 poles and
	rotating at 250 rpm			05.11	1) 40 0 (0 1 1
	a) 60 Hz	b) 50 Hz	C)	25 Hz	d) 16 2/3 Hz



Seat	
No.	

## S.E. (Part – II) (E&E) Old-CGPA Examination, 2018 AC MACHINES

Day and Date: Thursday 17-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

#### SECTION - I

#### 2. Attempt any four:

 $(4 \times 4 = 16)$ 

- a) Find the ratio of maximum torque to full load torque of a 4-pole, 50 Hz, 3-phase I.M: the data required is as follows: Slip is 4%, Rotor impedance/phase =  $(0.3 + j 1.2) \Omega$  at standstill.
- b) What are the different types of 1-phase induction motors are there? Explain the principle of operation of shaded pole induction motor.
- c) Derive the expression for  $T_{\rm sf}/T_{\rm max}$  and  $T_{\rm ff}/T_{\rm max}$  with neat explanation.
- d) How the starting torque of squirrel cage induction motor can be improved? Explain with neat sketch.
- e) Explain the DOL starter with neat circuit diagram.

### 3. Attempt any two:

 $(2 \times 6 = 12)$ 

- a) Why single phase induction motor is not a self starting one? Explain with double revolving field theory and show how that backward slip  $S_B = (2-S)$  where S is forward slip.
- b) Find the mechanical power output of 185-W, 4 pole, 110-V, 50-Hz single-phase induction motor, whose constants are given below at a slip of 0.05. R1 = 1.86  $\Omega$  X1 = 2.56  $\Omega$  Xm = 53.5  $\Omega$  R2 = 3.56  $\Omega$  X2 = 2.56  $\Omega$  Core loss = 3.5 W, Friction and Windage loss = 13.5 W.
- c) Explain how rotating magnetic field is created when 3-ph supply voltage is given to the 3-ph stator winding.



#### SECTION - II

### 4. Attempt any four:

 $(4 \times 4 = 16)$ 

- a) Give the applications of synchronous motor.
- b) Explain why synchronous motor is not self starting.
- c) Derive EMF equation of alternator with short pitched coils and distributed winding.
- d) What is armature reaction? What its effect when RL load is connected to alternators explain with phasor diagram?
- e) Explain synchronous motor as synchronous condenser. Draw neat phasor diagram.

#### 5. Attempt any two:

 $(2 \times 6 = 12)$ 

- a) Draw neat vector diagram of salient pole alternator and derive expression for power generated in alternator and draw P Vs  $\delta$  characteristics.
- b) Explain the operation of synchronous motor with constant load and following different type of excitation with phasor diagram.
  - i) Normal excitation
  - ii) Under excitation
  - iii) Over excitation.
- c) A 208 V, star connected 3-phase synchronous motor has a synchronous reactance of 4  $\Omega$ /phase and negligible armature winding resistance. At a certain load, the motor takes 7.2 kW at 0.8 p.f lagging. If the power developed by the motor remains the same while the excitation voltage is increased by 50% by raising the field excitation, determine
  - i) The new armature current and
  - ii) The power factor.



Seat	
No.	

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## S.E. (E and E) (Part – II) (Old CGPA) Examination, 2018 ELECTRICAL AND ELECTRONICS MEASUREMENTS

Day and Date: Saturday, 19-5-2018 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:

 $(14 \times 1 = 14)$ 

- 1) Which instruments has the highest frequency range with accuracy within reasonable limits?
  - a) PMMC

b) Electrodynamometer

c) Thermocouple

- d) Rectifier
- 2) 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
- 3) Time division multiplexing is used when
  - a) Data to be transmitted is slow changing
  - b) Data to be transmitted has small bandwidth
  - c) Data to be transmitted is slow changing and low bandwidth
  - d) None of the above
- 4) Which of the following are integrating instruments?
  - a) Ammeters
  - b) Voltmeters
  - c) Wattmeters
  - d) Ampere-hour and watt-hour meters

5)	The household energy meter is a) an indicating instrument c) an integrating instrument	<ul><li>b) a recording instrument</li><li>d) none of the above</li></ul>
6)	In majority of instruments damping is a) fluid friction c) eddy currents	,
7)	In a low power factor wattmeter the pa) to the supply side of the current colb) to the load side of the current coil c) in any of the two meters at connecd) none of the above	oil
8)	The electrical power to a meggar is part a) Battery b) Permanent magnet D. C. generate c) AC Generator d) Any of the above	•
9)	An induction meter can handle currer a) 10 A b) 30 A	nt upto c) 60 A d) 100 A
10)	For measurement of mutual inductar a) Anderson bridge c) Heaviside bridge	ce we can use b) Maxwell's bridge d) Any of the above
11)	<ul><li>A Lissajous patterns are used to mea</li><li>a) Voltage and frequency</li><li>b) Frequency and phase shift</li><li>c) Frequency and amplitude distortion</li><li>d) Amplitude and flux</li></ul>	
12)	Which meter is suitable for the meas a) Moving iron voltmeter c) Moving coil voltmeter	urement of 10 mV at 50 MHz ? b) VTVM d) CRO
13)	Jewels are used in instruments for that a) Damping c) Suppressing noise	e purpose of b) Torque control d) Bearing
14)	<ul><li>A galvanometer has</li><li>a) Air friction damping</li><li>c) Spring coil damping</li></ul>	<ul><li>b) Fluid friction damping</li><li>d) Eddy current damping</li></ul>



Seat	
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## S.E. (E and E) (Part – II) (Old CGPA) Examination, 2018 ELECTRICAL AND ELECTRONICS MEASUREMENTS

Day and Date: Saturday, 19-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

#### SECTION - I

#### 2. Attempt any four questions:

 $(4 \times 4 = 16)$ 

- a) Explain construction and operation of PMMC type instrument.
- b) Explain construction and operation of current transformer in detail.
- c) Explain the following terms related to instrument transformer:
  - i) Transformation ratio
  - ii) Nomial ratio
  - iii) Turns ratio
  - iv) Ratio correction factor
- d) Explain shunts and multipliers.
- e) A simple slide wire is used for measurement of current in a circuit. The voltage drop across a standard resistor of 0.1  $\Omega$  is balanced at 75 cm. Find the magnitude of the current if the standard cell emf of 1.45 V is balanced at 50 cm.
- f) Explain induction type energy meter.

#### 3. Attempt any two:

 $(6 \times 2 = 12)$ 

- a) Two wattmeters are connected to measure the input to a balanced 3-phase circuit indicate 2000 W and 500 W respectively. Find the power factor of the circuit
  - i) when both the readings are positive.
  - ii) when the later reading is obtained after reversing the connections to the current coil of first instrument.
- b) Explain Hays bridge with neat phasor diagram.
- c) Draw the equivalent circuit diagram and typical phasor diagram of potential transformer. Write the actual transformation ratio error and phase angle error.

## 

#### SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain LCD display with diagram also state its advantages.
- 2) What are the front panel control details of dual trace oscilloscope?
- 3) Explain X-Y recorder with neat diagram.
- 4) Explain the electrical pressure transducer with neat diagram.
- 5) With neat sketch explain 1Ø electrodynamometer power factor meter.
- 6) Explain working of Q-meter with neat diagram.

5. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Explain construction and operation of dual trace oscilloscope.
- 2) Explain construction and working of LVDT also state its advantages and disadvantages.
- 3) Explain different types of phase sequence indicator with neat diagram.

Set P



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## S.E. (E and E) (Part – II) (Old CGPA) Examination, 2018 ELECTRICAL AND ELECTRONICS MEASUREMENTS

Day and Date: Saturday, 19-5-2018 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:

 $(14 \times 1 = 14)$ 

- 1) The electrical power to a meggar is provided by
  - a) Battery
  - b) Permanent magnet D. C. generator
  - c) AC Generator
  - d) Any of the above
- 2) An induction meter can handle current upto
  - a) 10 A
- b) 30 A
- c) 60 A
- d) 100 A
- 3) For measurement of mutual inductance we can use
  - a) Anderson bridge

b) Maxwell's bridge

c) Heaviside bridge

- d) Any of the above
- 4) A Lissajous patterns are used to measure
  - a) Voltage and frequency
  - b) Frequency and phase shift
  - c) Frequency and amplitude distortion
  - d) Amplitude and flux
- 5) Which meter is suitable for the measurement of 10 mV at 50 MHz?
  - a) Moving iron voltmeter
- b) VTVM
- c) Moving coil voltmeter
- d) CRO

6)	Jewels are used in instruments for th	ne p	ourpose of
	a) Damping	b)	Torque control
	c) Suppressing noise	d)	Bearing
7)	A galvanometer has		
,	a) Air friction damping	b)	Fluid friction damping
	c) Spring coil damping	,	Eddy current damping
8)	Which instruments has the highest f reasonable limits?	-	
	a) PMMC	b)	Electrodynamometer
	c) Thermocouple	,	Rectifier
ŕ	The value of resistance of an earthin a) Shape and material of electrode b) Depth to which electrode is driver c) Specific resistance of soil d) All of the above	g e	lectrode depends upon to earth
10)	Time division multiplexing is used wha) Data to be transmitted is slow chab) Data to be transmitted has small look of the above	ang bar	ing Idwidth
11)	<ul><li>Which of the following are integrating</li><li>a) Ammeters</li><li>b) Voltmeters</li><li>c) Wattmeters</li><li>d) Ampere-hour and watt-hour meter</li></ul>		struments?
12)	The household energy meter is		
,	<ul><li>a) an indicating instrument</li><li>c) an integrating instrument</li></ul>	,	a recording instrument none of the above
13)	In majority of instruments damping is a) fluid friction c) eddy currents	b)	ovided by spring all of the above
14)	In a low power factor wattmeter the pa) to the supply side of the current cb) to the load side of the current coil c) in any of the two meters at conned) none of the above	oil	



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## S.E. (E and E) (Part – II) (Old CGPA) Examination, 2018 ELECTRICAL AND ELECTRONICS MEASUREMENTS

Day and Date: Saturday, 19-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

#### SECTION - I

#### 2. Attempt any four questions:

 $(4 \times 4 = 16)$ 

- a) Explain construction and operation of PMMC type instrument.
- b) Explain construction and operation of current transformer in detail.
- c) Explain the following terms related to instrument transformer:
  - i) Transformation ratio
  - ii) Nomial ratio
  - iii) Turns ratio
  - iv) Ratio correction factor
- d) Explain shunts and multipliers.
- e) A simple slide wire is used for measurement of current in a circuit. The voltage drop across a standard resistor of 0.1  $\Omega$  is balanced at 75 cm. Find the magnitude of the current if the standard cell emf of 1.45 V is balanced at 50 cm.
- f) Explain induction type energy meter.

### 3. Attempt any two:

 $(6 \times 2 = 12)$ 

- a) Two wattmeters are connected to measure the input to a balanced 3-phase circuit indicate 2000 W and 500 W respectively. Find the power factor of the circuit
  - i) when both the readings are positive.
  - ii) when the later reading is obtained after reversing the connections to the current coil of first instrument.
- b) Explain Hays bridge with neat phasor diagram.
- c) Draw the equivalent circuit diagram and typical phasor diagram of potential transformer. Write the actual transformation ratio error and phase angle error.

## 

#### SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain LCD display with diagram also state its advantages.
- 2) What are the front panel control details of dual trace oscilloscope?
- 3) Explain X-Y recorder with neat diagram.
- 4) Explain the electrical pressure transducer with neat diagram.
- 5) With neat sketch explain 1Ø electrodynamometer power factor meter.
- 6) Explain working of Q-meter with neat diagram.

5. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Explain construction and operation of dual trace oscilloscope.
- 2) Explain construction and working of LVDT also state its advantages and disadvantages.
- 3) Explain different types of phase sequence indicator with neat diagram.

Set Q



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## S.E. (E and E) (Part – II) (Old CGPA) Examination, 2018 ELECTRICAL AND ELECTRONICS MEASUREMENTS

Day and Date: Saturday, 19-5-2018 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:

 $(14 \times 1 = 14)$ 

- 1) The household energy meter is
  - a) an indicating instrument
- b) a recording instrument
- c) an integrating instrument
- d) none of the above
- 2) In majority of instruments damping is provided by
  - a) fluid friction

b) spring

c) eddy currents

- d) all of the above
- 3) In a low power factor wattmeter the pressure coil is connected
  - a) to the supply side of the current coil
  - b) to the load side of the current coil
  - c) in any of the two meters at connection
  - d) none of the above
- 4) The electrical power to a meggar is provided by
  - a) Battery
  - b) Permanent magnet D. C. generator
  - c) AC Generator
  - d) Any of the above
- 5) An induction meter can handle current upto
  - a) 10 A
- b) 30 A
- c) 60 A
- d) 100 A

6)	For measurement of mutual inductar a) Anderson bridge c) Heaviside bridge	nce we can use b) Maxwell's bridge d) Any of the above
7)	<ul><li>A Lissajous patterns are used to mea</li><li>a) Voltage and frequency</li><li>b) Frequency and phase shift</li><li>c) Frequency and amplitude distortion</li><li>d) Amplitude and flux</li></ul>	
8)	Which meter is suitable for the meas a) Moving iron voltmeter c) Moving coil voltmeter	surement of 10 mV at 50 MHz ? b) VTVM d) CRO
9)	Jewels are used in instruments for that a) Damping c) Suppressing noise	he purpose of b) Torque control d) Bearing
10)	<ul><li>A galvanometer has</li><li>a) Air friction damping</li><li>c) Spring coil damping</li></ul>	<ul><li>b) Fluid friction damping</li><li>d) Eddy current damping</li></ul>
11)	Which instruments has the highest f reasonable limits?  a) PMMC c) Thermocouple	frequency range with accuracy within  b) Electrodynamometer d) Rectifier
12)	The value of resistance of an earthin a) Shape and material of electrode b) Depth to which electrode is driver c) Specific resistance of soil d) All of the above	
13)	Time division multiplexing is used wha) Data to be transmitted is slow chab) Data to be transmitted has small be c) Data to be transmitted is slow chab) None of the above	anging bandwidth
14)	Which of the following are integrating a) Ammeters b) Voltmeters c) Wattmeters d) Ampere-hour and watt-hour mete	



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## S.E. (E and E) (Part – II) (Old CGPA) Examination, 2018 ELECTRICAL AND ELECTRONICS MEASUREMENTS

Day and Date: Saturday, 19-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

#### SECTION - I

#### 2. Attempt any four questions :

 $(4 \times 4 = 16)$ 

- a) Explain construction and operation of PMMC type instrument.
- b) Explain construction and operation of current transformer in detail.
- c) Explain the following terms related to instrument transformer:
  - i) Transformation ratio
  - ii) Nomial ratio
  - iii) Turns ratio
  - iv) Ratio correction factor
- d) Explain shunts and multipliers.
- e) A simple slide wire is used for measurement of current in a circuit. The voltage drop across a standard resistor of 0.1  $\Omega$  is balanced at 75 cm. Find the magnitude of the current if the standard cell emf of 1.45 V is balanced at 50 cm.
- f) Explain induction type energy meter.

#### 3. Attempt any two:

 $(6 \times 2 = 12)$ 

- a) Two wattmeters are connected to measure the input to a balanced 3-phase circuit indicate 2000 W and 500 W respectively. Find the power factor of the circuit
  - i) when both the readings are positive.
  - ii) when the later reading is obtained after reversing the connections to the current coil of first instrument.
- b) Explain Hays bridge with neat phasor diagram.
- c) Draw the equivalent circuit diagram and typical phasor diagram of potential transformer. Write the actual transformation ratio error and phase angle error.

## 

#### SECTION - II

-4-

4. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain LCD display with diagram also state its advantages.
- 2) What are the front panel control details of dual trace oscilloscope?
- 3) Explain X-Y recorder with neat diagram.
- 4) Explain the electrical pressure transducer with neat diagram.
- 5) With neat sketch explain 1Ø electrodynamometer power factor meter.
- 6) Explain working of Q-meter with neat diagram.

5. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Explain construction and operation of dual trace oscilloscope.
- 2) Explain construction and working of LVDT also state its advantages and disadvantages.
- 3) Explain different types of phase sequence indicator with neat diagram.

Set R



Seat	
No.	

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S

## S.E. (E and E) (Part – II) (Old CGPA) Examination, 2018 ELECTRICAL AND ELECTRONICS MEASUREMENTS

Day and Date: Saturday, 19-5-2018 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:

 $(14 \times 1 = 14)$ 

- 1) For measurement of mutual inductance we can use
  - a) Anderson bridge

b) Maxwell's bridge

c) Heaviside bridge

- d) Any of the above
- 2) A Lissajous patterns are used to measure
  - a) Voltage and frequency
  - b) Frequency and phase shift
  - c) Frequency and amplitude distortion
  - d) Amplitude and flux
- 3) Which meter is suitable for the measurement of 10 mV at 50 MHz?
  - a) Moving iron voltmeter

b) VTVM

c) Moving coil voltmeter

- d) CRO
- 4) Jewels are used in instruments for the purpose of
  - a) Damping

b) Torque control

c) Suppressing noise

d) Bearing

- 5) A galvanometer has
  - a) Air friction damping
- b) Fluid friction damping
- c) Spring coil damping
- d) Eddy current damping
- 6) Which instruments has the highest frequency range with accuracy within reasonable limits?
  - a) PMMC

b) Electrodynamometer

c) Thermocouple

d) Rectifier

R-T(	C – 487	-2-	
7)	The value of resistance of an eart a) Shape and material of electrod b) Depth to which electrode is drive. Specific resistance of soil d) All of the above	le	upon
8)	Time division multiplexing is used a) Data to be transmitted is slow of b) Data to be transmitted has small c) Data to be transmitted is slow of d) None of the above	changing all bandwidth	width
9)	<ul><li>Which of the following are integrated:</li><li>a) Ammeters</li><li>b) Voltmeters</li><li>c) Wattmeters</li><li>d) Ampere-hour and watt-hour metals</li></ul>		
10)	The household energy meter is a) an indicating instrument c) an integrating instrument	b) a recording instru d) none of the abov	
l 1)	In majority of instruments damping a) fluid friction c) eddy currents	g is provided by b) spring d) all of the above	
12)	In a low power factor wattmeter that a) to the supply side of the current b) to the load side of the current c) in any of the two meters at cond) none of the above	nt coil coil	ected
13)	The electrical power to a meggar a) Battery b) Permanent magnet D. C. gene c) AC Generator d) Any of the above		

c) 60 A d) 100 A

14) An induction meter can handle current upto

b) 30 A

a) 10 A



Seat	
No.	

## S.E. (E and E) (Part – II) (Old CGPA) Examination, 2018 ELECTRICAL AND ELECTRONICS MEASUREMENTS

Day and Date: Saturday, 19-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

#### SECTION - I

#### 2. Attempt any four questions:

 $(4 \times 4 = 16)$ 

- a) Explain construction and operation of PMMC type instrument.
- b) Explain construction and operation of current transformer in detail.
- c) Explain the following terms related to instrument transformer:
  - i) Transformation ratio
  - ii) Nomial ratio
  - iii) Turns ratio
  - iv) Ratio correction factor
- d) Explain shunts and multipliers.
- e) A simple slide wire is used for measurement of current in a circuit. The voltage drop across a standard resistor of 0.1  $\Omega$  is balanced at 75 cm. Find the magnitude of the current if the standard cell emf of 1.45 V is balanced at 50 cm.
- f) Explain induction type energy meter.

#### 3. Attempt any two:

 $(6 \times 2 = 12)$ 

- a) Two wattmeters are connected to measure the input to a balanced 3-phase circuit indicate 2000 W and 500 W respectively. Find the power factor of the circuit
  - i) when both the readings are positive.
  - ii) when the later reading is obtained after reversing the connections to the current coil of first instrument.
- b) Explain Hays bridge with neat phasor diagram.
- c) Draw the equivalent circuit diagram and typical phasor diagram of potential transformer. Write the actual transformation ratio error and phase angle error.

#### -4-

## 

#### SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain LCD display with diagram also state its advantages.
- 2) What are the front panel control details of dual trace oscilloscope?
- 3) Explain X-Y recorder with neat diagram.
- 4) Explain the electrical pressure transducer with neat diagram.
- 5) With neat sketch explain 1Ø electrodynamometer power factor meter.
- 6) Explain working of Q-meter with neat diagram.

5. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Explain construction and operation of dual trace oscilloscope.
- 2) Explain construction and working of LVDT also state its advantages and disadvantages.
- 3) Explain different types of phase sequence indicator with neat diagram.

Set S

Set |

## Seat No.

# S.E. (Electrical & Electronics Engineering) (Part – II) (Old CGPA) Examination, 2018 SIGNALS AND SYSTEMS

Daν	and Date : Tuesday, 22-5-2018	Total Marks: 70
_ ~,	and Bate : raceday, EE e Ee le	rotal marto : 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) <b>All</b> 4) If <b>r</b>	Page. questions are con necessary, assume nure to right indicat	su	itable data.		
	, -	MCQ/Objective Ty				
Duratio	n : 30 Minutes					Marks: 14
1. Ch	noose the correct answ	/er:				(14×1=14)
1)	1) z-transform converts convolution of time-signals to					
	A) addition		B)	subtraction		
	C) multiplication		D)	division		
2)	Convolution is the					
	A) Sum product		B)	Product sum		
	C) Sum product sum		D)	Product sum p	roduct	
3)	Regen of Conversion	is the rang of				
	A) S	Β) jΩ	C)	Ω	D) σ	
4)	$X(n)^*h(n) = h(n)^*x(n)$					
	A) Associative prope	rty	B)	Distributive pro	perty	
	C) Commutative prop	perty	D)	None of above	<b>;</b>	
5)	The function which ha	as its Fourier transf	orm	ı, Laplace trans	form and Z tra	ınsform
	A) Gaussian	B) Impulse	C)	Sine	D) Pulse	

6)	The discrete-time signal x (n) =	(-1) <sup>n</sup> is periodic with fundamental period			
	A) 6 B) 4	C) 2 D) 0			
7)	The impulse response of a system is $h(n) = a^n u(n)$ . The condition for the system to be BIBO stable is				
	A) a is real and positive	B) a is real and negative			
	C)  a  > 1	D)  a  < 1			
8)	The Fourier transform (FT) of a	function x (t) is X (f). The FT of dx (t)/dt will be			
	A) $dX(f)/df$ B) $j2pf X$	(f) C) $jf X(f)$ D) $X(f)/(jf)$			
9)	If the Fourier series coefficients	of a signal are periodic then the signal must be			
	A) continuous-time, periodic	B) discrete-time, periodic			
	C) continuous-time, non-period	ic D) discrete-time, non-periodic			
10)	The region of convergence of the	the z-transform of the signal $x(n) = \{2, 1, 1, 2\}$ is			
		<u>^</u>			
		n = 0			
	A) all z, except $z = 0$ and $z = \infty$	B) all $z$ , except $z = 0$			
	C) all z, except $z = \infty$	D) all z			
11)	The Laplace transform of u (t) is	S			
	A) $\frac{1}{s}$ B) $s^2$	C) $\frac{1}{s^2}$ D) s			
12)	Sampled frequency less than n	quist rate is called			
	A) under sampling	B) over sampling			
	C) critical sampling	D) nyquist sampling			
13)	Product of two functions in spat	ial domain is what, in frequency domain			
	A) Correlation	B) Convolution			
	C) Fourier transform	D) Fast Fourier transform			
14)	x(t) is the combination of				
	A) ramp and unit component	B) sin and cos component			
	C) even and odd component	D) similar and dissimilar component			

Marks: 56

 $(4 \times 3 = 12)$ 

Seat No.

### S.E. (Electrical & Electronics Engineering) (Part – II) (Old CGPA) Examination, 2018 SIGNALS AND SYSTEMS

Day and Date: Tuesday, 22-5-2018

Time: 10.00 a.m. to 1.00 p.m.

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

2) If necessary, assume suitable data.

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

SECTION - I

#### 2. Solve any three:

a) Find signal are energy, power signals

i) 
$$x(t) = \cos^2 \omega_0 t$$

ii) 
$$x(t)u(t) - u(t-1)$$

b) State and proof any one property of convolution.

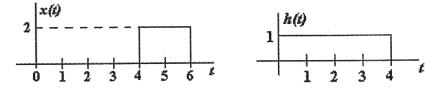
c) Laplace transform of x (t) =  $\cos \Omega 0t$ .

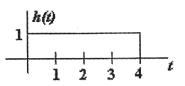
d) Find the convolution of two sequences.  $X(n) = \{1, 4, 3, 2\}$ ;  $h(n) = \{1, 3, 2, 1\}$ .

### 3. Solve any two:

 $(2 \times 8 = 16)$ 

a) Find the convolution of two rectangular pulse signals shown below.





b) Find inverse Laplace transform of  $\frac{3s^2 + 8s + 6}{(s+2)(s^2 + 2s + 1)}$ .

c) Find convolution of sequence x(n) = u(n) - u(n-7); h(n) = u(n-1) - u(n-4).

## 

#### SECTION - II

4. Solve any three:

 $(4 \times 3 = 12)$ 

- a) Give the application of signal and system.
- b) Explain short time Fourier transforms.
- c) Find Fourier transform if m (t) =  $e^{-at}u$  (t).
- d) Find z transform and ROC  $x(n) = \frac{2^n}{3}u(n) + \left(-\frac{1}{2}\right)^n u(n)$ .

5. Solve any two:

 $(2 \times 8 = 16)$ 

- a) The signal  $x(t) = 10\cos(10\pi t)$  is sampled at rate 8 samples per second. Plot the amplitude spectrum for  $|\Omega| \le 30~\pi$ . Can the original signal can be recovered from samples ? Explain.
- b) Find inverse z-transform of  $\frac{z+4}{z^2-4z+3}\,.$
- c) Prove that convolution in time domain is equivalent with multiplication in frequency domain.



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## Seat No.

### S.E. (Electrical & Electronics Engineering) (Part – II) (Old CGPA) Examination, 2018 SIGNALS AND SYSTEMS

Day and Date: Tuesday, 22-5-2018 Total 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.

		,	If <b>necessary</b> , ass Figure to <b>right</b> ind			
			MCQ/Objective	e Type Question	s	
Dura	atio	n : 30 Minutes				Marks: 14
1.	Ch	oose the correct a	answer:			(14×1=14)
	1)	The Fourier trans	sform (FT) of a func	tion x (t) is X (f).	The FT of dx (t)/dt w	vill be
		A) dX(f)/df	B) j2pf X(f)	C) jf X(f)	D) $X(f)/(jf)$	
	2)	If the Fourier seri	es coefficients of a	signal are period	ic then the signal m	ust be
		A) continuous-tin	me, periodic	B) discrete-t	ime, periodic	
		C) continuous-tin	ne, non-periodic	D) discrete-t	ime, non-periodic	
	3)	The region of cor	nvergence of the z-t	transform of the s	ignal x(n) = {2, 1, 1 ↑ n =	
		A) all z, except z	$z = 0$ and $z = \infty$	B) all z, exce	ept z = 0	
		C) all z, except z	: = ∞	D) all z		
	4)	The Laplace trans	sform of u (t) is			
		A) $\frac{1}{s}$	B) s <sup>2</sup>	C) $\frac{1}{s^2}$	D) s	

5)	Sampled frequency less than nyquist rate is called				
	A) under sampling		B)	over sampling	
	C) critical sampling		D)	nyquist samplir	ng
6)	Product of two functions in spatial domain is what, in frequency domain				
	A) Correlation		B) Convolution		
	C) Fourier transform		D)	Fast Fourier tra	ansform
7)	x(t) is the combination	n of			
	A) ramp and unit con	nponent	B) sin and cos component		
	C) even and odd con	nponent	D)	similar and diss	similar component
8)	z-transform converts	convolution of time	-sig	nals to	
	A) addition		B)	subtraction	
	C) multiplication		D)	division	
9)	Convolution is the				
	A) Sum product		B)	Product sum	
	C) Sum product sum		D)	Product sum p	roduct
10)	Regen of Conversion is the rang of				
	A) S	B) jΩ	C)	Ω	<b>D</b> ) σ
11)	$X(n)^*h(n) = h(n)^*x(n)$				
	A) Associative prope	rty	B) Distributive property		
	C) Commutative property		D)	None of above	
12)	The function which has its Fourier transform, Laplace transform and Z transform unity is				
	A) Gaussian	B) Impulse	C)	Sine	D) Pulse
13)	The discrete-time sign	nal x (n) = $(-1)^n$ is p	peri	odic with fundar	mental period
	A) 6	B) 4	C)	2	D) 0
14)	The impulse response of a system is $h(n) = a^n u(n)$ . The condition for the system to be BIBO stable is				
	A) a is real and positive		B) a is real and negative		
	C)  a  > 1		D)  a  < 1		

Seat No.

## S.E. (Electrical & Electronics Engineering) (Part – II) (Old CGPA) Examination, 2018 SIGNALS AND SYSTEMS

Day and Date: Tuesday, 22-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

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

2) If necessary, assume suitable data.

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

SECTION - I

2. Solve any three:

a) Find signal are energy, power signals

i) 
$$x(t) = \cos^2 \omega_0 t$$

ii) 
$$x(t)u(t) - u(t-1)$$

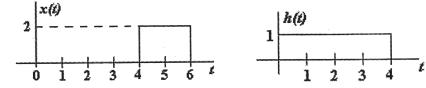
b) State and proof any one property of convolution.

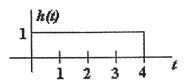
c) Laplace transform of x (t) =  $\cos \Omega 0t$ .

d) Find the convolution of two sequences.  $X(n) = \{1, 4, 3, 2\}$ ;  $h(n) = \{1, 3, 2, 1\}$ .

3. Solve any two:  $(2 \times 8 = 16)$ 

a) Find the convolution of two rectangular pulse signals shown below.





b) Find inverse Laplace transform of  $\frac{3s^2 + 8s + 6}{(s+2)(s^2 + 2s + 1)}$ .

c) Find convolution of sequence x(n) = u(n) - u(n-7); h(n) = u(n-1) - u(n-4).

 $(4 \times 3 = 12)$ 



#### SECTION - II

4. Solve any three:

 $(4 \times 3 = 12)$ 

- a) Give the application of signal and system.
- b) Explain short time Fourier transforms.
- c) Find Fourier transform if m (t) =  $e^{-at}u$  (t).
- d) Find z transform and ROC  $x(n) = \frac{2^n}{3}u(n) + \left(-\frac{1}{2}\right)^n u(n)$ .

5. Solve any two:

 $(2 \times 8 = 16)$ 

- a) The signal  $x(t) = 10\cos(10\pi t)$  is sampled at rate 8 samples per second. Plot the amplitude spectrum for  $|\Omega| \le 30~\pi$ . Can the original signal can be recovered from samples ? Explain.
- b) Find inverse z-transform of  $\frac{z+4}{z^2-4z+3}$  .
- c) Prove that convolution in time domain is equivalent with multiplication in frequency domain.

Set	R
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### Seat No.

A) continuous-time, periodic

C) continuous-time, non-periodic

# S.E. (Electrical & Electronics Engineering) (Part – II) (Old CGPA) Examination, 2018 SIGNALS AND SYSTEMS

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-		d Date : Tuesday, 0.00 a.m. to 1.00			Total Marks: 70	
		2, 3, 4,	carries <b>one</b> mark. <b>Answer MCQ/Obje</b>	wer Book Page Nective type quest to mention, Q.P. compulsory.	lo. 3. Each question tions on Page No. 3 2. Set (P/Q/R/S) on Top	
			MCQ/Objective	Type Questions	5	
Dura	atio	n : 30 Minutes			Marks: 14	
1.	Choose the correct answer :			(14×1=14)		
	The function which has its Fourier trans unity is			nsform, Laplace t	sform, Laplace transform and Z transform	
		A) Gaussian	B) Impulse	C) Sine	D) Pulse	
	2) The discrete-time signal $x(n) = (-1)^n$ is periodic with fundamental periodic with fundamen				ındamental period	
		A) 6	B) 4	C) 2	D) 0	
	3)	The impulse response of a system is $h(n) = a^n u(n)$ . The condition for the system to be BIBO stable is				
		A) a is real and positive		B) a is real and negative		
		C) $ a  > 1$		D)  a  < 1		
	4)	The Fourier transform (FT) of a function $x$ (t) is $X$ (f). The FT of $dx$ (t)/ $dt$ will be				
		A) dX(f)/df	B) j2pf X(f)	C) jf X(f)	D) X(f)/(jf)	
	5)	If the Fourier ser	ies coefficients of a s	signal are periodi	then the signal must be	

B) discrete-time, periodic

D) discrete-time, non-periodic

- 6) The region of convergence of the z-transform of the signal  $x(n) = \{2, 1, 1, 2\}$  is  $\uparrow$  n = 0
  - A) all z, except z = 0 and  $z = \infty$
- B) all z, except z = 0

C) all z, except  $z = \infty$ 

- D) all z
- 7) The Laplace transform of u (t) is
  - A)  $\frac{1}{s}$

- B) s<sup>2</sup>
- C)  $\frac{1}{s^2}$
- D) s
- 8) Sampled frequency less than nyquist rate is called
  - A) under sampling

B) over sampling

C) critical sampling

- D) nyquist sampling
- 9) Product of two functions in spatial domain is what, in frequency domain
  - A) Correlation

B) Convolution

C) Fourier transform

D) Fast Fourier transform

- 10) x(t) is the combination of
  - A) ramp and unit component
- B) sin and cos component
- C) even and odd component
- D) similar and dissimilar component
- 11) z-transform converts convolution of time-signals to
  - A) addition

B) subtraction

C) multiplication

D) division

- 12) Convolution is the
  - A) Sum product

B) Product sum

C) Sum product sum

- D) Product sum product
- 13) Regen of Conversion is the rang of
  - A) S

- Β) jΩ
- **C**) Ω
- D) σ

- 14) X(n)\*h(n) = h(n)\*x(n)
  - A) Associative property

- B) Distributive property
- C) Commutative property
- D) None of above

-3-

Seat No.

### S.E. (Electrical & Electronics Engineering) (Part – II) (Old CGPA) Examination, 2018 SIGNALS AND SYSTEMS

Day and Date: Tuesday, 22-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

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

2) If necessary, assume suitable data.

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

SECTION - I

#### 2. Solve any three:

 $(4 \times 3 = 12)$ 

a) Find signal are energy, power signals

i) 
$$x(t) = \cos^2 \omega_0 t$$

ii) 
$$x(t)u(t) - u(t-1)$$

b) State and proof any one property of convolution.

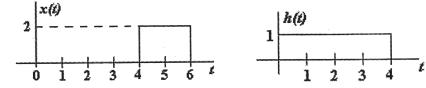
c) Laplace transform of x (t) =  $\cos \Omega 0t$ .

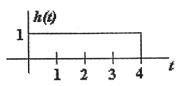
d) Find the convolution of two sequences.  $X(n) = \{1, 4, 3, 2\}$ ;  $h(n) = \{1, 3, 2, 1\}$ .

### 3. Solve any two:

 $(2 \times 8 = 16)$ 

a) Find the convolution of two rectangular pulse signals shown below.





b) Find inverse Laplace transform of  $\frac{3s^2 + 8s + 6}{(s+2)(s^2 + 2s + 1)}$ .

c) Find convolution of sequence x(n) = u(n) - u(n-7); h(n) = u(n-1) - u(n-4).

## 

#### SECTION - II

4. Solve any three:

 $(4 \times 3 = 12)$ 

- a) Give the application of signal and system.
- b) Explain short time Fourier transforms.
- c) Find Fourier transform if m (t) =  $e^{-at}u$  (t).
- d) Find z transform and ROC  $x(n) = \frac{2^n}{3}u(n) + \left(-\frac{1}{2}\right)^n u(n)$ .

5. Solve any two:

 $(2 \times 8 = 16)$ 

- a) The signal  $x(t) = 10\cos(10\pi t)$  is sampled at rate 8 samples per second. Plot the amplitude spectrum for  $|\Omega| \le 30~\pi$ . Can the original signal can be recovered from samples ? Explain.
- b) Find inverse z-transform of  $\frac{z+4}{z^2-4z+3}$  .
- c) Prove that convolution in time domain is equivalent with multiplication in frequency domain.



**SLR-TC - 488** 

# Seat No.

### S.E. (Electrical & Electronics Engineering) (Part – II) (Old CGPA) Examination, 2018 SIGNALS AND SYSTEMS

Daν	and Date : Tuesday, 22-5-2018	Total Marks: 70
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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 forgo of Page. 3) All questions are 4) If necessary, ass 5) Figure to right in	e <b>compulsory</b> . sume suitable da		т Тор
	MCQ/Objectiv	ve Type Questio	ns	
Dura	ation : 30 Minutes			Marks: 14
1.	Choose the correct answer:			(14×1=14)
	1) The region of convergence of the z-	-transform of the	signal $x(n) = \{2, 1, 1\}$	1, 2} is
			n =	: 0
	A) all z, except $z = 0$ and $z = \infty$	B) all z, ex	cept z = 0	
	C) all z, except $z = \infty$	D) all z		
	2) The Laplace transform of u (t) is			
	A) $\frac{1}{s}$ B) $s^2$	C) $\frac{1}{s^2}$	D) s	
	3) Sampled frequency less than nyqui	st rate is called		
	A) under sampling	B) over sar	mpling	
	C) critical sampling	D) nyquist	sampling	
	4) Product of two functions in spatial of	domain is what, ir	n frequency domain	
	A) Correlation	B) Convolu	ıtion	
	C) Fourier transform	D) Fast Fo	urier transform	

5)	x(t) is the combination	n of			
	A) ramp and unit con	nponent	B)	sin and cos cor	mponent
	C) even and odd com	nponent	D)	similar and diss	similar component
6)	z-transform converts convolution of time-signals to				
	A) addition		B)	subtraction	
	C) multiplication		D)	division	
7)	Convolution is the				
	A) Sum product		B)	Product sum	
	C) Sum product sum		D)	Product sum p	roduct
8)	Regen of Conversion	is the rang of			
	A) S	Β) jΩ	C)	Ω	<b>D</b> ) σ
9)	$X(n)^*h(n) = h(n)^*x(n)$				
	A) Associative prope	rty	B)	Distributive pro	perty
	C) Commutative prop	perty	D)	None of above	
10)	The function which ha	as its Fourier transf	orm	n, Laplace trans	form and Z transform
	A) Gaussian	B) Impulse	C)	Sine	D) Pulse
11)	The discrete-time sign	nal x (n) = $(-1)^n$ is p	oeri	odic with fundar	mental period
	A) 6	B) 4	C)	2	D) 0
12)	The impulse response to be BIBO stable is	e of a system is h(r	า) =	a <sup>n</sup> u(n). The cor	ndition for the system
	A) a is real and posit	ive	B)	a is real and ne	egative
	C)  a  > 1		D)	a  < 1	
13)	The Fourier transform	n (FT) of a function	x (t	i) is X (f). The F	T of dx (t)/dt will be
	A) dX(f)/df	B) j2pf X(f)	C)	jf X(f)	D) $X(f)/(jf)$
14)	If the Fourier series c	oefficients of a sigr	nal a	are periodic the	n the signal must be
	A) continuous-time, p	periodic	B)	discrete-time, p	periodic
	C) continuous-time, r	non-periodic	D)	discrete-time, r	non-periodic

Set S

Seat No.

# S.E. (Electrical & Electronics Engineering) (Part – II) (Old CGPA) Examination, 2018 SIGNALS AND SYSTEMS

Day and Date: Tuesday, 22-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

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

2) If necessary, assume suitable data.

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

SECTION - I

## 2. Solve any three:

a) Find signal are energy, power signals

i) 
$$x(t) = \cos^2 \omega_0 t$$

ii) 
$$x(t)u(t) - u(t-1)$$

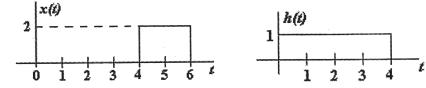
b) State and proof any one property of convolution.

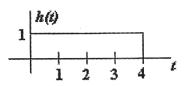
c) Laplace transform of x (t) =  $\cos \Omega 0t$ .

d) Find the convolution of two sequences.  $X(n) = \{1, 4, 3, 2\}$ ;  $h(n) = \{1, 3, 2, 1\}$ .

#### 3. Solve any two: $(2 \times 8 = 16)$

a) Find the convolution of two rectangular pulse signals shown below.





b) Find inverse Laplace transform of  $\frac{3s^2 + 8s + 6}{(s+2)(s^2 + 2s + 1)}$ .

c) Find convolution of sequence x(n) = u(n) - u(n-7); h(n) = u(n-1) - u(n-4).

 $(4 \times 3 = 12)$ 

# 

### SECTION - II

4. Solve any three:

 $(4 \times 3 = 12)$ 

- a) Give the application of signal and system.
- b) Explain short time Fourier transforms.
- c) Find Fourier transform if m (t) =  $e^{-at}u$  (t).
- d) Find z transform and ROC  $x(n) = \frac{2^n}{3}u(n) + \left(-\frac{1}{2}\right)^n u(n)$ .

5. Solve any two:

 $(2 \times 8 = 16)$ 

- a) The signal  $x(t) = 10\cos(10\pi t)$  is sampled at rate 8 samples per second. Plot the amplitude spectrum for  $|\Omega| \le 30~\pi$ . Can the original signal can be recovered from samples ? Explain.
- b) Find inverse z-transform of  $\frac{z+4}{z^2-4z+3}\,.$
- c) Prove that convolution in time domain is equivalent with multiplication in frequency domain.


**SLR-TC - 489** 

Seat No. Se	t
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### S.E. (Part – II) (Electrical and Electronics Engg.) (Old-CGPA) Examination, 2018 **DIGITAL TECHNIQUES**

Day and Date: Thursday, 24-5-2018 Total 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 Ton of Page

		3) <b>A</b>	<b>II</b> questions are ake suitable as	e compulsory. esumption if nec	essary.	
		ı	MCQ/Objective	Type Questio	ns	
Dur	atic	on : 30 Minutes				Marks: 14
1.	Cł	noose the correct ar	nswer:			(14×1=14)
	1)	The code used for	K-Map is			
		a) 8-4-2-1 Binary	code	b) Gray cod	de	
		c) Octal		d) Hexadeo	cimal	
	2)	Which of the follow	ving is Universa	l Gate ?		
		a) AND	b) NAND	c) OR	d) XNOR	
	3)	Multiplexer is also	called			
		a) Decoder		b) Encoder		
		c) Data Selector		d) None of	the above	
	4)	While obtaining mi	nimal SOP exp	ression		
	,	a) All don't cares a	are ignored			
		b) All don't cares a	are treated as lo	ogic ones		
		c) All don't cares a				

d) Only such don't cares that help minimisation are treated as logic Ones

5)	How many inputs ar	nd outputs does fu	ull adder have?	
	a) 2 i/p, 2 o/p	b) 2 i/p, 1 o/p	c) 3 i/p, 2 o/p	d) 2 i/p, 3 o/p
6)	Which of the following	ng IC is used as c	comparator?	
	a) IC7483	b) IC7490	c) IC74181	d) IC7485
7)	An example of Cano	onical SOP is		
	a) $ABC + BC + AB$	b) AB	c) ABC + AB	d) AB'C + AB"C
8)	A MOD-6 synchrono counts skipped by it			-flop, the number of
	a) 6	b) 5	c) 3	d) 2
9)	A sequential circuit	is one, whose out	put depends on	
	a) Present input		b) Past output	
	c) Both a) and b)		d) None	
10)	Intyp	e of shift register,	we have access	only to leftmost and
	rightmost flip-flops.	-		
	a) SISO	b) PIPO	c) SIPO	d) PISO
11)	The output frequence signal is	cy of decade cou	nter, when it is c	locked by 100 KHz
	a) 10 KHz	b) 20 KHz	c) 1 KHz	d) 50 KHz
12)	The maximum coun flip-flops is		ained by a counte	er which is having 5
	a) 32	b) 31	c) 5	d) None
13)	Flip-flop is	mult	ivibrator.	
	a) Monostable		b) Bistable	
	c) Both a) and b)		d) None	
14)	A BCD counter has		_ different states	
	a) 3	b) 4	c) 10	d) 9



Seat	
No.	

# S.E. (Part – II) (Electrical and Electronics Engg.) (Old-CGPA) Examination, 2018 DIGITAL TECHNIQUES

Day and Date: Thursday, 24-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

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

2) Make suitable assumption if necessary.

SECTION - I

2. Solve the following:

 $(3 \times 4 = 12)$ 

- 1) Explain Demorgan's and Duality Theorem in detail.
- 2) Minimise using k-map and realise using Basic gates.

$$F(ABCD) = \pi M (0, 3, 4, 7, 8, 10, 12, 14) + d(2, 6).$$

3) Explain full subtractor in detail. Using Boolean Expression show that  $AB + AC + \overline{B}C = AB + \overline{B}C$ .

3. Solve **any two**:

 $(2 \times 8 = 16)$ 

- 1) Implement following using:
  - a) 16:1 Multiplexer b) 8:1 Multiplexer.

$$F = \text{Em}(0, 1, 2, 3, 7, 8, 9, 11, 14).$$

- 2) Explain 2-bit digital comparator in detail.
- 3) Design a combinational circuit for Binary to Gray Code conversion.

SECTION - II

4. Attempt any three:

 $(3\times 4=12)$ 

- 1) Explain the characteristics of flip-flop.
- 2) What is excitation table? Draw excitation table of JK, T flip-flop, D flip-flop.



- 3) Determine the number of flip-flops required to construct a register capable of storing :
  - a) 6 bit binary no.
  - b) Decimal number upto 31
  - c) Hexadecimal number up to F
  - d) Octal number up to 10.
- 4) Design MOD-6 counter using IC 7490.
- 5) Explain any one type of shift register in detail.
- 5. Attempt any two of the following:

 $(2 \times 8 = 16)$ 

- 1) Explain the following flip-flop with circuit diagram, truth table, characteristic table, characteristic equation.
  - a) D flip-flop
- b) JK flip-flop.
- 2) Design asynchronous 4-bit up/down counter with waveforms.
- 3) Draw internal architecture of IC 7490. Design a asynchronous counter which counts from 000 to 100.

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**SLR-TC - 489** 

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# S.E. (Part – II) (Electrical and Electronics Engg.) (Old-CGPA)

			ation, 2018 ECHNIQUES		
-	nd Date : Thursday 10.00 a.m. to 1.00			Tot	al Marks : 70
<ul> <li>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.</li> <li>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.</li> <li>3) All questions are compulsory.</li> <li>4) Make suitable assumption if necessary.</li> </ul>					question ge No. 3
		MCQ/Objective	e Type Question	ns	
Duratio	on : 30 Minutes				Marks: 14
1. Cł	noose the correct a	ınswer:			(14×1=14)
1)	A MOD-6 synchro counts skipped by		•	K flip-flop, the n	umber of
	a) 6	b) 5	c) 3	d) 2	
2)	A sequential circu	iit is one, whose	output depends	on	
	a) Present input		b) Past outp	out	
	c) Both a) and b)		d) None		
3)	Int rightmost flip-flop		ter, we have acc	ess only to lefti	most and
	a) SISO	b) PIPO	c) SIPO	d) PISO	
4)	The output freque	ency of decade	counter, when it	is clocked by	100 KHz

a) 10 KHz b) 20 KHz c) 1 KHz d) 50 KHz

<ol> <li>The maximum count that can be obtained by a counter which is f flip-flops is</li> </ol>			er which is having 5	
	a) 32	b) 31	c) 5	d) None
6)	Flip-flop is	mul	tivibrator.	
	a) Monostable		b) Bistable	
	c) Both a) and b)		d) None	
7)	A BCD counter has		different states	S.
	a) 3	b) 4	c) 10	d) 9
8)	The code used for h	K-Map is		
	a) 8-4-2-1 Binary co	ode	b) Gray code	
	c) Octal		d) Hexadecimal	
9)	Which of the followi	ng is Universal G	ate ?	
	a) AND	b) NAND	c) OR	d) XNOR
10)	Multiplexer is also c	alled		
	a) Decoder		b) Encoder	
	c) Data Selector		d) None of the a	above
11)	While obtaining min	imal SOP expres	sion	
	a) All don't cares a	re ignored		
	b) All don't cares a			
	c) All don't cares a	J		
	•	-		eated as logic Ones
12)	How many inputs a	-		
	a) 2 i/p, 2 o/p			d) 2 i/p, 3 o/p
13)	Which of the followi	_	-	
	a) IC7483	b) IC7490	c) IC74181	d) IC7485
14)	An example of Cano			
	a) ABC + BC + AB	b) AB	c) ABC + AB	d) AB'C + AB"C



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# S.E. (Part – II) (Electrical and Electronics Engg.) (Old-CGPA) Examination, 2018 DIGITAL TECHNIQUES

Day and Date: Thursday, 24-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

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

2) Make suitable assumption if necessary.

SECTION - I

2. Solve the following:

 $(3 \times 4 = 12)$ 

- 1) Explain Demorgan's and Duality Theorem in detail.
- 2) Minimise using k-map and realise using Basic gates.

$$F(ABCD) = \pi M (0, 3, 4, 7, 8, 10, 12, 14) + d(2, 6).$$

3) Explain full subtractor in detail. Using Boolean Expression show that  $AB + AC + \overline{B}C = AB + \overline{B}C$ .

3. Solve **any two**:

 $(2 \times 8 = 16)$ 

- 1) Implement following using:
  - a) 16:1 Multiplexer b) 8:1 Multiplexer.

$$F = \text{Em}(0, 1, 2, 3, 7, 8, 9, 11, 14).$$

- 2) Explain 2-bit digital comparator in detail.
- 3) Design a combinational circuit for Binary to Gray Code conversion.

SECTION - II

4. Attempt any three:

 $(3\times 4=12)$ 

- 1) Explain the characteristics of flip-flop.
- 2) What is excitation table? Draw excitation table of JK, T flip-flop, D flip-flop.



- 3) Determine the number of flip-flops required to construct a register capable of storing :
  - a) 6 bit binary no.
  - b) Decimal number upto 31
  - c) Hexadecimal number up to F
  - d) Octal number up to 10.
- 4) Design MOD-6 counter using IC 7490.
- 5) Explain any one type of shift register in detail.
- 5. Attempt any two of the following:

 $(2 \times 8 = 16)$ 

- 1) Explain the following flip-flop with circuit diagram, truth table, characteristic table, characteristic equation.
  - a) D flip-flop
- b) JK flip-flop.
- 2) Design asynchronous 4-bit up/down counter with waveforms.
- 3) Draw internal architecture of IC 7490. Design a asynchronous counter which counts from 000 to 100.



c) Both a) and b)

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S.E. (Part – II) (	Electrical and E Examinati DIGITAL TE	ion, 2018	g.) (Old-CGPA)
Day and Date : Thursday Time : 10.00 a.m. to 1.00			Total Marks : 70
2) A 3) A	<b>30 minutes</b> in Ans carries <b>one</b> mark. <b>Answer MCQ/Obj</b> e	ective type quest to mention, Q.P compulsory.	lo. 3. Each question tions on Page No. 3 2. Set (P/Q/R/S) on
	MCQ/Objective	Type Questions	
Duration: 30 Minutes			Marks : 14
Choose the correct a	nswer:		(14×1=14)
1) How many inputs	and outputs does	full adder have ?	
a) 2 i/p, 2 o/p	b) 2 i/p, 1 o/p	c) 3 i/p, 2 o/p	d) 2 i/p, 3 o/p
2) Which of the follow	wing IC is used as	comparator?	
a) IC7483	b) IC7490	c) IC74181	d) IC7485
3) An example of Ca	nonical SOP is		
a) ABC + BC + A	B b) AB	c) ABC + AB	d) AB'C + AB''C
-	nous counter is de		ip-flop, the number of
a) 6	b) 5	c) 3	d) 2
<ol> <li>A sequential circular</li> <li>Present input</li> </ol>	it is one, whose o	utput depends on b) Past output	

d) None

In typ rightmost flip-flops.	e of shift register,	we	have access	only	to leftmost and
a) SISO	b) PIPO	c)	SIPO	d)	PISO
The output frequen signal is	cy of decade cou	nte	r, when it is c	lock	ed by 100 KHz
a) 10 KHz	b) 20 KHz	c)	1 KHz	d)	50 KHz
		aine	ed by a counte	er w	hich is having 5
a) 32	b) 31	c)	5	d)	None
Flip-flop is	mult	ivik	orator.		
a) Monostable		b)	Bistable		
c) Both a) and b)		d)	None		
A BCD counter has		_ different states.			
a) 3	b) 4	c)	10	d)	9
The code used for h	K-Map is				
a) 8-4-2-1 Binary co	ode	b)	Gray code		
c) Octal		d)	Hexadecimal		
Which of the followi	ng is Universal Ga	ate	?		
a) AND	b) NAND	c)	OR	d)	XNOR
Multiplexer is also o	alled				
a) Decoder		b)	Encoder		
c) Data Selector		d)	None of the a	bov	е
4) While obtaining minimal SOP expression					
a) All don't cares are ignored					
b) All don't cares are treated as logic ones					
c) All don't cares are treated as logic Zeros					
	rightmost flip-flops.  a) SISO The output frequency signal is  a) 10 KHz The maximum countilip-flops is	rightmost flip-flops.  a) SISO b) PIPO  The output frequency of decade coursignal is  a) 10 KHz b) 20 KHz  The maximum count that can be obtated flip-flops is	rightmost flip-flops.  a) SISO b) PIPO c)  The output frequency of decade countersignal is  a) 10 KHz b) 20 KHz c)  The maximum count that can be obtained flip-flops is	rightmost flip-flops.  a) SISO b) PIPO c) SIPO  The output frequency of decade counter, when it is or signal is  a) 10 KHz b) 20 KHz c) 1 KHz  The maximum count that can be obtained by a counter flip-flops is  a) 32 b) 31 c) 5  Flip-flop is multivibrator.  a) Monostable b) Bistable c) Both a) and b) d) None  A BCD counter has different states a) 3 b) 4 c) 10  The code used for K-Map is  a) 8-4-2-1 Binary code b) Gray code c) Octal d) Hexadecimal Which of the following is Universal Gate?  a) AND b) NAND c) OR  Multiplexer is also called  a) Decoder b) Encoder c) Data Selector d) None of the aux of the property	a) SISO b) PIPO c) SIPO d) The output frequency of decade counter, when it is clock signal is a) 10 KHz b) 20 KHz c) 1 KHz d) The maximum count that can be obtained by a counter w flip-flops is a) 32 b) 31 c) 5 d) Flip-flop is multivibrator. a) Monostable b) Bistable c) Both a) and b) d) None A BCD counter has different states. a) 3 b) 4 c) 10 d) The code used for K-Map is a) 8-4-2-1 Binary code b) Gray code c) Octal d) Hexadecimal Which of the following is Universal Gate? a) AND b) NAND c) OR d) Multiplexer is also called a) Decoder b) Encoder c) Data Selector d) None of the abov While obtaining minimal SOP expression a) All don't cares are ignored b) All don't cares are treated as logic ones

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# S.E. (Part – II) (Electrical and Electronics Engg.) (Old-CGPA) Examination, 2018 DIGITAL TECHNIQUES

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Time: 10.00 a.m. to 1.00 p.m.

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SECTION - I

2. Solve the following:

 $(3 \times 4 = 12)$ 

- 1) Explain Demorgan's and Duality Theorem in detail.
- 2) Minimise using k-map and realise using Basic gates.

$$F(ABCD) = \pi M (0, 3, 4, 7, 8, 10, 12, 14) + d(2, 6).$$

3) Explain full subtractor in detail. Using Boolean Expression show that  $AB + AC + \overline{B}C = AB + \overline{B}C$ .

3. Solve **any two**:

 $(2 \times 8 = 16)$ 

- 1) Implement following using:
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$$F = \text{Em}(0, 1, 2, 3, 7, 8, 9, 11, 14).$$

- 2) Explain 2-bit digital comparator in detail.
- 3) Design a combinational circuit for Binary to Gray Code conversion.

SECTION - II

4. Attempt any three:

 $(3\times 4=12)$ 

- 1) Explain the characteristics of flip-flop.
- 2) What is excitation table? Draw excitation table of JK, T flip-flop, D flip-flop.



- 3) Determine the number of flip-flops required to construct a register capable of storing :
  - a) 6 bit binary no.
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- 4) Design MOD-6 counter using IC 7490.
- 5) Explain any one type of shift register in detail.
- 5. Attempt any two of the following:

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- 1) Explain the following flip-flop with circuit diagram, truth table, characteristic table, characteristic equation.
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**SLR-TC - 489** 

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# S.E. (Part – II) (Electrical and Electronics Engg.) (Old-CGPA) Examination, 2018 DIGITAL TECHNIQUES

Day and Date: Thursday, 24-5-2018 Total Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

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  - 3) All questions are compulsory.
  - 4) Make suitable assumption if necessary.

## **MCQ/Objective Type Questions**

Dur	ation : 30 Minut	es			Marks: 14
1.	Choose the co	rrect answer :			(14×1=14)
	1) In rightmost fl	type of shift regi	ister, we have acc	ess only to leftm	ost and
	a) SISO	b) PIPO	c) SIPO	d) PISO	
	2) The output signal is	frequency of decade	counter, when it	is clocked by 1	00 KHz
	a) 10 KHz	b) 20 KHz	c) 1 KHz	d) 50 KHz	
	3) The maximum count that can be obtained by a counter which is having 5 flip-flops is				
	a) 32	b) 31	c) 5	d) None	
	4) Flip-flop is		multivibrator.		
	a) Monosta	able	b) Bistable		
	c) Both a)	and b)	d) None		

5)	A BCD counter has		different states.		
	a) 3	b) 4	c) 10	d) 9	
6)	The code used for k	K-Map is			
	a) 8-4-2-1 Binary co	ode	b) Gray code		
	c) Octal		d) Hexadecimal		
7)	Which of the following	ng is Universal G	ate?		
	a) AND	b) NAND	c) OR	d) XNOR	
8)	Multiplexer is also c	alled			
	a) Decoder		b) Encoder		
	c) Data Selector		d) None of the a	bove	
9)	While obtaining min	imal SOP expres	sion		
	a) All don't cares ar	e ignored			
	b) All don't cares ar	re treated as logic	ones		
	c) All don't cares ar	e treated as logic	Zeros		
	d) Only such don't cares that help minimisation are treated as logic Ones				
10)	How many inputs ar	nd outputs does f	ull adder have?		
	a) 2 i/p, 2 o/p	b) 2 i/p, 1 o/p	c) 3 i/p, 2 o/p	d) 2 i/p, 3 o/p	
11)	Which of the following	ng IC is used as o	comparator?		
	a) IC7483	b) IC7490	c) IC74181	d) IC7485	
12)	An example of Can	onical SOP is			
	a) $ABC + BC + AB$	b) AB	c) ABC + AB	d) AB'C + AB"C	
13)	) A MOD-6 synchronous counter is designed by 3 JK flip-flop, the number of counts skipped by it is				
	a) 6	b) 5	c) 3	d) 2	
14)	A sequential circuit	is one, whose out	tput depends on		
	a) Present input		b) Past output		
	c) Both a) and b)		d) None		



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# S.E. (Part – II) (Electrical and Electronics Engg.) (Old-CGPA) Examination, 2018 DIGITAL TECHNIQUES

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SECTION - I

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SECTION - II

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## **SLR-TC - 490**

Seat	Cat	
No.	Set	P

# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 3-5-2018 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) Make suitable assumptions if **necessary**.

### MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct answer:
  - 1) The value of the unit vector is
    - a) 0

- b) -1
- c) 1
- d) 2

- 2) Unit of potential difference is
  - a) Coulomb

b) Joules

c) Coulomb/Joules

- d) Joules/Coulomb
- 3) If dot product of two vectors is zero, the vectors are
  - a) Perpendicular

b) Parallel

c) Oblique

- d) None of these
- 4) Which of the following are not vector functions in Electromagnetics?
  - a) Gradient
  - b) Divergence
  - c) Curl
  - d) There is no non-vector functions in Electromagnetics
- 5) Vector is the quantity which is completely defined by its
  - a) Magnitude

b) Direction

c) Both a) and b)

d) None of these

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•	, un.uv	

- a) az
- b) ax
- c) ay
- d) zero

## 7) For the volume density $\rho_{\nu}$ , the divergence of the E will be equal to

- a)  $\frac{\rho v}{\epsilon}$
- b)  $\rho_{v} \epsilon$
- c)  $\epsilon^2 \rho_v$
- d)  $\frac{\rho v}{\epsilon^2}$

8) For free space 
$$\alpha$$
 value is

- a) 1.5
- b) 0
- c) 2.5
- d) 5.6

9) A charge of 
$$2 \times 10^{-7}$$
 C is acted upon by a force of 0.1N. Determine the distance to the other charge of  $4.5 \times 10^{-7}$ C; both the charges are in vacuum.

- a) 0.03
- b) 0.05
- c) 0.07
- d) 0.09

a)  $3 \times 10^8$  cm/s

b)  $3 \times 10^8$  m/hou

c)  $3 \times 10^8$  m/s

d)  $3 \times 10^{12} \,\text{m/s}$ 

11) 
$$\nabla \times \overline{E} = -\mu \frac{\partial H}{\partial t}$$
 is

a) Coulomb's law

b) Gauss law

c) Faradays law

d) Ohm's law

a)  $F = Q \times [E + V \times B]$ 

b)  $F = Q[E + V \times B]$ 

c)  $F = Q \times [V + E \times B]$ 

d)  $F = Q[B + V \times B]$ 

### 13) The electric flux density is the

- a) Product of permittivity and electric field intensity
- b) Product of number of flux lines and permittivity
- c) Product of permeability and electric field intensity
- d) Product of number of flux lines and permeability

## 14) For static magnetic field

a)  $\nabla \times B = \rho$ 

b)  $\nabla \times \overline{B} = \mu \overline{J}$ 

c)  $\nabla \cdot B = \mu \cdot J$ 

d)  $\nabla \times B = 0$ 



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# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTROMAGNETIC ENGINEERING

Day and Date: Thursday, 3-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

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

2) Make suitable assumptions if necessary.

#### SECTION - I

### 2. Solve any three:

 $(3 \times 4 = 12)$ 

- 1) State and prove divergence theorem.
- 2) Show that  $E = -\nabla V$ .
- 3) Derive the continuity equation for current in integral form and point form.
- 4) Explain various charge configurations in electrostatic field.
- 5) Find the force on a 100  $\mu$ C charge at (0, 0, 3) m if four like charges of 20  $\mu$ C are located on the x and y axis at  $\pm$  4m.

### 3. Solve any two:

 $(2 \times 8 = 16)$ 

- 1) Given that  $D = (10 \times 3/3) ax (c/m^2)$ , evaluate both sides of the divergence theorem for the volume of a cube 2 m on the edge, centered at origin and with edges parallel to the axis.
- 2) Derive the expression for electric field intensity due to infinitely long line charge.
- 3) Derive point form of the Gauss's law.

### SECTION - II

## 4. Solve any three:

 $(3 \times 4 = 12)$ 

- 1) Derive the expression on the axis of a circular loop.
- 2) A current filament of  $3\overline{a}_x$  amp. Lies along the x-axis. Find H components at P(-1, 3, 2).



- 3) What is Lorentz force?
- 4) Write Maxwell's equations for static fields.
- 5) A circular loop located on  $x^2 + y^2 = 9$ , z = 0 carries a direct current of 10 A along  $\overline{a_{\phi}}$ . Determine H at (0, 0, 4).

5. Solve any two:

 $(2 \times 8 = 16)$ 

- 1) Derive an expression for magnetic field intensity due to finite long straight current filament.
- 2) Derive expression for point form of Ampere's law.
- 3) Evaluate both sides of Stroke's theorem for the field

$$\overline{H} = \left(\frac{y^2 z}{x}\right) \overline{a_x} + \left(\frac{0.5 y^2 z^2}{x^2}\right) \overline{a_z}$$

And find current in the  $\overline{a_y}$  direction crossing the square surface in the plane y = 2 bounded by x = z = 1 and x = z = 2.

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# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTROMAGNETIC ENGINEERING

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  - 3) Make suitable assumptions if **necessary**.

### MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct answer:
  - 1) For free space  $\alpha$  value is
    - a) 1.5
- b) 0
- c) 2.5
- d) 5.6
- 2) A charge of  $2\times 10^{-7}$  C is acted upon by a force of 0.1N. Determine the distance to the other charge of  $4.5\times 10^{-7}$ C; both the charges are in vacuum.
  - a) 0.03
- b) 0.05
- c) 0.07
- d) 0.09

- 3) The velocity of EM wave in free space is
  - a)  $3 \times 10^8$  cm/s

b)  $3 \times 10^8$  m/hou

c)  $3 \times 10^8$  m/s

d)  $3 \times 10^{12} \,\text{m/s}$ 

- 4)  $\nabla \times \overline{E} = -\mu \frac{\partial H}{\partial t}$  is
  - a) Coulomb's law

b) Gauss law

c) Faradays law

- d) Ohm's law
- 5) Lorentz force equation is
  - a)  $F = Q \times [E + V \times B]$

b)  $F = Q[E + V \times B]$ 

c)  $F = Q \times [V + E \times B]$ 

d)  $F = Q [B + V \times B]$ 

6	The	electric	flux	density	/ is	the
U	, ,,,,	CICCLIIC	IIUA	uchony	/ 13	uic

- a) Product of permittivity and electric field intensity
- b) Product of number of flux lines and permittivity
- c) Product of permeability and electric field intensity
- d) Product of number of flux lines and permeability

7) For static magnetic field	7	) For	static	magnetic	field
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a)  $\nabla \times B = \rho$ 

b)  $\nabla \times \overline{B} = \mu \overline{J}$ 

c)  $\nabla \cdot B = \mu J$ 

- d)  $\nabla \times B = 0$
- 8) The value of the unit vector is
  - a) 0

- b) -1
- c) 1

d) 2

- 9) Unit of potential difference is
  - a) Coulomb

b) Joules

c) Coulomb/Joules

- d) Joules/Coulomb
- 10) If dot product of two vectors is zero, the vectors are
  - a) Perpendicular

b) Parallel

c) Oblique

- d) None of these
- 11) Which of the following are not vector functions in Electromagnetics?
  - a) Gradient
  - b) Divergence
  - c) Curl
  - d) There is no non-vector functions in Electromagnetics
- 12) Vector is the quantity which is completely defined by its
  - a) Magnitude

b) Direction

c) Both a) and b)

d) None of these

- 13) ax.ay =
  - a) az
- b) ax
- c) ay
- d) zero
- 14) For the volume density  $\rho_{\nu}$  the divergence of the E will be equal to
  - a)  $\frac{\rho v}{\epsilon}$
- b)  $\rho_v \epsilon$
- c)  $\epsilon^{\!\scriptscriptstyle 2} \rho_{\scriptscriptstyle \nu}$
- d)  $\frac{\rho v}{\epsilon^2}$



Seat	
No.	

# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTROMAGNETIC ENGINEERING

Day and Date: Thursday, 3-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

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

2) Make suitable assumptions if necessary.

#### SECTION - I

### 2. Solve any three:

 $(3 \times 4 = 12)$ 

- 1) State and prove divergence theorem.
- 2) Show that  $E = -\nabla V$ .
- 3) Derive the continuity equation for current in integral form and point form.
- 4) Explain various charge configurations in electrostatic field.
- 5) Find the force on a 100  $\mu$ C charge at (0, 0, 3) m if four like charges of 20  $\mu$ C are located on the x and y axis at  $\pm$  4m.

### 3. Solve any two:

 $(2 \times 8 = 16)$ 

- 1) Given that  $D = (10 \times 3/3) ax (c/m^2)$ , evaluate both sides of the divergence theorem for the volume of a cube 2 m on the edge, centered at origin and with edges parallel to the axis.
- 2) Derive the expression for electric field intensity due to infinitely long line charge.
- 3) Derive point form of the Gauss's law.

### SECTION - II

### 4. Solve any three:

 $(3\times 4=12)$ 

- 1) Derive the expression on the axis of a circular loop.
- 2) A current filament of  $3\overline{a_x}$  amp. Lies along the x-axis. Find H components at P(-1, 3, 2).



- 3) What is Lorentz force?
- 4) Write Maxwell's equations for static fields.
- 5) A circular loop located on  $x^2 + y^2 = 9$ , z = 0 carries a direct current of 10 A along  $\overline{a_{\phi}}$ . Determine H at (0, 0, 4).

5. Solve any two:

 $(2 \times 8 = 16)$ 

- 1) Derive an expression for magnetic field intensity due to finite long straight current filament.
- 2) Derive expression for point form of Ampere's law.
- 3) Evaluate both sides of Stroke's theorem for the field

$$\overline{H} = \left(\frac{y^2 z}{x}\right) \overline{a_x} + \left(\frac{0.5 y^2 z^2}{x^2}\right) \overline{a_z}$$

And find current in the  $\overline{a_y}$  direction crossing the square surface in the plane y = 2 bounded by x = z = 1 and x = z = 2.

Set Q

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### T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 **ELECTROMAGNETIC ENGINEERING**

Day and Date: Thursday, 3-5-2018 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.

1	Choose	the	correct	answer	
1.		шс	COLLECT	allowel	

	01	nly. Don't forget i f Page.	ective type questi to mention, Q.P. S mptions if necessa	Set (P/Q/R/S	_
		MCQ/Objective T	ype Questions		
ratio	n : 30 Minutes				Marks: 14
Ch	oose the correct an	swer:			
1)	Vector is the quant a) Magnitude c) Both a) and b)	tity which is compl	letely defined by its b) Direction d) None of these	3	
2)	ax.ay = a) az	b) ax	c) ay	d) zero	
3)	For the volume der	nsity $ ho_{_{ m v}}$ the diverg	ence of the E will b	e equal to	
	a) $\frac{\rho v}{\epsilon}$	b) $\rho_{\nu} \epsilon$	c) $\epsilon^2 \rho_{\nu}$	d) $\frac{\rho v}{\epsilon^2}$	
4)	For free space $\alpha$ va a) 1.5	alue is b) 0	c) 2.5	d) 5.6	
5)	A charge of $2 \times 10^{\circ}$ distance to the ot vacuum. a) 0.03	ther charge of 4.5			
6)	The velocity of EM	•	•	,	

a)  $3 \times 10^8$  cm/s

b)  $3 \times 10^8$  m/hou

c)  $3 \times 10^8$  m/s

d)  $3 \times 10^{12} \,\text{m/s}$ 



- 7)  $\nabla \times \overline{E} = -\mu \frac{\partial H}{\partial t}$  is
  - a) Coulomb's law
  - c) Faradays law

- b) Gauss law
- d) Ohm's law
- 8) Lorentz force equation is
  - a)  $F = Q \times [E + V \times B]$
  - c)  $F = Q \times [V + E \times B]$

- b)  $F = Q[E + V \times B]$
- d)  $F = Q [B + V \times B]$
- 9) The electric flux density is the
  - a) Product of permittivity and electric field intensity
  - b) Product of number of flux lines and permittivity
  - c) Product of permeability and electric field intensity
  - d) Product of number of flux lines and permeability
- 10) For static magnetic field
  - a)  $\nabla \times B = \rho$

b)  $\nabla \times \overline{B} = \mu \overline{J}$ 

c)  $\nabla \cdot B = \mu J$ 

- d)  $\nabla \times B = 0$
- 11) The value of the unit vector is
  - a) 0

- b) -1
- c) 1
- d) 2

- 12) Unit of potential difference is
  - a) Coulomb

b) Joules

c) Coulomb/Joules

- d) Joules/Coulomb
- 13) If dot product of two vectors is zero, the vectors are
  - a) Perpendicular

b) Parallel

c) Oblique

- d) None of these
- 14) Which of the following are not vector functions in Electromagnetics?
  - a) Gradient
  - b) Divergence
  - c) Curl
  - d) There is no non-vector functions in Electromagnetics



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# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTROMAGNETIC ENGINEERING

Day and Date: Thursday, 3-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

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

2) Make suitable assumptions if necessary.

#### SECTION - I

### 2. Solve any three:

 $(3 \times 4 = 12)$ 

- 1) State and prove divergence theorem.
- 2) Show that  $E = -\nabla V$ .
- 3) Derive the continuity equation for current in integral form and point form.
- 4) Explain various charge configurations in electrostatic field.
- 5) Find the force on a 100  $\mu$ C charge at (0, 0, 3) m if four like charges of 20  $\mu$ C are located on the x and y axis at  $\pm$  4m.

## 3. Solve any two:

 $(2 \times 8 = 16)$ 

- 1) Given that  $D = (10 \times 3/3) ax (c/m^2)$ , evaluate both sides of the divergence theorem for the volume of a cube 2 m on the edge, centered at origin and with edges parallel to the axis.
- 2) Derive the expression for electric field intensity due to infinitely long line charge.
- 3) Derive point form of the Gauss's law.

### SECTION - II

## 4. Solve any three:

 $(3\times 4=12)$ 

- 1) Derive the expression on the axis of a circular loop.
- 2) A current filament of  $3\overline{a_x}$  amp. Lies along the x-axis. Find H components at P(-1, 3, 2).

Set R



- 3) What is Lorentz force?
- 4) Write Maxwell's equations for static fields.
- 5) A circular loop located on  $x^2 + y^2 = 9$ , z = 0 carries a direct current of 10 A along  $\overline{a_{\phi}}$ . Determine H at (0, 0, 4).

5. Solve any two:

 $(2 \times 8 = 16)$ 

- 1) Derive an expression for magnetic field intensity due to finite long straight current filament.
- 2) Derive expression for point form of Ampere's law.
- 3) Evaluate both sides of Stroke's theorem for the field

$$\overline{H} = \left(\frac{y^2 z}{x}\right) \overline{a_x} + \left(\frac{0.5 y^2 z^2}{x^2}\right) \overline{a_z}$$

And find current in the  $\overline{a_y}$  direction crossing the square surface in the plane y = 2 bounded by x = z = 1 and x = z = 2.

Set R

Seat	
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Set S

# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTROMAGNETIC ENGINEERING

Day and Date: Thursday, 3-5-2018 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) Make suitable assumptions if **necessary**.

### **MCQ/Objective Type Questions**

Duration: 30 Minutes Marks: 14

- 1. Choose the correct answer:
  - 1) The velocity of EM wave in free space is

a) 
$$3 \times 10^8$$
 cm/s

b)  $3 \times 10^8$  m/hou

c) 
$$3 \times 10^8$$
 m/s

d)  $3 \times 10^{12} \,\text{m/s}$ 

2) 
$$\nabla \times \overline{E} = -\mu \frac{\partial H}{\partial t}$$
 is

a) Coulomb's law

b) Gauss law

c) Faradays law

- d) Ohm's law
- 3) Lorentz force equation is

a) 
$$F = Q \times [E + V \times B]$$

b) 
$$F = Q[E + V \times B]$$

c) 
$$F = Q \times [V + E \times B]$$

d) 
$$F = Q[B + V \times B]$$

- 4) The electric flux density is the
  - a) Product of permittivity and electric field intensity
  - b) Product of number of flux lines and permittivity
  - c) Product of permeability and electric field intensity
  - d) Product of number of flux lines and permeability

vacuum.

a) 0.03

5)	For static magnetic a) $\nabla \times B = \rho$ c) $\nabla \cdot B = \mu J$	c field				
6)	The value of the una) 0	nit vector is b) -1	c)	1	d)	2
7)	Unit of potential difa) Coulomb  c) Coulomb/Joules		,	Joules Joules/Coulom	b	
8)	If dot product of tw a) Perpendicular c) Oblique	o vectors is zero,	b)	vectors are Parallel None of these		
9)	<ul><li>Which of the follow</li><li>a) Gradient</li><li>b) Divergence</li><li>c) Curl</li><li>d) There is no nor</li></ul>					agnetics ?
10)	Vector is the quant a) Magnitude c) Both a) and b)	ity which is compl	b)	ly defined by its Direction None of these		
11)	ax.ay = a) az	b) ax	c)	ay	d)	zero
12)	For the volume de	nsity $ ho_{_{\scriptscriptstyle  m V}}$ the diverge	enc	e of the E will b	e e	qual to
	a) $\frac{\rho v}{\epsilon}$	b) $\rho_{\nu}\epsilon$	c)	$\epsilon^2 \rho_{_{\nu}}$	d)	$\frac{\rho \nu}{\epsilon^2}$
13)	For free space $\alpha$ value a) 1.5	alue is b) 0	c)	2.5	d)	5.6
14)	A charge of $2 \times 10^{\circ}$ distance to the ot			-		

b) 0.05 c) 0.07 d) 0.09



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# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTROMAGNETIC ENGINEERING

Day and Date: Thursday, 3-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

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

2) Make suitable assumptions if necessary.

#### SECTION - I

### 2. Solve any three:

 $(3 \times 4 = 12)$ 

- 1) State and prove divergence theorem.
- 2) Show that  $E = -\nabla V$ .
- 3) Derive the continuity equation for current in integral form and point form.
- 4) Explain various charge configurations in electrostatic field.
- 5) Find the force on a 100  $\mu$ C charge at (0, 0, 3) m if four like charges of 20  $\mu$ C are located on the x and y axis at  $\pm$  4m.

### 3. Solve any two:

 $(2 \times 8 = 16)$ 

- 1) Given that  $D = (10 \times 3/3) ax (c/m^2)$ , evaluate both sides of the divergence theorem for the volume of a cube 2 m on the edge, centered at origin and with edges parallel to the axis.
- 2) Derive the expression for electric field intensity due to infinitely long line charge.
- 3) Derive point form of the Gauss's law.

### SECTION - II

## 4. Solve any three:

 $(3\times 4=12)$ 

- 1) Derive the expression on the axis of a circular loop.
- 2) A current filament of  $3\overline{a_x}$  amp. Lies along the x-axis. Find H components at P(-1, 3, 2).



- 3) What is Lorentz force?
- 4) Write Maxwell's equations for static fields.
- 5) A circular loop located on  $x^2 + y^2 = 9$ , z = 0 carries a direct current of 10 A along  $\overline{a_{\phi}}$ . Determine H at (0, 0, 4).

5. Solve any two:

 $(2 \times 8 = 16)$ 

- 1) Derive an expression for magnetic field intensity due to finite long straight current filament.
- 2) Derive expression for point form of Ampere's law.
- 3) Evaluate both sides of Stroke's theorem for the field

$$\overline{H} = \left(\frac{y^2 z}{x}\right) \overline{a_x} + \left(\frac{0.5 y^2 z^2}{x^2}\right) \overline{a_z}$$

And find current in the  $\overline{a_y}$  direction crossing the square surface in the plane y = 2 bounded by x = z = 1 and x = z = 2.

Set S



**SLR-TC - 491** 

Seat	
No.	

## T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018 **INSTRUMENTATION TECHNIQUES**

Day and Date: Friday, 4-5-2018 Total 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 wherever necessary.
- 4) Non-programmable calculators are **permitted**.

#### **MCQ/Objective Type Questions**

**Duration: 30 Minutes** Marks: 14  $(14 \times 1 = 14)$ 1. Solve the following:

- 1) In an LVDT the two secondary windings are connected in differential to obtain
  - a) Higher output voltage
  - b) An output voltage which is phase sensitive i.e. the output voltage has a phase which can lead us to conclusion whether the displacement of the core tool place from right to left or from left to right
  - c) In order to establish the null or the reference point for the displacement of the core
  - d) Both b and c
- 2) The dynamic characteristics of capacitive transducers are similar to those of
  - a) Low pass filter
- b) High pass filter c) Notch filter
- d) Band stop filters

- 3) Quartz and Rochelle salt belong to
  - a) Nature group of piezo electric material
  - b) Synthetic group of piezo-electric material
  - c) Can belong to nature or synthetic group of piezo-electric material provided properly polarized
  - d) All of these
- 4) Piezo-elecric transducers are
  - a) Passive transducers

b) Active transducers

c) Inverse transducers

d) b and c

- 5) In FM systems operate at
  - a) VHF and UHF
- b) Only VHF
- c) Only MF
- d) MF and HF

d) None of these



6)	Time division multiplexing requires				
	a) Constant data transmission	b) Transmission of data sample			
	c) Transmission of data at random	d) Transmission of data of only one measured			
7)	Modem is an acronym of				
	a) Modulation	b) Demodulation			
	c) Modulation and demodulation	d) All of these			
8)	If an information is required to be stored over	er a short interval of time			
	a) A single number/devices should be used	I			
	b) A storage type oscilloscope should be us	sed			
	c) A CRO with photographic equipment sho	ould be used			
	d) A direct writing recorder or a magnetic to	ape recorder should be used			
9)	The machine interpretable output from an ar	nalog transducer can be had from			
	a) Magnetic tapes	b) Punched cards and tapes			
	c) Teletypewriter	d) All of these			
10)	Period measurement is done in frequency m	neters for achieving high accuracy in the case of			
	a) High frequencies	b) Medium frequencies			
	c) DC	d) Low frequencies			
11)	A digital voltmeter uses an A/D converter v comparator and has a relatively fixed convers The A to D converter is				
	a) Successive approximation converter	b) Digital ramp converter			
	c) Digital slope converter	d) All of these			
12)	X-Y recorders				
	a) Record one quantity with respect to another	ther quantity			
	b) Record one quantity on X axis with response	ect to time on Y axis			
	c) Record one quantity on Y axis with response	ect to time on X axis			
	d) None of these				
13)	The advantages of FM magnetic tape record	ding are			
	a) It can record from dc to several KHz				
	b) It is free from dropout effects				
	<ul> <li>c) It is independent of amplitude variations of input signal</li> </ul>	and accurately reproduces the waveform			
	d) All of these				
14)	When measuring strain, ballast circuits use done when,	a capacitor to act as high pass filter. This is			
	a) Static strains are being measured	a) Static strains are being measured			
	b) Dynamic strains are being measured				
	c) Both static and dynamics strains are bei	ng measured			



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# T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018 INSTRUMENTATION TECHNIQUES

Day and Date: Friday, 4-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

**Instructions**: 1) Assume suitable data **wherever** necessary.

2) Non-programmable calculators are **permitted**.

SECTION - I

2. Solve any three : (3×4=12)

- a) State the errors occurring in the instrumentation system and discuss the methods to minimise them.
- b) What is mean transducer? State types of transducer. Explain any one.
- c) Explain comparator with necessary diagram.
- d) Draw block diagram of instrumentation system and explain the function of each block.

3. Solve any two: (2×8=16)

- a) Short note on:
  - I) Modulator
  - II) Demodulator
- b) Explain the passive filter with its frequency graph.
- c) Explain the working principle and construction of LVDT and thermocouple.

SECTION - II

4. Solve any three: (3×4=12)

- a) Explain seven segment displays with necessary diagram.
- b) Explain Radio frequency telemetry system.
- c) Describe the oscilloscope with suitable diagram.
- d) Draw and explain architecture of PLC.

- 5. Solve any two: (2×8=16)
  - a) Short note on:
    - I) Function Generator
    - II) Spectrum analyser.
  - b) Explain the working of Tape recorder and give classification of recorders. State the advantages of recorder.
  - c) Draw Ladder diagram of PLC. What is the role of PLC in automation?

# **SLR-TC - 491**

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Set Q

# T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018 INSTRUMENTATION TECHNIQUES

Day and Date: Friday, 4-5-2018 Total 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 **wherever** necessary.
- 4) Non-programmable calculators are **permitted**.

#### **MCQ/Objective Type Questions**

Duration : 30 Minutes

1. Solve the following : (14×1=14)

- 1) If an information is required to be stored over a short interval of time
  - a) A single number/devices should be used
  - b) A storage type oscilloscope should be used
  - c) A CRO with photographic equipment should be used
  - d) A direct writing recorder or a magnetic tape recorder should be used
- 2) The machine interpretable output from an analog transducer can be had from
  - a) Magnetic tapes

b) Punched cards and tapes

c) Teletypewriter

- d) All of these
- 3) Period measurement is done in frequency meters for achieving high accuracy in the case of
  - a) High frequencies

b) Medium frequencies

c) DC

- d) Low frequencies
- 4) A digital voltmeter uses an A/D converter which needs a start pulse, uses an analog comparator and has a relatively fixed conversion time independent of the applied voltage. The A to D converter is
  - a) Successive approximation converter
- b) Digital ramp converter

c) Digital slope converter

d) All of these

- 5) X-Y recorders
  - a) Record one quantity with respect to another quantity
  - b) Record one quantity on X axis with respect to time on Y axis
  - c) Record one quantity on Y axis with respect to time on X axis
  - d) None of these



- 6) The advantages of FM magnetic tape recording are
  - a) It can record from dc to several KHz
  - b) It is free from dropout effects
  - c) It is independent of amplitude variations and accurately reproduces the waveform of input signal
  - d) All of these
- 7) When measuring strain, ballast circuits use a capacitor to act as high pass filter. This is done when.
  - a) Static strains are being measured
  - b) Dynamic strains are being measured
  - c) Both static and dynamics strains are being measured
  - d) None of these
- 8) In an LVDT the two secondary windings are connected in differential to obtain
  - a) Higher output voltage
  - b) An output voltage which is phase sensitive i.e. the output voltage has a phase which can lead us to conclusion whether the displacement of the core tool place from right to left or from left to right
  - c) In order to establish the null or the reference point for the displacement of the core
  - d) Both b and c
- 9) The dynamic characteristics of capacitive transducers are similar to those of
  - a) Low pass filter
- b) High pass filter c) Notch filter
- d) Band stop filters

- 10) Quartz and Rochelle salt belong to
  - a) Nature group of piezo electric material
  - b) Synthetic group of piezo-electric material
  - c) Can belong to nature or synthetic group of piezo-electric material provided properly polarized
  - d) All of these
- 11) Piezo-elecric transducers are
  - a) Passive transducers

b) Active transducers

c) Inverse transducers

d) b and c

- 12) In FM systems operate at
  - a) VHF and UHF
- b) Only VHF
- c) Only MF
- d) MF and HF

- 13) Time division multiplexing requires
  - a) Constant data transmission
  - c) Transmission of data at random
- b) Transmission of data sample
- d) Transmission of data of only one measured

- 14) Modem is an acronym of
  - a) Modulation

- b) Demodulation
- c) Modulation and demodulation
- d) All of these



Seat	
No.	

# T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018 INSTRUMENTATION TECHNIQUES

Day and Date: Friday, 4-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

**Instructions**: 1) Assume suitable data **wherever** necessary.

2) Non-programmable calculators are **permitted**.

SECTION - I

2. Solve any three : (3×4=12)

- a) State the errors occurring in the instrumentation system and discuss the methods to minimise them.
- b) What is mean transducer? State types of transducer. Explain any one.
- c) Explain comparator with necessary diagram.
- d) Draw block diagram of instrumentation system and explain the function of each block.

3. Solve any two: (2×8=16)

- a) Short note on:
  - I) Modulator
  - II) Demodulator
- b) Explain the passive filter with its frequency graph.
- c) Explain the working principle and construction of LVDT and thermocouple.

SECTION - II

4. Solve any three: (3×4=12)

- a) Explain seven segment displays with necessary diagram.
- b) Explain Radio frequency telemetry system.
- c) Describe the oscilloscope with suitable diagram.
- d) Draw and explain architecture of PLC.

5. Solve any two: (2×8=16)

- a) Short note on:
  - I) Function Generator
  - II) Spectrum analyser.
- b) Explain the working of Tape recorder and give classification of recorders. State the advantages of recorder.
- c) Draw Ladder diagram of PLC. What is the role of PLC in automation?



# **SLR-TC - 491**

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# T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018 **INSTRUMENTATION TECHNIQUES**

Day and Date : Friday, 4-5-201	3 Total 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.

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	MCQ/Objective 1	Гуре Questions	
Dura	ation : 30 Minutes		Marks: 14
1.	Solve the following:		(14×1=14)
	1) In FM systems operate at		
	a) VHF and UHF b) Only VHF	c) Only MF d) MF and	HF
	2) Time division multiplexing requires		
	a) Constant data transmission	b) Transmission of data sample	;
	c) Transmission of data at random	d) Transmission of data of only	one measured
	3) Modem is an acronym of		
	a) Modulation	b) Demodulation	
	c) Modulation and demodulation	d) All of these	
	4) If an information is required to be stored o	ver a short interval of time	
	a) A single number/devices should be us	ed	
	b) A storage type oscilloscope should be		
	c) A CRO with photographic equipment s		
	d) A direct writing recorder or a magnetic		
	5) The machine interpretable output from an	•	1
	a) Magnetic tapes	b) Punched cards and tapes	
	c) Teletypewriter	d) All of these	
	6) Period measurement is done in frequency		/ in the case of
	a) High frequencies	b) Medium frequencies	
	c) DC	d) Low frequencies	



7)	A digital voltmeter uses an A/D converter which needs a start pulse, uses an ana	log
	comparator and has a relatively fixed conversion time independent of the applied volta	ge.
	The A to D converter is	_

- a) Successive approximation converter
- b) Digital ramp converter

c) Digital slope converter

d) All of these

- 8) X-Y recorders
  - a) Record one quantity with respect to another quantity
  - b) Record one quantity on X axis with respect to time on Y axis
  - c) Record one quantity on Y axis with respect to time on X axis
  - d) None of these
- 9) The advantages of FM magnetic tape recording are
  - a) It can record from dc to several KHz
  - b) It is free from dropout effects
  - c) It is independent of amplitude variations and accurately reproduces the waveform of input signal
  - d) All of these
- 10) When measuring strain, ballast circuits use a capacitor to act as high pass filter. This is done when.
  - a) Static strains are being measured
  - b) Dynamic strains are being measured
  - c) Both static and dynamics strains are being measured
  - d) None of these
- 11) In an LVDT the two secondary windings are connected in differential to obtain
  - a) Higher output voltage
  - b) An output voltage which is phase sensitive i.e. the output voltage has a phase which can lead us to conclusion whether the displacement of the core tool place from right to left or from left to right
  - c) In order to establish the null or the reference point for the displacement of the core
  - d) Both b and c
- 12) The dynamic characteristics of capacitive transducers are similar to those of
  - a) Low pass filter
- b) High pass filter c) Notch filter
- d) Band stop filters

- 13) Quartz and Rochelle salt belong to
  - a) Nature group of piezo electric material
  - b) Synthetic group of piezo-electric material
  - c) Can belong to nature or synthetic group of piezo-electric material provided properly polarized
  - d) All of these
- 14) Piezo-elecric transducers are
  - a) Passive transducers

b) Active transducers

c) Inverse transducers

d) b and c



Seat	
No.	

# T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018 INSTRUMENTATION TECHNIQUES

Day and Date: Friday, 4-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

**Instructions**: 1) Assume suitable data **wherever** necessary.

2) Non-programmable calculators are **permitted**.

SECTION - I

2. Solve any three : (3×4=12)

- a) State the errors occurring in the instrumentation system and discuss the methods to minimise them.
- b) What is mean transducer? State types of transducer. Explain any one.
- c) Explain comparator with necessary diagram.
- d) Draw block diagram of instrumentation system and explain the function of each block.

3. Solve any two: (2×8=16)

- a) Short note on:
  - I) Modulator
  - II) Demodulator
- b) Explain the passive filter with its frequency graph.
- c) Explain the working principle and construction of LVDT and thermocouple.

SECTION - II

4. Solve any three: (3×4=12)

- a) Explain seven segment displays with necessary diagram.
- b) Explain Radio frequency telemetry system.
- c) Describe the oscilloscope with suitable diagram.
- d) Draw and explain architecture of PLC.

5. Solve any two: (2×8=16)

- a) Short note on:
  - I) Function Generator
  - II) Spectrum analyser.
- b) Explain the working of Tape recorder and give classification of recorders. State the advantages of recorder.
- c) Draw Ladder diagram of PLC. What is the role of PLC in automation?



**SLR-TC - 491** 

Set S

# Seat No.

# T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018 INSTRUMENTATION TECHNIQUES

Day and Date: Friday, 4-5-2018 Total Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions:

- 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: 14

1. Solve the following: (14×1=14)

- 1) Period measurement is done in frequency meters for achieving high accuracy in the case of
  - a) High frequencies

b) Medium frequencies

c) DC

- d) Low frequencies
- A digital voltmeter uses an A/D converter which needs a start pulse, uses an analog comparator and has a relatively fixed conversion time independent of the applied voltage. The A to D converter is
  - a) Successive approximation converter
- b) Digital ramp converter

c) Digital slope converter

d) All of these

- 3) X-Y recorders
  - a) Record one quantity with respect to another quantity
  - b) Record one quantity on X axis with respect to time on Y axis
  - c) Record one quantity on Y axis with respect to time on X axis
  - d) None of these
- 4) The advantages of FM magnetic tape recording are
  - a) It can record from dc to several KHz
  - b) It is free from dropout effects
  - It is independent of amplitude variations and accurately reproduces the waveform of input signal
  - d) All of these



R-T	C – 491	-2-			
5)	When measuring strain, ballast circudone when,	its use a ca	pacitor to a	ct as high pass filter.	This is
	a) Static strains are being measure	d			
	b) Dynamic strains are being measi				
	c) Both static and dynamics strains	are being r	neasured		
	d) None of these				
6)	In an LVDT the two secondary windi	ngs are cor	nected in di	fferential to obtain	
•	a) Higher output voltage				
	<ul> <li>An output voltage which is phase which can lead us to conclusion from right to left or from left to rig</li> </ul>	whether the			
	c) In order to establish the null or th	e reference	point for the	e displacement of the	core
	d) Both b and c				
7)	The dynamic characteristics of capa	citive transc	ducers are s	milar to those of	
	a) Low pass filter b) High pas	s filter c)	Notch filter	d) Band stop fi	Iters
8)	Quartz and Rochelle salt belong to				
	a) Nature group of piezo electric ma	aterial			
	b) Synthetic group of piezo-electric	material			
	c) Can belong to nature or synthetic (	group of piez	zo-electric ma	aterial provided proper	ly polarized
	d) All of these				
9)	Piezo-elecric transducers are				
	a) Passive transducers	b)	Active trans	ducers	
	c) Inverse transducers	d)	b and c		
10)	In FM systems operate at				
	a) VHF and UHF b) Only VH	F c)	Only MF	d) MF and HF	
11)	Time division multiplexing requires				
	a) Constant data transmission	b)	Transmission	on of data sample	
	c) Transmission of data at random	d)	Transmission	on of data of only one	measured
12)	Modem is an acronym of				
	a) Modulation	b)	Demodulati	on	
	c) Modulation and demodulation	d)	All of these		
13)	If an information is required to be sto	red over a	short interva	l of time	
	a) A single number/devices should	be used			
	b) A storage type oscilloscope shou				
	c) A CRO with photographic equipm	nent should	be used		

a) Magnetic tapes

b) Punched cards and tapes

c) Teletypewriter

d) All of these



Seat	
No.	

# T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018 INSTRUMENTATION TECHNIQUES

Day and Date: Friday, 4-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

**Instructions**: 1) Assume suitable data **wherever** necessary.

2) Non-programmable calculators are **permitted**.

SECTION - I

2. Solve any three : (3×4=12)

- a) State the errors occurring in the instrumentation system and discuss the methods to minimise them.
- b) What is mean transducer? State types of transducer. Explain any one.
- c) Explain comparator with necessary diagram.
- d) Draw block diagram of instrumentation system and explain the function of each block.

3. Solve any two: (2×8=16)

- a) Short note on:
  - I) Modulator
  - II) Demodulator
- b) Explain the passive filter with its frequency graph.
- c) Explain the working principle and construction of LVDT and thermocouple.

SECTION - II

4. Solve any three: (3×4=12)

- a) Explain seven segment displays with necessary diagram.
- b) Explain Radio frequency telemetry system.
- c) Describe the oscilloscope with suitable diagram.
- d) Draw and explain architecture of PLC.

- 5. Solve any two: (2×8=16)
  - a) Short note on:
    - I) Function Generator
    - II) Spectrum analyser.
  - b) Explain the working of Tape recorder and give classification of recorders. State the advantages of recorder.
  - c) Draw Ladder diagram of PLC. What is the role of PLC in automation?



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## T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 **MICROPROCESSOR AND ITS APPLICATIONS**

Day and Date: Saturday, 5-5-2018 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

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

- 2) Make suitable assumption 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	e Type Questions	
Duration : 30 Minutes		Marks: 14
1. Choose the correct alternative:		(14×1=14)
1) Minimum clock frequency of 8085	microprocessors is	
a) 300 kHz	b) 100 kHz	
c) 500 kHz	d) 400 kHz	
2) Which one is the bi-directional?		
a) Address bus	b) Data bus	
c) Both a) and b)	d) None of the above	
3) Which one is the not special purpo	ose resister?	
a) Stack pointer	b) Program counter	
c) Increment/Decrement latch	d) Accumulator	
4) LHLD address is a		
a) Direct addressing	b) Indirect addressing	
c) Resister addressing	d) None of the above add	ressing

5)	LDA address is a						
	a) 1 byte instruction			b) 2 byte instruction			
	c) 3 byte instruction	on	d)	4 byte instruction	on		
6)	Take odd man out	: TRAP, INTR, $S_0$ ,	RS	T 7.5.			
	a) TRAP	b) INTR	c)	RST 7.5	d)	S <sub>o</sub>	
7)	Signal required for	demultiplexing of a	add	ress and data b	us		
	a) ALE	b) $S_0$ and $S_1$	c)	IO/M	d)	All of these	
8)	Which of below is	a functional block o	of 82	255 ?			
	a) Modem control		b)	Receive buffer			
	c) Group A contro	ol	d)	Transmit buffer			
9)	Control word nece	ssary only in casca	.de	mode of 8259 P	lC		
	a) ICW1	b) ICW2	c)	ICW3	d)	ICW4	
10)	Which of below is	not a functional blo	ck (	of 8251 ?			
	a) Read/write con	trol logic	b)	Modem control			
	c) Group A contro	ol	d)	Data bus buffer	r		
11)	Which of below is	not a functional blo	ck (	of 8259 ?			
	a) In service regis	ster	b)	Modem control			
	c) Priority resolve	r	d)	Data bus buffer	r		
12)	RIM instruction for	mat bit D4 is					
	a) SID	b) IE	c)	I 5.5	d)	M 7.5	
13)	SIM instruction for	mat bit D4 is					
	a) SID	b) SOD	c)	R 7.5	d)	None of these	
14)	8259 is a						
	a) USART		b)	PPI			
	c) PIT		d)	PIC			



Seat	
No.	

# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 MICROPROCESSOR AND ITS APPLICATIONS

Day and Date: Saturday, 5-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

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

2) Make suitable assumption if necessary.

#### SECTION - I

#### 2. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) Draw the timing diagram of memory read cycle.
- 2) Explain following instructions:
  - a) Accumulator
  - b) ALE
  - c) ALU
  - d) General purpose resister.
- 3) Classify memory and explain one of them.
- 4) Write a program to multiply two 8 bit numbers. Also give the result.
- 5) List out the features of 8085 microprocessor.

#### 3. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) Draw and explain internal architecture of 8085.
- 2) Write a program of arranging 10 numbers in descending order. Assume suitable data and addresses.
- 3) Explain the different types of memory in detail.

#### SECTION - II

4. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) What is ICW2 of 8259 PIC?
- 2) List out the features of 8251.
- 3) Comparison between synchronous and asynchronous I/O.
- 4) Draw the block diagram of 8255.
- 5) Explain dual slope ADC.
- 5. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) What is DAC? Explain weighted register DAC.
- 2) Draw and explain detailed interfacing of 8254 with 8085. Assume suitable addresses.
- 3) Explain with block diagram, frequency measurement using 8085.

Set P



No.
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## T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 MICROPROCESSOR AND ITS APPLICATIONS

Day and Date: Saturday, 5-5-2018 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

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

- 2) Make suitable assumption 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 Ton of Page

		rop or rage.				
		MCQ/Objecti	ve Type	Question	s	
Duratio	on : 30 Minutes					Marks: 14
1. Cł	noose the correct a	Ilternative :				(14×1=14)
1)	Which of below is	s a functional b	lock of 8	255 ?		
	a) Modem contr	ol	b)	Receive b	ouffer	
	c) Group A cont	rol	d)	Transmit	buffer	
2)	Control word nec	essary only in o	cascade	mode of 8	259 PIC	
	a) ICW1	b) ICW2	c)	ICW3	d) ICV	V4
3)	Which of below is	s not a function	al block	of 8251?		
	a) Read/write co	ontrol logic	b)	Modem co	ontrol	
	c) Group A cont	rol	d)	Data bus	buffer	
4)	Which of below is	s not a function	al block	of 8259?		
	a) In service reg	ister	b)	Modem co	ontrol	
	c) Priority resolv	ver	d)	Data bus	buffer	
5)	RIM instruction for	ormat bit D4 is				
	a) SID	b) IE	c)	I 5.5	d) M 7	'.5

6)	SIM instruction for	mat bit D4 is				
	a) SID	b) SOD	c)	R 7.5	d)	None of these
7)	8259 is a					
	a) USART		b)	PPI		
	c) PIT		d)	PIC		
8)	Minimum clock fre	quency of 8085 mid	crop	processors is		
	a) 300 kHz		b)	100 kHz		
	c) 500 kHz		d)	400 kHz		
9)	Which one is the b	oi-directional ?				
	a) Address bus		b)	Data bus		
	c) Both a) and b)		d)	None of the ab	ove	•
10)	0) Which one is the not special purpose resister?					
	a) Stack pointer		b)	Program count	er	
	c) Increment/Dec	rement latch	d)	Accumulator		
11)	LHLD address is a	l				
	a) Direct address	ing	b)	Indirect addres	sin	g
	c) Resister addre	ssing	d)	None of the ab	ove	addressing
12)	LDA address is a					
	a) 1 byte instructi	on	b)	2 byte instruction	on	
	c) 3 byte instructi	on	d)	4 byte instruction	on	
13)	Take odd man out	: TRAP, INTR, $S_0$ ,	RS	T 7.5.		
	a) TRAP	b) INTR	c)	RST 7.5	d)	S <sub>0</sub>
14)	Signal required for	demultiplexing of a	add	ress and data b	us	
	a) ALE	b) $S_0$ and $S_1$	c)	IO/M	d)	All of these



Seat	
No.	

# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 MICROPROCESSOR AND ITS APPLICATIONS

Day and Date: Saturday, 5-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

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

2) Make suitable assumption if necessary.

#### SECTION - I

#### 2. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) Draw the timing diagram of memory read cycle.
- 2) Explain following instructions:
  - a) Accumulator
  - b) ALE
  - c) ALU
  - d) General purpose resister.
- 3) Classify memory and explain one of them.
- 4) Write a program to multiply two 8 bit numbers. Also give the result.
- 5) List out the features of 8085 microprocessor.

## 3. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) Draw and explain internal architecture of 8085.
- 2) Write a program of arranging 10 numbers in descending order. Assume suitable data and addresses.
- 3) Explain the different types of memory in detail.

# 

#### SECTION - II

4. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) What is ICW2 of 8259 PIC?
- 2) List out the features of 8251.
- 3) Comparison between synchronous and asynchronous I/O.
- 4) Draw the block diagram of 8255.
- 5) Explain dual slope ADC.

5. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) What is DAC? Explain weighted register DAC.
- 2) Draw and explain detailed interfacing of 8254 with 8085. Assume suitable addresses.
- 3) Explain with block diagram, frequency measurement using 8085.

Set Q



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Seat	Set	R
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## T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 MICROPROCESSOR AND ITS APPLICATIONS

Day and Date: Saturday, 5-5-2018 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

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

- 2) Make suitable assumption 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

		. , po da cononc		
Duration: 30 Minutes	3		Marks: 14	1
1. Choose the corre	ect alternative :		(14×1=14	)
1) LDA address	is a			
a) 1 byte ins	truction	b) 2 byte instru	uction	
c) 3 byte ins	truction	d) 4 byte instru	uction	
2) Take odd ma	n out : TRAP, INTR, S	S <sub>0</sub> , RST 7.5.		
a) TRAP	b) INTR	c) RST 7.5	d) $S_0$	
3) Signal require	ed for demultiplexing o	of address and dat	a bus	
a) ALE	b) $S_0$ and $S_1$	c) IO/M	d) All of these	
4) Which of belo	w is a functional bloc	k of 8255 ?		
a) Modem co	ontrol	b) Receive but	ffer	
c) Group A	control	d) Transmit bu	ıffer	
5) Control word	necessary only in cas	cade mode of 825	9 PIC	
a) ICW1	b) ICW2	c) ICW3	d) ICW4	

6)	Which of below is not a functional block of 8251 ?							
	a)	Read/write con	ontrol logic b) Modem control					
	c)	Group A contro	ol .	d)	Data bus buffe	r		
7)	Wh	nich of below is i	not a functional blo	ck (	of 8259 ?			
	a)	In service regis	ter	b)	Modem control			
	c)	Priority resolve	r	d)	Data bus buffe	r		
8)	RII	M instruction for	mat bit D4 is					
	a)	SID	b) IE	c)	I 5.5	d)	M 7.5	
9)	SIN	A instruction for	mat bit D4 is					
	a)	SID	b) SOD	c)	R 7.5	d)	None of these	
10)	82	59 is a						
	a)	USART		b)	PPI			
	c)	PIT		d)	PIC			
11)	1) Minimum clock frequency of 8085 microprocessors is							
	a)	300 kHz		b)	100 kHz			
	c)	500 kHz		d)	400 kHz			
12)	Wh	nich one is the b	i-directional ?					
	a)	Address bus		b)	Data bus			
	c)	Both a) and b)		d)	None of the ab	ove	•	
13)	) Which one is the not special purpose resister?							
	a)	Stack pointer		b)	Program count	er		
	c)	Increment/Dec	rement latch	d)	Accumulator			
14)	LH	LD address is a						
	a)	Direct addressi	ng	b)	Indirect addres	sin	g	
	c)	Resister addres	ssing	d)	None of the ab	ove	addressing	



Seat	
No.	

# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 MICROPROCESSOR AND ITS APPLICATIONS

Day and Date: Saturday, 5-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

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

2) Make suitable assumption if necessary.

#### SECTION - I

#### 2. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) Draw the timing diagram of memory read cycle.
- 2) Explain following instructions:
  - a) Accumulator
  - b) ALE
  - c) ALU
  - d) General purpose resister.
- 3) Classify memory and explain one of them.
- 4) Write a program to multiply two 8 bit numbers. Also give the result.
- 5) List out the features of 8085 microprocessor.

### 3. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) Draw and explain internal architecture of 8085.
- 2) Write a program of arranging 10 numbers in descending order. Assume suitable data and addresses.
- 3) Explain the different types of memory in detail.



#### SECTION - II

4. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) What is ICW2 of 8259 PIC?
- 2) List out the features of 8251.
- 3) Comparison between synchronous and asynchronous I/O.
- 4) Draw the block diagram of 8255.
- 5) Explain dual slope ADC.

5. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) What is DAC? Explain weighted register DAC.
- 2) Draw and explain detailed interfacing of 8254 with 8085. Assume suitable addresses.
- 3) Explain with block diagram, frequency measurement using 8085.

Set R



Seat No.		Set	S
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# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 MICROPROCESSOR AND ITS APPLICATIONS

Day and Date: Saturday, 5-5-2018 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

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

- 2) Make suitable assumption 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

		o Type diagonome		
Duration: 30 Minutes			Marks : 14	4
1. Choose the correct	t alternative :		(14×1=14)	1)
1) Which of below	v is not a functiona	Il block of 8251 ?		
a) Read/write	control logic	b) Modem co	ntrol	
c) Group A co	ontrol	d) Data bus b	ouffer	
2) Which of below	v is not a functiona	Il block of 8259 ?		
a) In service r	egister	b) Modem co	ntrol	
c) Priority res	olver	d) Data bus b	ouffer	
3) RIM instruction	format bit D4 is			
a) SID	b) IE	c) 15.5	d) M 7.5	
4) SIM instruction	format bit D4 is			
a) SID	b) SOD	c) R 7.5	d) None of these	
5) 8259 is a				
a) USART		b) PPI		
c) PIT		d) PIC		

6)	Minimum clock frequency of 8085 mi			processors is		
	a) 300 kHz		b)	100 kHz		
	c) 500 kHz		d)	400 kHz		
7)	Which one is the b	i-directional ?				
	a) Address bus		b)	Data bus		
	c) Both a) and b)		d)	None of the abo	ove	;
8)	Which one is the n	ot special purpose	res	sister?		
	a) Stack pointer		b)	Program count	er	
	c) Increment/Dec	rement latch	d)	Accumulator		
9)	LHLD address is a					
	a) Direct addressi	ng	b)	Indirect address	sin	g
	c) Resister addres	ssing	d)	None of the abo	ove	addressing
10)	LDA address is a					
	a) 1 byte instruction	on	b)	2 byte instruction	on	
	c) 3 byte instruction		,	4 byte instruction	on	
11)	Take odd man out	•	RS	T 7.5.		
	a) TRAP	b) INTR	c)	RST 7.5	d)	$S_0$
12)	Signal required for	demultiplexing of a	add	ress and data b	us	
	a) ALE	b) S <sub>0</sub> and S <sub>1</sub>	c)	IO/M	d)	All of these
13)	Which of below is a	a functional block o	f 8	255 ?		
	a) Modem control		b)	Receive buffer		
	c) Group A contro	ol .	d)	Transmit buffer		
14)	Control word neces	ssary only in casca	de	mode of 8259 P	IC	
	a) ICW1	b) ICW2	c)	ICW3	d)	ICW4



Seat	
No.	

# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 MICROPROCESSOR AND ITS APPLICATIONS

Day and Date: Saturday, 5-5-2018 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

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

2) Make suitable assumption if necessary.

#### SECTION - I

#### 2. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) Draw the timing diagram of memory read cycle.
- 2) Explain following instructions:
  - a) Accumulator
  - b) ALE
  - c) ALU
  - d) General purpose resister.
- 3) Classify memory and explain one of them.
- 4) Write a program to multiply two 8 bit numbers. Also give the result.
- 5) List out the features of 8085 microprocessor.

## 3. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) Draw and explain internal architecture of 8085.
- 2) Write a program of arranging 10 numbers in descending order. Assume suitable data and addresses.
- 3) Explain the different types of memory in detail.

# 

#### SECTION - II

4. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) What is ICW2 of 8259 PIC?
- 2) List out the features of 8251.
- 3) Comparison between synchronous and asynchronous I/O.
- 4) Draw the block diagram of 8255.
- 5) Explain dual slope ADC.

5. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) What is DAC? Explain weighted register DAC.
- 2) Draw and explain detailed interfacing of 8254 with 8085. Assume suitable addresses.
- 3) Explain with block diagram, frequency measurement using 8085.

Set S

**SLR-TC - 493** 

Seat	
No.	

## T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 **ELEMENTS OF POWER SYSTEM**

Max. Marks: 70 Day and Date: Monday, 7-5-2018

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) All questions are compulsory.

- 2) Figure to the **right** indicates **maximum** marks.
- 3) Assume the suitable data whenever necessary.
- 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.

# MCO/Objective Type Ougetiens

	tive Type Questions
Duration: 30 Minutes	Marks : 14
1. Choose the correct answer:	14
1) In a cable immediately above r	netallic sheath is provided.
<ul> <li>a) Earthing connection</li> </ul>	b) Bedding
c) Armoring	d) None of these
<ol><li>In order to improve the power the power system.</li></ol>	factor which device should be connected to
a) Series capacitor	b) Shunt capacitor
c) Series inductor	d) Shunt inductor
3) Varnished cambric is also know	n as
a) Empire tape b) Rubb	er tape c) Paper tape d) PVC tape
<ol> <li>Corona usually occurs when to conductor succeeds</li> </ol>	ne electrostatic stress in the air around the
a) 30 kV (maximum value)/cm	b) 22 kV (maximum value)/cm
c) 11 kV (rms value)/cm	d) 6.6 kV (rms value)/cm
5) The effect of ice deposition on	conductor is
<ul> <li>a) Increased skin effect</li> </ul>	b) Reduced corona losses
c) Increased weight	d) Reduced sag



6)	Which of the following statements is incorrect?				
	a) As the temperature raises the tension in the transmission line decreases				
	b) As temperature rises the sag in transmission lines reduces				
	c) Tension and sag in transmission lines are complementary to each other				
	d) None of the above				
7)	In transmission syster	n a feeder feeds	power to		
	a) Service mains		b) Generating	stations	
	c) Distributors		d) All of the ab	oove	
8)	The characteristic imp	edance of a trans	smission line de	pends upon	
	a) Shape of the condu	uctor			
	b) Surface treatment	of the conductors			
	c) Conductivity of the	material			
	d) Geometrical config	uration of the cor	nductors		
9)	In any transmission lir	ne, AD – BC =			
	a) 1	b) 2	c) 4	d) 5	
10)	The disadvantage with	n paper as insulat	ting material is		
	a) It is hygroscopic		b) It has high of	capacitance	
	c) It is an organic mat	terial	d) None of the	above	
11)	The bundling of condu	uctors is done prir	marily to		
	a) Reduce reactance		b) Increase rea	actance	
	c) Increase ratio inter	ference	d) Reduce rad	io interference	
12)	The thickness of the la upon	yer of insulation o	on the conductor	r, in cables, depends	
	a) Reactive power		b) Power factor	or	
	c) Voltage		d) Current car	rying capacity	
13)	SAG depends on wha	t factors in transr	nission lines		
	a) Span length				
	b) Tension in the cond	ductors			
	c) Weight of the cond	uctor per unit len	gth		
	d) All the above				
14)	In transmission systemake the shape of	ท between two รเ	upports, due to	SAG the conductors	
	a) Catenary	b) Semi-circule	c) Parabola	d) Hyperbola	



Seat	
No.	

# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELEMENTS OF POWER SYSTEM

Day and Date: Monday, 7-5-2018

Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

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

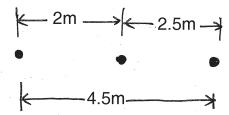
2) Figure to the **right** indicates **maximum** marks.
3) **Assume** the suitable data **whenever** necessary.

#### SECTION - I

#### 2. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain the concept of self GMD.
- 2) Criteria for choosing conductor material. Describe ACSR conductors.
- 3) Write short note on skin effect.
- 4) Draw and describe suspension type insulators along with its advantages.
- 5) Explain inductance of single phase two wire line.
- 6) A 3 phase, 50 Hz, 66 KV overhead line conductors are placed in horizontal plane as shown in figure. The conductor diameter is 1.25 cm. If the line length is 100 km, calculate:
  - i) Capacitance per phase
  - ii) Charging current per phase.



### 3. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Derive expression of voltage distribution in 3 insulators in a string.
- 2) A 3-phase transmission line is being supported by three disc insulators. The potential across top unit (i.e. near to tower) and middle unit are 8 KV and 11 KV respectively. Calculate:
  - i) The ratio of capacitance between pin and earth to the self-capacitance of each unit.
  - ii) The line voltage.
  - iii) String efficiency.
- 3) Derive the expression for inductance of 3-phase overhead line for un-symmetrical spacing.



#### SECTION - II

#### 4. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Derive an expression for voltage regulation and efficiency of Medium transmission line consider nominal-∏ method along with the equivalent circuit and phasor diagram.
- 2) Draw and describe both types of pressure cables.
- 3) A single core cable of conductor diameter 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 KV 3-phase system. Two intersheath of diameter 3.1 cm and 4.2 cm are introduced between the core and lead sheath. If maximum stress in the layers is same; find the voltages on the intersheath.
- 4) Draw and explain the dielectric strength in a single core underground cable with the ratio of maximum and minimum value of potential gradient.
- 5) Derive the generalized circuit constants for medium line using nominal T-method.
- 6) Explain economics of power factor improvement.

### 5. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Explain the capacitance of 3-core belted type cables.
- 2) A 100 km long 3-phase, 50 Hz transmission line has following constants : Resistance/phase/km =  $0.1\Omega$

Reactance/phase/km =  $0.5\Omega$ 

Susceptance/phase/km =  $10 \times 10^{-6}$  S

If line supplies load of 20 MW at 0.9 p.f. lagging at 66 KV at the receiving end, calculate by nominal- $\Pi$  method.

- i) Sending end power factor
- ii) Regulation
- iii) Transmission efficiency.
- 3) Derive an expression for sending end and receiving end voltage and current for Long Transmission line. (Rigorous method).

# Seat No.

c) Voltage

# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018

ELEMENTS OF P	OWER SYSTEM
Day and Date : Monday, 7-5-2018 Time : 10.00 a.m. to 1.00 p.m.	Max. Marks: 70
3) <b>Assume</b> the suitab 4) Q. No. <b>1</b> is <b>compu</b> <b>30 minutes</b> in Ans carries <b>one</b> mark. 5) <b>Answer MCQ/Obje</b>	indicates maximum marks. ille data whenever necessary. Isory. It should be solved in first wer Book Page No. 3. Each question ective type questions on Page No. 3 t to mention, Q.P. Set (P/Q/R/S) on
MCQ/Objective Touration: 30 Minutes	<b>Type Questions</b> Marks : 14
1. Choose the correct answer:	14
1) The characteristic impedance of a tra	ansmission line depends upon
<ul> <li>a) Shape of the conductor</li> </ul>	
b) Surface treatment of the conductor	ors
<ul><li>c) Conductivity of the material</li></ul>	
d) Geometrical configuration of the c	
2) In any transmission line, AD – BC =	
a) 1 b) 2	,
<ul><li>3) The disadvantage with paper as insu</li><li>a) It is hygroscopic</li></ul>	b) It has high capacitance
c) It is an organic material	d) None of the above
4) The bundling of conductors is done p	•
a) Reduce reactance	b) Increase reactance
<ul> <li>c) Increase ratio interference</li> </ul>	d) Reduce radio interference
<ol><li>The thickness of the layer of insulatio upon</li></ol>	n on the conductor, in cables, depends
a) Reactive power	b) Power factor

d) Current carrying capacity



6)	6) SAG depends on what factors in transmission lines				
	a) Span length				
	b) Tension in the conductors				
	c) Weight of the conductor per unit len	gth			
	d) All the above				
7)	In transmission system between two su	upports, due to SAG the conductors			
	take the shape of	a) Davidada — al\ I birrarila da			
0/	a) Catenary b) Semi-circule				
8)	In a cable immediately above metallic s	·			
	a) Earthing connection	b) Bedding			
- `	c) Armoring	d) None of these			
9)	In order to improve the power factor w the power system.	hich device should be connected to			
	a) Series capacitor	b) Shunt capacitor			
	c) Series inductor	d) Shunt inductor			
10)	Varnished cambric is also known as				
	a) Empire tape b) Rubber tape	c) Paper tape d) PVC tape			
11)	11) Corona usually occurs when the electrostatic stress in the air around the conductor succeeds				
	a) 30 kV (maximum value)/cm	b) 22 kV (maximum value)/cm			
	c) 11 kV (rms value)/cm	d) 6.6 kV (rms value)/cm			
12)	The effect of ice deposition on conduct	or is			
	a) Increased skin effect	b) Reduced corona losses			
	c) Increased weight	d) Reduced sag			
13)	Which of the following statements is inc	correct?			
	a) As the temperature raises the tension	on in the transmission line decreases			
	b) As temperature rises the sag in tran	smission lines reduces			
	c) Tension and sag in transmission line	es are complementary to each other			
	d) None of the above				
14)	In transmission system a feeder feeds	power to			
,	a) Service mains	b) Generating stations			
	c) Distributors	d) All of the above			
	5,554.5.5				



Seat	
No.	

# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELEMENTS OF POWER SYSTEM

Day and Date: Monday, 7-5-2018

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) All questions are compulsory.

2) Figure to the **right** indicates **maximum** marks. 3) **Assume** the suitable data **whenever** necessary.

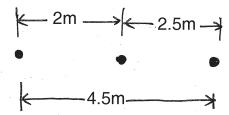
#### SECTION - I

2. Solve any four:

 $(4 \times 4 = 16)$ 

Marks: 56

- 1) Explain the concept of self GMD.
- 2) Criteria for choosing conductor material. Describe ACSR conductors.
- 3) Write short note on skin effect.
- 4) Draw and describe suspension type insulators along with its advantages.
- 5) Explain inductance of single phase two wire line.
- 6) A 3 phase, 50 Hz, 66 KV overhead line conductors are placed in horizontal plane as shown in figure. The conductor diameter is 1.25 cm. If the line length is 100 km, calculate:
  - i) Capacitance per phase
  - ii) Charging current per phase.



### 3. Solve any two:

- 1) Derive expression of voltage distribution in 3 insulators in a string.
- 2) A 3-phase transmission line is being supported by three disc insulators. The potential across top unit (i.e. near to tower) and middle unit are 8 KV and 11 KV respectively. Calculate:
  - i) The ratio of capacitance between pin and earth to the self-capacitance of each unit.
  - ii) The line voltage.
  - iii) String efficiency.
- 3) Derive the expression for inductance of 3-phase overhead line for un-symmetrical spacing.



#### SECTION - II

#### 4. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Derive an expression for voltage regulation and efficiency of Medium transmission line consider nominal-∏ method along with the equivalent circuit and phasor diagram.
- 2) Draw and describe both types of pressure cables.
- 3) A single core cable of conductor diameter 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 KV 3-phase system. Two intersheath of diameter 3.1 cm and 4.2 cm are introduced between the core and lead sheath. If maximum stress in the layers is same; find the voltages on the intersheath.
- 4) Draw and explain the dielectric strength in a single core underground cable with the ratio of maximum and minimum value of potential gradient.
- 5) Derive the generalized circuit constants for medium line using nominal T-method.
- 6) Explain economics of power factor improvement.

#### 5. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Explain the capacitance of 3-core belted type cables.
- 2) A 100 km long 3-phase, 50 Hz transmission line has following constants :

Resistance/phase/km =  $0.1\Omega$ Reactance/phase/km =  $0.5\Omega$ 

Susceptance/phase/km =  $10 \times 10^{-6}$  S

If line supplies load of 20 MW at 0.9 p.f. lagging at 66 KV at the receiving end, calculate by nominal- $\Pi$  method.

- i) Sending end power factor
- ii) Regulation
- iii) Transmission efficiency.
- 3) Derive an expression for sending end and receiving end voltage and current for Long Transmission line. (Rigorous method).


Set

# Seat No.

# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELEMENTS OF POWER SYSTEM

Day and Date: Monday, 7-5-2018 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) All questions are compulsory.

- 2) Figure to the **right** indicates **maximum** marks.
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- 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) The effect of ice deposition on conductor is
- a) Increased skin effect

b) Reduced corona losses

c) Increased weight

- d) Reduced sag
- 2) Which of the following statements is incorrect?
  - a) As the temperature raises the tension in the transmission line decreases
  - b) As temperature rises the sag in transmission lines reduces
  - c) Tension and sag in transmission lines are complementary to each other
  - d) None of the above
- 3) In transmission system a feeder feeds power to
  - a) Service mains

b) Generating stations

c) Distributors

- d) All of the above
- 4) The characteristic impedance of a transmission line depends upon
  - a) Shape of the conductor
  - b) Surface treatment of the conductors
  - c) Conductivity of the material
  - d) Geometrical configuration of the conductors



5)	In any transmission line, $AD - BC = $ _	
	a) 1 b) 2	c) 4 d) 5
6)	The disadvantage with paper as insu	lating material is
	a) It is hygroscopic	b) It has high capacitance
	c) It is an organic material	d) None of the above
7)	The bundling of conductors is done p	orimarily to
	a) Reduce reactance	b) Increase reactance
	c) Increase ratio interference	d) Reduce radio interference
8)	The thickness of the layer of insulation upon	n on the conductor, in cables, depends
	a) Reactive power	b) Power factor
	c) Voltage	d) Current carrying capacity
9)	SAG depends on what factors in tran	smission lines
	a) Span length	
	b) Tension in the conductors	
	c) Weight of the conductor per unit le	ength
	d) All the above	
10)	In transmission system between two take the shape of	supports, due to SAG the conductors
	a) Catenary b) Semi-circule	e c) Parabola d) Hyperbola
11)	In a cable immediately above metallic	-
	a) Earthing connection	b) Bedding
	c) Armoring	d) None of these
12)	In order to improve the power factor the power system.	which device should be connected to
	a) Series capacitor	b) Shunt capacitor
	c) Series inductor	d) Shunt inductor
13)	Varnished cambric is also known as	N = N = N = N = N = N = N = N = N = N =
	, , , , , , , , , , , , , , , , , , , ,	e c) Paper tape d) PVC tape
14)	Corona usually occurs when the ele conductor succeeds	ectrostatic stress in the air around the
	a) 30 kV (maximum value)/cm	b) 22 kV (maximum value)/cm
	c) 11 kV (rms value)/cm	d) 6.6 kV (rms value)/cm



Seat	
No.	

# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELEMENTS OF POWER SYSTEM

Day and Date: Monday, 7-5-2018

Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

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

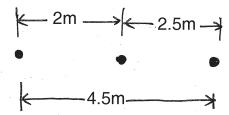
2) Figure to the **right** indicates **maximum** marks. 3) **Assume** the suitable data **whenever** necessary.

SECTION - I

2. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain the concept of self GMD.
- 2) Criteria for choosing conductor material. Describe ACSR conductors.
- 3) Write short note on skin effect.
- 4) Draw and describe suspension type insulators along with its advantages.
- 5) Explain inductance of single phase two wire line.
- 6) A 3 phase, 50 Hz, 66 KV overhead line conductors are placed in horizontal plane as shown in figure. The conductor diameter is 1.25 cm. If the line length is 100 km, calculate:
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### 3. Solve any two:

- 1) Derive expression of voltage distribution in 3 insulators in a string.
- 2) A 3-phase transmission line is being supported by three disc insulators. The potential across top unit (i.e. near to tower) and middle unit are 8 KV and 11 KV respectively. Calculate:
  - i) The ratio of capacitance between pin and earth to the self-capacitance of each unit.
  - ii) The line voltage.
  - iii) String efficiency.
- 3) Derive the expression for inductance of 3-phase overhead line for un-symmetrical spacing.



#### SECTION - II

#### 4. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Derive an expression for voltage regulation and efficiency of Medium transmission line consider nominal-∏ method along with the equivalent circuit and phasor diagram.
- 2) Draw and describe both types of pressure cables.
- 3) A single core cable of conductor diameter 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 KV 3-phase system. Two intersheath of diameter 3.1 cm and 4.2 cm are introduced between the core and lead sheath. If maximum stress in the layers is same; find the voltages on the intersheath.
- 4) Draw and explain the dielectric strength in a single core underground cable with the ratio of maximum and minimum value of potential gradient.
- 5) Derive the generalized circuit constants for medium line using nominal T-method.
- 6) Explain economics of power factor improvement.

### 5. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Explain the capacitance of 3-core belted type cables.
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If line supplies load of 20 MW at 0.9 p.f. lagging at 66 KV at the receiving end, calculate by nominal- $\Pi$  method.

- i) Sending end power factor
- ii) Regulation
- iii) Transmission efficiency.
- 3) Derive an expression for sending end and receiving end voltage and current for Long Transmission line. (Rigorous method).



Set

# Seat No.

# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELEMENTS OF POWER SYSTEM

Day and Date: Monday, 7-5-2018 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. Choose the correct answer:

14

- 1) The disadvantage with paper as insulating material is
  - a) It is hygroscopic

- b) It has high capacitance
- c) It is an organic material
- d) None of the above
- 2) The bundling of conductors is done primarily to
  - a) Reduce reactance

- b) Increase reactance
- c) Increase ratio interference
- d) Reduce radio interference
- 3) The thickness of the layer of insulation on the conductor, in cables, depends upon
  - a) Reactive power

b) Power factor

c) Voltage

- d) Current carrying capacity
- 4) SAG depends on what factors in transmission lines
  - a) Span length
  - b) Tension in the conductors
  - c) Weight of the conductor per unit length
  - d) All the above



5)	In transmission syste take the shape of	m between two si	upports, due to	SAG the conductors	
	a) Catenary	b) Semi-circule	c) Parabola	d) Hyperbola	
6)	In a cable immediate	ly above metallic	sheath	_ is provided.	
	a) Earthing connection	on	b) Bedding		
	c) Armoring		d) None of the	ese	
7)	In order to improve the power system.	ne power factor w	hich device sho	ould be connected to	
	a) Series capacitor		b) Shunt capa	citor	
	c) Series inductor		d) Shunt indu	ctor	
8)	Varnished cambric is	also known as			
	a) Empire tape				
9)	Corona usually occu conductor succeeds	rs when the elect	rostatic stress i	in the air around the	
	a) 30 kV (maximum v	value)/cm	b) 22 kV (max	kimum value)/cm	
	c) 11 kV (rms value)/	'cm	d) 6.6 kV (rms	s value)/cm	
10)	The effect of ice depo		or is		
	a) Increased skin effe	ect	b) Reduced co	orona losses	
	c) Increased weight		d) Reduced sa	ag	
11)	11) Which of the following statements is incorrect?				
	<ul><li>a) As the temperature raises the tension in the transmission line decreases</li><li>b) As temperature rises the sag in transmission lines reduces</li></ul>				
	c) Tension and sag in transmission lines are complementary to each other				
	d) None of the above		•	,	
12)	In transmission syste		power to		
,	a) Service mains		b) Generating	stations	
	c) Distributors		d) All of the al	oove	
13)	The characteristic imp	pedance of a trans	smission line de	epends upon	
	a) Shape of the cond	luctor			
	b) Surface treatment	of the conductors	<b>;</b>		
	c) Conductivity of the	e material			
	d) Geometrical config		nductors		
14)	In any transmission li	ne, AD – BC =			
	a) 1	b) 2	c) 4	d) 5	



Seat	
No.	

# T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELEMENTS OF POWER SYSTEM

Day and Date: Monday, 7-5-2018

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) All questions are compulsory.

2) Figure to the **right** indicates **maximum** marks. 3) **Assume** the suitable data **whenever** necessary.

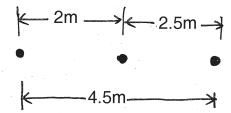
SECTION - I

2. Solve any four:

 $(4 \times 4 = 16)$ 

Marks: 56

- 1) Explain the concept of self GMD.
- 2) Criteria for choosing conductor material. Describe ACSR conductors.
- 3) Write short note on skin effect.
- 4) Draw and describe suspension type insulators along with its advantages.
- 5) Explain inductance of single phase two wire line.
- 6) A 3 phase, 50 Hz, 66 KV overhead line conductors are placed in horizontal plane as shown in figure. The conductor diameter is 1.25 cm. If the line length is 100 km, calculate:
  - i) Capacitance per phase
  - ii) Charging current per phase.



3. Solve any two:

- 1) Derive expression of voltage distribution in 3 insulators in a string.
- 2) A 3-phase transmission line is being supported by three disc insulators. The potential across top unit (i.e. near to tower) and middle unit are 8 KV and 11 KV respectively. Calculate:
  - i) The ratio of capacitance between pin and earth to the self-capacitance of each unit.
  - ii) The line voltage.
  - iii) String efficiency.
- 3) Derive the expression for inductance of 3-phase overhead line for un-symmetrical spacing.



#### SECTION - II

#### 4. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Derive an expression for voltage regulation and efficiency of Medium transmission line consider nominal-∏ method along with the equivalent circuit and phasor diagram.
- 2) Draw and describe both types of pressure cables.
- 3) A single core cable of conductor diameter 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 KV 3-phase system. Two intersheath of diameter 3.1 cm and 4.2 cm are introduced between the core and lead sheath. If maximum stress in the layers is same; find the voltages on the intersheath.
- 4) Draw and explain the dielectric strength in a single core underground cable with the ratio of maximum and minimum value of potential gradient.
- 5) Derive the generalized circuit constants for medium line using nominal T-method.
- 6) Explain economics of power factor improvement.

### 5. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Explain the capacitance of 3-core belted type cables.
- 2) A 100 km long 3-phase, 50 Hz transmission line has following constants :

Resistance/phase/km =  $0.1\Omega$ Reactance/phase/km =  $0.5\Omega$ 

Susceptance/phase/km =  $10 \times 10^{-6}$  S

If line supplies load of 20 MW at 0.9 p.f. lagging at 66 KV at the receiving end, calculate by nominal- $\Pi$  method.

- i) Sending end power factor
- ii) Regulation
- iii) Transmission efficiency.
- 3) Derive an expression for sending end and receiving end voltage and current for Long Transmission line. (Rigorous method).

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### **SLR-TC - 494**

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### T.E. (E&E) (Part – I) (CGPA) Examination, 2018 **CONTROL SYSTEMS - I**

Day and Date: Tuesday, 8-5-2018 Total 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) Figures to the right indicate full marks.
  - 5) Assume suitable data wherever necessary.

		N	ICQ/Objective T	ype Questions			
Dur	atio	n : 30 Minutes				Marks: 14	
1.	Ch	noose the correct an	swer:			(14×1=14)	
	1)	Two blocks G <sub>1</sub> (s) an	$d G_2(s)$ can be cas	scaded to get resul	tant transfer t	function as	
		a) $G_1(s) + G_2(s)$	b) $G_1(s)/G_2(s)$	c) $G_{1}(s) G_{2}(s)$	d) $1 + G_1(s)$	) G <sub>2</sub> (s)	
	2)	As a root moves fur	ther away from ir	naginary axis the	ginary axis the stability		
		a) increase	b) decreases	c) not affected	d) none of	these	
	3) The initial response when the output response.			ut is not equal to	the input is	termed	
		a) dynamic	b) transient	c) error	d) none of	these	
	4)	has the t	endency to oscill	ate.			
a) Open loop control system		ol system	b) Closed loop control system		m		
		c) Both (a) and (b)		d) Neither (a) no	or (b)		
	5) When damping factor decreases the		or decreases the	per unit overshoo	ot ?		
		a) increases		b) decreases			
		c) remains unaffec	ted	d) none of the a	bove		



6)	For a type one syste	em, the steady $-$	state ei	rror due to	step input is equal to
	a) infinite	b) zero	c) 0.2	5	d) 0.5
7)	For a system if the i	nitial conditions a	re zero	, it means	that the system is
	a) Working with zer	o reference input			
	b) Working but does	s not store energy	y		
	c) At rest but store	energy			
	d) At rest and has r	o energy stored i	n any p	oart	
8)	The bode plot is app	olicable to	_ phase	e network.	
	a) all	b) maximum	c) mir	nimum	d) none of these
9)	Addition of zeros in	transfer function	causes	co	ompensation.
	a) lag	b) lead	c) lag	- lead	d) none of these
10)	The transfer function having	on technique is c	onside	red inaded	quate with systems
	a) stability problems	3	b) mu	Itiple input	disturbances
	c) complexities and	non-linearity's	d) all	of the abov	/e
11)	Phase margin of a s	system is used to	specify	which of t	he following?
	a) Frequency response	nse	b) Ab	solute stab	ility
	c) Relative stability		d) Tin	ne respons	е
12)	For an n <sup>th</sup> order syst	em state equatio	ns will	be	
	a) n	b) 1	c) $\frac{n}{2}$		d) $\frac{n+1}{2}$
13)	The transfer function of the following comphase lead compens	ditions is necess			·
	a) $\alpha_1 = \beta_1$	b) $\alpha_1 > \beta_1$	c) $\alpha_1$	= 0	d) $\alpha_1 < \beta_1$
14)	The transfer function space representation the state, Y the output	n of $X = AX + BU$	and Y = ut vecto	CX + DU or, will be g	where X represents iven by
	a) C (sl – A) – 1B		, ,	sl – A) – 1l	
	c) (sI – A) – 1B		d) (sl	– A) – 1B -	+ D



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# T.E. (E&E) (Part – I) (CGPA) Examination, 2018 CONTROL SYSTEMS – I

Day and Date: Tuesday, 8-5-2018

Time: 10.00 a.m. to 1.00 p.m.

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

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

3) Assume suitable data wherever necessary.

#### SECTION - I

#### 2. Solve any four:

 $(4 \times 4 = 16)$ 

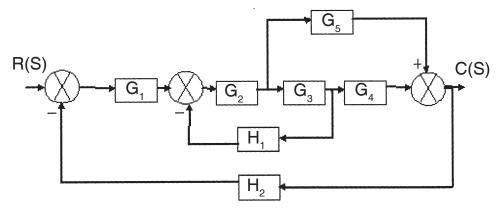
Marks: 56

1) Explain the classification of control systems.

- 2) A second order system is given by  $C(s)/R(s) = \frac{25}{s^2 + 6s + 25}$ . Find its rise time, peak time, peak overshoot and settling time.
- 3) Explain terminologies used in signal flow graph.
- 4) What is root locus? Explain angle condition and magnitude condition.
- 5) What is the difference between steady state response and transient response of a control system?

### 3. Solve any two:

- 1) Explain step response of second order system.
- 2) Reduce the block diagram using reduction rules and obtain C(s)/R(s).





3) For a unity feedback system,  $G(s) = \frac{K}{s(s+1)(s+2)(s+3)}$ . Sketch the complete root locus showing all details on it.

#### 4. Solve any four:

 $(4 \times 4 = 16)$ 

a) Derive transfer function from state model given as below.

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

$$Y(t) = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

- b) Explain PD controller.
- c) Explain phase lead compensator.
- d) Check the observability of system below

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} -0.5 & 0 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

$$Y(t) = \begin{bmatrix} 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

- e) Explain correlation between time and frequency domain.
- f) Define Gain margin and Phase margin.

### 5. Solve any two:

 $(2\times6=12)$ 

- a) Construct the bode plot for the system whose open loop transfer function is given below and determine
  - a) gain margin
  - b) phase margin

$$G(s) H(s) = \frac{50}{s(1+0.25s)(1+0.1s)}$$

- b) Sketch the polar plot for G(S) = 1/S(S + 1).
- c) Explain programmable logic controller in detail.

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# T.E. (E&E) (Part – I) (CGPA) Examination, 2018

			CONTROL SY	STEMS – I		
•		d Date : Tuesday, 8-5 10.00 a.m. to 1.00 p.n			Total	Marks: 70
	ı	carri 2) <b>Ans</b> <b>only</b> <b>Top</b> 3) <b>All</b> ( 4) Figu	ninutes in Answies one mark.  wer MCQ/Object  of Page.  questions are co	ver Book Page No ctive type question to mention, Q.P.	o. 3. Each que ons on Pago Set (P/Q/R/	uestion e No. 3
		MC	CQ/Objective Ty	pe Questions		
Dura	ıtio	n : 30 Minutes				Marks: 14
1.	Ch	oose the correct answ	ver:			(14×1=14)
	1)	The bode plot is appl	icable to	_ phase network.		
		a) all	o) maximum	c) minimum	d) none of	these
	2)	Addition of zeros in tr	ansfer function	causes c	ompensatio	n.
		a) lag	o) lead	c) lag – lead	d) none of	these
	3)	The transfer function having	n technique is c	considered inade	quate with s	systems
		a) stability problems		b) multiple input	disturbance	es
		c) complexities and I	non-linearity's	d) all of the abou	ve	
	4)	Phase margin of a sy	stem is used to	specify which of	the following	<b>;</b> ?
		a) Frequency respon	ise	b) Absolute stab	oility	
		c) Relative stability		d) Time respons	se	
	5)	For an n <sup>th</sup> order syste	em state equatio	ns will be		
		a) n	o) 1	c) $\frac{n}{2}$	d) $\frac{n+1}{2}$	BTO



6)	The transfer function of a passive network is given by $s + \alpha_1/s + \beta_1$ . Which of the following conditions is necessary such that the network acts as a phase lead compensator?			
	a) $\alpha_1 = \beta_1$	b) $\alpha_1 > \beta_1$	c) $\alpha_1 = 0$	d) $\alpha_1 < \beta_1$
7)		on of $X = AX + BU$	and $Y = CX + DU$	tem, with the state- where X represents given by
	a) C (sI - A) - 1B		b) $C (sI - A) - 1$	B + D
	c) $(sI - A) - 1B$		d) $(sI - A) - 1B$	+ D
8)	Two blocks G <sub>1</sub> (s) an	$d G_2(s)$ can be cas	caded to get resul	tant transfer function as
	a) $G_1(s) + G_2(s)$	b) $G_1(s)/G_2(s)$	c) $G_1(s) G_2(s)$	d) $1 + G_1(s) G_2(s)$
9)	As a root moves ful	rther away from in	naginary axis the	stability
	a) increase	b) decreases	c) not affected	d) none of these
10)	The initial response.	e when the outpu	it is not equal to	the input is termed
	a) dynamic	b) transient	c) error	d) none of these
11)	has the t	tendency to oscilla	ate.	
	a) Open loop contr	ol system	b) Closed loop of	control system
	c) Both (a) and (b)		d) Neither (a) no	or (b)
12)	When damping fact	tor decreases the	per unit overshoo	ot?
	a) increases		b) decreases	
	c) remains unaffec	ted	d) none of the a	bove
13)	For a type one syst	em, the steady –	state error due to	step input is equal to
	a) infinite	b) zero	c) 0.25	d) 0.5
14)	For a system if the	initial conditions a	are zero, it means	that the system is
	a) Working with ze	ro reference input		
	b) Working but doe	es not store energ	у	
	c) At rest but store	0,		
	d) At rest and has	no energy stored	in any part	



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# T.E. (E&E) (Part – I) (CGPA) Examination, 2018 CONTROL SYSTEMS – I

Day and Date: Tuesday, 8-5-2018

Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

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

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

3) Assume suitable data wherever necessary.

#### SECTION - I

#### 2. Solve any four:

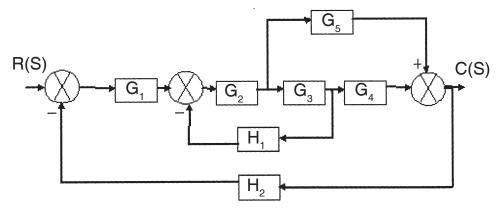
 $(4 \times 4 = 16)$ 

1) Explain the classification of control systems.

- 2) A second order system is given by  $C(s)/R(s) = \frac{25}{s^2 + 6s + 25}$ . Find its rise time, peak time, peak overshoot and settling time.
- 3) Explain terminologies used in signal flow graph.
- 4) What is root locus? Explain angle condition and magnitude condition.
- 5) What is the difference between steady state response and transient response of a control system ?

### 3. Solve any two:

- 1) Explain step response of second order system.
- 2) Reduce the block diagram using reduction rules and obtain C(s)/R(s).





3) For a unity feedback system,  $G(s) = \frac{K}{s(s+1)(s+2)(s+3)}$ . Sketch the complete root locus showing all details on it.

#### 4. Solve any four:

 $(4 \times 4 = 16)$ 

a) Derive transfer function from state model given as below.

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

$$Y(t) = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

- b) Explain PD controller.
- c) Explain phase lead compensator.
- d) Check the observability of system below

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} -0.5 & 0 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

$$Y(t) = \begin{bmatrix} 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

- e) Explain correlation between time and frequency domain.
- f) Define Gain margin and Phase margin.

### 5. Solve any two:

 $(2\times6=12)$ 

- a) Construct the bode plot for the system whose open loop transfer function is given below and determine
  - a) gain margin
  - b) phase margin

$$G(s) H(s) = \frac{50}{s(1+0.25s)(1+0.1s)}$$

- b) Sketch the polar plot for G(S) = 1/S(S + 1).
- c) Explain programmable logic controller in detail.

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# T.E. (E&E) (Part – I) (CGPA) Examination, 2018 CONTROL SYSTEMS – I

Day and Date: Tuesday, 8-5-2018 Total 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) Figures to the right indicate full marks.
  - 5) Assume suitable data wherever necessary.

		MCQ/Objectiv	e Type Question	S	
Dur	ration : 30 Minutes				Marks: 14
1.	Choose the correct ar	nswer:			(14×1=14)
	1) When damping fac	ctor decreases	the per unit overs	hoot?	
	a) increases		b) decreases	3	
	c) remains unaffe	cted	d) none of th	e above	
	2) For a type one sys	stem, the stead	y – state error due	e to step input	is equal to
	a) infinite	b) zero	c) 0.25	d) 0.5	
	3) For a system if the	initial conditio	ns are zero, it me	ans that the s	ystem is
	a) Working with ze	ero reference i	nput		
	b) Working but do	es not store er	nergy		
	c) At rest but store	e energy			
	d) At rest and has	no energy sto	red in any part		
	4) The bode plot is a	oplicable to	phase netwo	ork.	
	a) all		b) maximum		
	c) minimum		d) none of th	ese	



5)	Addition of zeros in	transfer function	cau	ises co	ompensation.
	a) lag	b) lead	c)	lag – lead	d) none of these
6)	The transfer function having	on technique is c	ons	sidered inaded	juate with systems
	a) stability problems	S	b)	multiple input	disturbances
	c) complexities and	I non-linearity's	d)	all of the above	re e
7)	Phase margin of a s	system is used to	spe	ecify which of t	he following?
	a) Frequency response	onse	b)	Absolute stab	ility
	c) Relative stability		d)	Time respons	е
8)	For an n <sup>th</sup> order sys	tem state equatio	ns v	will be	
	a) n	b) 1	c)	$\frac{n}{2}$	d) $\frac{n+1}{2}$
9)	The transfer function of the following compensate lead compens	nditions is necess			
	a) $\alpha_1 = \beta_1$	b) $\alpha_1 > \beta_1$	c)	$\alpha_1 = 0$	d) $\alpha_1 < \beta_1$
10)	The transfer function of a multi-input multi-output system, with the state- space representation of $X = AX + BU$ and $Y = CX + DU$ where X represents the state, Y the output and U the input vector, will be given by				
	a) C (sl – A) – 1B		b)	C(sI - A) - 1I	B + D
	c) (sI - A) - 1B		d)	(sI - A) - 1B -	+ D
11)	Two blocks G <sub>1</sub> (s) and	$d G_2(s)$ can be case	cad	led to get result	ant transfer function as
	a) $G_1(s) + G_2(s)$	b) $G_1(s)/G_2(s)$	c)	$G_1(s) G_2(s)$	d) $1 + G_1(s) G_2(s)$
12)	As a root moves fur	ther away from im	nag	inary axis the	stability
	a) increase	b) decreases	c)	not affected	d) none of these
13)	The initial response response.	when the outpu	t is	not equal to	the input is termed
	a) dynamic	b) transient	c)	error	d) none of these
14)	has the to	endency to oscilla	ite.		
	a) Open loop contro	ol system	b)	Closed loop c	ontrol system
	c) Both (a) and (b)		d)	Neither (a) no	r (b)



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# T.E. (E&E) (Part – I) (CGPA) Examination, 2018 CONTROL SYSTEMS – I

Day and Date: Tuesday, 8-5-2018

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) All questions are compulsory.

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

3) Assume suitable data wherever necessary.

SECTION - I

#### 2. Solve any four:

 $(4 \times 4 = 16)$ 

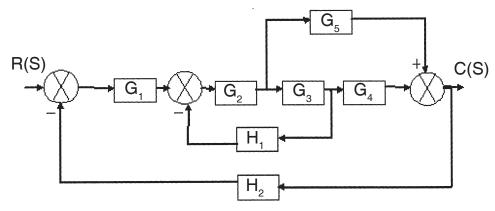
Marks: 56

1) Explain the classification of control systems.

- 2) A second order system is given by  $C(s)/R(s) = \frac{25}{s^2 + 6s + 25}$ . Find its rise time, peak time, peak overshoot and settling time.
- 3) Explain terminologies used in signal flow graph.
- 4) What is root locus? Explain angle condition and magnitude condition.
- 5) What is the difference between steady state response and transient response of a control system?

### 3. Solve any two:

- 1) Explain step response of second order system.
- 2) Reduce the block diagram using reduction rules and obtain C(s)/R(s).





3) For a unity feedback system,  $G(s) = \frac{K}{s(s+1)(s+2)(s+3)}$ . Sketch the complete root locus showing all details on it.

#### 4. Solve any four:

 $(4 \times 4 = 16)$ 

a) Derive transfer function from state model given as below.

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

$$Y(t) = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

- b) Explain PD controller.
- c) Explain phase lead compensator.
- d) Check the observability of system below

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} -0.5 & 0 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

$$Y(t) = \begin{bmatrix} 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

- e) Explain correlation between time and frequency domain.
- f) Define Gain margin and Phase margin.

### 5. Solve any two:

 $(2\times6=12)$ 

- a) Construct the bode plot for the system whose open loop transfer function is given below and determine
  - a) gain margin
  - b) phase margin

$$G(s) H(s) = \frac{50}{s(1+0.25s)(1+0.1s)}$$

- b) Sketch the polar plot for G(S) = 1/S(S + 1).
- c) Explain programmable logic controller in detail.

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Seat No.

### T.E. (E&E) (Part – I) (CGPA) Examination, 2018 **CONTROL SYSTEMS - I**

Total Marks: 70 Day and Date: Tuesday, 8-5-2018

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.

		4) Figure		<b>mpulsory</b> . Indicate <b>full</b> mark a <b>wherever</b> nece		
		MCQ	/Objective Ty	pe Questions		
Dur	atic	n : 30 Minutes				Marks: 14
1.	Cł	noose the correct answe	r:			(14×1=14)
	1)	The transfer function to having	echnique is co	onsidered inaded	quate with s	ystems
		a) stability problems		b) multiple input	disturbance	S
		c) complexities and no	n-linearity's	d) all of the above	ve	
	2)	Phase margin of a syste	em is used to	specify which of t	the following	?
		a) Frequency response	9	b) Absolute stab	oility	
		c) Relative stability		d) Time respons	se	
	3)	For an n <sup>th</sup> order system	state equation	ns will be		
		a) n b)	1	c) $\frac{n}{2}$	d) $\frac{n+1}{2}$	
	4)	The transfer function of	a passive net	work is given by	s + α./s + β	Which

- of the following conditions is necessary such that the network acts as a phase lead compensator?
  - a)  $\alpha_1 = \beta_1$
- b)  $\alpha_1 > \beta_1$  c)  $\alpha_1 = 0$  d)  $\alpha_1 < \beta_1$

5)		on of $X = AX + BU$	and $Y = CX +$	system, with the state- DU where X represents be given by
	a) C (sl – A) – 1B		b) C (sI - A)	– 1B + D
	c) (sI - A) - 1B		d) (sI - A) -	1B + D
6)	Two blocks G <sub>1</sub> (s) an	$d G_{2}(s) can be cas$	scaded to get re	esultant transfer function as
	·	_		s) d) $1 + G_1(s) G_2(s)$
7)	As a root moves fu	rther away from in	maginary axis	the stability
	a) increase	b) decreases	c) not affect	ed d) none of these
8)	The initial respons response.	e when the outpo	ut is not equal	I to the input is termed
	a) dynamic	b) transient	c) error	d) none of these
9)	has the	tendency to oscill	ate.	
	a) Open loop conti	rol system	b) Closed lo	op control system
	c) Both (a) and (b)		d) Neither (a	n) nor (b)
10) When damping factor decreases the per unit overshoot?		shoot?		
	a) increases		b) decreases	S
	c) remains unaffect	ted	d) none of th	ne above
11)	For a type one sys	tem, the steady –	state error due	e to step input is equal to
	a) infinite	b) zero	c) 0.25	d) 0.5
12)	For a system if the	initial conditions	are zero, it me	ans that the system is
	a) Working with ze	ro reference inpu	t	
	b) Working but doe	es not store energ	ЗУ	
	c) At rest but store	energy		
	d) At rest and has	no energy stored	in any part	
13)	The bode plot is ap	plicable to	_ phase netwo	ork.
	a) all	b) maximum	c) minimum	d) none of these
14)	Addition of zeros in	transfer function	causes	compensation.
	a) lag	h) lead	c) lag – lead	d) none of these



Seat	
No.	

# T.E. (E&E) (Part – I) (CGPA) Examination, 2018 CONTROL SYSTEMS – I

Day and Date: Tuesday, 8-5-2018

Time: 10.00 a.m. to 1.00 p.m.

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

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

3) Assume suitable data wherever necessary.

SECTION - I

#### 2. Solve any four:

 $(4 \times 4 = 16)$ 

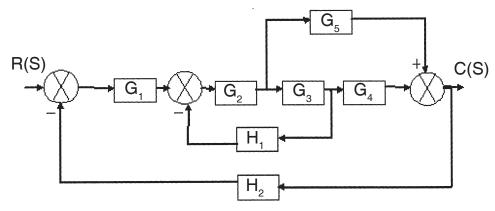
Marks: 56

1) Explain the classification of control systems.

- 2) A second order system is given by  $C(s)/R(s) = \frac{25}{s^2 + 6s + 25}$ . Find its rise time, peak time, peak overshoot and settling time.
- 3) Explain terminologies used in signal flow graph.
- 4) What is root locus? Explain angle condition and magnitude condition.
- 5) What is the difference between steady state response and transient response of a control system ?

### 3. Solve any two:

- 1) Explain step response of second order system.
- 2) Reduce the block diagram using reduction rules and obtain C(s)/R(s).





3) For a unity feedback system,  $G(s) = \frac{K}{s(s+1)(s+2)(s+3)}$ . Sketch the complete root locus showing all details on it.

#### 4. Solve any four:

 $(4 \times 4 = 16)$ 

a) Derive transfer function from state model given as below.

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

$$Y(t) = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

- b) Explain PD controller.
- c) Explain phase lead compensator.
- d) Check the observability of system below

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} -0.5 & 0 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

$$Y(t) = \begin{bmatrix} 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

- e) Explain correlation between time and frequency domain.
- f) Define Gain margin and Phase margin.

### 5. Solve any two:

 $(2\times6=12)$ 

- a) Construct the bode plot for the system whose open loop transfer function is given below and determine
  - a) gain margin
  - b) phase margin

$$G(s) H(s) = \frac{50}{s(1+0.25s)(1+0.1s)}$$

- b) Sketch the polar plot for G(S) = 1/S(S + 1).
- c) Explain programmable logic controller in detail.

Seat	
No.	

Set

Р

# T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA) Examination, 2018 POWER ELECTRONICS

Day and Date: Monday, 14-5-2018

Max. Marks: 70

Time: 2.30 p.m. to 5.30 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:

 $(1 \times 14 = 14)$ 

- 1) As the breakdown voltage reached, the DIAC exhibits
  - a) Negative resistance characteristics
  - b) Goes into avalanche condition
  - c) Voltage drop snaps back
  - d) All of these
- 2) The angle at which SCR turns off is called
  - a) On angle

b) Conduction angle

c) Firing angle

- d) Extinction angle
- 3) For power output higher than 15 kW, the suitable rectifier is
  - a) Single phase

b) 3-phase

c) Poly phase

d) Both b) and c)

- 4) IGBT possess
  - a) Low input impedance
- b) High input impedance
- c) High on state resistance
- d) Second break down problems
- 5) In phase controlled rectification Power Factor (PF)
  - a) Remains unaffected
  - b) Improves with increase of firing angle
  - c) Deteriorates with increase of  $\boldsymbol{\alpha}$
  - d) Is unrelated to  $\boldsymbol{\alpha}$



6)	<ul><li>Which circuit gives inherent freewhee</li><li>a) Half wave converter</li><li>c) Full converter</li></ul>	b)	g action ? Semi converter None
7)	The cycloconverter require natural or a) Natural commutation in both step-b) Forced commutation in both step-c) Forced commutation in step-up cyd) Forced commutation in step-down	-up ·up yclo	and step down cycloconverter and step-down cycloconverter oconverter
8)	If the chopper switching frequency is cycle is a) 0.4		0 Hz and Ton time is 2 ms, the duty
	c) 0.6	,	None of these
9)	<ul> <li>A class D chopper</li> <li>a) Can operate in first quadrant only</li> <li>b) Can operate in second quadrant of</li> <li>c) Can operate in first or fourth quadrant</li> <li>d) Can operate in all quadrant</li> </ul>	only	
10)	In pulse width modulation of chopper a) T is kept constant and $T_{ON}$ is varied b) $T_{ON}$ is kept constant and T is varied c) Both T and $T_{ON}$ is varied d) None of these	ed	
11)	The commutation method, in an invea) Line commutation c) Both a) and b)	b)	ris Forced commutation None of the above
12)	For a duty cycle of 40%, the output D is 200 V a) 80 V		or step down chopper is if input dc 800 V
	c) 8 V	•	0.8 V
13)	Power electronics converters used to a) Control the speed c) Control the current	b)	Control the power None
14)	The rms value of output voltage in a a) $\mathrm{V/2}$	1-p b)	
	c) 2 V	d)	V/3



Seat	
No.	

# T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA) Examination, 2018 POWER ELECTRONICS

Day and Date: Monday, 14-5-2018

Time: 2.30 p.m. to 5.30 p.m.

SECTION - I

#### 2. Attempt any four questions :

 $(4 \times 4 = 16)$ 

Marks: 56

- a) Explain the two transistor analogy of SCR. Explain regenerative current process to conduct the SCR.
- b) Explain the working principle of Depletion p-channel MOSFET with V-I and transfer characteristics.
- c) What is meant by commutation? Explain Class-D commutation with proper wave form.
- d) Write the application of thyristor in SMPS.
- e) Write the comparison between SCR, DIAC and TRIAC.

### 3. Attempt any two questions:

 $(2 \times 6 = 12)$ 

- a) Draw and explain the dynamic turn on and turn off characteristics of SCR.
- b) Explain the two quadrant operation of 1-phase fully controlled bridge rectifier with RL load. Draw the output voltage and current wave form for  $\alpha=0$  degrees,  $\alpha=90$  degrees and  $\alpha=120$  degrees. Derive the  $V_{L}$  and  $I_{L}$ .
- c) The load commutation (class-A) circuitry is initially at relaxed. The thyristors T is turned on at t=0. Determine i) Conduction time of SCR. ii) Voltage across SCR and capacitor after SCR is turned off by taking L=5 mH,  $C=20\mu F$  and input voltage for circuit is 200 V.

#### SECTION - II

### 4. Attempt any four questions:

 $(4 \times 4 = 16)$ 

- a) Explain principle of operation of Morgan Chopper.
- b) Explain the voltage control and harmonics analysis of inverter.
- c) Explain principle of operation of single phase to single phase cycloconverter with R.



- d) A single phase half bridge inverter feeds a resistive load of R =  $7.5\Omega$ . The dc voltage of the inverter is given as 220 V. determine
  - i) RMS value of output voltage.
  - ii) Output power.
- e) Explain the principle of operation of class-D chopper.

#### 5. Attempt any two questions:

 $(2 \times 6 = 12)$ 

- a) Draw a neat sketch and explain the 180 degrees conduction mode of 3-phase inverter and derive the line-line voltage and phase voltage expressions.
- b) Explain the principle of operation of step up chopper and derive the expressions for output voltage, current and RMS output voltage.
- c) Explain principle of operation of 3 phase to 3 phase 6 pulse cycloconverter with wave forms.

Set



# T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA) Examination, 2018 POWER ELECTRONICS

Day and Date: Monday, 14-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 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:

 $(1 \times 14 = 14)$ 

- 1) If the chopper switching frequency is 200 Hz and Ton time is 2 ms, the duty cycle is
  - a) 0.4
- b) 0.8
- c) 0.6
- d) None of these

- 2) A class D chopper
  - a) Can operate in first quadrant only
  - b) Can operate in second quadrant only
  - c) Can operate in first or fourth quadrant
  - d) Can operate in all quadrant
- 3) In pulse width modulation of chopper
  - a) T is kept constant and  $\rm T_{\rm ON}$  is varied
  - b)  $T_{ON}$  is kept constant and T is varied
  - c) Both T and T<sub>ON</sub> is varied
  - d) None of these
- 4) The commutation method, in an inverter is
  - a) Line commutation

b) Forced commutation

c) Both a) and b)

- d) None of the above
- 5) For a duty cycle of 40%, the output DC for step down chopper is if input dc is 200 V
  - a) 80 V

b) 800 V

c) 8 V

d) 0.8 V



6)	Power electronics converters used to a) Control the speed c) Control the current	b) Control the power d) None
7)	The rms value of output voltage in a a) V/2 c) 2 V	1-phase half bridge inverter is b) V d) V/3
8)	As the breakdown voltage reached, to a) Negative resistance characteristic b) Goes into avalanche condition c) Voltage drop snaps back d) All of these	
9)	The angle at which SCR turns off is	
	<ul><li>a) On angle</li><li>c) Firing angle</li></ul>	<ul><li>b) Conduction angle</li><li>d) Extinction angle</li></ul>
10)	For power output higher than 15 kW, a) Single phase c) Poly phase	the suitable rectifier is b) 3-phase d) Both b) and c)
11)	IGBT possess a) Low input impedance c) High on state resistance	<ul><li>b) High input impedance</li><li>d) Second break down problems</li></ul>
12)	In phase controlled rectification Power a) Remains unaffected b) Improves with increase of firing at c) Deteriorates with increase of $\alpha$ d) Is unrelated to $\alpha$	` ,
13)	Which circuit gives inherent freewhee a) Half wave converter c) Full converter	eling action ? b) Semi converter d) None
14)	The cycloconverter require natural or a) Natural commutation in both steps b) Forced commutation in both steps c) Forced commutation in step-up cyd) Forced commutation in step-down	up and step down cycloconverter up and step-down cycloconverter vcloconverter



Seat	
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# T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA) Examination, 2018 POWER ELECTRONICS

Day and Date: Monday, 14-5-2018

Time: 2.30 p.m. to 5.30 p.m.

SECTION - I

#### 2. Attempt any four questions:

 $(4 \times 4 = 16)$ 

Marks: 56

- a) Explain the two transistor analogy of SCR. Explain regenerative current process to conduct the SCR.
- b) Explain the working principle of Depletion p-channel MOSFET with V-I and transfer characteristics.
- c) What is meant by commutation? Explain Class-D commutation with proper wave form.
- d) Write the application of thyristor in SMPS.
- e) Write the comparison between SCR, DIAC and TRIAC.

### 3. Attempt any two questions:

 $(2 \times 6 = 12)$ 

- a) Draw and explain the dynamic turn on and turn off characteristics of SCR.
- b) Explain the two quadrant operation of 1-phase fully controlled bridge rectifier with RL load. Draw the output voltage and current wave form for  $\alpha=0$  degrees,  $\alpha=90$  degrees and  $\alpha=120$  degrees. Derive the  $V_{L}$  and  $I_{L}$ .
- c) The load commutation (class-A) circuitry is initially at relaxed. The thyristors T is turned on at t=0. Determine i) Conduction time of SCR. ii) Voltage across SCR and capacitor after SCR is turned off by taking L=5 mH,  $C=20\mu F$  and input voltage for circuit is 200 V.

SECTION - II

### 4. Attempt any four questions:

 $(4 \times 4 = 16)$ 

- a) Explain principle of operation of Morgan Chopper.
- b) Explain the voltage control and harmonics analysis of inverter.
- c) Explain principle of operation of single phase to single phase cycloconverter with R.



- d) A single phase half bridge inverter feeds a resistive load of R =  $7.5\Omega$ . The dc voltage of the inverter is given as 220 V. determine
  - i) RMS value of output voltage.
  - ii) Output power.
- e) Explain the principle of operation of class-D chopper.

#### 5. Attempt any two questions:

 $(2 \times 6 = 12)$ 

- a) Draw a neat sketch and explain the 180 degrees conduction mode of 3-phase inverter and derive the line-line voltage and phase voltage expressions.
- b) Explain the principle of operation of step up chopper and derive the expressions for output voltage, current and RMS output voltage.
- c) Explain principle of operation of 3 phase to 3 phase 6 pulse cycloconverter with wave forms.

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# T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA) Examination, 2018 POWER ELECTRONICS

Day and Date: Monday, 14-5-2018

Max. Marks: 70

Time: 2.30 p.m. to 5.30 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:

 $(1 \times 14 = 14)$ 

- 1) In phase controlled rectification Power Factor (PF)
  - a) Remains unaffected
  - b) Improves with increase of firing angle
  - c) Deteriorates with increase of  $\alpha$
  - d) Is unrelated to  $\alpha$
- 2) Which circuit gives inherent freewheeling action?
  - a) Half wave converter

b) Semi converter

c) Full converter

- d) None
- 3) The cycloconverter require natural or forced commutation as under
  - a) Natural commutation in both step-up and step down cycloconverter
  - b) Forced commutation in both step-up and step-down cycloconverter
  - c) Forced commutation in step-up cycloconverter
  - d) Forced commutation in step-down cycloconverter
- 4) If the chopper switching frequency is 200 Hz and Ton time is 2 ms, the duty cycle is

a) 0.4

b) 0.8

c) 0.6

d) None of these

5)	<ul><li>a) Can operate in</li><li>b) Can operate in</li><li>c) Can operate in</li><li>d) Can operate in</li></ul>	first quadrant only second quadrant of first or fourth quad	only			
6)	In pulse width mod a) T is kept consta b) T <sub>ON</sub> is kept cons c) Both T and T <sub>ON</sub> d) None of these	ant and T <sub>on</sub> is varie stant and T is varie	ed			
7)	The commutation (a) Line commutation (b) Both a) and b)		b)	r is Forced commu None of the ab		
8)	For a duty cycle of is 200 V	•		·		·
9)	<ul><li>a) 80 V</li><li>Power electronics</li><li>a) Control the spe</li><li>c) Control the curr</li></ul>	ed	b)	Control the pov	ŕ	0.8 V
10)	The rms value of ca) V/2	output voltage in a b) V		hase half bridge 2 V		verter is V/3
11)	As the breakdown  a) Negative resists  b) Goes into avala  c) Voltage drop sr  d) All of these	ance characteristic anche condition		DIAC exhibits		
12)	The angle at which a) On angle c) Firing angle	n SCR turns off is o	b)	ed Conduction and Extinction angle	_	
13)	For power output ha) Single phase c) Poly phase	nigher than 15 kW,	b)	e suitable rectific 3-phase Both b) and c)	er i	S
14)	IGBT possess a) Low input impe c) High on state re		,	High input impe		



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# T.E. (Part – II) Electrical and Electronics Engg. (CGPA) Examination, 2018 POWER ELECTRONICS

Day and Date: Monday, 14-5-2018

Time: 2.30 p.m. to 5.30 p.m.

#### SECTION - I

### 2. Attempt any four questions :

 $(4 \times 4 = 16)$ 

Marks: 56

- a) Explain the two transistor analogy of SCR. Explain regenerative current process to conduct the SCR.
- b) Explain the working principle of Depletion p-channel MOSFET with V-I and transfer characteristics.
- c) What is meant by commutation? Explain Class-D commutation with proper wave form.
- d) Write the application of thyristor in SMPS.
- e) Write the comparison between SCR, DIAC and TRIAC.

## 3. Attempt any two questions:

 $(2 \times 6 = 12)$ 

- a) Draw and explain the dynamic turn on and turn off characteristics of SCR.
- b) Explain the two quadrant operation of 1-phase fully controlled bridge rectifier with RL load. Draw the output voltage and current wave form for  $\alpha=0$  degrees,  $\alpha=90$  degrees and  $\alpha=120$  degrees. Derive the  $V_{L}$  and  $I_{L}$ .
- c) The load commutation (class-A) circuitry is initially at relaxed. The thyristors T is turned on at t=0. Determine i) Conduction time of SCR. ii) Voltage across SCR and capacitor after SCR is turned off by taking L=5 mH,  $C=20\mu F$  and input voltage for circuit is 200 V.

### SECTION - II

### 4. Attempt any four questions:

 $(4 \times 4 = 16)$ 

- a) Explain principle of operation of Morgan Chopper.
- b) Explain the voltage control and harmonics analysis of inverter.
- c) Explain principle of operation of single phase to single phase cycloconverter with R.



- d) A single phase half bridge inverter feeds a resistive load of R =  $7.5\Omega$ . The dc voltage of the inverter is given as 220 V. determine
  - i) RMS value of output voltage.
  - ii) Output power.
- e) Explain the principle of operation of class-D chopper.

### 5. Attempt any two questions:

 $(2 \times 6 = 12)$ 

- a) Draw a neat sketch and explain the 180 degrees conduction mode of 3-phase inverter and derive the line-line voltage and phase voltage expressions.
- b) Explain the principle of operation of step up chopper and derive the expressions for output voltage, current and RMS output voltage.
- c) Explain principle of operation of 3 phase to 3 phase 6 pulse cycloconverter with wave forms.

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Set

Seat	
No.	

# T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA) Examination, 2018 POWER ELECTRONICS

Day and Date: Monday, 14-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 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:

 $(1 \times 14 = 14)$ 

- 1) In pulse width modulation of chopper
  - a) T is kept constant and  $T_{\rm ON}$  is varied
  - b)  $T_{ON}$  is kept constant and T is varied
  - c) Both T and T<sub>ON</sub> is varied
  - d) None of these
- 2) The commutation method, in an inverter is
  - a) Line commutation
  - b) Forced commutation
  - c) Both a) and b)
  - d) None of the above
- 3) For a duty cycle of 40%, the output DC for step down chopper is if input dc is 200 V
  - a) 80 V

b) 800 V

c) 8 V

- d) 0.8 V
- 4) Power electronics converters used to
  - a) Control the speed

b) Control the power

c) Control the current

- d) None
- 5) The rms value of output voltage in a 1-phase half bridge inverter is
  - a) V/2

b) V

c) 2 V

d) V/3

6)	As the breakdown voltage reached, a) Negative resistance characteristi b) Goes into avalanche condition c) Voltage drop snaps back d) All of these		
7)	The angle at which SCR turns off is	called	
	a) On angle	b) Conduction an	•
	c) Firing angle	d) Extinction ang	le
8)	For power output higher than 15 kW	, the suitable rectif	ier is
	a) Single phase	b) 3-phase	
	c) Poly phase	d) Both b) and c)	
9)	IGBT possess		
	a) Low input impedance	b) High input imp	
	c) High on state resistance	d) Second break	down problems
10)	In phase controlled rectification Pow	er Factor (PF)	
	a) Remains unaffected		
	b) Improves with increase of firing a	ingle	
	c) Deteriorates with increase of $\alpha$ d) Is unrelated to $\alpha$		
44\	,	oling action 2	
11)	Which circuit gives inherent freewhe a) Half wave converter	b) Semi converte	r
	c) Full converter	d) None	ı
12)	The cycloconverter require natural of	,	ion as under
. — ,	a) Natural commutation in both step		
	b) Forced commutation in both step	•	•
	c) Forced commutation in step-up of		
	d) Forced commutation in step-dow	-	
13)	If the chopper switching frequency is	200 Hz and Ton tir	me is 2 ms, the duty
	cycle is a) 0.4 b) 0.8	c) 0.6	d) None of these
4 4\	,	C) 0.0	u) None of these
14)	<ul><li>A class D chopper</li><li>a) Can operate in first quadrant only</li></ul>	ı	
	b) Can operate in second quadrant		
	c) Can operate in first or fourth quar		
	d) Can operate in all quadrant		



Seat	
No.	

# T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA) Examination, 2018 POWER ELECTRONICS

Day and Date: Monday, 14-5-2018

Time: 2.30 p.m. to 5.30 p.m.

SECTION - I

### 2. Attempt any four questions:

 $(4 \times 4 = 16)$ 

Marks: 56

- a) Explain the two transistor analogy of SCR. Explain regenerative current process to conduct the SCR.
- b) Explain the working principle of Depletion p-channel MOSFET with V-I and transfer characteristics.
- c) What is meant by commutation? Explain Class-D commutation with proper wave form.
- d) Write the application of thyristor in SMPS.
- e) Write the comparison between SCR, DIAC and TRIAC.

## 3. Attempt any two questions:

 $(2\times6=12)$ 

- a) Draw and explain the dynamic turn on and turn off characteristics of SCR.
- b) Explain the two quadrant operation of 1-phase fully controlled bridge rectifier with RL load. Draw the output voltage and current wave form for  $\alpha=0$  degrees,  $\alpha=90$  degrees and  $\alpha=120$  degrees. Derive the  $V_{L}$  and  $I_{L}$ .
- c) The load commutation (class-A) circuitry is initially at relaxed. The thyristors T is turned on at t = 0. Determine i) Conduction time of SCR. ii) Voltage across SCR and capacitor after SCR is turned off by taking L = 5 mH, C =  $20\mu F$  and input voltage for circuit is 200 V.

### SECTION - II

## 4. Attempt any four questions :

 $(4 \times 4 = 16)$ 

- a) Explain principle of operation of Morgan Chopper.
- b) Explain the voltage control and harmonics analysis of inverter.
- c) Explain principle of operation of single phase to single phase cycloconverter with R.



- d) A single phase half bridge inverter feeds a resistive load of R =  $7.5\Omega$ . The dc voltage of the inverter is given as 220 V. determine
  - i) RMS value of output voltage.
  - ii) Output power.
- e) Explain the principle of operation of class-D chopper.

### 5. Attempt any two questions:

 $(2 \times 6 = 12)$ 

- a) Draw a neat sketch and explain the 180 degrees conduction mode of 3-phase inverter and derive the line-line voltage and phase voltage expressions.
- b) Explain the principle of operation of step up chopper and derive the expressions for output voltage, current and RMS output voltage.
- c) Explain principle of operation of 3 phase to 3 phase 6 pulse cycloconverter with wave forms.

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Seat	
No.	

## T.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2018 **ELECTRONIC COMMUNICATION ENGINEERING**

Day and Date: Wednesday, 16-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 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.

		3)	only. Don't forg Top of Page. Assume suitable	bjective type quest get to mention, Q.P e data if necessary. indicate full marks.	_	
			MCQ/Objective	e Type Questions		
Dur	atio	n : 30 Minutes			Mark	ks : 14
1.	Ch	noose the correct	answer:		(14×	:1=14)
	1)	FM produced by a) FM	PM is called b) PM	c) Direct FM	d) Indirect FM	
	2)	b) infinite bandv c) pure DC				
	3)			tage rise to maximue modulation index		
		a) 3	b) 1/3	c) $\frac{1}{4}$	d) $\frac{1}{2}$	
	4)	A DSB-SC signa	al can be demodu	lated using		
		a) low pass filte	r	b) a synchrono	ous detector	

- c) a phase shift discriminator
- d) an envelope detector

5)	The modulating frequency in FM is increased from 10 KHz to 20 KHz. The bandwidth is		
	a) doubled	b) halved	
	c) increased by 20 KHz	d) increased tremendously	
6)	The output $V_{\rm R}$ of the ratio detector w discriminator as follows	ith the output of $V_F$ of Foster-Seeley	
	a) $V_F = V_R$ b) $V_F < V_R$	c) $V_F = 0.51V_R$ d) $V_F = 2V_R$	
7)	Base band signal is		
	a) Information signal	b) Carrier signal	
	c) High frequency signal	d) Band pass signal	
8)	Companding is used in PCM to		
	a) reduce bandwidth	b) reduce power	
	c) increase S/N ratio	d) get almost uniform S/N ratio	
9)	The standard data rate PCM voice ch	annel is	
	a) 8kbps b) 8bps	c) 16bps d) 64kbps	
10)	The coding efficiency is given by		
	a) 1 – Redundancy	b) 1 + Redundancy	
	c) 1/ Redundancy	d) None	
11)	Which one is second generation of m	obile communication system ?	
	a) AMPS b) IMT-2000	c) GSM d) None	
12)	State True or False: "A code with he error detection".	amming distance 2 is not capable of	
	a) True b) False		
13)	The probability density function of a r	andom variable X is $ae^{-bx} u(x)$ . Then	
	a) a and b can be arbitrary	b) $a = b/2$	
	c) a = b	d) a = 2b	
14)	The audio frequency range is		
	a) 10 Hz to 1 KHz	b) 80 MHz to 108 MHz	
	c) 20 Hz to 20 KHz	d) 1 KHz to 1 MHz	



Seat	
No.	

# T.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2018 ELECTRONIC COMMUNICATION ENGINEERING

Day and Date: Wednesday, 16-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Assume suitable data if **necessary**.
- 3) Figures to **right** indicate **full** marks.

### SECTION - I

## 2. Solve any four of the following:

 $(4 \times 4 = 16)$ 

- 1) Define the term Autocorrelation and explain significance of correlation coefficient.
- 2) Explain with block diagram phase shift method of SSB generation. State advantages and disadvantages.
- 3) Distinguish between wide band and narrow band FM.
- 4) Explain preemphasis and deemphasis in FM broadcasting.
- 5) Show that during maximum modulation only 33.33 % of total power is used in AM for information transmission.

## 3. Solve any two of the following:

 $(6 \times 2 = 12)$ 

- 1) A 75 MHz carrier signal having amplitude of 50 V is modulated by 3 KHz audio signal having amplitude 20 V.
  - a) Determine modulation index and percentage modulation.
  - b) What frequencies are expected in spectrum of modulated wave?
  - c) Write the equation of modulating, carrier and modulated signal in terms of LSB and USB.
- 2) Draw and explain slope detector in detail. Discuss its advantages and drawbacks.
- 3) What is heterodyne principle? With the block diagram explain super heterodyne receiver.

# 

### SECTION - II

4. Solve any four of the following:

 $(4 \times 4 = 16)$ 

- 1) State and explain sampling theorem.
- 2) How correlation is exploited in delta modulation? Draw and explain delta modulation.
- 3) What are the types of random variables? Explain with examples.
- 4) What is linear block coding? How it is different from systematic linear block code?
- 5) Explain the Frequency reuse concept.
- 5. Solve any two of the following:

 $(2 \times 6 = 12)$ 

- 1) Explain FDMA, TDMA and CDMA in short.
- 2) What are the limitations of delta modulation? Draw and explain block diagram of Adaptive delta modulation.
- 3) What is M-ary communication? Explain in detail.

Set P

# Seat No.

# T.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2018 ELECTRONIC COMMUNICATION ENGINEERING

Day and Date: Wednesday, 1	16-5-2018	Total Marks: 70
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Time: 2.30 p.m. to 5.30 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.

		,	gures to <b>right</b> inc		•	
		ı	MCQ/Objective	Гуре Question	ıs	
Dur	atio	n : 30 Minutes				Marks: 14
1.		noose the correct ar Companding is use				(14×1=14)
		<ul><li>a) reduce bandwic</li><li>c) increase S/N ra</li></ul>		b) reduce po d) get almos	ower st uniform S/N r	ratio
	2)	The standard data a) 8kbps	rate PCM voice (b) 8bps	channel is c) 16bps	d) 64kbps	3
	3)	The coding efficient a) 1 – Redundancy c) 1/ Redundancy	, ,	b) 1 + Redu d) None	ndancy	
	4)	Which one is seconda) AMPS	nd generation of b) IMT-2000	mobile commu c) GSM	nication systen d) None	n ?
	5)	State True or False error detection".	e: "A code with	hamming dista	nce 2 is not ca	apable of
		a) True	b) False			
	6)	The probability der  a) a and b can be		b) $a = b/2$	ole X is ae <sup>-bx</sup> u(	x). Then
		c) a = b		d) a = 2b		

7)	The audio frequency	/ range is				
	a) 10 Hz to 1 KHz		b)	80 MHz to 108	8 M	Hz
	c) 20 Hz to 20 KHz		d)	1 KHz to 1 MH	Ηz	
8)	FM produced by PM	l is called				
	a) FM	b) PM	c)	Direct FM	d)	Indirect FM
9)	An impulse function	consists of				
	a) entire frequency	range with same	rela	ative phase		
	b) infinite bandwidth	n with linear phas	e v	ariation		
	c) pure DC					
	d) large DC along w	rith weak harmon	ics			
10)	A positive RF peak drop to a minimum vertical modulation is	_				
	a) 3	b) 1/3	c)	1/4	d)	1/2
11)	A DSB-SC signal ca	n be demodulate	d u	sing		
	a) low pass filter		b)	a synchronous	s de	etector
	c) a phase shift disc	criminator	d)	an envelope o	dete	ctor
12)	The modulating freq bandwidth is	uency in FM is in	cre	ased from 10 k	〈Ηz	to 20 KHz. The
	a) doubled		b)	halved		
	c) increased by 20	KHz	d)	increased trer	nen	dously
13)	The output $V_R$ of the discriminator as follows:		ith	the output of \	<b>√</b> <sub>F</sub> 0	f Foster-Seeley
	a) $V_F = V_R$	b) $V_F < V_R$	c)	$V_F = 0.51V_R$	d)	$V_F = 2V_R$
14)	Base band signal is					
	a) Information signa	ıl	b)	Carrier signal		
	c) High frequency s	ignal	d)	Band pass sig	gnal	



Seat	
No.	

# T.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2018 ELECTRONIC COMMUNICATION ENGINEERING

Day and Date: Wednesday, 16-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Assume suitable data if **necessary**.
- 3) Figures to **right** indicate **full** marks.

### SECTION - I

## 2. Solve any four of the following:

 $(4 \times 4 = 16)$ 

- 1) Define the term Autocorrelation and explain significance of correlation coefficient.
- 2) Explain with block diagram phase shift method of SSB generation. State advantages and disadvantages.
- 3) Distinguish between wide band and narrow band FM.
- 4) Explain preemphasis and deemphasis in FM broadcasting.
- 5) Show that during maximum modulation only 33.33 % of total power is used in AM for information transmission.

## 3. Solve any two of the following:

 $(6 \times 2 = 12)$ 

- 1) A 75 MHz carrier signal having amplitude of 50 V is modulated by 3 KHz audio signal having amplitude 20 V.
  - a) Determine modulation index and percentage modulation.
  - b) What frequencies are expected in spectrum of modulated wave?
  - c) Write the equation of modulating, carrier and modulated signal in terms of LSB and USB.
- 2) Draw and explain slope detector in detail. Discuss its advantages and drawbacks.
- 3) What is heterodyne principle? With the block diagram explain super heterodyne receiver.

# 

### SECTION - II

4. Solve **any four** of the following:

 $(4 \times 4 = 16)$ 

- 1) State and explain sampling theorem.
- 2) How correlation is exploited in delta modulation? Draw and explain delta modulation.
- 3) What are the types of random variables? Explain with examples.
- 4) What is linear block coding? How it is different from systematic linear block code?
- 5) Explain the Frequency reuse concept.
- 5. Solve any two of the following:

 $(2 \times 6 = 12)$ 

- 1) Explain FDMA, TDMA and CDMA in short.
- 2) What are the limitations of delta modulation? Draw and explain block diagram of Adaptive delta modulation.
- 3) What is M-ary communication? Explain in detail.

Set Q

Set R

# Seat No.

# T.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2018 ELECTRONIC COMMUNICATION ENGINEERING

Day and Date: Wednesday, 16-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 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) As	sume suitable da gures to <b>right</b> indi		-		
		N	ICQ/Objective T	ype	Questions		
Dur	atio	n : 30 Minutes					Marks: 14
1.	Ch	noose the correct an	swer:				(14×1=14)
	1)	The modulating free bandwidth is	quency in FM is ir	cre	ased from 10	KHz to 20 Kł	Hz. The
		a) doubled		b)	halved		
		c) increased by 20	KHz	d)	increased tre	mendously	
	2)	The output $V_{\rm R}$ of the discriminator as follows:		vith	the output of	V <sub>F</sub> of Foster-	-Seeley
		a) $V_F = V_R$	b) $V_F < V_R$	c)	$V_F = 0.51V_R$	d) $V_F = 2V_F$	}
	3)	Base band signal is	3				
		a) Information sign	al	b)	Carrier signal		
		c) High frequency	signal	d)	Band pass sig	gnal	
	4)	Companding is use	d in PCM to				
		a) reduce bandwid	th	b)	reduce power	r	
		c) increase S/N rat	io	d)	get almost un	niform S/N ra	tio
	5)	The standard data	rate PCM voice cl	han	nel is		
		a) 8kbps	b) 8bps	c)	16bps	d) 64kbps	



6)	The coding efficience	y is given by		
	a) 1 - Redundancy		b) 1 + Redundar	ncy
	c) 1/ Redundancy		d) None	
7)	Which one is second	d generation of m	obile communica	tion system ?
	a) AMPS	b) IMT-2000	c) GSM	d) None
8)	State True or False error detection".	: "A code with ha	amming distance	2 is not capable of
	a) True	b) False		
9)	The probability dens	ity function of a r	andom variable X	( is ae <sup>-bx</sup> u(x). Then
	a) a and b can be a	rbitrary	b) $a = b/2$	
	c) a = b		d) $a = 2b$	
10)	The audio frequency	range is		
	a) 10 Hz to 1 KHz		b) 80 MHz to 10	8 MHz
	c) 20 Hz to 20 KHz		d) 1 KHz to 1 M	Hz
11)	FM produced by PM	is called		
	a) FM	b) PM	c) Direct FM	d) Indirect FM
12)	An impulse function <ul><li>a) entire frequency</li><li>b) infinite bandwidth</li><li>c) pure DC</li><li>d) large DC along w</li></ul>	range with same n with linear phas	e variation	
13)	A positive RF peak drop to a minimum vector modulation is	_		
	a) 3	b) 1/3	c) $\frac{1}{4}$	d) $\frac{1}{2}$
14)	A DSB-SC signal ca a) low pass filter c) a phase shift disc		ed using b) a synchronou d) an envelope o	



Seat	
No.	

# T.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2018 ELECTRONIC COMMUNICATION ENGINEERING

Day and Date: Wednesday, 16-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Assume suitable data if **necessary**.
- 3) Figures to right indicate full marks.

### SECTION - I

## 2. Solve any four of the following:

 $(4 \times 4 = 16)$ 

- 1) Define the term Autocorrelation and explain significance of correlation coefficient.
- 2) Explain with block diagram phase shift method of SSB generation. State advantages and disadvantages.
- 3) Distinguish between wide band and narrow band FM.
- 4) Explain preemphasis and deemphasis in FM broadcasting.
- 5) Show that during maximum modulation only 33.33 % of total power is used in AM for information transmission.

## 3. Solve any two of the following:

 $(6 \times 2 = 12)$ 

- 1) A 75 MHz carrier signal having amplitude of 50 V is modulated by 3 KHz audio signal having amplitude 20 V.
  - a) Determine modulation index and percentage modulation.
  - b) What frequencies are expected in spectrum of modulated wave?
  - c) Write the equation of modulating, carrier and modulated signal in terms of LSB and USB.
- 2) Draw and explain slope detector in detail. Discuss its advantages and drawbacks.
- 3) What is heterodyne principle? With the block diagram explain super heterodyne receiver.

# 

### SECTION - II

4. Solve **any four** of the following:

 $(4 \times 4 = 16)$ 

- 1) State and explain sampling theorem.
- 2) How correlation is exploited in delta modulation? Draw and explain delta modulation.
- 3) What are the types of random variables? Explain with examples.
- 4) What is linear block coding? How it is different from systematic linear block code?
- 5) Explain the Frequency reuse concept.
- 5. Solve any two of the following:

 $(2 \times 6 = 12)$ 

- 1) Explain FDMA, TDMA and CDMA in short.
- 2) What are the limitations of delta modulation? Draw and explain block diagram of Adaptive delta modulation.
- 3) What is M-ary communication? Explain in detail.

Set R

Set	5

# Seat No.

# T.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2018 ELECTRONIC COMMUNICATION ENGINEERING

Day and Date: Wednesday, 16-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 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

		,	gures to <b>right</b> ind			
		N	/ICQ/Objective 1	Type Questions	6	
Dur	atic	on : 30 Minutes			Marks	s : 14
1.	Cł	noose the correct an	swer:		(14×1	=14)
	1)	The coding efficien	cy is given by			
		a) 1 – Redundancy	/	b) 1 + Redur	dancy	
		c) 1/ Redundancy		d) None		
	2)	Which one is secon	nd generation of	mobile commur	ication system ?	
		a) AMPS	b) IMT-2000	c) GSM	d) None	
	3)	State True or False error detection".	e: "A code with	hamming distar	nce 2 is not capable o	f
		a) True	b) False			
	4)	The probability den	sity function of a	random variab	e X is ae <sup>-bx</sup> u(x). Then	l
		a) a and b can be	arbitrary	b) $a = b/2$		
		c) a = b		d) a = 2b		
	5)	The audio frequenc	cy range is			
		a) 10 Hz to 1 KHz		b) 80 MHz to	108 MHz	
		c) 20 Hz to 20 KHz	Z	d) 1 KHz to 1	MHz	

6)	FM produced by PM	is called			
	a) FM	b) PM	c)	Direct FM	d) Indirect FM
7)	An impulse function	consists of			
	a) entire frequency	range with same	rela	ative phase	
	b) infinite bandwidth	n with linear phas	e va	ariation	
	c) pure DC				
	d) large DC along w	rith weak harmon	ics		
8)	A positive RF peak of drop to a minimum vimodulation is	_			
	a) 3	b) 1/3	c)	1/4	d) $\frac{1}{2}$
9)	A DSB-SC signal ca	n be demodulate	d u	sing	
	a) low pass filter		b)	a synchronou	s detector
	c) a phase shift disc	criminator	d)	an envelope of	detector
10)	The modulating frequency bandwidth is	uency in FM is in	cre	ased from 10 k	KHz to 20 KHz. The
	a) doubled		b)	halved	
	c) increased by 20 H	KHz	d)	increased trer	mendously
l1)	The output $V_{\rm R}$ of the discriminator as follows:		ith	the output of \	V <sub>F</sub> of Foster-Seeley
	a) $V_F = V_R$	b) $V_F < V_R$	c)	$V_F = 0.51V_R$	d) $V_F = 2V_R$
12)	Base band signal is				
	a) Information signa	ıl	b)	Carrier signal	
	c) High frequency s	ignal	d)	Band pass sig	gnal
13)	Companding is used	I in PCM to			
	a) reduce bandwidth	า	b)	reduce power	
	c) increase S/N ratio	0	d)	get almost un	iform S/N ratio
14)	The standard data ra	ate PCM voice ch	anı	nel is	
	a) 8kbps	b) 8bps	c)	16bps	d) 64kbps



Seat	
No.	

# T.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2018 ELECTRONIC COMMUNICATION ENGINEERING

Day and Date: Wednesday, 16-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Assume suitable data if **necessary**.
- 3) Figures to **right** indicate **full** marks.

### SECTION - I

## 2. Solve any four of the following:

 $(4 \times 4 = 16)$ 

- Define the term Autocorrelation and explain significance of correlation coefficient.
- 2) Explain with block diagram phase shift method of SSB generation. State advantages and disadvantages.
- 3) Distinguish between wide band and narrow band FM.
- 4) Explain preemphasis and deemphasis in FM broadcasting.
- 5) Show that during maximum modulation only 33.33 % of total power is used in AM for information transmission.

## 3. Solve any two of the following:

 $(6 \times 2 = 12)$ 

- 1) A 75 MHz carrier signal having amplitude of 50 V is modulated by 3 KHz audio signal having amplitude 20 V.
  - a) Determine modulation index and percentage modulation.
  - b) What frequencies are expected in spectrum of modulated wave?
  - c) Write the equation of modulating, carrier and modulated signal in terms of LSB and USB.
- 2) Draw and explain slope detector in detail. Discuss its advantages and drawbacks.
- 3) What is heterodyne principle? With the block diagram explain super heterodyne receiver.

# 

### SECTION - II

4. Solve any four of the following:

 $(4 \times 4 = 16)$ 

- 1) State and explain sampling theorem.
- 2) How correlation is exploited in delta modulation? Draw and explain delta modulation.
- 3) What are the types of random variables? Explain with examples.
- 4) What is linear block coding? How it is different from systematic linear block code?
- 5) Explain the Frequency reuse concept.
- 5. Solve any two of the following:

 $(2 \times 6 = 12)$ 

- 1) Explain FDMA, TDMA and CDMA in short.
- 2) What are the limitations of delta modulation? Draw and explain block diagram of Adaptive delta modulation.
- 3) What is M-ary communication? Explain in detail.

Set S

Seat	
No.	

a) Four

Set P

# T.E. (E & E) (Part – II) (CGPA) Examination, 2018 POWER SYSTEM ANALYSIS

Day and Date : Frid Time : 2.30 p.m. to	•		Max. Marks : 70		
Instructions	carries <b>one</b> mark 2) <b>Answer MCQ/O</b> b	nswer Book Pago D <b>jective type q</b> u	d be solved in first e No. 3. Each question estions on Page No. 3 Q.P. Set (P/Q/R/S) on		
	MCQ/Objective	Type Question	ns		
Duration: 30 Minute	es		Marks: 14		
1. Choose the cor	rect answer :		14		
<ul><li>a) Angle bet</li><li>b) Angular d</li><li>c) Angular d</li></ul>	ween stator voltage ar isplacement of the rote isplacement of the stati isplacement of an axis	nd current or w.r.t. stator tor mmf w.r.t. a	s generator is the synchronously rotating axis or w.r.t. a synchronously		
	2) In method of load flow, convergence is dependent on the				
,	b) N-R	c) FD	d) All		
•	mentum nstant	d) Excitation base MVA, then	ating power on of generator the new p.u. impedance		

c) Two

d) Three

b) Half



- 5) The power delivered by a synchronous generator to an infinite bus is given
  - a)  $P = \frac{|V_t|E_f|}{R_a} \sin \delta$

b)  $P = \frac{|V_t||E_f||^2}{X_a} \sin \delta$ 

c)  $P = \frac{|V_t|E_f|}{X} \sin \delta$ 

d)  $P = \frac{|V_t|E_f|}{X_c}\cos\delta$ 

- 6) Normally Z<sub>bus</sub> matrix is a
  - a) Null matrix
- b) Sparse matrix
- c) Full matrix d) Unity matrix
- 7) Load flow study is carried out for
  - a) Load frequency control
- b) Stability studies

c) System planning

- d) Fault calculations
- 8) At slack bus, which one of the following combinations of variables is specified?
  - a) |V|,  $\delta$
- b) P, Q
- c) P,|V|
- d) Q, |V|
- 9) For a load flow solution, the quantities normally specified at a voltage controlled bus are
  - a) P and Q
- b) P and |V|
- c) Q and |V| d) P and  $\delta$
- 10) For stability reasons, the transmission line is operated with power angle in the range \_\_\_\_\_
  - a) 10 to 25 degree

b) 30 to 45 degree

c) 60 to 75 degree

- d) 65 to 90 degree
- 11) 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)  $X'_d = \frac{X_d}{2}$
- 12) In case of balanced three phase system, negative and zero sequence currents are \_\_
  - a) Absent
- b) Equal
- c) Infinite
- d) Present

- 13) Fault level means
  - a) Voltage at the point of fault
- b) Fault power factor

c) Fault current

- d) Fault MVA
- 14) The usual value of  $\delta$  is about
  - a) 30

- b) 45
- c) 60
- d) 90



Seat	
No.	

# T.E. (E & E) (Part – II) (CGPA) Examination, 2018 POWER SYSTEM ANALYSIS

Day and Date: Friday, 18-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

#### SECTION - I

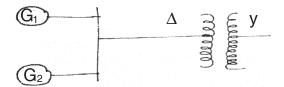
2. Solve any four questions:

 $(4 \times 4 = 16)$ 

- a) State and derive the equal area criterion of stability.
- b) Three generators are rated as G1: 100 MVA, 33 KV, Xgl = 0.1 pu., G2: 150 MVA, 32 KV, Xg2 = 0.08 pu and G3: 110 MVA, 30 KV, Xg3 = 0.12 pu. Determine the reactance of generators in per unit corresponding to base values of 200 MVA and 35 KV.
- c) Assuming 25 MVA as base MVA, calculate the through impedance between the generator and output terminal of the transformer for the system shown below:

The specifications of the components are given below:

Generator G <sub>1</sub>	Generator G <sub>2</sub>	Transformer
30 MVA	25 MVA	60 MVA
11 KV	11 KV	11 KV∆ / 66 KV
X" = 0.20 p.u.	X" = 0.25 p.u.	X = 0.10 p.u.



- d) Discuss various types of buses and explain their significance in detail.
- e) Define per unit system. What are the advantages of using per unit system?
- f) A 60 Hz, 4 pole turbo generator rated 100 MVA, 13.8 KV has a inertia constant of 10 MJ/MVA. Determine :
  - a) Stored energy in rotor
  - b) If the mechanical input is suddenly raised to 60 MW for a load of 50 MW, find rotor acceleration?



### 3. Solve following:

 $(2 \times 6 = 12)$ 

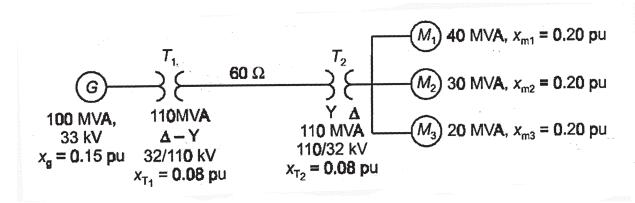
a) Data for the sample three bus system are given in following tables. Using Gauss Siedal method determine values of phase voltages at bus 2 and 3 after first iteration.

		Generation Load			k
Bus Code i	Assumed Bus Voltage	MW	MVAr	MW	MVAr
1 (slack bus)	1.05 + j 0.0	_	_	0	0
2	1 + j 0.0	50	30	305.6	140.2
3	1 + j 0.0	0.0	0.0	138.6	45.2

Base MVA = 100

Bus Code i – k	Impedance Z <sub>ik</sub>
1 – 2	0.02 + j 0.04
1 – 3	0.01 + j 0.03
2 – 3	0.0125 + j 0.025
OR	

a) For the power system shown below, draw per unit reactance diagram. Assume generator rating as base values.



b) Explain the Newton-Raphson method for solution of non-linear algebraic equations.



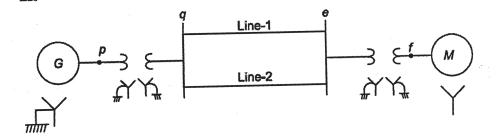
### SECTION - II

4. Solve any four questions:

 $(4 \times 4 = 16)$ 

- a) Describe the transients occurring in a transmission line on occurrence of a short circuit.
- b) Explain different faults taking place in a power system.
- c) The zero and positive sequence components of red phase are  $E_{_{R0}}=0.5-j0.866~v;~E_{_{R1}}=2+j0~if~the~phase~voltage~E_{_{R}}=3+j0~find~the~$  negative phase sequence component of red phase and voltages  $E_{_{Y}}$  and  $E_{_{B}}$ .
- d) Derive an expression for symmetrical components in terms of phase components.
- e) For the power system shown below draw zero sequence network :

G:  $x_{g0} = 0.05 \text{ pu}$ M:  $x_{m0} = 0.03 \text{ pu}$   $T_1$ :  $x_{T1} = 0.12 \text{ pu}$   $T_2$ :  $x_{T2} = 0.10 \text{ pu}$ Line-1:  $x_{L10} = 0.70 \text{ pu}$ Line-2:  $x_{L20} = 0.70 \text{ pu}$ 



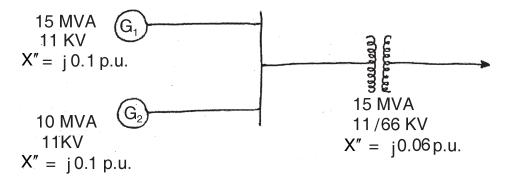
f) A 50 MVA generator with a reactance of 0.1 pu is connected to a busbar. A 25 MVA transformer with a reactance of 0.05 pu is also connected through a busbar reactor of 0.1 pu to a same busbar. Both these reactances are based on 25 MVA rating. If a feeder taken out from a busbar through a circuit breaker develops a line to ground fault what should be the rating of circuit breaker.



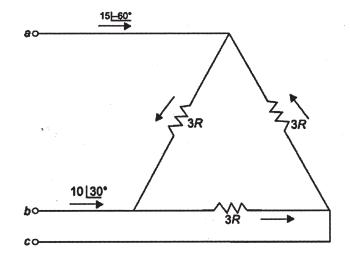
5. Solve any two questions:

 $(2 \times 6 = 12)$ 

a) Two generators G<sub>1</sub> and G<sub>2</sub> are connected in parallel having rating of 15 MVA, 11 KV and 10 MVA, 11 KV resp. The generators are connected to transformer as shown in fig. Calculate the subtransient current in each generator when a three phase fault occurs on the high voltage side of the transformer.



b) A delta connected resistive load is connected across a balanced 3 phase supply. Find the symmetrical components of line currents and delta currents.



- c) A 50 MVA, 11 KV, three phase alternator was subjected to different types of faults. The fault currents were :
  - i) 1870 Amp. for three phase fault
  - ii) 2590 Amp. for L L fault.
  - iii) 4130 Amp. for L G fault.

The alternator neutral is solidly grounded. Find the three sequence reactances of the alternator.



Seat No.

# **SLR-TC - 498**

# T.E. (E & E) (Part – II) (CGPA) Examination, 2018 POWER SYSTEM ANALYSIS

Day and Date : Friday, 18-5-2018 Time : 2.30 p.m. to 5.30 p.m.	Max. Marks: 70
carries <b>one</b> mark. 2) <b>Answer MCQ/Objec</b>	ory. It should be solved in first er Book Page No. 3. Each question etive type questions on Page No. 3 to mention, Q.P. Set (P/Q/R/S) on
MCQ/Objective Ty	-
Duration: 30 Minutes	Marks : 14
<ol> <li>Choose the correct answer:         <ol> <li>At slack bus, which one of the following a)  V , δ</li> <li>P, Q</li> </ol> </li> <li>For a load flow solution, the quantities controlled bus are</li></ol>	<ul> <li>c) P, V </li> <li>d) Q,  V </li> <li>normally specified at a voltage</li> <li>c) Q and  V </li> <li>d) P and δ</li> </ul>
4) Which one of the following is correct?	,
a) $X''_d = X'_d = X_d$ c) $X''_d = \frac{X_d}{2}$	b) $X''_d < X'_d < X_d$ d) $X'_d = \frac{X_d}{2}$
<ul> <li>5) In case of balanced three phase systems are</li> <li>a) Absent b) Equal</li> <li>6) Fault level means</li> <li>a) Voltage at the point of fault</li> </ul>	c) Infinite d) Present b) Fault power factor
c) Fault current	d) Fault MVA

7)	The usual value of $\delta$ is			_	I) 00	
	a) 30	o) 45	c) 60	0	d) 90	
8)	The angle $\delta$ in the swing equation of a synchronous generator is the					
	a) Angle between stator voltage and current					
	b) Angular displacement of the rotor w.r.t. stator					
	c) Angular displacement of the stator mmf w.r.t. a synchronously rotating axis					
	<ul><li>d) Angular displaceme rotating axis</li></ul>	nt of an axis fixe	d to t	he rotor w.r.	t. a synchronously	
-	In method of load flow, convergence is dependent on the					
	choice of slack bus.					
	a) G-S	o) N-R	c) F	D	d) All	
10)	$I d^2 \delta/dt^2 = $					
	a) Rotor momentum			b) Accelerating power		
	c) Inertia constant		d) E	xcitation of	generator	
11)	If the new base MVA is twice the old base MVA, then the new p.u. impedance					
	will be ti	mes old p.u. imp	edan	ce.		
	a) Four	o) Half	c) T	WO	d) Three	
12)	The power delivered by a synchronous generator to an infinite bus is given					
	by					
	a) $P = \frac{ V_t E_f }{R_a} \sin \delta$		b) P	$=\frac{\mid V_{t}\mid E_{f}\mid^{2}}{X_{s}}$	sinδ	
	c) $P = \frac{ V_t E_f }{X_s} \sin \delta$		d) P	$=\frac{\mid V_t\mid E_f\mid}{X_s}c$	osδ	
13)	Normally Z <sub>bus</sub> matrix is	а				
	a) Null matrix b)	Sparse matrix	c) F	ull matrix	d) Unity matrix	
14)	Load flow study is carr	ied out for				
ŕ	a) Load frequency control		b) Stability studies			
	c) System planning		d) Fault calculations			



Seat	
No.	

# T.E. (E & E) (Part – II) (CGPA) Examination, 2018 POWER SYSTEM ANALYSIS

Day and Date: Friday, 18-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

### SECTION - I

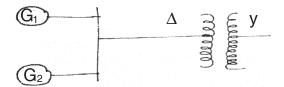
### 2. Solve any four questions:

 $(4 \times 4 = 16)$ 

- a) State and derive the equal area criterion of stability.
- b) Three generators are rated as G1: 100 MVA, 33 KV, Xgl = 0.1 pu., G2: 150 MVA, 32 KV, Xg2 = 0.08 pu and G3: 110 MVA, 30 KV, Xg3 = 0.12 pu. Determine the reactance of generators in per unit corresponding to base values of 200 MVA and 35 KV.
- c) Assuming 25 MVA as base MVA, calculate the through impedance between the generator and output terminal of the transformer for the system shown below:

The specifications of the components are given below:

Generator G <sub>1</sub>	Generator G <sub>2</sub>	Transformer		
30 MVA	25 MVA	60 MVA		
11 KV	11 KV	11 KV∆ / 66 KV		
X" = 0.20 p.u.	X" = 0.25 p.u.	X = 0.10 p.u.		



- d) Discuss various types of buses and explain their significance in detail.
- e) Define per unit system. What are the advantages of using per unit system?
- f) A 60 Hz, 4 pole turbo generator rated 100 MVA, 13.8 KV has a inertia constant of 10 MJ/MVA. Determine :
  - a) Stored energy in rotor
  - b) If the mechanical input is suddenly raised to 60 MW for a load of 50 MW, find rotor acceleration?



### 3. Solve following:

 $(2 \times 6 = 12)$ 

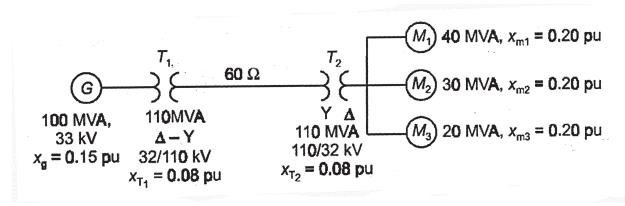
a) Data for the sample three bus system are given in following tables. Using Gauss Siedal method determine values of phase voltages at bus 2 and 3 after first iteration.

		Generation Load			
Bus Code i	Assumed Bus Voltage	MW	MVAr	MW	MVAr
1 (slack bus)	1.05 + j 0.0	_	_	0	0
2	1 + j 0.0	50	30	305.6	140.2
3	1 + j 0.0	0.0	0.0	138.6	45.2

Base MVA = 100

Bus Code i – k	Impedance Z <sub>ik</sub>		
1 – 2	0.02 + j 0.04		
1 – 3	0.01 + j 0.03		
2 – 3	0.0125 + j 0.025		
OR			

a) For the power system shown below, draw per unit reactance diagram. Assume generator rating as base values.



b) Explain the Newton-Raphson method for solution of non-linear algebraic equations.



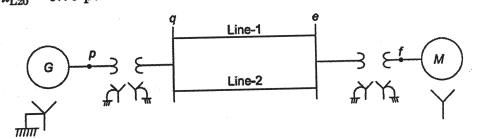
#### SECTION - II

4. Solve any four questions:

 $(4 \times 4 = 16)$ 

- a) Describe the transients occurring in a transmission line on occurrence of a short circuit.
- b) Explain different faults taking place in a power system.
- c) The zero and positive sequence components of red phase are  $E_{_{R0}} = 0.5 j0.866 \text{ v}; \ E_{_{R1}} = 2 + j0 \text{ if the phase voltage } E_{_{R}} = 3 + j0 \text{ find the negative phase sequence component of red phase and voltages } E_{_{Y}} \text{ and } E_{_{B}}.$
- d) Derive an expression for symmetrical components in terms of phase components.
- e) For the power system shown below draw zero sequence network :

G:  $x_{g0} = 0.05$  pu M:  $x_{m0} = 0.03$  pu  $T_1$ :  $x_{T1} = 0.12$  pu  $T_2$ :  $x_{T2} = 0.10$  pu Line-1:  $x_{L10} = 0.70$  pu Line-2:  $x_{L20} = 0.70$  pu



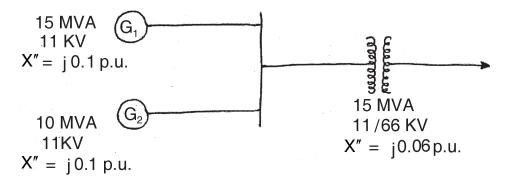
f) A 50 MVA generator with a reactance of 0.1 pu is connected to a busbar. A 25 MVA transformer with a reactance of 0.05 pu is also connected through a busbar reactor of 0.1 pu to a same busbar. Both these reactances are based on 25 MVA rating. If a feeder taken out from a busbar through a circuit breaker develops a line to ground fault what should be the rating of circuit breaker.



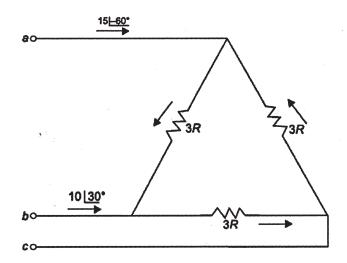
5. Solve any two questions:

 $(2 \times 6 = 12)$ 

a) Two generators G<sub>1</sub> and G<sub>2</sub> are connected in parallel having rating of 15 MVA, 11 KV and 10 MVA, 11 KV resp. The generators are connected to transformer as shown in fig. Calculate the subtransient current in each generator when a three phase fault occurs on the high voltage side of the transformer.



b) A delta connected resistive load is connected across a balanced 3 phase supply. Find the symmetrical components of line currents and delta currents.



- c) A 50 MVA, 11 KV, three phase alternator was subjected to different types of faults. The fault currents were :
  - i) 1870 Amp. for three phase fault
  - ii) 2590 Amp. for L L fault.
  - iii) 4130 Amp. for L G fault.

The alternator neutral is solidly grounded. Find the three sequence reactances of the alternator.

## Seat No.

### T.E. (E & E) (Part – II) (CGPA) Examination, 2018 **POWER SYSTEM ANALYSIS**

Max. Marks: 70 Day and Date: Friday, 18-5-2018

Time: 2.30 p.m. to 5.30 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 power delivered by a synchronous generator to an infinite bus is given

a) 
$$P = \frac{|V_t|E_f|}{R_a} \sin \delta$$

b) 
$$P = \frac{|V_t|E_f|^2}{X_s} \sin \delta$$

c) 
$$P = \frac{|V_t|E_f|}{X_s} \sin \delta$$

d) 
$$P = \frac{|V_t|E_f|}{X_s}\cos\delta$$

2) Normally  $Z_{\text{bus}}$  matrix is a

- a) Null matrix
- b) Sparse matrix
- c) Full matrix d) Unity matrix

3) Load flow study is carried out for

- a) Load frequency control
- b) Stability studies

c) System planning

d) Fault calculations

4) At slack bus, which one of the following combinations of variables is specified?

- a) |V|,  $\delta$
- b) P. Q
- c) P,|V|
- d) Q, |V|

5) For a load flow solution, the quantities normally specified at a voltage controlled bus are

- a) P and Q
- b) P and |V| c) Q and |V| d) P and  $\delta$

6)	For stability reasons, the range		line is	operated v	vith power angle in	
	a) 10 to 25 degree	_	b) 30	to 45 deg	ree	
	c) 60 to 75 degree		,	to 90 deg		
7)	Which one of the follo	owing is correct?	,	J		
• ,	a) $X''_{d} = X'_{d} = X_{d}$	wing to correct .	b) X	$_{d}^{\prime\prime}$ $<$ $X_{d}^{\prime}$ $<$ $X$	d	
	c) $X''_d = \frac{X_d}{2}$		d) x	$X_d' = \frac{X_d}{2}$		
8)	In case of balanced currents are	three phase sys	tem,	negative a	nd zero sequence	
	a) Absent	b) Equal	c) In	finite	d) Present	
9)	Fault level means					
	<ul><li>a) Voltage at the poir</li><li>c) Fault current</li></ul>	t of fault		ault power 1 ault MVA	actor	
10)	The usual value of $\delta$ is	s about				
	a) 30	b) 45	c) 60	)	d) 90	
11)	The angle $\delta$ in the swi	ing equation of a s	synch	ronous ger	erator is the	
	a) Angle between stator voltage and current					
	b) Angular displacement of the rotor w.r.t. stator					
	c) Angular displacement of the stator mmf w.r.t. a synchronously rotating axis					
	<ul><li>d) Angular displacem rotating axis</li></ul>	ent of an axis fixe	d to th	ne rotor w.r	.t. a synchronously	
12)	In me	thod of load flow,	conv	ergence is	dependent on the	
,	choice of slack bus.				•	
	a) G-S	b) N-R	c) FI	)	d) All	
13)	$I d^2 \delta/dt^2 = $					
,	a) Rotor momentum		b) Ad	ccelerating	power	
	c) Inertia constant		d) Excitation of generator			
14)	If the new base MVA is	twice the old base	e MVA	, then the n	ew p.u. impedance	
,	will be					
	a) Four	b) Half	c) Tv		d) Three	



Seat	
No.	

# T.E. (E & E) (Part – II) (CGPA) Examination, 2018 POWER SYSTEM ANALYSIS

Day and Date: Friday, 18-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

#### SECTION - I

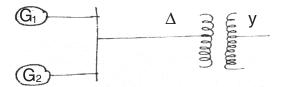
### 2. Solve any four questions:

 $(4 \times 4 = 16)$ 

- a) State and derive the equal area criterion of stability.
- b) Three generators are rated as G1: 100 MVA, 33 KV, Xgl = 0.1 pu., G2: 150 MVA, 32 KV, Xg2 = 0.08 pu and G3: 110 MVA, 30 KV, Xg3 = 0.12 pu. Determine the reactance of generators in per unit corresponding to base values of 200 MVA and 35 KV.
- c) Assuming 25 MVA as base MVA, calculate the through impedance between the generator and output terminal of the transformer for the system shown below:

The specifications of the components are given below:

Generator G <sub>1</sub>	Generator G <sub>2</sub>	Transformer
30 MVA	25 MVA	60 MVA
11 KV	11 KV	11 KV∆ / 66 KV
X" = 0.20 p.u.	X" = 0.25 p.u.	X = 0.10 p.u.



- d) Discuss various types of buses and explain their significance in detail.
- e) Define per unit system. What are the advantages of using per unit system?
- f) A 60 Hz, 4 pole turbo generator rated 100 MVA, 13.8 KV has a inertia constant of 10 MJ/MVA. Determine :
  - a) Stored energy in rotor
  - b) If the mechanical input is suddenly raised to 60 MW for a load of 50 MW, find rotor acceleration?



### 3. Solve following:

 $(2 \times 6 = 12)$ 

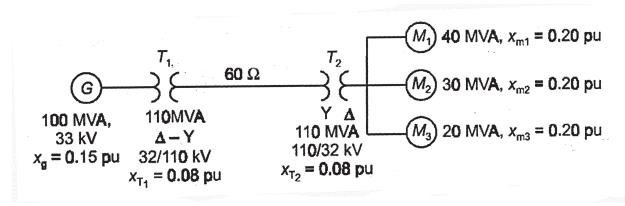
a) Data for the sample three bus system are given in following tables. Using Gauss Siedal method determine values of phase voltages at bus 2 and 3 after first iteration.

		Generation Load			
Bus Code i	Assumed Bus Voltage	MW	MVAr	MW	MVAr
1 (slack bus)	1.05 + j 0.0	_	_	0	0
2	1 + j 0.0	50	30	305.6	140.2
3	1 + j 0.0	0.0	0.0	138.6	45.2

Base MVA = 100

Bus Code i – k	Impedance Z <sub>ik</sub>
1 – 2	0.02 + j 0.04
1 – 3	0.01 + j 0.03
2 – 3	0.0125 + j 0.025
OR	

a) For the power system shown below, draw per unit reactance diagram. Assume generator rating as base values.



b) Explain the Newton-Raphson method for solution of non-linear algebraic equations.



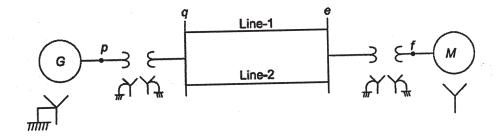
#### SECTION - II

### 4. Solve any four questions:

 $(4 \times 4 = 16)$ 

- a) Describe the transients occurring in a transmission line on occurrence of a short circuit.
- b) Explain different faults taking place in a power system.
- c) The zero and positive sequence components of red phase are  $E_{_{R0}} = 0.5 j0.866 \text{ v}; \ E_{_{R1}} = 2 + j0 \text{ if the phase voltage } E_{_{R}} = 3 + j0 \text{ find the negative phase sequence component of red phase and voltages } E_{_{Y}} \text{ and } E_{_{B}}.$
- d) Derive an expression for symmetrical components in terms of phase components.
- e) For the power system shown below draw zero sequence network :

G:  $x_{g0} = 0.05 \text{ pu}$ M:  $x_{m0} = 0.03 \text{ pu}$   $T_1$ :  $x_{T1} = 0.12 \text{ pu}$   $T_2$ :  $x_{T2} = 0.10 \text{ pu}$ Line-1:  $x_{L10} = 0.70 \text{ pu}$ Line-2:  $x_{L20} = 0.70 \text{ pu}$ 



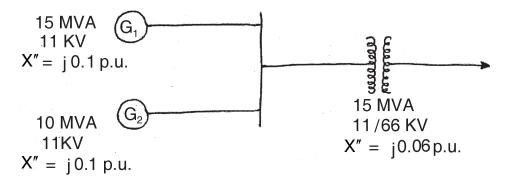
f) A 50 MVA generator with a reactance of 0.1 pu is connected to a busbar. A 25 MVA transformer with a reactance of 0.05 pu is also connected through a busbar reactor of 0.1 pu to a same busbar. Both these reactances are based on 25 MVA rating. If a feeder taken out from a busbar through a circuit breaker develops a line to ground fault what should be the rating of circuit breaker.



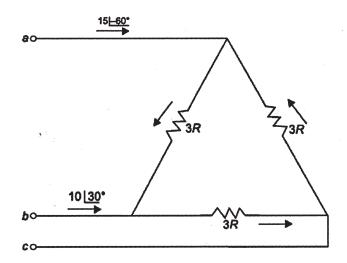
5. Solve any two questions:

 $(2 \times 6 = 12)$ 

a) Two generators G<sub>1</sub> and G<sub>2</sub> are connected in parallel having rating of 15 MVA, 11 KV and 10 MVA, 11 KV resp. The generators are connected to transformer as shown in fig. Calculate the subtransient current in each generator when a three phase fault occurs on the high voltage side of the transformer.



b) A delta connected resistive load is connected across a balanced 3 phase supply. Find the symmetrical components of line currents and delta currents.



- c) A 50 MVA, 11 KV, three phase alternator was subjected to different types of faults. The fault currents were :
  - i) 1870 Amp. for three phase fault
  - ii) 2590 Amp. for L L fault.
  - iii) 4130 Amp. for L G fault.

The alternator neutral is solidly grounded. Find the three sequence reactances of the alternator.



## Seat No.

### T.E. (E & E) (Part – II) (CGPA) Examination, 2018 **POWER SYSTEM ANALYSIS**

Max. Marks: 70 Day and Date: Friday, 18-5-2018

Time: 2.30 p.m. to 5.30 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) For stability reasons, the transmission line is operated with power angle in the range a) 10 to 25 degree b) 30 to 45 degree d) 65 to 90 degree c) 60 to 75 degree 2) 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)  $X'_d = \frac{X_d}{2}$ 

- 3) In case of balanced three phase system, negative and zero sequence currents are
  - a) Absent
- b) Equal
- c) Infinite
- d) Present

- 4) Fault level means
  - a) Voltage at the point of fault
- b) Fault power factor

c) Fault current

- d) Fault MVA
- 5) The usual value of  $\delta$  is about
  - a) 30

- b) 45
- c) 60
- d) 90

14

0)	The angle of in the sw		-	_	nerator is the	
	<ul><li>a) Angle between stator voltage and current</li><li>b) Angular displacement of the rotor w.r.t. stator</li></ul>					
	, .				huanan allu vatatina assia	
				-	hronously rotating axis	
	d) Angular displacem	ient of an axis fixe	ed to	o the rotor w.	r.t. a synchronously	
	rotating axis					
7)	In me	ethod of load flow	, CC	onvergence is	s dependent on the	
	choice of slack bus.					
	a) G-S	b) N-R	c)	FD	d) All	
8)	$I d^2 \delta/dt^2 = $					
	a) Rotor momentum		b)	Accelerating	power	
	c) Inertia constant		d)	Excitation of	generator	
9)	If the new base MVA is	s twice the old base	e M	IVA, then the i	new p.u. impedance	
	will be	times old p.u. imp	eda	ance.		
	a) Four	b) Half	c)	Two	d) Three	
10)	The power delivered	by a synchronous	ge	nerator to an	infinite bus is given	
	by	_				
	a) $P = \frac{ V_t E_f }{R_a} \sin \delta$		b)	$P = \frac{ V_t  E_f ^2}{X_s}$	e - <b>sin</b> δ	
	c) $P = \frac{ V_t E_f }{X_s} \sin \delta$		d)	$P = \frac{ V_t E_f }{X_s}$	$\cos\delta$	
11)	Normally Z <sub>bus</sub> matrix i	is a				
,	a) Null matrix b		c)	Full matrix	d) Unity matrix	
12)	Load flow study is ca	rried out for				
	a) Load frequency co	ontrol	b)	Stability stud	dies	
	c) System planning		d)	Fault calcula	ations	
13)	At slack bus, which or	ne of the following	cor	mbinations of	variables is specified?	
	a)  V , δ	b) P, Q	c)	P, V	d) Q,  V	
14)	For a load flow solution	on, the quantities i	nor	mally specifie	ed at a voltage	
Í	controlled bus are	·		- •	-	
	a) P and Q	b) P and  V	c)	Q and  V	d) P and $\delta$	



Seat	
No.	

# T.E. (E & E) (Part – II) (CGPA) Examination, 2018 POWER SYSTEM ANALYSIS

Day and Date: Friday, 18-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.s

SECTION - I

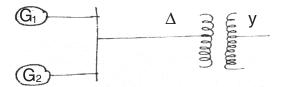
2. Solve any four questions:

 $(4 \times 4 = 16)$ 

- a) State and derive the equal area criterion of stability.
- b) Three generators are rated as G1: 100 MVA, 33 KV, Xgl = 0.1 pu., G2: 150 MVA, 32 KV, Xg2 = 0.08 pu and G3: 110 MVA, 30 KV, Xg3 = 0.12 pu. Determine the reactance of generators in per unit corresponding to base values of 200 MVA and 35 KV.
- c) Assuming 25 MVA as base MVA, calculate the through impedance between the generator and output terminal of the transformer for the system shown below:

The specifications of the components are given below:

Generator G <sub>1</sub>	Generator G <sub>2</sub>	Transformer
30 MVA	25 MVA	60 MVA
11 KV	11 KV	11 KV∆ / 66 KV
X" = 0.20 p.u.	X" = 0.25 p.u.	X = 0.10 p.u.



- d) Discuss various types of buses and explain their significance in detail.
- e) Define per unit system. What are the advantages of using per unit system?
- f) A 60 Hz, 4 pole turbo generator rated 100 MVA, 13.8 KV has a inertia constant of 10 MJ/MVA. Determine :
  - a) Stored energy in rotor
  - b) If the mechanical input is suddenly raised to 60 MW for a load of 50 MW, find rotor acceleration?



### 3. Solve following:

 $(2 \times 6 = 12)$ 

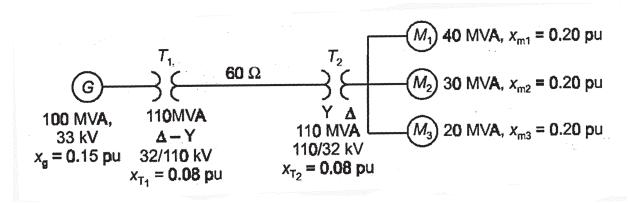
a) Data for the sample three bus system are given in following tables. Using Gauss Siedal method determine values of phase voltages at bus 2 and 3 after first iteration.

		Generation Load			
Bus Code i	Assumed Bus Voltage	MW	MVAr	MW	MVAr
1 (slack bus)	1.05 + j 0.0	_	_	0	0
2	1 + j 0.0	50	30	305.6	140.2
3	1 + j 0.0	0.0	0.0	138.6	45.2

Base MVA = 100

Bus Code i – k	Impedance Z <sub>ik</sub>
1 – 2	0.02 + j 0.04
1 – 3	0.01 + j 0.03
2 – 3	0.0125 + j 0.025
OR	

a) For the power system shown below, draw per unit reactance diagram. Assume generator rating as base values.



b) Explain the Newton-Raphson method for solution of non-linear algebraic equations.



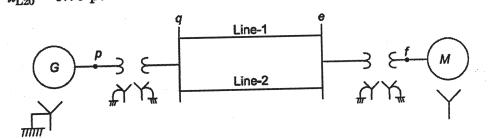
#### SECTION - II

4. Solve any four questions:

 $(4 \times 4 = 16)$ 

- a) Describe the transients occurring in a transmission line on occurrence of a short circuit.
- b) Explain different faults taking place in a power system.
- c) The zero and positive sequence components of red phase are  $E_{_{R0}} = 0.5 j0.866 \text{ v}; \ E_{_{R1}} = 2 + j0 \text{ if the phase voltage } E_{_{R}} = 3 + j0 \text{ find the negative phase sequence component of red phase and voltages } E_{_{Y}} \text{ and } E_{_{B}}.$
- d) Derive an expression for symmetrical components in terms of phase components.
- e) For the power system shown below draw zero sequence network :

G:  $x_{g0} = 0.05 \text{ pu}$ M:  $x_{m0} = 0.03 \text{ pu}$   $T_1$ :  $x_{T1} = 0.12 \text{ pu}$   $T_2$ :  $x_{T2} = 0.10 \text{ pu}$ Line-1:  $x_{L10} = 0.70 \text{ pu}$ Line-2:  $x_{L20} = 0.70 \text{ pu}$ 



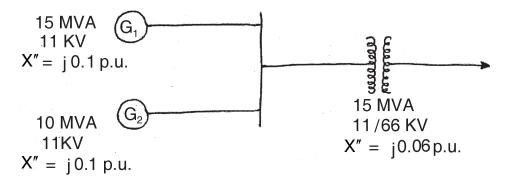
f) A 50 MVA generator with a reactance of 0.1 pu is connected to a busbar. A 25 MVA transformer with a reactance of 0.05 pu is also connected through a busbar reactor of 0.1 pu to a same busbar. Both these reactances are based on 25 MVA rating. If a feeder taken out from a busbar through a circuit breaker develops a line to ground fault what should be the rating of circuit breaker.



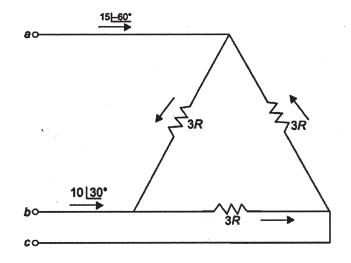
5. Solve any two questions:

 $(2 \times 6 = 12)$ 

a) Two generators G<sub>1</sub> and G<sub>2</sub> are connected in parallel having rating of 15 MVA, 11 KV and 10 MVA, 11 KV resp. The generators are connected to transformer as shown in fig. Calculate the subtransient current in each generator when a three phase fault occurs on the high voltage side of the transformer.



b) A delta connected resistive load is connected across a balanced 3 phase supply. Find the symmetrical components of line currents and delta currents.



- c) A 50 MVA, 11 KV, three phase alternator was subjected to different types of faults. The fault currents were :
  - i) 1870 Amp. for three phase fault
  - ii) 2590 Amp. for L L fault.
  - iii) 4130 Amp. for L G fault.

The alternator neutral is solidly grounded. Find the three sequence reactances of the alternator.

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# T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2018

CONT	ROL SYSTEMS – II	-,
Day and Date : Monday, 21-5-2018 Time : 2.30 p.m. to 5.30 p.m.		Max. Marks: 70
<b>30 minute</b> carries <b>on</b> e 2) <b>Answer M</b>	is compulsory. It should be a es in Answer Book Page No. 3. e mark. ICQ/Objective type questions 't forget to mention, Q.P. Set (	Each question on Page No. 3
MCQ/Obj Duration : 30 Minutes	jective Type Questions	Marks : 14
of P <sup>-1</sup> AP where P is a linea a) 1, -1/2, 1/4 c) 1, 4, 16	b) Control matrix d) Diagonal matrix atrix A are 1, -2 and 4. What are tar transformation b) -1, 2, -4 d) 1, -2, 4	(14×1=14) he eigenvalues
<ul><li>3) The eigenvalues of the mat</li><li>a) Open loop poles</li><li>c) Regulator pole</li></ul>	b) Open loop zeros d) None of these	
<ul><li>4) The TIF having 'P' and/or 'Z phase TIFs.</li><li>a) Minimum</li><li>c) All pass</li></ul>	Z' in the RHS of s-plane are call b) Non minimum d) None of these	ed
<ul><li>5) The eigenvalues of linear sy</li><li>a) Poles of the system</li><li>c) Both a) and b)</li></ul>	ystem are the location of b) Zero of the system d) Finite pole and zer	
<ul><li>6) A state variable approach c</li><li>a) Continuous time</li><li>c) Periodic time</li></ul>	an be applied to system b) Discrete time	stems.





- 7) For the system  $X = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} x \div \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$  and  $y = \begin{bmatrix} 1 & 1 \end{bmatrix} X$  then the
  - a) System is controllable but unstable
  - b) System is uncontrollable but unstable
  - c) System is controllable and stable
  - d) System is uncontrollable but stable
- 8) The process of designing a closed loop control system is by
  - a) Regulator

b) Lag compensation

c) Pole placement

- d) None of these
- 9) The transfer function of a compensating network is of form  $(1 + \alpha Ts)/(1 + Ts)$ . If this is a phase – Lag network, the value of  $\alpha$  should be
  - a) Greater than 1

b) Between 0 and 1

c) Exactly equal to 1

- d) Exactly equal to 0
- 10) The transfer function 1 + 0.5s/1 + s represent a
  - a) lag network

b) lead network

c) lag-lead network

- d) proportional controller
- 11) The transfer function of a multi-input multi-output system, with the statespace representation of X = AX + BU and Y = CX + DU where X represents the state, Y the output and U the input vector, will be given by
  - a)  $C(sI A)^{-1} B$

b)  $C(sI - A)^{-1}B + D$ 

c)  $(sI - A)^{-1} B$ 

- d)  $(sI A)^{-1} B + D$
- 12) The information contained in a signal is preserved in the sampled version
  - a) wm = ws

b) ws = 0.1 wm

c) ws = 0.5 wm

- d) ws = 2 wm
- 13) In Jury's table \_\_\_\_\_ number of rows are formed, where n is order of system.
  - a) (3n 2)

b) (2n - 3)

c) (3n + 2)

- d) (2n + 3)
- 14) When the eigenvalues are distinct, real and negative then the singular point is called a
  - a) Stable node

b) Unstable node

c) Stable focus

d) Unstable focus

Marks: 56



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# T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2018 CONTROL SYSTEMS – II

Day and Date: Monday, 21-5-2018

Time: 2.30 p.m. to 5.30 p.m.

SECTION - I

2. Solve any four: (4×4=16)

- 1) Give steps to design lead-lag compensator using root locus method.
- 2) Derive the realization of lag compensator network.
- 3) Obtain state transition matrix whose system matrix is given by

$$A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}.$$

4) Obtain state model for the system described in phase variable form.

$$d^3y/dt^3 + 11 d^2y/dt^2 + 4 \frac{dy}{dx} + 8y = 9 u(t).$$

5) For the following system test the controllability.

$$X = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix} X + \begin{bmatrix} 0 & 1 \\ 0 & 0 \\ 1 & 0 \end{bmatrix} U(t).$$

3. Solve **any two** :

 $(2\times6=12)$ 

1) Consider the system defined by X = AX + BU where  $A = \begin{bmatrix} 0 & 1 \\ -1 & -3 \end{bmatrix}$ ,  $B = \begin{bmatrix} 0 \\ 2 \end{bmatrix}$ 

and  $C = [1 \ 0]$  by using state feedback control U = -KX; It is desired to have closed loop poles at s = -3 and s = -4. Determine the state feedback gain matrix 'k' by any one method.

2) Find out the time response for unit step input of a system given by

$$x(t) = \begin{bmatrix} 0 & 1 \\ -4 & -5 \end{bmatrix} x(t) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} U(t) \text{ and } X(0) = \begin{bmatrix} 1 \\ 1 \end{bmatrix} \text{ and } Y = \begin{bmatrix} 1 & 0 \end{bmatrix} X.$$



3) The open loop transfer function of certain unity feedback control system is given by  $G(s) = \frac{K}{s(s+4)(s+80)}$ . It is desired to have the phase margin to

be atleast  $33^{\circ}$  and the velocity error constant Kv = 30/sec. Design a phase lag series compensator.

#### SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$ 

- a) Explain in short mapping between s-plane and z-plane.
- b) Derive transfer function of zero order hold.
- c) Derive pulse transfer function of closed loop system.
- d) Determine the kind of singularity for the following differential equation,  $\ddot{y}+3\dot{y}-10=0\,\cdot$
- e) Explain common physical nonlinearities.
- f) Derive the pulse transfer function of digital controller.
- 5. Solve any two:

 $(2 \times 6 = 12)$ 

- a) Explain the basic digital control system with suitable diagram.
- b) Examine the stability of the system given, by using Jury's stability test  $Z^3 0.2 Z^2 0.25Z + 0.05 = 0$ .
- c) Explain construction of phase trajectory by Delta method.



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Max. Marks: 70



# T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2018 CONTROL SYSTEMS – II

Day and Date: Monday, 21-5-2018

Time: 2.30 p.m. to 5.30 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 alternative:

 $(14 \times 1 = 14)$ 

- 1) The process of designing a closed loop control system is by
  - a) Regulator

b) Lag compensation

c) Pole placement

- d) None of these
- 2) The transfer function of a compensating network is of form  $(1 + \alpha Ts)/(1 + Ts)$ . If this is a phase Lag network, the value of  $\alpha$  should be
  - a) Greater than 1

b) Between 0 and 1

c) Exactly equal to 1

- d) Exactly equal to 0
- 3) The transfer function 1 + 0.5s/1 + s represent a
  - a) lag network

b) lead network

c) lag-lead network

- d) proportional controller
- 4) The transfer function of a multi-input multi-output system, with the statespace representation of X = AX + BU and Y = CX + DU where X represents the state, Y the output and U the input vector, will be given by
  - a)  $C(sI A)^{-1} B$

b)  $C(sI - A)^{-1} B + D$ 

c)  $(sI - A)^{-1} B$ 

- d)  $(sI A)^{-1} B + D$
- 5) The information contained in a signal is preserved in the sampled version
  - a) wm = ws

b) ws = 0.1 wm

c) ws = 0.5 wm

d) ws = 2 wm

6)	In Jury's table number of rosystem.	ws are formed, where n is order of
	a) (3n – 2)	b) $(2n-3)$
	c) (3n + 2)	d) (2n + 3)
7)	When the eigenvalues are distinct, realist called a	al and negative then the singular point
	a) Stable node	b) Unstable node
	c) Stable focus	d) Unstable focus
8)	•	b) Control matrix
	c) Linear matrix	d) Diagonal matrix
9)	of $P^{-1}$ AP where P is a linear transfor	
	a) 1, –1/2, 1/4	b) -1, 2, -4
	c) 1, 4, 16	d) 1, –2, 4
10)	The eigenvalues of the matrix $(A - B)$	•
	a) Open loop poles	b) Open loop zeros
	c) Regulator pole	d) None of these
11)	The TIF having 'P' and/or 'Z' in the F phase TIFs.	RHS of s-plane are called
	a) Minimum	b) Non minimum
	c) All pass	d) None of these
12)	The eigenvalues 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
13)	<ul><li>A state variable approach can be applea</li><li>a) Continuous time</li><li>c) Periodic time</li></ul>	olied to systems. b) Discrete time d) Both a) and b)
14)	For the system $X = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} x \div \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$	

- a) System is controllable but unstable
  - b) System is uncontrollable but unstable
  - c) System is controllable and stable
  - d) System is uncontrollable but stable

Marks: 56



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No.	

# T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2018 CONTROL SYSTEMS – II

Day and Date: Monday, 21-5-2018

Time: 2.30 p.m. to 5.30 p.m.

SECTION - I

2. Solve any four: (4×4=16)

- 1) Give steps to design lead-lag compensator using root locus method.
- 2) Derive the realization of lag compensator network.
- 3) Obtain state transition matrix whose system matrix is given by

$$A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}.$$

4) Obtain state model for the system described in phase variable form.

$$d^3y/dt^3 + 11 d^2y/dt^2 + 4 \frac{dy}{dx} + 8y = 9 u(t).$$

5) For the following system test the controllability.

$$X = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix} X + \begin{bmatrix} 0 & 1 \\ 0 & 0 \\ 1 & 0 \end{bmatrix} U(t).$$

3. Solve any two : (2×6=12)

1) Consider the system defined by X = AX + BU where  $A = \begin{bmatrix} 0 & 1 \\ -1 & -3 \end{bmatrix}$ ,  $B = \begin{bmatrix} 0 \\ 2 \end{bmatrix}$ 

and  $C = [1 \ 0]$  by using state feedback control U = -KX; It is desired to have closed loop poles at s = -3 and s = -4. Determine the state feedback gain matrix 'k' by any one method.

2) Find out the time response for unit step input of a system given by

$$x(t) = \begin{bmatrix} 0 & 1 \\ -4 & -5 \end{bmatrix} x(t) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} U(t) \text{ and } X(0) = \begin{bmatrix} 1 \\ 1 \end{bmatrix} \text{ and } Y = \begin{bmatrix} 1 & 0 \end{bmatrix} X.$$



3) The open loop transfer function of certain unity feedback control system is given by  $G(s) = \frac{K}{s(s+4)(s+80)}$ . It is desired to have the phase margin to

be atleast  $33^{\circ}$  and the velocity error constant Kv = 30/sec. Design a phase lag series compensator.

#### SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$ 

- a) Explain in short mapping between s-plane and z-plane.
- b) Derive transfer function of zero order hold.
- c) Derive pulse transfer function of closed loop system.
- d) Determine the kind of singularity for the following differential equation,  $\ddot{y}+3\dot{y}-10=0\,\cdot$
- e) Explain common physical nonlinearities.
- f) Derive the pulse transfer function of digital controller.
- 5. Solve any two:

 $(2 \times 6 = 12)$ 

- a) Explain the basic digital control system with suitable diagram.
- b) Examine the stability of the system given, by using Jury's stability test  $Z^3 0.2 Z^2 0.25Z + 0.05 = 0$ .
- c) Explain construction of phase trajectory by Delta method.

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Marks: 14

### T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2018 CONTROL SYSTEMS - II

Day an	d Date : I	Monda	y, 21-5-2018	Max. Marks: 70
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Time: 2.30 p.m. to 5.30 p.m.

**Duration: 30 Minutes** 

- Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each guestion 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 alternative :		(14×1=14)
	1) The eigenvalues of linear syste	m are the location of	
	a) Poles of the system	b) Zero of the system	
	c) Both a) and b)	<ul><li>d) Finite pole and zero</li></ul>	

- 2) A state variable approach can be applied to \_\_\_\_\_ systems.
  - a) Continuous time

b) Discrete time

c) Periodic time

d) Both a) and b)

3) For the system 
$$X = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} x \div \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$
 and  $y = \begin{bmatrix} 1 & 1 \end{bmatrix} X$  then the

- a) System is controllable but unstable
- b) System is uncontrollable but unstable
- c) System is controllable and stable
- d) System is uncontrollable but stable
- 4) The process of designing a closed loop control system is by
  - a) Regulator

b) Lag compensation

c) Pole placement

- d) None of these
- 5) The transfer function of a compensating network is of form  $(1 + \alpha Ts)/(1 + Ts)$ . If this is a phase – Lag network, the value of  $\alpha$  should be
  - a) Greater than 1

b) Between 0 and 1

c) Exactly equal to 1

d) Exactly equal to 0

6)	The transfer function $1 + 0.5s/1 + s$ r	epresent a
	a) lag network	b) lead network
	c) lag-lead network	d) proportional controller
7)		t multi-output system, with the state- and $Y = CX + DU$ where X represents ut vector, will be given by b) $C(sI - A)^{-1} B + D$ d) $(sI - A)^{-1} B + D$
8)	The information contained in a signa	I is preserved in the sampled version
	a) wm = ws	b) ws = 0.1 wm
	c) ws = 0.5 wm	d) ws = 2 wm
9)	In Jury's table number of rosystem.	ows are formed, where n is order of
	a) (3n – 2)	b) (2n – 3)
	c) (3n + 2)	d) (2n + 3)
10)	When the eigenvalues are distinct, re is called a	al and negative then the singular point
	a) Stable node	b) Unstable node
	c) Stable focus	d) Unstable focus
11)	In state space equation $X = AX + BU$	J, B matrix is called
	a) State matrix	b) Control matrix
	c) Linear matrix	d) Diagonal matrix
12)	If the eigenvalues of $3 \times 3$ matrix A are of P <sup>-1</sup> AP where P is a linear transform	e 1, –2 and 4. What are the eigenvalues mation
	a) 1, -1/2, 1/4	b) -1, 2, -4
	c) 1, 4, 16	d) 1, –2, 4
13)	The eigenvalues of the matrix $(A - B)$	K) are called
	a) Open loop poles	b) Open loop zeros
	c) Regulator pole	d) None of these
14)	The TIF having 'P' and/or 'Z' in the F phase TIFs.	RHS of s-plane are called
	a) Minimum	b) Non minimum
	c) All pass	d) None of these

Marks: 56



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# T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2018 CONTROL SYSTEMS – II

Day and Date: Monday, 21-5-2018

Time: 2.30 p.m. to 5.30 p.m.

SECTION - I

2. Solve any four: (4×4=16)

- 1) Give steps to design lead-lag compensator using root locus method.
- 2) Derive the realization of lag compensator network.
- 3) Obtain state transition matrix whose system matrix is given by

$$A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}.$$

4) Obtain state model for the system described in phase variable form.

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5) For the following system test the controllability.

$$X = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix} X + \begin{bmatrix} 0 & 1 \\ 0 & 0 \\ 1 & 0 \end{bmatrix} U(t).$$

3. Solve **any two**:

1) Consider the system defined by X = AX + BU where  $A = \begin{bmatrix} 0 & 1 \\ -1 & -3 \end{bmatrix}$ ,  $B = \begin{bmatrix} 0 \\ 2 \end{bmatrix}$ 

and  $C = [1 \ 0]$  by using state feedback control U = -KX; It is desired to have closed loop poles at s = -3 and s = -4. Determine the state feedback gain matrix 'k' by any one method.

2) Find out the time response for unit step input of a system given by

$$x(t) = \begin{bmatrix} 0 & 1 \\ -4 & -5 \end{bmatrix} x(t) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} U(t) \text{ and } X(0) = \begin{bmatrix} 1 \\ 1 \end{bmatrix} \text{ and } Y = \begin{bmatrix} 1 & 0 \end{bmatrix} X.$$

 $(2 \times 6 = 12)$ 



3) The open loop transfer function of certain unity feedback control system is given by  $G(s) = \frac{K}{s(s+4)(s+80)}$ . It is desired to have the phase margin to

be atleast  $33^{\circ}$  and the velocity error constant Kv = 30/sec. Design a phase lag series compensator.

### SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$ 

- a) Explain in short mapping between s-plane and z-plane.
- b) Derive transfer function of zero order hold.
- c) Derive pulse transfer function of closed loop system.
- d) Determine the kind of singularity for the following differential equation,  $\ddot{y}+3\dot{y}-10=0\,\cdot$
- e) Explain common physical nonlinearities.
- f) Derive the pulse transfer function of digital controller.
- 5. Solve any two:

 $(2 \times 6 = 12)$ 

- a) Explain the basic digital control system with suitable diagram.
- b) Examine the stability of the system given, by using Jury's stability test  $Z^3 0.2 Z^2 0.25Z + 0.05 = 0$ .
- c) Explain construction of phase trajectory by Delta method.



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# T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2018 CONTROL SYSTEMS – II

Time: 2.30 p.m. to 5.30 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

1. Choose the correct alternative : (14×1=14)

- 1) The transfer function 1 + 0.5s/1 + s represent a
  - a) lag network

b) lead network

c) lag-lead network

- d) proportional controller
- 2) The transfer function of a multi-input multi-output system, with the statespace representation of X = AX + BU and Y = CX + DU where X represents the state, Y the output and U the input vector, will be given by

a) 
$$C(sI - A)^{-1} B$$

b) 
$$C(sI - A)^{-1} B + D$$

c) 
$$(sI - A)^{-1} B$$

d) 
$$(sI - A)^{-1}B + D$$

- 3) The information contained in a signal is preserved in the sampled version
  - a) wm = ws

b) ws = 0.1 wm

c) ws = 0.5 wm

- d) ws = 2 wm
- 4) In Jury's table \_\_\_\_\_ number of rows are formed, where n is order of system.
  - a) (3n 2)

b) (2n - 3)

c) (3n + 2)

- d) (2n + 3)
- 5) When the eigenvalues are distinct, real and negative then the singular point is called a
  - a) Stable node

b) Unstable node

c) Stable focus

d) Unstable focus



6)	In state space equation $X = AX + BU$ , B matrix is called				
	a) State matrix	b) Control matrix			
	c) Linear matrix	d) Diagonal matrix			
7)	If the eigenvalues of $3 \times 3$ matrix A are 1, $-2$ and 4. What are the eigenvalues of $P^{-1}$ AP where P is a linear transformation				
	a) 1, -1/2, 1/4	b) -1, 2, -4			
	c) 1, 4, 16	d) 1, –2, 4			
8)	The eigenvalues of the matrix (A – B	-			
	a) Open loop poles	b) Open loop zeros			
	c) Regulator pole	d) None of these			
9)	The TIF having 'P' and/or 'Z' in the F phase TIFs.	RHS of s-plane are called			
	a) Minimum	b) Non minimum			
	c) All pass	d) None of these			
10)	The eigenvalues of linear system are	e the location of			
	a) Poles of the system	b) Zero of the system			
	c) Both a) and b)	d) Finite pole and zero			
11)	A state variable approach can be ap a) Continuous time	b) Discrete time			
	c) Periodic time	d) Both a) and b)			
12)	For the system $X = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} x \div \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$	u and y = [1 1] X then the			
	<ul><li>a) System is controllable but unstab</li><li>b) System is uncontrollable but unst</li><li>c) System is controllable and stable</li><li>d) System is uncontrollable but stab</li></ul>	able			
13)	The process of designing a closed lo	oop control system is by			
•	a) Regulator	b) Lag compensation			
	c) Pole placement	d) None of these			
14)	The transfer function of a compensatir If this is a phase – Lag network, the a) Greater than 1 c) Exactly equal to 1	ng network is of form $(1 + \alpha Ts)/(1 + Ts)$ . value of $\alpha$ should be b) Between 0 and 1 d) Exactly equal to 0			

Marks: 56



Seat No.

# T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2018 CONTROL SYSTEMS – II

Day and Date: Monday, 21-5-2018

Time: 2.30 p.m. to 5.30 p.m.

SECTION - I

2. Solve any four: (4×4=16)

- 1) Give steps to design lead-lag compensator using root locus method.
- 2) Derive the realization of lag compensator network.
- 3) Obtain state transition matrix whose system matrix is given by

$$A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}.$$

4) Obtain state model for the system described in phase variable form.

$$d^3y/dt^3 + 11 d^2y/dt^2 + 4 \frac{dy}{dx} + 8y = 9 u(t).$$

5) For the following system test the controllability.

$$X = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix} X + \begin{bmatrix} 0 & 1 \\ 0 & 0 \\ 1 & 0 \end{bmatrix} U(t).$$

3. Solve any two : (2×6=12)

1) Consider the system defined by X = AX + BU where  $A = \begin{bmatrix} 0 & 1 \\ -1 & -3 \end{bmatrix}$ ,  $B = \begin{bmatrix} 0 \\ 2 \end{bmatrix}$ 

and  $C = [1 \ 0]$  by using state feedback control U = -KX; It is desired to have closed loop poles at s = -3 and s = -4. Determine the state feedback gain matrix 'k' by any one method.

2) Find out the time response for unit step input of a system given by  $\begin{bmatrix} 0 & 1 \end{bmatrix}$ 

$$x(t) = \begin{bmatrix} 0 & 1 \\ -4 & -5 \end{bmatrix} x(t) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} U(t) \text{ and } X(0) = \begin{bmatrix} 1 \\ 1 \end{bmatrix} \text{ and } Y = \begin{bmatrix} 1 & 0 \end{bmatrix} X.$$



3) The open loop transfer function of certain unity feedback control system is given by  $G(s) = \frac{K}{s(s+4)(s+80)}$ . It is desired to have the phase margin to

be atleast  $33^{\circ}$  and the velocity error constant Kv = 30/sec. Design a phase lag series compensator.

SECTION - II

### 4. Solve any four:

 $(4 \times 4 = 16)$ 

- a) Explain in short mapping between s-plane and z-plane.
- b) Derive transfer function of zero order hold.
- c) Derive pulse transfer function of closed loop system.
- d) Determine the kind of singularity for the following differential equation,  $\ddot{y}+3\dot{y}-10=0\,\cdot$
- e) Explain common physical nonlinearities.
- f) Derive the pulse transfer function of digital controller.

### 5. Solve any two:

 $(2 \times 6 = 12)$ 

- a) Explain the basic digital control system with suitable diagram.
- b) Examine the stability of the system given, by using Jury's stability test  $Z^3 0.2 Z^2 0.25Z + 0.05 = 0$ .
- c) Explain construction of phase trajectory by Delta method.

Set S

SL	R-	T	C	_	5	0	0



Seat	
No.	

Set P

# T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA) Examination, 2018 MICROCONTROLLER AND ITS APPLICATIONS

Day and Date: Wednesday, 23-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 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 suitable data if necessary.
  - 5) Use of non programmable calculator is allowed.

### **MCQ/Objective Type Questions**

Dur	ation: 30 Minutes		Marks : 14	
1.	Choose the correct answer:		(14×1=14)	
	<ol> <li>PSEN (program store enable) signa microcontroller and must be conn containing the program code.</li> </ol>			
	A) Output, RAM	B) Input, ROI	M	
	C) Output, ROM	D) Input, RAN	Л	
	2) RS = 0 for LCD module selects	Register	•	
	A) Command B) Data	C) DPTR	D) SAR	
	3) Bit addressable area for 8051 microcontroller is			
	A) 16 byte	B) 128 bits		
	C) Both A and B	D) 32 byte		
	4) 8051 timer mode 1 is			
	A) 16 bit timer	B) 13 bit time	er	
	C) Auto reload mode	D) 8 bit timer		

5)	MOVX instruction is normally used for data transfer of				
A) Internal RAM B)			External ROM		
	C) External RAM		D)	Internal ROM	1
6)	MUL AB instruction s	stores lower byte	of	result in the re	egister.
	A) B	B) A	C)	R0	D) R1
7)	As we push data ont	to the stack, the S	SP	is k	by one.
	A) incremented		B)	decremented	l
	C) subtracted		D)	initialized	
8)	Interfacing LCD with signals			data lines are	e used along with the
	A) 6, RS, RW		B)	5, RW, EN	
	C) 8, RS, EN, RW		D)	9, RS, EN, R	W
9)	Timer count	clock pulses v	whil	e counter cou	nt clock pules.
	A) External, Internal		B)	Internal, Exte	ernal
	C) TH0, TL0		D)	None	
10)	With XTAL = 11.059 rate 4800	2 MHz, find the	TH	1 value neede	ed to have the baud
	A) FD	B) FA	C)	F4	D) E8
11)	The only registers that mode	at can be used for	poi	nters in registe	er indirect addressing
	A) A and B		B)	PC and DPT	R
	C) A and R0		D)	R0 and R1	
12)	If data can be transmission.	nitted and receiv	ed	simultaneousl	y, it is a
	A) Simplex	B) Half duplex	C)	Full duplex	D) Multiplex
13)	When the 8051 is rest to the first program in		e is	LOW, the pro	gram counter points
	A) Internal code mer	mory	B)	External code	e memory
	C) Internal data men	nory	D)	External data	a memory
14)	Which of the following	g instruction perf	orm	as of indirect	RAM to accumulator?
	A) MOV A, Rn		B)	MOV @Ri, A	
	C) MOV A, @Ri		D)	MOV Rn, A	



Seat	
No.	

# T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA) Examination, 2018 MICROCONTROLLER AND ITS APPLICATIONS

Day and Date: Wednesday, 23-5-2018

Time: 2.30 p.m. to 5.30 p.m.

**Instructions**: 1) Figures to **right** indicate **full** marks.

- 2) All questions are compulsory.
- 3) Assume suitable data if necessary.
- 4) Use of non programmable calculator is allowed.

#### SECTION - I

### 2. Solve any three questions:

 $(4 \times 3 = 12)$ 

Marks: 56

- 1) How interrupts are handled by 8051 microcontroller? Write interrupt vector addresses of all interrupts for 8051.
- 2) Explain data memory organization of 8051 microcontroller.
- 3) Write a program to copy a block of 10 bytes of data from 35H to 60H.
- 4) Give the operation of each bit in the SFR SCON.
- 5) Draw and explain the operation of Port1, pin internal logic circuit.

### 3. Solve any two questions:

 $(8 \times 2 = 16)$ 

- 1) Write a program for the 8051 to receive bytes of data serially and put them in P1, set the baud rate at 4800, 8-bit data and 1 stop bit.
- 2) Explain the operation of following instructions with one example

Α	SWAP A
В	MUL AB
С	MOV DPTR,#nn
D	DJNZ Rn,radd
Е	AJMP sadd

3) Draw and explain RESET and clock circuit for 8051 microcontroller.



#### SECTION - II

### 4. Solve any three questions:

 $(4 \times 3 = 12)$ 

- 1) Explain I2c protocol for serial communication.
- 2) How common anode seven segment display can be interfaced with 8051? What should be done to display digit 5 on it?
- 3) How DS1307 RTC can be interfaced with microcontroller? List different registers present in DS 1307.
- 4) Draw and explain serial EEPROM interfacing.
- 5) Interface 8255 with microcontroller and give the address of PA, PB, PC and CWR.

### 5. Solve any two questions:

 $(8 \times 2 = 16)$ 

- 1) Explain mode 1 of UART communication of 8051. How mode 1 baud rate can be changed?
- 2) Discuss microcontroller based proportional temperature control system in detail.
- 3) How 8255 can be interfaced with microcontroller? Program PC4 of the 8255 to generate a pulse of 50 ms with 50% duty cycle.

Seat	
No.	

Set Q

# T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA) Examination, 2018 MICROCONTROLLER AND ITS APPLICATIONS

Day and Date: Wednesday, 23-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 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 suitable data if necessary.
  - 5) Use of non programmable calculator is allowed.

### MCQ/Objective Type Questions

Dur	ration: 30 Minutes	Marks: 14				
1.	Choose the correct answer	(14×1=14)				
	1) Interfacing LCD with 89C signals.	51 data lines are used along with the				
	A) 6, RS, RW	B) 5, RW, EN				
	C) 8, RS, EN, RW	D) 9, RS, EN, RW				
	2) Timer count c	ock pulses while counter count clock pules.				
	<ul><li>A) External, Internal</li></ul>	B) Internal, External				
	C) TH0, TL0	D) None				
	3) With XTAL = 11.0592 M rate 4800	Hz, find the TH1 value needed to have the baud				
	A) FD B) F	A C) F4 D) E8				
	4) The only registers that can be used for pointers in register indirect addressin mode					
	A) A and B	B) PC and DPTR				
	C) A and R0	D) R0 and R1				

5)	i) If data can be transmitted and received simultaneously, it is a transmission.			sly, it is a	
	A) Simplex	B) Half duplex	C)	Full duplex	D) Multiplex
6)	When the 8051 is reto the first program			LOW, the pro	ogram counter points
	A) Internal code me	emory	B)	External cod	le memory
	C) Internal data me	mory	D)	External data	a memory
7)	Which of the following	ng instruction perf	form	as of indirec	t RAM to accumulator?
	A) MOV A, Rn		B)	MOV @Ri, A	A
	C) MOV A, @Ri		D)	MOV Rn, A	
8)		must be connec			signal for the 8031/51 pin of a
	A) Output, RAM		B)	Input, ROM	
	C) Output, ROM		D)	Input, RAM	
9)	RS = 0 for LCD mo	dule selects		_ Register.	
	A) Command	B) Data	C)	DPTR	D) SAR
10)	Bit addressable are	a for 8051 micro	cont	roller is	
	A) 16 byte		B)	128 bits	
	C) Both A and B		D)	32 byte	
11)	8051 timer mode 1	is			
	A) 16 bit timer		B)	13 bit timer	
	C) Auto reload mod	le	D)	8 bit timer	
12)	MOVX instruction is	s normally used fo	or da	ata transfer o	f
	A) Internal RAM		B)	External RO	M
	C) External RAM		D)	Internal RON	Л
13)	MUL AB instruction	stores lower byte	e of	result in the r	register.
	A) B	B) A	C)	R0	D) R1
14)	As we push data or	nto the stack, the	SP	is	by one.
	A) incremented		B)	decremented	d
	C) subtracted		D)	initialized	



Seat	
No.	

# T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA) Examination, 2018 MICROCONTROLLER AND ITS APPLICATIONS

Day and Date: Wednesday, 23-5-2018

Time: 2.30 p.m. to 5.30 p.m.

**Instructions**: 1) Figures to **right** indicate **full** marks.

- 2) All questions are compulsory.
- 3) Assume suitable data if necessary.
- 4) Use of non programmable calculator is allowed.

#### SECTION - I

### 2. Solve any three questions:

 $(4 \times 3 = 12)$ 

Marks: 56

- 1) How interrupts are handled by 8051 microcontroller? Write interrupt vector addresses of all interrupts for 8051.
- 2) Explain data memory organization of 8051 microcontroller.
- 3) Write a program to copy a block of 10 bytes of data from 35H to 60H.
- 4) Give the operation of each bit in the SFR SCON.
- 5) Draw and explain the operation of Port1, pin internal logic circuit.

### 3. Solve any two questions:

 $(8 \times 2 = 16)$ 

- 1) Write a program for the 8051 to receive bytes of data serially and put them in P1, set the baud rate at 4800, 8-bit data and 1 stop bit.
- 2) Explain the operation of following instructions with one example

Α	SWAP A
В	MUL AB
С	MOV DPTR,#nn
D	DJNZ Rn,radd
E	AJMP sadd

3) Draw and explain RESET and clock circuit for 8051 microcontroller.



#### SECTION - II

### 4. Solve any three questions:

 $(4 \times 3 = 12)$ 

- 1) Explain I2c protocol for serial communication.
- 2) How common anode seven segment display can be interfaced with 8051? What should be done to display digit 5 on it?
- 3) How DS1307 RTC can be interfaced with microcontroller? List different registers present in DS 1307.
- 4) Draw and explain serial EEPROM interfacing.
- 5) Interface 8255 with microcontroller and give the address of PA, PB, PC and CWR.

### 5. Solve any two questions:

 $(8 \times 2 = 16)$ 

- 1) Explain mode 1 of UART communication of 8051. How mode 1 baud rate can be changed?
- 2) Discuss microcontroller based proportional temperature control system in detail.
- 3) How 8255 can be interfaced with microcontroller? Program PC4 of the 8255 to generate a pulse of 50 ms with 50% duty cycle.

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<b>SLR-TC - 50</b>
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Seat	
No.	

Set R

## T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA) Examination, 2018 MICROCONTROLLER AND ITS APPLICATIONS

Day and Date: Wednesday, 20 5 2010	ay and Date: Wednesday, 23-5-2018	Total Marks: 70
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Time: 2.30 p.m. to 5.30 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 suitable data if necessary.
  - 5) Use of non programmable calculator is **allowed**.

### MCQ/Objective Type Questions

Dura	ation : 30 Minute	98			Marks: 14
1.	Choose the cor	rect answer:			(14×1=14)
	1) MOVX instruction is normally used for data transfer of				
	A) Internal F	RAM	B) Externa	al ROM	
	C) External	RAM	D) Interna	IROM	
	2) MUL AB ins	truction stores lowe	er byte of result in	the register.	
	A) B	В) А	C) R0	D) R1	
	3) As we push	data onto the stacl	x, the SP is	by one.	
	A) incremer	nted	B) decrem	nented	
	C) subtracte	ed	D) initializa	ed	
	,	.CD with 89C51 _ signals.	data lin	es are used alon	g with the
	A) 6, RS, R	W	B) 5, RW,	EN	
	C) 8. RS. E	N. RW	D) 9. RS.	EN. RW	

5)	Timer count	clock pulses v	whil	e counter cou	ınt clock pules.
	A) External, Internal		B)	Internal, Exte	ernal
	C) TH0, TL0		D)	None	
6)	With XTAL = 11.059 rate 4800	2 MHz, find the	TH	1 value need	ed to have the baud
	A) FD	B) FA	C)	F4	D) E8
7)	The only registers that mode	it can be used for	poi	nters in registe	er indirect addressing
	A) A and B		B)	PC and DPT	R
	C) A and R0		D)	R0 and R1	
8)	If data can be transmission.	nitted and receiv	ed	simultaneous	ly, it is a
	A) Simplex	B) Half duplex	C)	Full duplex	D) Multiplex
9)	When the 8051 is rest to the first program in	nstruction in the		•	
	A) Internal code mer				
	C) Internal data men	nory	D)	External data	a memory
10)	Which of the followin	g instruction perf	orm	as of indirect	RAM to accumulator?
	A) MOV A, Rn		B)	MOV @Ri, A	
	C) MOV A, @Ri		D)	MOV Rn, A	
11)	PSEN (program store microcontroller and containing the progra	must be connec			
	A) Output, RAM		B)	Input, ROM	
	C) Output, ROM		D)	Input, RAM	
12)	RS = 0 for LCD mod	ule selects		_ Register.	
	A) Command	B) Data	C)	DPTR	D) SAR
13)	Bit addressable area	for 8051 microc	cont	roller is	
	A) 16 byte		B)	128 bits	
	C) Both A and B		D)	32 byte	
14)	8051 timer mode 1 is	3			
	A) 16 bit timer		B)	13 bit timer	
	C) Auto reload mode	e	D)	8 bit timer	



Seat	
No.	

## T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA) Examination, 2018 MICROCONTROLLER AND ITS APPLICATIONS

Day and Date: Wednesday, 23-5-2018

Time: 2.30 p.m. to 5.30 p.m.

**Instructions**: 1) Figures to **right** indicate **full** marks.

- 2) All questions are compulsory.
- 3) Assume suitable data if necessary.
- 4) Use of non programmable calculator is allowed.

#### SECTION - I

#### 2. Solve any three questions:

 $(4 \times 3 = 12)$ 

Marks: 56

- 1) How interrupts are handled by 8051 microcontroller? Write interrupt vector addresses of all interrupts for 8051.
- 2) Explain data memory organization of 8051 microcontroller.
- 3) Write a program to copy a block of 10 bytes of data from 35H to 60H.
- 4) Give the operation of each bit in the SFR SCON.
- 5) Draw and explain the operation of Port1, pin internal logic circuit.

### 3. Solve any two questions:

 $(8 \times 2 = 16)$ 

- 1) Write a program for the 8051 to receive bytes of data serially and put them in P1, set the baud rate at 4800, 8-bit data and 1 stop bit.
- 2) Explain the operation of following instructions with one example

Α	SWAP A
В	MUL AB
С	MOV DPTR,#nn
D	DJNZ Rn,radd
E	AJMP sadd

3) Draw and explain RESET and clock circuit for 8051 microcontroller.



#### SECTION - II

#### 4. Solve any three questions:

 $(4 \times 3 = 12)$ 

- 1) Explain I2c protocol for serial communication.
- 2) How common anode seven segment display can be interfaced with 8051? What should be done to display digit 5 on it?
- 3) How DS1307 RTC can be interfaced with microcontroller? List different registers present in DS 1307.
- 4) Draw and explain serial EEPROM interfacing.
- 5) Interface 8255 with microcontroller and give the address of PA, PB, PC and CWR.

#### 5. Solve any two questions:

 $(8 \times 2 = 16)$ 

- 1) Explain mode 1 of UART communication of 8051. How mode 1 baud rate can be changed?
- 2) Discuss microcontroller based proportional temperature control system in detail.
- 3) How 8255 can be interfaced with microcontroller? Program PC4 of the 8255 to generate a pulse of 50 ms with 50% duty cycle.

Set S

## T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA) Examination, 2018 MICROCONTROLLER AND ITS APPLICATIONS

Day and Date: Wednesday, 23-5-2018	Total Marks: 70
T: 0 00 t- F 00	

Time: 2.30 p.m. to 5.30 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 suitable data if necessary.
  - 5) Use of non programmable calculator is allowed.

#### MCQ/Objective Type Questions

Dur	atic	on: 30 Minutes			N	/larks : 14	
1.	Cł	noose the correct ar	nswer:		(	14×1=14)	
	1) With XTAL = 11.0592 MHz, find the rate 4800			TH1 value need	ed to have the	baud	
		A) FD	B) FA	C) F4	D) E8		
	2)	The only registers t mode	hat can be used fo	r pointers in regist	er indirect addre	essing	
		A) A and B		B) PC and DPT	R		
		C) A and R0		D) R0 and R1			
	<ol> <li>If data can be transmitted and rece transmission.</li> </ol>			ved simultaneous	sly, it is a		
		A) Simplex	B) Half duplex	C) Full duplex	D) Multiplex		
	4)	4) When the 8051 is reset and the EA line is LOW, the program counter points to the first program instruction in the					
		A) Internal code m	emory	B) External cod	le memory		
		C) Internal data m	emory	D) External dat	a memory		

5)	Which of the following instruction perf	form as of indirect RAM to accumulator?
	A) MOV A, Rn	B) MOV @Ri, A
	C) MOV A, @Ri	D) MOV Rn, A
6)	PSEN (program store enable) signal is	s an signal for the 8031/51
	microcontroller and must be connect containing the program code.	ected to the OE pin of a
	A) Output, RAM	B) Input, ROM
	C) Output, ROM	D) Input, RAM
7)	RS = 0 for LCD module selects	Register.
	A) Command B) Data	C) DPTR D) SAR
8)	Bit addressable area for 8051 microo	controller is
	A) 16 byte	B) 128 bits
	C) Both A and B	D) 32 byte
9)	8051 timer mode 1 is	
	A) 16 bit timer	B) 13 bit timer
	C) Auto reload mode	D) 8 bit timer
10)	MOVX instruction is normally used for	for data transfer of
	A) Internal RAM	B) External ROM
	C) External RAM	D) Internal ROM
11)	MUL AB instruction stores lower byte	te of result in the register.
	A) B B) A	C) R0 D) R1
12)	As we push data onto the stack, the	SP is by one.
	A) incremented	B) decremented
	C) subtracted	D) initialized
13)	Interfacing LCD with 89C51 signals.	data lines are used along with the
	A) 6, RS, RW	B) 5, RW, EN
	C) 8, RS, EN, RW	D) 9, RS, EN, RW
14)	Timer count clock pulses v	while counter count clock pules.
	A) External, Internal	B) Internal, External
	C) TH0, TL0	D) None



Seat	
No.	

## T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA) Examination, 2018 MICROCONTROLLER AND ITS APPLICATIONS

Day and Date: Wednesday, 23-5-2018

Time: 2.30 p.m. to 5.30 p.m.

**Instructions**: 1) Figures to **right** indicate **full** marks.

- 2) All questions are compulsory.
- 3) Assume suitable data if necessary.
- 4) Use of non programmable calculator is allowed.

#### SECTION - I

#### 2. Solve any three questions:

 $(4 \times 3 = 12)$ 

Marks: 56

- 1) How interrupts are handled by 8051 microcontroller? Write interrupt vector addresses of all interrupts for 8051.
- 2) Explain data memory organization of 8051 microcontroller.
- 3) Write a program to copy a block of 10 bytes of data from 35H to 60H.
- 4) Give the operation of each bit in the SFR SCON.
- 5) Draw and explain the operation of Port1, pin internal logic circuit.

### 3. Solve any two questions:

 $(8 \times 2 = 16)$ 

- 1) Write a program for the 8051 to receive bytes of data serially and put them in P1, set the baud rate at 4800, 8-bit data and 1 stop bit.
- 2) Explain the operation of following instructions with one example

А	SWAP A
В	MUL AB
С	MOV DPTR,#nn
D	DJNZ Rn,radd
Е	AJMP sadd

3) Draw and explain RESET and clock circuit for 8051 microcontroller.



#### SECTION - II

#### 4. Solve any three questions:

 $(4 \times 3 = 12)$ 

- 1) Explain I2c protocol for serial communication.
- 2) How common anode seven segment display can be interfaced with 8051? What should be done to display digit 5 on it?
- 3) How DS1307 RTC can be interfaced with microcontroller? List different registers present in DS 1307.
- 4) Draw and explain serial EEPROM interfacing.
- 5) Interface 8255 with microcontroller and give the address of PA, PB, PC and CWR.

#### 5. Solve any two questions:

 $(8 \times 2 = 16)$ 

- 1) Explain mode 1 of UART communication of 8051. How mode 1 baud rate can be changed?
- 2) Discuss microcontroller based proportional temperature control system in detail.
- 3) How 8255 can be interfaced with microcontroller? Program PC4 of the 8255 to generate a pulse of 50 ms with 50% duty cycle.



Seat	
No.	

## T.E. (Part –II) (Electrical and Electronic Engg.) (CGPA) Examination, 2018 **Self Learning (Technical)** INDUSTRIAL MANAGEMENT

Day and Date: Friday, 25-5-2018 Total Marks: 50

Time: 2.30 p.m. to 4.30 p.m.

*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) Strategic management is primarily carried out by
  - a) Top management

- b) Middle management
- c) Knowledge management
- d) Operational management
- 2) The objective of plant layout are
  - a) Optimum utilization of resources b) Better inventory control
- - c) Economics of material handling d) All of above
- 3) F. W. Taylor introduced a system of management known as
  - a) Line organization
  - b) Functional management
  - c) Line and staff organization
  - d) Line, staff and functional organization

4)	The product layout				
	a) Lower the overall manufacturing time				
	b) Requires less space for placing machines				
	c) Utilize machine and labour better				
	d) All of these				
5)	Job evolution is a method of determine	ning	g the		
	a) Relative value of job	b)	Job enrichment		
	c) Worth of machine	d)	Value of overall production		
6)	In value engineering, important consi	ider	ation is given to		
	a) Customer satisfaction	b)	Function concept		
	c) Profit maximization	d)	Cost reduction		
7)	Functional management is				
	a) Less differentiated and more diffu	sec			
	b) More differentiated and longer term	m			
	c) More differentiated and focused				
	d) Goal oriented				
8)	Manufacturing a number of identical		•		
	order or to meet continuous demand				
	a) Job production	b)	Batch production		
	c) Continuous production	d)	Flow production		
9)	The appellate authority for any industrial	trial	dispute is		
	a) Management	b)	Labour court		
	c) High court	d)	Board of directors		
10)	The time elapsed between the placin	g o	f an order and its arrival is called as		
	a) Cycle time	b)	Load time		
	c) Work station process time	d)	None of the above		



Seat	
No.	

# T.E. (Part –II) (Electrical and Electronic Engg.) (CGPA) Examination, 2018 Self Learning (Technical) INDUSTRIAL MANAGEMENT

Day and Date: Friday, 25-5-2018 Marks: 40 Time: 2.30 p.m. to 4.30 p.m. *Instructions*: 1) *All* the questions are *compulsory*. 2) Figures to the **right** indicate **full** marks. Solve any four from Q. No. 2 to Q. No. 6: 40 2. a) What is cost control? Brief the cost control area in production 5 organization. b) Explain role of public relation officer in industry. 5 3. a) Explain recruitment and selection procedure in engineering industry. 5 b) What are the different types of production system? 5 4. a) What credit facilities are given to a small scale industry by banks? 5 b) Explain importance of "Staffing" in an organization. 5 5. a) Explain core concept of marketing. 5 b) Brief evolution of scientific management. 5 6. Write short notes on any two:  $(2 \times 5 = 10)$ a) What type of compensation is given to a employee injured in the organization during working? b) Explain safety majors during fire in a workshop. c) Brief inventory management.



Seat	
No.	

## T.E. (Part –II) (Electrical and Electronic Engg.) (CGPA) Examination, 2018 **Self Learning (Technical)** INDUSTRIAL MANAGEMENT

Day and Date: Friday, 25-5-2018 Total Marks: 50

Time: 2.30 p.m. to 4.30 p.m.

*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 appellate authority for any industrial dispute is
  - a) Management

b) Labour court

c) High court

- d) Board of directors
- 2) The time elapsed between the placing of an order and its arrival is called as
  - a) Cycle time

- b) Load time
- c) Work station process time
- d) None of the above
- 3) Functional management is
  - a) Less differentiated and more diffused
  - b) More differentiated and longer term
  - c) More differentiated and focused
  - d) Goal oriented

4)	Manufacturing a number of identical a order or to meet continuous demand		·
	a) Job production	b)	Batch production
	c) Continuous production	d)	Flow production
5)	Strategic management is primarily ca	ırrie	d out by
	a) Top management	b)	Middle management
	c) Knowledge management	d)	Operational management
6)	The objective of plant layout are		
	a) Optimum utilization of resources	b)	Better inventory control
	c) Economics of material handling	d)	All of above
7)	F. W. Taylor introduced a system of r	man	agement known as
	a) Line organization		
	b) Functional management		
	c) Line and staff organization		
	d) Line, staff and functional organiza	tion	
8)	The product layout		
	a) Lower the overall manufacturing ti	ime	
	b) Requires less space for placing m	ach	ines
	c) Utilize machine and labour better		
	d) All of these		
9)	Job evolution is a method of determine	ning	the
	a) Relative value of job	b)	Job enrichment
	c) Worth of machine	d)	Value of overall production
10)	In value engineering, important consi	dera	ation is given to
	a) Customer satisfaction	b)	Function concept
	c) Profit maximization	d)	Cost reduction



Seat	
No.	

# T.E. (Part –II) (Electrical and Electronic Engg.) (CGPA) Examination, 2018 Self Learning (Technical) INDUSTRIAL MANAGEMENT

Day and Date: Friday, 25-5-2018 Marks: 40 Time: 2.30 p.m. to 4.30 p.m. *Instructions*: 1) *All* the questions are *compulsory*. 2) Figures to the **right** indicate **full** marks. Solve any four from Q. No. 2 to Q. No. 6: 40 2. a) What is cost control? Brief the cost control area in production 5 organization. b) Explain role of public relation officer in industry. 5 3. a) Explain recruitment and selection procedure in engineering industry. 5 b) What are the different types of production system? 5 4. a) What credit facilities are given to a small scale industry by banks? 5 b) Explain importance of "Staffing" in an organization. 5 5. a) Explain core concept of marketing. 5 b) Brief evolution of scientific management. 5 6. Write short notes on any two:  $(2 \times 5 = 10)$ a) What type of compensation is given to a employee injured in the organization during working? b) Explain safety majors during fire in a workshop. c) Brief inventory management.



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## T.E. (Part –II) (Electrical and Electronic Engg.) (CGPA) Examination, 2018 Self Learning (Technical) INDUSTRIAL MANAGEMENT

Day and Date: Friday, 25-5-2018 Total Marks: 50

Time: 2.30 p.m. to 4.30 p.m.

*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) Job evolution is a method of determining the
  - a) Relative value of job
- b) Job enrichment

c) Worth of machine

- d) Value of overall production
- 2) In value engineering, important consideration is given to
  - a) Customer satisfaction
- b) Function concept

c) Profit maximization

- d) Cost reduction
- 3) The appellate authority for any industrial dispute is
  - a) Management

b) Labour court

c) High court

- d) Board of directors
- 4) The time elapsed between the placing of an order and its arrival is called as
  - a) Cycle time

- b) Load time
- c) Work station process time
- d) None of the above

R-T	C <b>– 501</b> -2-	
5)	F. W. Taylor introduced a system of	management known as
	a) Line organization	
	b) Functional management	
	c) Line and staff organization	
	d) Line, staff and functional organization	ation
6)	The product layout	
	a) Lower the overall manufacturing	time
	b) Requires less space for placing r	nachines
	c) Utilize machine and labour better	
	d) All of these	
7)	Strategic management is primarily c	arried out by
	a) Top management	b) Middle management
	c) Knowledge management	d) Operational management
8)	The objective of plant layout are	
	a) Optimum utilization of resources	b) Better inventory control
	c) Economics of material handling	d) All of above
9)	Functional management is	
	a) Less differentiated and more diffu	used
	b) More differentiated and longer te	rm
	c) More differentiated and focused	
	d) Goal oriented	
١٠)	AA C	and the same of th

a) Job production

b) Batch production

c) Continuous production

d) Flow production



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# T.E. (Part –II) (Electrical and Electronic Engg.) (CGPA) Examination, 2018 Self Learning (Technical) INDUSTRIAL MANAGEMENT

Day and Date: Friday, 25-5-2018 Marks: 40 Time: 2.30 p.m. to 4.30 p.m. *Instructions*: 1) *All* the questions are *compulsory*. 2) Figures to the **right** indicate **full** marks. Solve any four from Q. No. 2 to Q. No. 6: 40 2. a) What is cost control? Brief the cost control area in production 5 organization. b) Explain role of public relation officer in industry. 5 3. a) Explain recruitment and selection procedure in engineering industry. 5 b) What are the different types of production system? 5 4. a) What credit facilities are given to a small scale industry by banks? 5 b) Explain importance of "Staffing" in an organization. 5 5. a) Explain core concept of marketing. 5 b) Brief evolution of scientific management. 5 6. Write short notes on any two:  $(2 \times 5 = 10)$ a) What type of compensation is given to a employee injured in the organization during working? b) Explain safety majors during fire in a workshop. c) Brief inventory management.



Seat No.

## T.E. (Part –II) (Electrical and Electronic Engg.) (CGPA) Examination, 2018 **Self Learning (Technical)** INDUSTRIAL MANAGEMENT

Day and Date: Friday, 25-5-2018 Total Marks: 50

Time: 2.30 p.m. to 4.30 p.m.

*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) F. W. Taylor introduced a system of management known as
  - a) Line organization
  - b) Functional management
  - c) Line and staff organization
  - d) Line, staff and functional organization
- 2) The product layout
  - a) Lower the overall manufacturing time
  - b) Requires less space for placing machines
  - c) Utilize machine and labour better
  - d) All of these



3)	) Job evolution is a method of determining the			
	a)	Relative value of job	b)	Job enrichment
	c)	Worth of machine	d)	Value of overall production
4)	In	value engineering, important consi	der	ation is given to
	a)	Customer satisfaction	b)	Function concept
	c)	Profit maximization	d)	Cost reduction
5)	Fu	nctional management is		
	a)	Less differentiated and more diffus	sed	
	b)	More differentiated and longer term	n	
	c)	More differentiated and focused		
	d)	Goal oriented		
6)		anufacturing a number of identical a der or to meet continuous demand		·
	a)	Job production	b)	Batch production
	c)	Continuous production	d)	Flow production
7)	Th	e appellate authority for any indust	rial	dispute is
	a)	Management	b)	Labour court
	c)	High court	d)	Board of directors
8)	Th	e time elapsed between the placing	g o	f an order and its arrival is called as
	a)	Cycle time	b)	Load time
	c)	Work station process time	d)	None of the above
9)	Stı	rategic management is primarily ca	rrie	ed out by
	a)	Top management	b)	Middle management
	c)	Knowledge management	d)	Operational management
10)	Th	e objective of plant layout are		
	a)	Optimum utilization of resources	b)	Better inventory control
	c)	Economics of material handling	d)	All of above



Seat	
No.	

# T.E. (Part –II) (Electrical and Electronic Engg.) (CGPA) Examination, 2018 Self Learning (Technical) INDUSTRIAL MANAGEMENT

Day and Date: Friday, 25-5-2018 Marks: 40 Time: 2.30 p.m. to 4.30 p.m. *Instructions*: 1) *All* the questions are *compulsory*. 2) Figures to the **right** indicate **full** marks. Solve any four from Q. No. 2 to Q. No. 6: 40 2. a) What is cost control? Brief the cost control area in production 5 organization. b) Explain role of public relation officer in industry. 5 3. a) Explain recruitment and selection procedure in engineering industry. 5 b) What are the different types of production system? 5 4. a) What credit facilities are given to a small scale industry by banks? 5 b) Explain importance of "Staffing" in an organization. 5 5. a) Explain core concept of marketing. 5 b) Brief evolution of scientific management. 5 6. Write short notes on any two:  $(2 \times 5 = 10)$ a) What type of compensation is given to a employee injured in the organization during working? b) Explain safety majors during fire in a workshop. c) Brief inventory management.

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Set P

## T.E. (Electrical and Electronics Engg.) Part – II (CGPA) Examination, 2018 SPECIAL MACHINES (Self Learning Technical)

Day and Date: Friday, 25-5-2018 Max. Marks: 50

Time: 2.30 p.m. to 4.30 p.m.

Note: 1) Q. No. 1 is compulsory. 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**

Marks: 10

	manto i io
Choose the correct answer:	(1×10=10)
1) A stepper motor is a	device.
a) Mechanical	b) Electrical
c) Analog	d) Incremental
<ol><li>A variable reluctance step material with salient poles.</li></ol>	oper motor is constructed of
a) Paramagnetic	b) Ferromagnetic
c) Diamagnetic	d) Non-magnetic
3) The controls stator and rotor.	ynchro's has three phase winding both on its
a) Differential	b) Transformer
c) Receiver	d) Transmitter
<ul> <li>4) Which of the following motor magnetized salient poles or</li> <li>a) Permanent magnet d.c.</li> <li>b) Disk d.c. motor</li> <li>c) Permanent magnet sync</li> <li>d) Brushless d.c. motor</li> </ul>	motor
	<ol> <li>A stepper motor is a</li></ol>



5)	<ul> <li>A D.C. Servomotor is similar to a regular d.c. motor except that its designs is modified to cope with</li> </ul>	
	a) Electronic switching	b) Slow speeds
	c) Static conditions	d) Both b) and c)
6)	Which of the following synchros are control system?	used for error detection in a servo
	a) Control transmitter	b) Control transformer
	c) Control receiver	d) Both a) and b)
7)	A stepper motor may be considered a	as aconverter.
	a) D. C. to D.C.	b) A. C. to A. C.
	c) D. C. to A. C.	d) Digital to analog
8)	In a brushless d.c. motor we have	
	a) No mechanical commutator	b) No brushes
	c) No arcing	d) All of above
9)	Motors that use electronic commutate	ors are classified as
	a) Thyristor controlled	b) Servo motors
	c) Brushless motors	d) Electronic motors
10)	The amount of torque required to m called	ake a stepper motor one full step is
	a) Holding torque	b) Residual torque
	c) Dent torque	d) Developed torque



Seat	
No.	

# T.E. (Electrical and Electronics Engg.) Part – II (CGPA) Examination, 2018 SPECIAL MACHINES (Self Learning Technical)

Day and Date: Friday, 25-5-2018 Marks: 40

Time: 2.30 p.m. to 4.30 p.m.

Note: Answer any four questions from Q. No. 2 to Q. No. 6.

2.	a)	What is a stepper motor? Explain its applications.	5
	b)	Explain the construction of variable reluctance stepper motor.	5
3.	a)	Explain the construction and working of permanent magnet D.C. motor.	5
	b)	Explain the construction and working of hybrid stepper motor.	5
4.	a)	Explain the constructional features of synchros.	5
	b)	Explain the application of synchro for torque transmission.	5
5.	a)	Explain the construction and working of A.C. servo motor.	5
	b)	Explain the working of switched reluctance motor.	5
6.	a)	Explain the construction and working of brushless D.C. motor.	5
	b)	Explain the construction and working of Scharge motor.	5

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Set Q

Seat No.

## T.E. (Electrical and Electronics Engg.) Part – II (CGPA) Examination, 2018 SPECIAL MACHINES (Self Learning Technical)

Day and Date: Friday, 25-5-2018 Max. Marks: 50

Time: 2.30 p.m. to 4.30 p.m.

1.

Note: 1) Q. No. 1 is compulsory. 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

Marks: 10

Ch	oose the correct answer :			(1×10=10)
1)	Motors that use electronic commutation	tators are	e classified as	
	a) Thyristor controlled	b) Se	ervo motors	
	c) Brushless motors	d) El	lectronic motors	
2)	The amount of torque required to called	make a	stepper motor of	one full step is
	a) Holding torque	b) Re	esidual torque	
	c) Dent torque	d) De	eveloped torque	
3)	A stepper motor may be considered	ed as a _		converter.
	a) D. C. to D.C.	b) A.	. C. to A. C.	
	c) D. C. to A. C.	d) Di	igital to analog	
4)	In a brushless d.c. motor we have			
	a) No mechanical commutator	b) No	o brushes	
	c) No arcing	d) Al	I of above	
5)	A stepper motor is a	_device.		
	a) Mechanical	b) El	lectrical	
	c) Analog	d) In	cremental	
	,	,		



6)	A variable reluctance stepper material with salient poles.	motor is constructed of
	a) Paramagnetic	b) Ferromagnetic
	c) Diamagnetic	d) Non-magnetic
7)	The controlsync stator and rotor.	nro's has three phase winding both on its
	a) Differential	b) Transformer
	c) Receiver	d) Transmitter
8)	Which of the following motor runs magnetized salient poles on its a) Permanent magnet d.c. mot b) Disk d.c. motor c) Permanent magnet synchro d) Brushless d.c. motor	or
9)	A D.C. Servomotor is similar to is modified to cope with	a regular d.c. motor except that its design
	a) Electronic switching	b) Slow speeds
	c) Static conditions	d) Both b) and c)
10)	Which of the following synchrocontrol system?	es are used for error detection in a servo
	a) Control transmitter	b) Control transformer
	c) Control receiver	d) Both a) and b)



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# T.E. (Electrical and Electronics Engg.) Part – II (CGPA) Examination, 2018 SPECIAL MACHINES (Self Learning Technical)

Day and Date: Friday, 25-5-2018 Marks: 40

Time: 2.30 p.m. to 4.30 p.m.

Note: Answer any four questions from Q. No. 2 to Q. No. 6.

2.	a)	what is a stepper motor? Explain its applications.	5
	b)	Explain the construction of variable reluctance stepper motor.	5
3.	a)	Explain the construction and working of permanent magnet D.C. motor.	5
	b)	Explain the construction and working of hybrid stepper motor.	5
4.	a)	Explain the constructional features of synchros.	5
	b)	Explain the application of synchro for torque transmission.	5
5.	a)	Explain the construction and working of A.C. servo motor.	5
	b)	Explain the working of switched reluctance motor.	5
6.	a)	Explain the construction and working of brushless D.C. motor.	5
	b)	Explain the construction and working of Scharge motor.	5

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No.

### **SLR-TC - 502**

Set R

T.E. (Electrical and Electronics Engg.) Part – II (CGPA) Examination, 2018
SPECIAL MACHINES
(Self Learning Technical)

Day and Date: Friday, 25-5-2018 Max. Marks: 50

Time: 2.30 p.m. to 4.30 p.m.

Note: 1) Q. No. 1 is compulsory. 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

Marks: 10

1. Choose the correct answer:

 $(1 \times 10 = 10)$ 

1) A D.C. Servomotor is similar to a regular d.c. motor except that its design is modified to cope with

a) Electronic switching

b) Slow speeds

c) Static conditions

d) Both b) and c)

2) Which of the following synchros are used for error detection in a servo control system?

a) Control transmitter

b) Control transformer

c) Control receiver

d) Both a) and b)

3) Motors that use electronic commutators are classified as

a) Thyristor controlled

b) Servo motors

c) Brushless motors

d) Electronic motors

4) The amount of torque required to make a stepper motor one full step is called

a) Holding torque

b) Residual torque

c) Dent torque

d) Developed torque

5)	The controlstator and rotor.	synchro's	has	three	phase	windi	ing both on	ı its
	a) Differential		b)	Trans	former			
	c) Receiver		d)	Trans	mitter			
6)	Which of the following motor magnetized salient poles (a) Permanent magnet d.c. b) Disk d.c. motor c) Permanent magnet syrd) Brushless d.c. motor	on its rotor . motor	?	ow d.c.	supply a	and ha	as permane	ntly
7)	A stepper motor is a	d	evic	e.				
	a) Mechanical		b)	Electr	ical			
	c) Analog		d)	Increr	nental			
8)	A variable reluctance stematerial with salient poles		or is	s cons	tructed	of		
	a) Paramagnetic		b)	Ferro	nagnet	ic		
	c) Diamagnetic		d)	Non-n	nagneti	С		
9)	A stepper motor may be considered as a						converter.	
	a) D. C. to D.C.		b)	A. C.	to A. C.			
	c) D. C. to A. C.		d)	Digita	l to ana	ılog		
10)	In a brushless d.c. motor	we have						
	a) No mechanical commu	itator	b)	No br	ushes			
	c) No arcing		d)	All of	above			



Seat	
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# T.E. (Electrical and Electronics Engg.) Part – II (CGPA) Examination, 2018 SPECIAL MACHINES (Self Learning Technical)

Day and Date: Friday, 25-5-2018 Marks: 40

Time: 2.30 p.m. to 4.30 p.m.

Note: Answer any four questions from Q. No. 2 to Q. No. 6.

2.	a)	what is a stepper motor? Explain its applications.	5
	b)	Explain the construction of variable reluctance stepper motor.	5
3.	a)	Explain the construction and working of permanent magnet D.C. motor.	5
	b)	Explain the construction and working of hybrid stepper motor.	5
4.	a)	Explain the constructional features of synchros.	5
	b)	Explain the application of synchro for torque transmission.	5
5.	a)	Explain the construction and working of A.C. servo motor.	5
	b)	Explain the working of switched reluctance motor.	5
6.	a)	Explain the construction and working of brushless D.C. motor.	5
	b)	Explain the construction and working of Scharge motor.	5

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# Seat No.

# T.E. (Electrical and Electronics Engg.) Part – II (CGPA) Examination, 2018 SPECIAL MACHINES (Self Learning Technical)

Day and Date: Friday, 25-5-2018 Max. Marks: 50

Time: 2.30 p.m. to 4.30 p.m.

Note: 1) Q. No. 1 is compulsory. 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	Marks: 10 : (1×10=10)
	1) The controlstator and rotor.	_synchro's has three phase winding both on its
	a) Differential	b) Transformer
	c) Receiver	d) Transmitter
	<ul> <li>2) Which of the following modern magnetized salient poles</li> <li>a) Permanent magnet of</li> <li>b) Disk d.c. motor</li> <li>c) Permanent magnet st</li> <li>d) Brushless d.c. motor</li> </ul>	.c. motor
	3) A D.C. Servomotor is sin is modified to cope with	milar to a regular d.c. motor except that its design
	a) Electronic switching	b) Slow speeds
	c) Static conditions	d) Both b) and c)
	4) Which of the following control system?	synchros are used for error detection in a servo
	a) Control transmitter	b) Control transformer
	c) Control receiver	d) Both a) and b)



5)	A stepper motor may be considered a	as a	_converter.
	a) D. C. to D.C.	b) A. C. to A. C.	
	c) D. C. to A. C.	d) Digital to analog	
6)	In a brushless d.c. motor we have		
	a) No mechanical commutator	b) No brushes	
	c) No arcing	d) All of above	
7)	Motors that use electronic commutate	ors are classified as	
	a) Thyristor controlled	b) Servo motors	
	c) Brushless motors	d) Electronic motors	
8)	The amount of torque required to m called	ake a stepper motor	one full step is
	a) Holding torque	b) Residual torque	
	c) Dent torque	d) Developed torque	)
9)	A stepper motor is ade	evice.	
	a) Mechanical	b) Electrical	
	c) Analog	d) Incremental	
10)	A variable reluctance stepper motor material with salient poles.	or is constructed of_	
	a) Paramagnetic	b) Ferromagnetic	
	c) Diamagnetic	d) Non-magnetic	



Seat	
No.	

# T.E. (Electrical and Electronics Engg.) Part – II (CGPA) Examination, 2018 SPECIAL MACHINES (Self Learning Technical)

Day and Date: Friday, 25-5-2018 Marks: 40

Time: 2.30 p.m. to 4.30 p.m.

Note: Answer any four questions from Q. No. 2 to Q. No. 6.

2.	a)	What is a stepper motor? Explain its applications.	5
	b)	Explain the construction of variable reluctance stepper motor.	5
3.	a)	Explain the construction and working of permanent magnet D.C. motor.	5
	b)	Explain the construction and working of hybrid stepper motor.	5
4.	a)	Explain the constructional features of synchros.	5
	b)	Explain the application of synchro for torque transmission.	5
5.	a)	Explain the construction and working of A.C. servo motor.	5
	b)	Explain the working of switched reluctance motor.	5
6.	a)	Explain the construction and working of brushless D.C. motor.	5
	b)	Explain the construction and working of Scharge motor.	5

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No.	Set	P

B.E. (Electrical and Electronics Engineering) (Part – I) (Old) Examination, 2018 INSTRUMENTATION TECHNIQUES					
Day and Date : Friday, 11-5-2018 Time : 2.30 p.m. to 5.30 p.m.	Total Marks: 100				
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 Duration: 30 Minutes	Type Questions  Marks: 20				
Choose the correct answer :	20				
<ol> <li>The output of current to voltage co</li> <li>a) - If.Rf</li> <li>b) Vo/Rin</li> <li>Bourdon tube are made of</li> </ol>					
<ul> <li>3) Butterworth filters are also known a <ul> <li>a) Ripple filter</li> <li>c) Flat filter</li> </ul> </li> <li>4) In Pt-100 RTD 100 means <ul> <li>a) Can measure up to 100°C</li> <li>b) Has 100 ohm resistance at 100°C</li> <li>c) Has 0 ohm resistance at 100°C</li> <li>d) Has 100 ohm resistance at 0°C</li> </ul> </li> </ul>	as b) Ripple stop band d) Spike filter				
5) Radiation pyrometer is used in for a) 0 – 500°C c) – 250 – 500°C					
<ul> <li>6) X-Y recorders record</li> <li>a) one quality with respect to othe</li> <li>b) one quantity on x axis with respect one quantity on y axis with respect of the cord both quantity on both ax</li> </ul>	pect to time on y axis pect to time on x axis				

7) Telemetry processes the information from remote by means of a) Mechanical means b) Electrical means

d) All of the above

8)	Which of the following is transducer a) Piezoelectric	? b) Thermocouple		
	c) Photovoltaic cell	d) LVDT		
9)	Which of the following is non-planar a) LCD	display ? b) LED		
	c) Rear projection display	d) None of these		
10)	What are selection criteria of PLC?	LV NI f ' I		
	<ul><li>a) Size of memory of CPU</li><li>c) Scan time</li></ul>	<ul><li>b) No. of input an</li><li>d) All of above</li></ul>	a o	utput
11)	In optical pyrometer temperature is r			
	<ul><li>a) Photocell principle</li><li>c) Comparing brightness of source</li></ul>	<ul><li>b) Peltier effect</li><li>d) None of these</li></ul>		
12)	Strip chart recorders have advantage			
,	a) Long period run	b) Change in spe	ed o	chart
4.0\	c) Uniform resolution	d) All of above		
13)	High value pot resistance leads to a) Low sensitivity	b) High sensitivity	,	
	c) Low non-linearity	d) Less error		
14)	What is value of LSB of an 8-bit DAC	_		
4 = \	a) 1.6 v b) 50 mv	c) 0.625 v	,	1.28 v
15)	In microwave telemetry repeater state a) 2 Km b) 5 Km	tions are required a c) 40 Km		very 100 Km
16)	The strain gauge should have low			
	<ul><li>a) Resistance</li><li>c) Gauge factor</li></ul>	<ul><li>b) Resistance ten</li><li>d) All of above</li></ul>	npe	rature
17)	For surface temperature measurement			
4.0\	a) Strain gauge b) Diaphragm	•	d)	Thermocouple
18)	Null type recorders area) Potentiometric b) Bridge		d)	Any of above
19)	The sensitivity factor of strain gauge	,	er of	;
	a) 1 to 1.5 b) 1.5 to 2.0	c) 0.5 to 1.0	d)	5 to 10
20)	Doppler shift principle is used in mea a) Temperature b) Frequency		d)	Pressure



Seat	
No.	

# B.E. (Electrical and Electronics Engineering) (Part – I) (Old) Examination, 2018 INSTRUMENTATION TECHNIQUES

Day and Date: Friday, 11-5-2018 Marks: 80

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) Assume suitable data wherever necessary.

2) Non-programmable calculators are **permitted**.

### SECTION - I

2. Solve any four. (5×4=20)

- a) How velocity is measured? Explain with neat diagram.
- b) Explain various types of transducer. Explain active and passive transducer with example based on working principle.
- c) Explain Chopper stabilized amplifier.
- d) What is error? Explain various errors in instrumentation.
- e) Define:
  - 1) Resolution
- 2) Accuracy
- 3) Threshold
- 4) Static error

3. Solve any two.

 $(10 \times 2 = 20)$ 

- a) Explain the instrumentation system with neat block diagram. Give a practical example of it with explanation.
- b) Explain various types of modulation.
- c) Define telemetry. Explain voltage and current telemetry system.

### SECTION - II

4. Solve any four.

 $(5 \times 4 = 20)$ 

- a) Explain the various types of DAC.
- b) Enlist different types of digital and analog input, output devices.



- c) Write short note on:
  - 1) LCD display
  - 2) LED display.
- d) Explain in short about sample and hold circuit.
- e) Explain data acquisition system.

5. Solve any two. (2×10=20)

- a) Explain magnetic strip chart recorder in detail.
- b) Explain frequency division multiplexing and time division multiplexing.
- c) Explain the architecture of PLC with neat diagram.



Seat		
No.	Set	Q

Exan	ronics Engineering) (Part – I) (Old) nination, 2018 TATION TECHNIQUES					
Day and Date : Friday, 11-5-2018 Time : 2.30 p.m. to 5.30 p.m.	Total Marks: 100					
30 minutes carries one n 2) Answer MC	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/Object	ctive Type Questions					
Duration: 30 Minutes	Marks: 20					
1. Choose the correct answer:	20					
<ol> <li>The strain gauge should have</li> <li>a) Resistance</li> <li>c) Gauge factor</li> </ol>	b) Resistance temperature d) All of above					
<ol> <li>For surface temperature meas</li> <li>a) Strain gauge b) Diaphra</li> </ol>						
<ul><li>3) Null type recorders are</li><li>a) Potentiometric b) Bridge</li></ul>						
4) The sensitivity factor of strain a) 1 to 1.5 b) 1.5 to 2						
<ul><li>5) Doppler shift principle is used</li><li>a) Temperature b) Freque</li></ul>						
6) The output of current to voltag a) – If.Rf b) Vo/Rin	ge converter is given by c) - Rf/R1 d) 1 + (Rf/R1)					
<ul><li>7) Bourdon tube are made of</li><li>a) Copper</li><li>b) Alumina</li></ul>	um c) Metal Alloy d) Phosphorous					
<ul><li>8) Butterworth filters are also kno</li><li>a) Ripple filter</li><li>c) Flat filter</li></ul>	own as b) Ripple stop band d) Spike filter					



9)	In Pt-100 RTD 100	means				
	a) Can measure u	p to 100°C				
	b) Has 100 ohm re					
	c) Has 0 ohm resis					
	d) Has 100 ohm re				_	
10)	Radiation pyrometer	er is used in for te			f	
	a) 0 – 500°C		•	500 – 1000°C 1200 – 2500°C		
44\	c) - 250 - 500°C	al	u)	1200 – 2500 C		
11)	X-Y recorders reco		בוור	ntity		
	b) one quantity on	•	•	•		
	c) one quantity on	•		•		
	d) record both qua	intity on both axis				
12)	Telemetry process			_		s of
	a) Mechanical mea	ans	,	Electrical mear		
	c) CRO		,	All of the above	€	
13)	Which of the follow	ing is transducer		Thormoounlo		
	<ul><li>a) Piezoelectric</li><li>c) Photovoltaic ce</li></ul>	II	,	Thermocouple LVDT		
14)	Which of the follow		,			
1 1)	a) LCD	ang io non pianai		LED		
	c) Rear projection	display	,	None of these		
15)	What are selection	criteria of PLC?				
	a) Size of memory	of CPU	,	No. of input an	d oı	utput
	c) Scan time		,	All of above		
16)	In optical pyrometer			-		
	<ul><li>a) Photocell princi</li><li>c) Comparing brig</li></ul>		,	Peltier effect None of these		
17)	Strip chart recorde		•			
17)	a) Long period run				ed c	chart
	c) Uniform resolut			All of above		
18)	High value pot resi	stance leads to				
	a) Low sensitivity		,	High sensitivity	,	
	c) Low non-lineari		,	Less error		
19)	What is value of LS			•		1.00
	a) 1.6 v	b) 50 mv	,	0.625 v	,	1.28 v
20)	In microwave telen	, ,		•		•
	a) 2 Km	b) 5 Km	C)	40 Km	d)	100 Km



Seat	
No.	

# B.E. (Electrical and Electronics Engineering) (Part – I) (Old) Examination, 2018 INSTRUMENTATION TECHNIQUES

Day and Date: Friday, 11-5-2018 Marks: 80

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) Assume suitable data wherever necessary.

2) Non-programmable calculators are **permitted**.

### SECTION - I

2. Solve any four. (5×4=20)

- a) How velocity is measured? Explain with neat diagram.
- b) Explain various types of transducer. Explain active and passive transducer with example based on working principle.
- c) Explain Chopper stabilized amplifier.
- d) What is error? Explain various errors in instrumentation.
- e) Define:
  - 1) Resolution
- 2) Accuracy
- 3) Threshold
- 4) Static error
- 3. Solve any two.

 $(10 \times 2 = 20)$ 

- a) Explain the instrumentation system with neat block diagram. Give a practical example of it with explanation.
- b) Explain various types of modulation.
- c) Define telemetry. Explain voltage and current telemetry system.

### SECTION - II

## 4. Solve any four.

 $(5 \times 4 = 20)$ 

- a) Explain the various types of DAC.
- b) Enlist different types of digital and analog input, output devices.



- c) Write short note on:
  - 1) LCD display
  - 2) LED display.
- d) Explain in short about sample and hold circuit.
- e) Explain data acquisition system.

5. Solve any two. (2×10=20)

- a) Explain magnetic strip chart recorder in detail.
- b) Explain frequency division multiplexing and time division multiplexing.
- c) Explain the architecture of PLC with neat diagram.



Seat		
No.	Set	<b>R</b>

# B.E. (Electrical and Electronics Engineering) (Part – I) (Old)

	mination, 2018 ITATION TECHNIQUES
Day and Date : Friday, 11-5-2018 Time : 2.30 p.m. to 5.30 p.m.	Total Marks: 100
30 minutes carries one 2) Answer MC	compulsory. It should be solved in first in Answer Book Page No. 3. Each question mark. CQ/Objective type questions on Page No. 3 forget to mention, Q.P. Set (P/Q/R/S) on Top
MCQ/Objection : 30 Minutes	ective Type Questions  Marks: 20
Choose the correct answer :	20
<ol> <li>In optical pyrometer tempera</li> <li>a) Photocell principle</li> <li>c) Comparing brightness of s</li> <li>2) Strip chart recorders have ac</li> <li>a) Long period run</li> <li>c) Uniform resolution</li> </ol>	ture is measured by b) Peltier effect source d) None of these
<ul><li>3) High value pot resistance lea</li><li>a) Low sensitivity</li><li>c) Low non-linearity</li></ul>	ds to b) High sensitivity d) Less error
4) What is value of LSB of an 8- a) 1.6 v b) 50 mv	•
5) In microwave telemetry repeated a) 2 Km b) 5 Km	ater stations are required at every c) 40 Km d) 100 Km
<ul><li>6) The strain gauge should have</li><li>a) Resistance</li><li>c) Gauge factor</li></ul>	e low b) Resistance temperature d) All of above
<ul><li>7) For surface temperature mea</li><li>a) Strain gauge b) Diaphi</li></ul>	

8)	Null type recorders	s are		recorders.		
	a) Potentiometric	b) Bridge	c)	LVDT	d)	Any of above
9)	The sensitivity fact	tor of strain gauge	is ı	normally of orde	r of	f
	a) 1 to 1.5	b) 1.5 to 2.0	c)	0.5 to 1.0	d)	5 to 10
10)	Doppler shift princi	iple is used in mea	เรน	rement of		
	a) Temperature	b) Frequency	c)	Speed	d)	Pressure
11)	The output of curre a) – If.Rf	ent to voltage conv b) Vo/Rin	ert c)	er is given by – Rf/R1	d)	1 + (Rf/R1)
12)	Bourdon tube are an a) Copper		c)	Metal Alloy	d)	Phosphorous
13)	Butterworth filters and Ripple filter c) Flat filter	are also known as	b)	Ripple stop bar Spike filter	nd	
14)	In Pt-100 RTD 100 a) Can measure u b) Has 100 ohm re c) Has 0 ohm resi d) Has 100 ohm re	ip to 100°C esistance at 100°C stance at 100°C	;			
15)	Radiation pyrometer is used in for temperature range of a) 0 - 500°C b) 500 - 1000°C c) - 250 - 500°C d) 1200 - 2500°C					
16)	X-Y recorders record a) one quality with respect to other quantity b) one quantity on x axis with respect to time on y axis c) one quantity on y axis with respect to time on x axis d) record both quantity on both axis					
17)	Telemetry process a) Mechanical me			m remote by mear Electrical mear		s of
	c) CRO		d)	All of the above	Э	
18)	Which of the follow	ving is transducer '	?			
	a) Piezoelectric		,	Thermocouple		
	c) Photovoltaic ce		,	LVDT		
19)	Which of the follow	ving is non-planar				
	<ul><li>a) LCD</li><li>c) Rear projection</li></ul>	display	,	LED None of these		
3U)	What are selection	, ,	u)	THORIC OF LITES		
20)	a) Size of memory		b)	No. of input an	d o	utout
	c) Scan time	,		All of above	J. 0	



Seat	
No.	

# B.E. (Electrical and Electronics Engineering) (Part – I) (Old) Examination, 2018 INSTRUMENTATION TECHNIQUES

Day and Date: Friday, 11-5-2018 Marks: 80

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) Assume suitable data wherever necessary.

2) Non-programmable calculators are **permitted**.

### SECTION - I

2. Solve any four. (5×4=20)

- a) How velocity is measured? Explain with neat diagram.
- b) Explain various types of transducer. Explain active and passive transducer with example based on working principle.
- c) Explain Chopper stabilized amplifier.
- d) What is error? Explain various errors in instrumentation.
- e) Define:
  - 1) Resolution
- 2) Accuracy
- 3) Threshold
- 4) Static error

3. Solve any two.

 $(10 \times 2 = 20)$ 

- a) Explain the instrumentation system with neat block diagram. Give a practical example of it with explanation.
- b) Explain various types of modulation.
- c) Define telemetry. Explain voltage and current telemetry system.

## SECTION - II

4. Solve any four.

 $(5 \times 4 = 20)$ 

- a) Explain the various types of DAC.
- b) Enlist different types of digital and analog input, output devices.



- c) Write short note on:
  - 1) LCD display
  - 2) LED display.
- d) Explain in short about sample and hold circuit.
- e) Explain data acquisition system.

5. Solve any two. (2×10=20)

- a) Explain magnetic strip chart recorder in detail.
- b) Explain frequency division multiplexing and time division multiplexing.
- c) Explain the architecture of PLC with neat diagram.



a) Photocell principle

c) Comparing brightness of source d) None of these

Seat		
No.	Set	S

# B.E. (Electrical and Electronics Engineering) (Part – I) (Old) Examination, 2018

**INSTRUMENTATION TECHNIQUES** Total Marks: 100 Day and Date: Friday, 11-5-2018 Time: 2.30 p.m. to 5.30 p.m. Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each guestion 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) X-Y recorders record a) one quality with respect to other quantity b) one quantity on x axis with respect to time on y axis c) one quantity on y axis with respect to time on x axis d) record both quantity on both axis 2) Telemetry processes the information from remote by means of b) Electrical means a) Mechanical means c) CRO d) All of the above 3) Which of the following is transducer? a) Piezoelectric b) Thermocouple c) Photovoltaic cell d) LVDT 4) Which of the following is non-planar display? b) LED a) LCD d) None of these c) Rear projection display 5) What are selection criteria of PLC? a) Size of memory of CPU b) No. of input and output d) All of above c) Scan time 6) In optical pyrometer temperature is measured by

b) Peltier effect



7)	Strip chart recorde	rs have advantage	e o	f		
	,		<ul><li>b) Change in speed chart</li><li>d) All of above</li></ul>			
8)	High value pot res a) Low sensitivity		,	High sensitivity	,	
	c) Low non-lineari	ty	d)	Less error		
9)	What is value of L	SB of an 8-bit DAC	C fc	or 0-12.8 v range	?	
	a) 1.6 v	b) 50 mv	c)	0.625 v	d)	1.28 v
10)	In microwave teler a) 2 Km			s are required a 40 Km		very 100 Km
11)	The strain gauge sa) Resistance	should have low	b)	Resistance ten	npe	rature
	c) Gauge factor		d)	All of above		
12)	For surface tempe a) Strain gauge			one can use RTD	d)	Thermocouple
13)	Null type recorders a) Potentiometric	s are			d)	Any of above
14)	The sensitivity fact	,	,		,	•
,	a) 1 to 1.5			0.5 to 1.0		5 to 10
15)	Doppler shift princ	iple is used in mea	asu	rement of		
	a) Temperature	b) Frequency	c)	Speed	d)	Pressure
16)	The output of curre a) – If.Rf	ent to voltage conv b) Vo/Rin			d)	1 + (Rf/R1)
17)	Bourdon tube are a) Copper		c)	Metal Alloy	d)	Phosphorous
18)	Butterworth filters <ul><li>a) Ripple filter</li><li>c) Flat filter</li></ul>	are also known as	b)	Ripple stop bar Spike filter	nd	
19)	In Pt-100 RTD 100 a) Can measure u b) Has 100 ohm re c) Has 0 ohm resi d) Has 100 ohm re	p to 100°C esistance at 100°C stance at 100°C				
20)	Radiation pyromet a) 0 – 500°C	er is used in for te	b)	500 – 1000°C		
	c) - 250 - 500°C		d)	1200 – 2500°C	,	



Seat	
No.	

# B.E. (Electrical and Electronics Engineering) (Part – I) (Old) Examination, 2018 INSTRUMENTATION TECHNIQUES

Day and Date: Friday, 11-5-2018 Marks: 80

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) Assume suitable data wherever necessary.

2) Non-programmable calculators are **permitted**.

### SECTION - I

2. Solve any four. (5×4=20)

- a) How velocity is measured? Explain with neat diagram.
- b) Explain various types of transducer. Explain active and passive transducer with example based on working principle.
- c) Explain Chopper stabilized amplifier.
- d) What is error? Explain various errors in instrumentation.
- e) Define:
  - 1) Resolution
- 2) Accuracy
- 3) Threshold
- 4) Static error

3. Solve any two.

 $(10 \times 2 = 20)$ 

- a) Explain the instrumentation system with neat block diagram. Give a practical example of it with explanation.
- b) Explain various types of modulation.
- c) Define telemetry. Explain voltage and current telemetry system.

### SECTION - II

4. Solve any four.

 $(5 \times 4 = 20)$ 

- a) Explain the various types of DAC.
- b) Enlist different types of digital and analog input, output devices.



- c) Write short note on:
  - 1) LCD display
  - 2) LED display.
- d) Explain in short about sample and hold circuit.
- e) Explain data acquisition system.

5. Solve any two. (2×10=20)

- a) Explain magnetic strip chart recorder in detail.
- b) Explain frequency division multiplexing and time division multiplexing.
- c) Explain the architecture of PLC with neat diagram.

Seat	
No.	

## B.E. (Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2018 POWER SYSTEM - II

Day and Date: Saturday, 12-5-2018 Max. Marks: 100

Time: 2.30 p.m. to 5.30 p.m.

Instructions: i) All questions are compulsory.

- ii) Figures to right indicate full marks.
- iii) Assume suitable data if necessary.
- iv) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- v) 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:

 $(20 \times 1 = 20)$ 

- 1) Load flow study is carried out for
  - a) Load frequency control
- b) Planning of power system

c) Fault calculation

- d) Study of stability of the system
- 2) The stability of power system is not affected by
  - a) Generator reactance

b) Line reactance

c) Line losses

- d) Excitation of generators
- 3) Which of the following results in a symmetrical fault?
  - a) Single L-G fault

- b) L-L faults
- c) All three phase to earth fault
- d) Two phase to earth fault
- 4) Zero sequence fault current is absent when fault is
  - a) Single L-G fault
- b) L-L faults
- c) Double L-L fault d) None of these
- 5) A negative sequence relay is commonly used to protect
  - a) Alternator
- b) Transformer
- c) Transmission line d) Bus bar
- 6) The magnitude of fault current depends on
  - a) Total impedance up to fault
  - b) Voltage at the fault point
  - c) Load current being supply before occurrence of faults
  - d) Both a) and b)
- 7) Equal area criterion gives the information regarding
  - a) Stability region

b) Absolute stability

c) Relative stability

- d) Swing curves
- 8) The critical clearing time of a fault in power system is related to
  - a) Reactive power limit

b) Short circuit limit

c) Steady state limit

d) Transient stability limit



9)	Negative sequence reactance of a transformer is  a) Equal to the positive sequence reactance b) Lesser than positive sequence reactance c) Greater than positive sequence reactance d) None of these				
10)	If all sequence voltages at the fault point in a) 3-phase fault c) L-L fault	<ul><li>a power system are equal, then the fault is</li><li>b) L-G fault</li><li>d) Double L-G fault</li></ul>			
11)	The positive sequence currents of a transmal alpha Always c) Equal to negative sequence current	b)	on line is 1/3 of negative se 3 times the negati	•	
12)	When a line to ground fault occurs, the cur equence current in this case will be a) Zero b) 33.3 A		in the faulted phase 66.6 A		s 100 A. The zero 100 A
13)	<ul> <li>A balanced 3-phase system consists of</li> <li>a) Zero sequence currents only</li> <li>b) Positive sequence currents only</li> <li>c) Negative sequence currents only</li> <li>d) Zero, positive and negative sequence c</li> </ul>	urre	ents		
14)	The distribution systems in India are mostly a) Radial b) Parallel		Network	d)	None of these
15)	Transient disturbance are caused by a) Sudden load changes c) Faults in the power system	•	Switching operation All of the above	on	
16)	The constant H of a turbo-generator of 2 300 MVA base will be				
17)	<ul><li>a) 9.0</li><li>b) 4.0</li><li>If the torque angle of an alternator increase</li><li>a) Steady state stability</li><li>c) Instability</li></ul>	s in b)	6.0 finitely the system Transient stability None of these	,	13.5 show
18)	Load-flow studies involve solving simultane <ul><li>a) Linear algebraic equations</li><li>c) Linear differential equations</li></ul>	b)	Non-linear algebra Non-linear differer		=
19)	Slack bus is bus. a) Load b) Generator	c)	Feeder	d)	Measurement
20)	In load-flow analysis, the load connected at a) Constant current drawn from the bus b) Constant impedance connected at the bc) Voltage and frequency dependent sourced) Constant real and reactive power drawn	ous ce a	t the bus	as	



Seat	
No.	

# B.E. (Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2018 POWER SYSTEM – II

Day and Date: Saturday, 12-5-2018 Marks: 80

Time: 2.30 p.m. to 5.30 p.m.

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

- ii) Figures to **right** indicate **full** marks.
- iii) Assume suitable data if necessary.

### SECTION - I

2. Solve any four: (5×4=20)

- a) Explain representation of loads.
- b) State advantages of PU system.
- c) Write short note on Slack bus.
- d) Derive an expression for SLFE.
- e) Explain the advantages and disadvantages of Gauss Seidel method and Newton Raphson method.
- f) Explain short circuit on synchronous machine at no load.

3. Solve any two: (10×2=20)

- a) Derive and explain the expression of Newton Raphson method.
- b) Explain briefly equal area criterion and how it may be used to study the stability of a two machine system.
- c) A double line fault occurs between the two phases of the transmission line with impedance Zf between them. Find the interconnection of the three sequence networks and hence determine the fault current.

#### SECTION - II

4. Solve any four: (5×4=20)

- a) Derive and draw sequence network of two conductor open fault.
- b) Draw the zero sequence network of different type of transformer connections.
- c) Write a short note on selection of circuit breaker.
- d) Explain the equal area criteria of power system stability.
- e) Analyze a single line to ground fault and show the connections of sequence network.



5. Solve any two: (10×2=20)

- a) What are the factors affecting transient stability? Explain the methods for improving stability of system.
- b) Explain in detail contingency analysis and sensitivity factors.
- c) Explain the system constraints in the power system. What is Unit commitment? Explain in detail.

Seat		
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# B F (Part – I) (Old) (Flectrical and Flectronics Engineering) Examination, 2018.

D.		(Part – I) (Old	, ,	POWER S		•	511119 <i>)</i> L <i>7</i>	ammau	)II, 2010
-		Date: Saturday 30 p.m. to 5.30	•					Max.	Marks : 100
	,	Instructions :	ii) Figures iii) Assume iv) Q. No. Answer v) <b>Answe</b> l	stions are conto right indices suitable dans 1 is compuls Book Page North MCQ/Objecton, Communication, Communic	cate <b>fu</b> ta if ne <b>sory</b> . I No. <b>3</b> . I ctive ty	II marks. cessary. It should be Each question pe question	on carries n <b>s on Pa</b> g	one mark. ge No. 3 o	
Durati	on	: 30 Minutes	МС	Q/Objective	Туре	Questions			Marks : 20
1. C	Chc	oose the correct	answer:						(20×1=20)
	1)	The constant 300 MVA base a) 9.0				MVA is 6.0.		correspor	nding to
	2)	If the torque ar a) Steady star c) Instability	ngle of an alte		ses in b)		ystem will tability		
	3)	Load-flow stud a) Linear alge c) Linear diffe	braic equatio	ns	b)	Non-linear o	•	•	
	4)	Slack bus is a) Load		s. Generator	c)	Feeder	d)	Measurer	nent
	5)	In load-flow an  a) Constant c  b) Constant ir  c) Voltage an  d) Constant re	urrent drawn npedance co d frequency d	from the bus nnected at th dependent so	e bus urce a	t the bus	ented as		
	6)	Load flow stud  a) Load frequ  c) Fault calcu	ency control	ut for		Planning of Study of sta			
	7)	The stability of a) Generator c) Line losses	power syster	m is not affec	ted by	-	nce	-	



8)	, •		cal fault ? b) L-L faults d) Two phase to earth fault		
9)	Zero sequence fault current is absent when a) Single L-G fault b) L-L faults		ılt is Double L-L fault	d)	None of these
10)	A negative sequence relay is commonly use a) Alternator b) Transformer			d)	Bus bar
11)	The magnitude of fault current depends on a) Total impedance up to fault b) Voltage at the fault point c) Load current being supply before occurr d) Both a) and b)	rend	ce of faults		
12)	Equal area criterion gives the information re a) Stability region c) Relative stability	b)	rding Absolute stability Swing curves		
13)	The critical clearing time of a fault in power a) Reactive power limit c) Steady state limit	b)	tem is related to Short circuit limit Transient stability	limi	it
14)	<ul> <li>Negative sequence reactance of a transformer is</li> <li>a) Equal to the positive sequence reactance</li> <li>b) Lesser than positive sequence reactance</li> <li>c) Greater than positive sequence reactance</li> <li>d) None of these</li> </ul>				
15)	) If all sequence voltages at the fault point in a power system are equal, then the fault is a) 3-phase fault b) L-G fault c) L-L fault d) Double L-G fault				I, then the fault is
16)	The positive sequence currents of a transm a) Always c) Equal to negative sequence current	b)	b) 1/3 of negative sequence current		
17)	When a line to ground fault occurs, the currequence current in this case will be a) Zero b) 33.3 A		in the faulted phase 66.6 A		s 100 A. The zero 100 A
18)	<ul> <li>A balanced 3-phase system consists of</li> <li>a) Zero sequence currents only</li> <li>b) Positive sequence currents only</li> <li>c) Negative sequence currents only</li> <li>d) Zero, positive and negative sequence currents</li> </ul>	urre	ents		
19)	The distribution systems in India are mostly a) Radial b) Parallel		Network	d)	None of these
20)	Transient disturbance are caused by a) Sudden load changes c) Faults in the power system		Switching operation All of the above	n	



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# B.E. (Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2018 POWER SYSTEM – II

Day and Date: Saturday, 12-5-2018 Marks: 80

Time: 2.30 p.m. to 5.30 p.m.

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

- ii) Figures to **right** indicate **full** marks.
- iii) Assume suitable data if necessary.

### SECTION - I

2. Solve any four: (5×4=20)

- a) Explain representation of loads.
- b) State advantages of PU system.
- c) Write short note on Slack bus.
- d) Derive an expression for SLFE.
- e) Explain the advantages and disadvantages of Gauss Seidel method and Newton Raphson method.
- f) Explain short circuit on synchronous machine at no load.

3. Solve any two: (10×2=20)

- a) Derive and explain the expression of Newton Raphson method.
- b) Explain briefly equal area criterion and how it may be used to study the stability of a two machine system.
- c) A double line fault occurs between the two phases of the transmission line with impedance Zf between them. Find the interconnection of the three sequence networks and hence determine the fault current.

#### SECTION - II

4. Solve any four: (5×4=20)

- a) Derive and draw sequence network of two conductor open fault.
- b) Draw the zero sequence network of different type of transformer connections.
- c) Write a short note on selection of circuit breaker.
- d) Explain the equal area criteria of power system stability.
- e) Analyze a single line to ground fault and show the connections of sequence network.



5. Solve any two: (10×2=20)

- a) What are the factors affecting transient stability? Explain the methods for improving stability of system.
- b) Explain in detail contingency analysis and sensitivity factors.
- c) Explain the system constraints in the power system. What is Unit commitment? Explain in detail.

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# B.E. (Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2018 POWER SYSTEM – II

Day a	nd Date : Saturday,	12-5-2018	Max. Marks: 100

Time: 2.30 p.m. to 5.30 p.m.

Instructions: i) All questions are compulsory.

- ii) Figures to right indicate full marks.
- iii) Assume suitable data if necessary.
- iv) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
- v) 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

1. Choose the correct answer : (20×1=20)

- 1) The positive sequence currents of a transmission line is
  - a) Always

- b) 1/3 of negative sequence current
- c) Equal to negative sequence current
- d) 3 times the negative sequence current
- 2) When a line to ground fault occurs, the current in the faulted phase is 100 A. The zero equence current in this case will be
  - a) Zero
- b) 33.3 A
- c) 66.6 A
- d) 100 A

- 3) A balanced 3-phase system consists of
  - a) Zero sequence currents only
  - b) Positive sequence currents only
  - c) Negative sequence currents only
  - d) Zero, positive and negative sequence currents
- 4) The distribution systems in India are mostly
  - a) Radial
- b) Parallel
- c) Network
- d) None of these

- 5) Transient disturbance are caused by
  - a) Sudden load changes

- b) Switching operation
- c) Faults in the power system
- d) All of the above
- 6) The constant H of a turbo-generator of 200 MVA is 6.0. Its value corresponding to 300 MVA base will be
  - a) 9.0
- b) 4.0
- c) 6.0
- d) 13.5
- 7) If the torque angle of an alternator increases infinitely the system will show
  - a) Steady state stability

b) Transient stability

c) Instability

d) None of these



8)	Load-flow studies involve solving simultaneous				
	a) Linear algebraic equations	b) Non-linear algebraic equations			
	c) Linear differential equations	d) Non-linear differential equations			
9)	Slack bus is bus.				
	a) Load b) Generator	c) Feeder d) Measurement			
10)	In load-flow analysis, the load connected at a bus is represented as a) Constant current drawn from the bus b) Constant impedance connected at the bus c) Voltage and frequency dependent source at the bus d) Constant real and reactive power drawn from the bus				
11)	Load flow study is carried out for a) Load frequency control c) Fault calculation	<ul><li>b) Planning of power system</li><li>d) Study of stability of the system</li></ul>			
12)	The stability of power system is not affected a) Generator reactance c) Line losses	d by b) Line reactance d) Excitation of generators			
13)	Which of the following results in a symmetri a) Single L-G fault c) All three phase to earth fault	b) L-L faults			
14)	Zero sequence fault current is absent when a) Single L-G fault b) L-L faults				
15)	A negative sequence relay is commonly use a) Alternator b) Transformer	ed to protect c) Transmission line d) Bus bar			
16)	<ul> <li>The magnitude of fault current depends on</li> <li>a) Total impedance up to fault</li> <li>b) Voltage at the fault point</li> <li>c) Load current being supply before occurrence of faults</li> <li>d) Both a) and b)</li> </ul>				
17)	<ul><li>Equal area criterion gives the information re</li><li>a) Stability region</li><li>c) Relative stability</li></ul>	egarding b) Absolute stability d) Swing curves			
18)	The critical clearing time of a fault in power a) Reactive power limit c) Steady state limit	system is related to b) Short circuit limit d) Transient stability limit			
19)	Negative sequence reactance of a transformal Equal to the positive sequence reactance by Lesser than positive sequence reactance control of these	ce ce			
20)	If all sequence voltages at the fault point in a) 3-phase fault c) L-L fault	<ul><li>a power system are equal, then the fault is</li><li>b) L-G fault</li><li>d) Double L-G fault</li></ul>			



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# B.E. (Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2018 POWER SYSTEM – II

Day and Date: Saturday, 12-5-2018 Marks: 80

Time: 2.30 p.m. to 5.30 p.m.

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

ii) Figures to **right** indicate **full** marks.

iii) Assume suitable data if necessary.

### SECTION - I

2. Solve any four: (5×4=20)

- a) Explain representation of loads.
- b) State advantages of PU system.
- c) Write short note on Slack bus.
- d) Derive an expression for SLFE.
- e) Explain the advantages and disadvantages of Gauss Seidel method and Newton Raphson method.
- f) Explain short circuit on synchronous machine at no load.

3. Solve any two: (10×2=20)

- a) Derive and explain the expression of Newton Raphson method.
- b) Explain briefly equal area criterion and how it may be used to study the stability of a two machine system.
- c) A double line fault occurs between the two phases of the transmission line with impedance Zf between them. Find the interconnection of the three sequence networks and hence determine the fault current.

#### SECTION - II

4. Solve any four: (5×4=20)

- a) Derive and draw sequence network of two conductor open fault.
- b) Draw the zero sequence network of different type of transformer connections.
- c) Write a short note on selection of circuit breaker.
- d) Explain the equal area criteria of power system stability.
- e) Analyze a single line to ground fault and show the connections of sequence network.



5. Solve any two: (10×2=20)

- a) What are the factors affecting transient stability? Explain the methods for improving stability of system.
- b) Explain in detail contingency analysis and sensitivity factors.
- c) Explain the system constraints in the power system. What is Unit commitment? Explain in detail.



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# B.E. (Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2018 POWER SYSTEM – II

Day and Date: Saturday, 12-5-2018 Max. Marks: 100

Time: 2.30 p.m. to 5.30 p.m.

Instructions: i) All questions are compulsory.

- ii) Figures to **right** indicate **full** marks.
- iii) Assume suitable data if necessary.
- iv) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
- v) 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:

 $(20 \times 1 = 20)$ 

- 1) The magnitude of fault current depends on
  - a) Total impedance up to fault
  - b) Voltage at the fault point
  - c) Load current being supply before occurrence of faults
  - d) Both a) and b)
- 2) Equal area criterion gives the information regarding
  - a) Stability region

b) Absolute stability

c) Relative stability

- d) Swing curves
- 3) The critical clearing time of a fault in power system is related to
  - a) Reactive power limit

b) Short circuit limit

c) Steady state limit

- d) Transient stability limit
- 4) Negative sequence reactance of a transformer is
  - a) Equal to the positive sequence reactance
  - b) Lesser than positive sequence reactance
  - c) Greater than positive sequence reactance
  - d) None of these
- 5) If all sequence voltages at the fault point in a power system are equal, then the fault is
  - a) 3-phase fault

b) L-G fault

c) L-L fault

- d) Double L-G fault
- 6) The positive sequence currents of a transmission line is
  - a) Always

- b) 1/3 of negative sequence current
- c) Equal to negative sequence current
- d) 3 times the negative sequence current

7)	equence current in this case will be	irrent in the faulted phase is 100 A. The zero
8)	<ul> <li>a) Zero</li> <li>b) 33.3 A</li> <li>A balanced 3-phase system consists of</li> <li>a) Zero sequence currents only</li> <li>b) Positive sequence currents only</li> <li>c) Negative sequence currents only</li> <li>d) Zero, positive and negative sequence</li> </ul>	c) 66.6 A d) 100 A currents
9)	The distribution systems in India are most a) Radial b) Parallel	ly c) Network d) None of these
10)	Transient disturbance are caused by a) Sudden load changes c) Faults in the power system	<ul><li>b) Switching operation</li><li>d) All of the above</li></ul>
11)	300 MVA base will be	200 MVA is 6.0. Its value corresponding to c) 6.0 d) 13.5
12)	<ul><li>a) 9.0</li><li>b) 4.0</li><li>If the torque angle of an alternator increas</li><li>a) Steady state stability</li><li>c) Instability</li></ul>	,
13)	Load-flow studies involve solving simultantal a) Linear algebraic equations c) Linear differential equations	eous b) Non-linear algebraic equations d) Non-linear differential equations
14)	Slack bus is bus. a) Load b) Generator	c) Feeder d) Measurement
15)	In load-flow analysis, the load connected a a) Constant current drawn from the bus b) Constant impedance connected at the c) Voltage and frequency dependent sou d) Constant real and reactive power draw	bus rce at the bus
16)	Load flow study is carried out for a) Load frequency control c) Fault calculation	<ul><li>b) Planning of power system</li><li>d) Study of stability of the system</li></ul>
17)	The stability of power system is not affected a) Generator reactance c) Line losses	ed by b) Line reactance d) Excitation of generators
18)	Which of the following results in a symmeta) Single L-G fault c) All three phase to earth fault	rical fault ? b) L-L faults d) Two phase to earth fault
19)	Zero sequence fault current is absent whe a) Single L-G fault b) L-L faults	n fault is c) Double L-L fault d) None of these
20)	A negative sequence relay is commonly u a) Alternator b) Transformer	·



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# B.E. (Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2018 POWER SYSTEM – II

Day and Date: Saturday, 12-5-2018 Marks: 80

Time: 2.30 p.m. to 5.30 p.m.

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

ii) Figures to **right** indicate **full** marks.

iii) Assume suitable data if necessary.

### SECTION - I

2. Solve any four: (5×4=20)

- a) Explain representation of loads.
- b) State advantages of PU system.
- c) Write short note on Slack bus.
- d) Derive an expression for SLFE.
- e) Explain the advantages and disadvantages of Gauss Seidel method and Newton Raphson method.
- f) Explain short circuit on synchronous machine at no load.

3. Solve any two: (10×2=20)

- a) Derive and explain the expression of Newton Raphson method.
- b) Explain briefly equal area criterion and how it may be used to study the stability of a two machine system.
- c) A double line fault occurs between the two phases of the transmission line with impedance Zf between them. Find the interconnection of the three sequence networks and hence determine the fault current.

#### SECTION - II

4. Solve any four: (5×4=20)

- a) Derive and draw sequence network of two conductor open fault.
- b) Draw the zero sequence network of different type of transformer connections.
- c) Write a short note on selection of circuit breaker.
- d) Explain the equal area criteria of power system stability.
- e) Analyze a single line to ground fault and show the connections of sequence network.



5. Solve any two: (10×2=20)

- a) What are the factors affecting transient stability? Explain the methods for improving stability of system.
- b) Explain in detail contingency analysis and sensitivity factors.
- c) Explain the system constraints in the power system. What is Unit commitment? Explain in detail.

**SLR-TC - 507** 

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# B.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018 INDUSTRIAL DRIVES AND CONTROL

Day and Date: Thursday, 3-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

Instructions : 1) Assume suitable data wherever necessary.

- 2) Non-programmable calculators are permitted.
- 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) A pole changing type squirrel cage motors used in derricks has four, eight and twenty four poles. In this, the medium speed is used for
  - a) lifting

b) hoisting

c) lowering

- d) landing the load
- 2) Light duty cranes are generally used in
  - a) automobile workshops
- b) pumping stations

c) power houses

- d) all of above
- 3) To get speed higher than the base speed of the dc shunt motor
  - a) armature resistance control is used
  - b) field resistance control is used
  - c) armature voltage control is used
  - d) none of these
- 4) Which of the following pair is used for frequency converter?
  - a) squirrel cage IM and synchronous motor
  - b) wound rotor IM and synchronous motor
  - c) wound rotor IM and squirrel cage IM
  - d) any of above



5) Which of the following is preferred for automatic drive? a) Synchronous motor b) Squirrel cage IM c) Ward Leonard controlled dc motors d) Any of above 6) A wound rotor IM is preferred over squirrel cage IM when the major consideration involved is a) high starting torque b) low starting current c) speed control over limited range d) any of above 7) 15 minutes rated motors are suitable for a) light duty crane b) medium duty crane c) high duty crane d) all of above 8) In motor circuit, static frequency changers are used for a) power factor improvement b) improved cooling c) reversal of direction d) speed regulation 9) During regenerative braking a) E < V b) E > V c) E = V d) none of above 10) The variable frequency supply to IM for speed control can be made available using a) VSI b) CSI c) Cycloconverter d) All 11) When quick speed reversal consideration, the motor preferred is a) Synchronous motor b) Squirrel cage IM c) Wound rotor IM d) DC motor 12) As compared to squirrel cage IM, a wound rotor IM is preferred when the major consideration is a) high starting torque b) low starting current c) speed control over limited range d) any of above 13) Effect of friction torque is more pronounced a) when the drive is running on full speed b) when the drive is being started c) when the drive is being started c) when the drive is being started d) when drive at half of its normal speed 14) The motor commonly used in computers and digital systems is a) dc shunt motor d) synchronous motor				
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c) high duty crane d) all of above  8) In motor circuit, static frequency changers are used for a) power factor improvement b) improved cooling c) reversal of direction d) speed regulation  9) During regenerative braking a) E < V b) E > V c) E = V d) none of above  10) The variable frequency supply to IM for speed control can be made available using a) VSI b) CSI c) Cycloconverter d) All  11) When quick speed reversal consideration, the motor preferred is a) Synchronous motor b) Squirrel cage IM c) Wound rotor IM d) DC motor  12) As compared to squirrel cage IM, a wound rotor IM is preferred when the major consideration is a) high starting torque b) low starting current c) speed control over limited range d) any of above  13) Effect of friction torque is more pronounced a) when the drive is being started c) when the drive is being started c) when the drive at half of its normal speed  14) The motor commonly used in computers and digital systems is a) dc shunt motor b) induction motor	7)			
a) power factor improvement c) improved cooling c) reversal of direction d) speed regulation  9) During regenerative braking a) E < V b) E > V c) E = V d) none of above  10) The variable frequency supply to IM for speed control can be made available using a) VSI b) CSI c) Cycloconverter d) All  11) When quick speed reversal consideration, the motor preferred is a) Synchronous motor b) Squirrel cage IM c) Wound rotor IM d) DC motor  12) As compared to squirrel cage IM, a wound rotor IM is preferred when the major consideration is a) high starting torque b) low starting current c) speed control over limited range d) any of above  13) Effect of friction torque is more pronounced a) when the drive is running on full speed b) when the drive is being started c) when the drive is being started d) when drive at half of its normal speed  14) The motor commonly used in computers and digital systems is a) dc shunt motor b) induction motor		, .	,	•
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a) Synchronous motor c) Wound rotor IM d) DC motor  12) As compared to squirrel cage IM, a wound rotor IM is preferred when the major consideration is a) high starting torque b) low starting current c) speed control over limited range d) any of above  13) Effect of friction torque is more pronounced a) when the drive is running on full speed b) when the drive is being started c) when the drive is being stopped d) when drive at half of its normal speed  14) The motor commonly used in computers and digital systems is a) dc shunt motor b) Squirrel cage IM d) DC motor	10)	The variable frequency supply to IM for	r sp	eed control can be made available using
major consideration is a) high starting torque b) low starting current c) speed control over limited range d) any of above  13) Effect of friction torque is more pronounced a) when the drive is running on full speed b) when the drive is being started c) when the drive is being stopped d) when drive at half of its normal speed  14) The motor commonly used in computers and digital systems is a) dc shunt motor b) induction motor	11)	a) Synchronous motor	b)	Squirrel cage IM
13) Effect of friction torque is more pronounced     a) when the drive is running on full speed     b) when the drive is being started     c) when the drive is being stopped     d) when drive at half of its normal speed  14) The motor commonly used in computers and digital systems is     a) dc shunt motor     b) induction motor	12)	major consideration is a) high starting torque	b)	low starting current
a) dc shunt motor b) induction motor	13)	Effect of friction torque is more prone a) when the drive is running on full s b) when the drive is being started c) when the drive is being stopped	oun spe	ced ed
	14)	a) dc shunt motor	b)	induction motor



Seat	
No.	

# B.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018 INDUSTRIAL DRIVES AND CONTROL

Day and Date: Thursday, 3-5-2018

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) Assume suitable data wherever necessary.

2) Non-programmable calculators are **permitted**.

### SECTION - I

2. Solve any three:

 $(3 \times 4 = 12)$ 

Marks: 56

- a) Explain the function of Control Unit and Sensing Unit in electrical drives.
- b) Give classification of Drives.
- c) What are the criteria for selection of Electrical Drives?
- d) Explain Current limit control loop with block diagram.
- e) Define dynamics and explain effect of dynamics on Electrical Drives.

3. Solve any two:

 $(2 \times 8 = 16)$ 

- a) A drive has following parameters:
  - J = 10kg-m², T = 100-0.1N, Nm, passive load torque  $T_1 = 0.05$ N, Nm where N is speed in rpm. Initially, the drive is operating in steady state. Now, it is to be reversed. For this, motor characteristics is changed to T = -100-0.1N,Nm. Calculate the time of reversal.
- b) A 220V, 970 rpm, 100A dc separately excited motor has an armature resistance of 0.05 Ohm. It is braked by plugging from an initial speed of 1000 rpm.
   Calculate:
  - i) Resistance to be placed in armature circuit to twice full load torque.
  - ii) Braking torque.
- c) Explain braking methods of D.C. drives with necessary diagram.



### 4. Solve any three:

 $(3 \times 4 = 12)$ 

- a) Explain speed control of induction motor by VSI.
- b) Explain static rotor resistance control method.
- c) Explain static Krammer drive with block diagram and waveforms.
- d) Explain operation stepper motor drives.
- e) A 440V, 50 Hz, 6 pole Y-connected wound rotor motor has following parameters-RS =  $0.5\Omega$ , Rr' =  $0.4\Omega$ , Xs = Xr' =  $1.2\Omega$ , Xm =  $50\Omega$  . Stator to rotor turn ratio is 3.5.

Motor is controlled by static rotor resistance control. External resistance is chosen such that breakdown torque is produced at stand still for duty ratio of zero. Calculate value of external resistance.

### 5. Solve any two:

 $(8 \times 2 = 16)$ 

- a) Describe Slip Power Recovery Scheme with needed diagram.
- b) A 440V, 50 Hz, 970 rpm, 6 pole, star connected,  $3\Phi$  wound rotor IM has following parameter referred to stator :

Rs =  $0.1\Omega$ , Rr' =  $0.08\Omega$ , Xs = $0.3\Omega$ , Xr' =  $0.4\Omega$ . Stator to rotor turn ratio is 2. Motor speed is controlled by Static Scherbius Drive. Drive is designed for speed range of 25% below synchronous speed. Maximum value of firing angle 165°. Calculate

- i) Transformer turns ratio.
- ii) Torque for the speed of 780 rpm and  $\alpha$  =140° [Note : Rd = 0.01 $\Omega$ ].
- c) Explain variable frequency control of multiple synchronous motor drives.



**SLR-TC - 507** 

Seat	Sat	1
No.	Set Q	

# B.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018 INDUSTRIAL DRIVES AND CONTROL

Day and Date: Thursday, 3-5-2018	Total Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

Instructions : 1) Assume suitable data wherever necessary.

- 2) Non-programmable calculators are **permitted**.
- 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) In motor circuit, static frequency changers are used for
- a) power factor improvement
- b) improved cooling
- c) reversal of direction
- d) speed regulation
- 2) During regenerative braking
  - a) E < V
- b) E > V
- c) E = V
- d) none of above
- 3) The variable frequency supply to IM for speed control can be made available using
  - a) VSI
- b) CSI
- c) Cycloconverter d) All
- 4) When quick speed reversal consideration, the motor preferred is
  - a) Synchronous motor
- b) Squirrel cage IM

c) Wound rotor IM

- d) DC motor
- 5) As compared to squirrel cage IM, a wound rotor IM is preferred when the major consideration is
  - a) high starting torque
  - b) low starting current
  - c) speed control over limited range
  - d) any of above



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6)	Effect of friction torque is more pro a) when the drive is running on ful b) when the drive is being started c) when the drive is being stopped d) when drive at half of its normal	ll speed d	
7)	The motor commonly used in com a) dc shunt motor c) stepper motor	b) ii	and digital systems is nduction motor ynchronous motor
8)	A pole changing type squirrel cage and twenty four poles. In this, the a lifting c) lowering	mediun b) h	_
9)	Light duty cranes are generally use a) automobile workshops c) power houses	b) p	umping stations Il of above
10)	To get speed higher than the base a) armature resistance control is used b) field resistance control is used c) armature voltage control is use d) none of these	used	of the dc shunt motor
11)	Which of the following pair is used a) squirrel cage IM and synchronous b) wound rotor IM and synchronous c) wound rotor IM and squirrel cag d) any of above	ous mot	or
12)	<ul><li>Which of the following is preferred</li><li>a) Synchronous motor</li><li>c) Ward Leonard controlled dc motor</li></ul>	b) S	Squirrel cage IM
13)	A wound rotor IM is preferred or consideration involved is a) high starting torque c) speed control over limited range	b) lo	ow starting current
14)	<ul><li>15 minutes rated motors are suital</li><li>a) light duty crane</li><li>c) high duty crane</li></ul>	b) n	nedium duty crane Il of above



Seat	
No.	

# B.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018 INDUSTRIAL DRIVES AND CONTROL

Day and Date: Thursday, 3-5-2018

Time: 2.30 p.m. to 5.30 p.m.

**Instructions**: 1) **Assume** suitable data **wherever** necessary.

2) Non-programmable calculators are **permitted**.

### SECTION - I

2. Solve any three:

 $(3 \times 4 = 12)$ 

Marks: 56

- a) Explain the function of Control Unit and Sensing Unit in electrical drives.
- b) Give classification of Drives.
- c) What are the criteria for selection of Electrical Drives?
- d) Explain Current limit control loop with block diagram.
- e) Define dynamics and explain effect of dynamics on Electrical Drives.

3. Solve any two:

 $(2 \times 8 = 16)$ 

- a) A drive has following parameters:
  - J = 10kg-m², T = 100-0.1N, Nm, passive load torque  $T_1 = 0.05$ N, Nm where N is speed in rpm. Initially, the drive is operating in steady state. Now, it is to be reversed. For this, motor characteristics is changed to T = -100-0.1N,Nm. Calculate the time of reversal.
- b) A 220V, 970 rpm, 100A dc separately excited motor has an armature resistance of 0.05 Ohm. It is braked by plugging from an initial speed of 1000 rpm.
  - Calculate:
  - i) Resistance to be placed in armature circuit to twice full load torque.
  - ii) Braking torque.
- c) Explain braking methods of D.C. drives with necessary diagram.

### 

#### SECTION - II

### 4. Solve any three:

 $(3\times 4=12)$ 

- a) Explain speed control of induction motor by VSI.
- b) Explain static rotor resistance control method.
- c) Explain static Krammer drive with block diagram and waveforms.
- d) Explain operation stepper motor drives.
- e) A 440V, 50 Hz, 6 pole Y-connected wound rotor motor has following parameters-RS =  $0.5\Omega$ , Rr' =  $0.4\Omega$ , Xs = Xr' =  $1.2\Omega$ , Xm =  $50\Omega$  . Stator to rotor turn ratio is 3.5.

Motor is controlled by static rotor resistance control. External resistance is chosen such that breakdown torque is produced at stand still for duty ratio of zero. Calculate value of external resistance.

### 5. Solve any two:

 $(8 \times 2 = 16)$ 

- a) Describe Slip Power Recovery Scheme with needed diagram.
- b) A 440V, 50 Hz, 970 rpm, 6 pole, star connected, 3Φ wound rotor IM has following parameter referred to stator :

Rs =  $0.1\Omega$ , Rr' =  $0.08\Omega$ , Xs = $0.3\Omega$ , Xr' =  $0.4\Omega$ . Stator to rotor turn ratio is 2. Motor speed is controlled by Static Scherbius Drive. Drive is designed for speed range of 25% below synchronous speed. Maximum value of firing angle 165°. Calculate

- i) Transformer turns ratio.
- ii) Torque for the speed of 780 rpm and  $\alpha$  =140° [Note : Rd = 0.01 $\Omega$ ].
- c) Explain variable frequency control of multiple synchronous motor drives.

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**SLR-TC - 507** 

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# B.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018 INDUSTRIAL DRIVES AND CONTROL

Total Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

Instructions : 1) Assume suitable data wherever necessary.

- 2) Non-programmable calculators are **permitted**.
- 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:
  - 1) Which of the following is preferred for automatic drive?
  - a) Synchronous motor
- b) Squirrel cage IM
- c) Ward Leonard controlled dc motors d) Any of above
- 2) A wound rotor IM is preferred over squirrel cage IM when the major consideration involved is
  - a) high starting torque

- b) low starting current
- c) speed control over limited range d) any of above
- 3) 15 minutes rated motors are suitable for
  - a) light duty crane

b) medium duty crane

c) high duty crane

- d) all of above
- 4) In motor circuit, static frequency changers are used for
  - a) power factor improvement
- b) improved cooling
- c) reversal of direction
- d) speed regulation
- 5) During regenerative braking
  - a) E < V
- b) E > V
- c) E = V
- d) none of above
- 6) The variable frequency supply to IM for speed control can be made available using
  - a) VSI
- b) CSI
- c) Cycloconverter d) All

14



7)	When quick speed reversal consider	
	a) Synchronous motor	b) Squirrel cage IM
	c) Wound rotor IM	d) DC motor
8)	As compared to squirrel cage IM, a major consideration is a) high starting torque	wound rotor IM is preferred when the b) low starting current
	c) speed control over limited range	,
9)	Effect of friction torque is more prono a) when the drive is running on full s b) when the drive is being started c) when the drive is being stopped d) when drive at half of its normal sp	punced speed
10)	The motor commonly used in computa) dc shunt motor c) stepper motor	ters and digital systems is b) induction motor d) synchronous motor
11)	A pole changing type squirrel cage mand twenty four poles. In this, the mea) lifting c) lowering	notors used in derricks has four, eight edium speed is used for b) hoisting d) landing the load
12)	Light duty cranes are generally used a) automobile workshops c) power houses	<ul><li>in</li><li>b) pumping stations</li><li>d) all of above</li></ul>
13)	To get speed higher than the base signal armature resistance control is used b) field resistance control is used c) armature voltage control is used d) none of these	
14)	Which of the following pair is used for a) squirrel cage IM and synchronous b) wound rotor IM and synchronous c) wound rotor IM and squirrel cage d) any of above	motor motor



Seat	
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# B.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018 INDUSTRIAL DRIVES AND CONTROL

Day and Date: Thursday, 3-5-2018

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) Assume suitable data wherever necessary.

2) Non-programmable calculators are **permitted**.

### SECTION - I

2. Solve any three:

 $(3 \times 4 = 12)$ 

Marks: 56

- a) Explain the function of Control Unit and Sensing Unit in electrical drives.
- b) Give classification of Drives.
- c) What are the criteria for selection of Electrical Drives?
- d) Explain Current limit control loop with block diagram.
- e) Define dynamics and explain effect of dynamics on Electrical Drives.

3. Solve any two:

 $(2 \times 8 = 16)$ 

- a) A drive has following parameters:
  - J = 10kg-m², T = 100-0.1N, Nm, passive load torque  $T_1 = 0.05$ N, Nm where N is speed in rpm. Initially, the drive is operating in steady state. Now, it is to be reversed. For this, motor characteristics is changed to T = -100-0.1N,Nm. Calculate the time of reversal.
- b) A 220V, 970 rpm, 100A dc separately excited motor has an armature resistance of 0.05 Ohm. It is braked by plugging from an initial speed of 1000 rpm.
  - Calculate:
  - i) Resistance to be placed in armature circuit to twice full load torque.
  - ii) Braking torque.
- c) Explain braking methods of D.C. drives with necessary diagram.



### 4. Solve any three:

 $(3\times 4=12)$ 

- a) Explain speed control of induction motor by VSI.
- b) Explain static rotor resistance control method.
- c) Explain static Krammer drive with block diagram and waveforms.
- d) Explain operation stepper motor drives.
- e) A 440V, 50 Hz, 6 pole Y-connected wound rotor motor has following parameters-RS =  $0.5\Omega$ , Rr' =  $0.4\Omega$ , Xs = Xr' =  $1.2\Omega$ , Xm =  $50\Omega$  . Stator to rotor turn ratio is 3.5.

Motor is controlled by static rotor resistance control. External resistance is chosen such that breakdown torque is produced at stand still for duty ratio of zero. Calculate value of external resistance.

### 5. Solve any two:

 $(8 \times 2 = 16)$ 

- a) Describe Slip Power Recovery Scheme with needed diagram.
- b) A 440V, 50 Hz, 970 rpm, 6 pole, star connected, 3Φ wound rotor IM has following parameter referred to stator :

Rs =  $0.1\Omega$ , Rr' =  $0.08\Omega$ , Xs = $0.3\Omega$ , Xr' =  $0.4\Omega$ . Stator to rotor turn ratio is 2. Motor speed is controlled by Static Scherbius Drive. Drive is designed for speed range of 25% below synchronous speed. Maximum value of firing angle 165°. Calculate

- i) Transformer turns ratio.
- ii) Torque for the speed of 780 rpm and  $\alpha$  =140° [Note : Rd = 0.01 $\Omega$ ].
- c) Explain variable frequency control of multiple synchronous motor drives.

**SLR-TC - 507** 

Seat	Set	
No.	Set	5

### B.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018 INDUSTRIAL DRIVES AND CONTROL

Day and Date: Thursday, 3-5-2018	Total Marks: 70
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Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) Assume suitable data wherever necessary.

- 2) Non-programmable calculators are **permitted**.
- 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 variable frequency supply to IM for speed control can be made available using
  - a) VSI
- b) CSI
- c) Cycloconverter d) All
- 2) When guick speed reversal consideration, the motor preferred is
  - a) Synchronous motor
- b) Squirrel cage IM

c) Wound rotor IM

- d) DC motor
- 3) As compared to squirrel cage IM, a wound rotor IM is preferred when the major consideration is
  - a) high starting torque

- b) low starting current
- c) speed control over limited range d) any of above
- 4) Effect of friction torque is more pronounced
  - a) when the drive is running on full speed
  - b) when the drive is being started
  - c) when the drive is being stopped
  - d) when drive at half of its normal speed
- 5) The motor commonly used in computers and digital systems is
  - a) dc shunt motor

b) induction motor

c) stepper motor

d) synchronous motor



6)	A pole changing type squirrel cage mand twenty four poles. In this, the mea) lifting c) lowering	notors used in derricks has four, eight edium speed is used for b) hoisting d) landing the load
7)	Light duty cranes are generally used a) automobile workshops c) power houses	in b) pumping stations d) all of above
8)	To get speed higher than the base span armature resistance control is used b) field resistance control is used c) armature voltage control is used d) none of these	
9)	Which of the following pair is used for a) squirrel cage IM and synchronous b) wound rotor IM and synchronous c) wound rotor IM and squirrel cage d) any of above	motor
10)	<ul><li>Which of the following is preferred fo</li><li>a) Synchronous motor</li><li>c) Ward Leonard controlled dc motors</li></ul>	b) Squirrel cage IM
11)	A wound rotor IM is preferred over consideration involved is a) high starting torque c) speed control over limited range	er squirrel cage IM when the major b) low starting current d) any of above
12)	<ul><li>15 minutes rated motors are suitable</li><li>a) light duty crane</li><li>c) high duty crane</li></ul>	for b) medium duty crane d) all of above
13)	In motor circuit, static frequency char a) power factor improvement c) reversal of direction	ngers are used for b) improved cooling d) speed regulation
14)	During regenerative braking a) E < V b) E > V	c) E = V d) none of above



Seat	
No.	

# B.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018 INDUSTRIAL DRIVES AND CONTROL

Day and Date: Thursday, 3-5-2018

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) Assume suitable data wherever necessary.

2) Non-programmable calculators are **permitted**.

### SECTION - I

2. Solve any three:

 $(3 \times 4 = 12)$ 

Marks: 56

- a) Explain the function of Control Unit and Sensing Unit in electrical drives.
- b) Give classification of Drives.
- c) What are the criteria for selection of Electrical Drives?
- d) Explain Current limit control loop with block diagram.
- e) Define dynamics and explain effect of dynamics on Electrical Drives.

3. Solve any two:

 $(2 \times 8 = 16)$ 

- a) A drive has following parameters:
  - J = 10kg-m², T = 100-0.1N, Nm, passive load torque  $T_1 = 0.05$ N, Nm where N is speed in rpm. Initially, the drive is operating in steady state. Now, it is to be reversed. For this, motor characteristics is changed to T = -100-0.1N,Nm. Calculate the time of reversal.
- b) A 220V, 970 rpm, 100A dc separately excited motor has an armature resistance of 0.05 Ohm. It is braked by plugging from an initial speed of 1000 rpm.
   Calculate:
  - i) Resistance to be placed in armature circuit to twice full load torque.
  - ii) Braking torque.
- c) Explain braking methods of D.C. drives with necessary diagram.



### 4. Solve any three:

 $(3 \times 4 = 12)$ 

- a) Explain speed control of induction motor by VSI.
- b) Explain static rotor resistance control method.
- c) Explain static Krammer drive with block diagram and waveforms.
- d) Explain operation stepper motor drives.
- e) A 440V, 50 Hz, 6 pole Y-connected wound rotor motor has following parameters-RS =  $0.5\Omega$ , Rr' =  $0.4\Omega$ , Xs = Xr' =  $1.2\Omega$ , Xm =  $50\Omega$  . Stator to rotor turn ratio is 3.5.

Motor is controlled by static rotor resistance control. External resistance is chosen such that breakdown torque is produced at stand still for duty ratio of zero. Calculate value of external resistance.

### 5. Solve any two:

 $(8 \times 2 = 16)$ 

- a) Describe Slip Power Recovery Scheme with needed diagram.
- b) A 440V, 50 Hz, 970 rpm, 6 pole, star connected, 3Φ wound rotor IM has following parameter referred to stator:

Rs =  $0.1\Omega$ , Rr' =  $0.08\Omega$ , Xs = $0.3\Omega$ , Xr' =  $0.4\Omega$ . Stator to rotor turn ratio is 2. Motor speed is controlled by Static Scherbius Drive. Drive is designed for speed range of 25% below synchronous speed. Maximum value of firing angle 165°. Calculate

- i) Transformer turns ratio.
- ii) Torque for the speed of 780 rpm and  $\alpha$  =140° [Note : Rd = 0.01 $\Omega$ ].
- c) Explain variable frequency control of multiple synchronous motor drives.



Seat	
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14

# B.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date: Friday, 4-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

- 2) Make suitable assumption 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. Choose the correct answer.
  - 1) What will be the total flux emitted by a source of 60 candle power?
    - a) 754.2 lumens

b) 0.001326 lumens

c) 60 lumens

- d) None of these
- 2) For intermittent work which of the following furnace is suitable?
  - a) Core less furnace

b) Indirect arc furnace

c) Either of above

- d) Neither of above
- 3) Induction heating takes place in
  - a) Conducting but non magnetic materials
  - b) Conducting materials may be magnetic or nonmagnetic materials
  - c) Insulating materials
  - d) Conducting and magnetic material
- 4) Subcooling is a process of cooling the refrigerant in vapour compression refrigeration system before
  - a) Evaporation
- b) Throttling
- c) Condensation d) Compression
- 5) Which of the following statement is correct?
  - a) Light consists of electromagnetic waves
  - b) Light consists of ultraviolet waves
  - c) Light consists of infrared waves
  - d) Light consists of gamma rays



6)	The main application of indirect arc fu a) Steel c) Non-ferrous metals	b)	ace is to melt Iron None of the abo	ove
7)	Candela is the unit of a) Wavelength c) Luminous flux	,	Luminous inten Frequency	sity
8)	The efficiency of diesel locomotives is a) 20-25 percent c) 50-55 percent	b)	early 35-40 percent 70-75 percent	
9)	Which locomotive has the highest open a) Diesel c) Steam	b)	tional availability Electric All have same a	
10)	The advantages of electric traction ova.  a) No pollution problems  c) Better braking action	b)	other methods is Faster accelera All of the above	ition
11)	What are the constituents in speed tire a) Coasting c) Constant speed	b)	curve of train ? Initial accelerat All of these	ion
12)	The magnitude for the tractive effort votation of the train depends on  a) The adhesive weight b) Friction between the driving wheel c) Both a) and b) d) Neither a) nor b)		·	r the propulsion
13)	A trolley bus runs on tyres driven by a) A DC compound motor c) An AC series motor	-	A DC series mo	
14)	The function of duct in air conditioning a) air cooling b) air cleaning			d) air distribution



Seat	
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# B.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date: Friday, 4-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

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

2) Make suitable assumption if necessary.

#### SECTION - I

### 2. Solve any three:

 $(3 \times 4 = 12)$ 

- 1) State and explain illumination.
- 2) With a neat sketch explain Ajax-Wyatt furnace.
- 3) Explain refrigeration cycle with neat diagram.
- 4) What is air conditioning? Discuss the role of air conditioning in our day to day life.
- 5) A 250V lamp has a total flux of 3000 lumens and takes a current of 0.8 A. Calculate lumens/watt and MSCP/Watt.

### 3. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) a) Discuss the general requirements of good lighting scheme.
  - b) What are the factors affecting in designing of lighting scheme?
- 2) What do you understand by refrigerator? Draw and explain electrical circuits used in a refrigerator.
- 3) A lamp of 500 Watts having MSCP of 1000 is suspended 2.7 m above the working plane.

#### Calculate:

- i) Illumination directly below the lamp at the working plane.
- ii) Lamp efficiency.
- iii) Illumination at a point 2.5 m away on the horizontal plane from vertically below the lamp.



4. Write short notes on the following (any three):

 $(3 \times 4 = 12)$ 

- 1) Design features of traction motor.
- 2) Current collection system for electric traction.
- 3) Quadrilateral speed-time curve.
- 4) Speed control of traction motors.
- 5) Discharging operation of battery in EV.

### 5. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) What do you mean by hybrid vehicles? What are motors to be selected for interconnection with hybrid vehicles?
- 2) What is specific energy consumption of a train? Discuss the various factors affecting it.
- 3) An electric train has quadrilateral speed time curve as follows:
  - i) Uniform acceleration from rest at 2 kmphps for 30 secs.
  - ii) Coasting for 50 secs.
  - iii) Uniform braking to rest for 20 secs.

If train is moving a uniform up gradient of 10/1000, train resistance is 40 N/tone, rotational inertia effect 10% of dead weight and duration of stop 30 secs, find the scheduled speed.



Seat	
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Set



# B.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date: Friday, 4-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

- 2) Make suitable assumption 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. Choose the correct answer. 14

- 1) The efficiency of diesel locomotives is nearly
  - a) 20-25 percent

b) 35-40 percent

c) 50-55 percent

- d) 70-75 percent
- 2) Which locomotive has the highest operational availability?
  - a) Diesel

b) Electric

c) Steam

- d) All have same availability
- 3) The advantages of electric traction over other methods is
  - a) No pollution problems

b) Faster acceleration

c) Better braking action

- d) All of the above
- 4) What are the constituents in speed time curve of train?
  - a) Coasting

b) Initial acceleration

c) Constant speed

- d) All of these
- 5) The magnitude for the tractive effort which is required for the propulsion of the train depends on
  - a) The adhesive weight
  - b) Friction between the driving wheel and the track
  - c) Both a) and b)
  - d) Neither a) nor b)



6)	A trolley bus runs on tyres driven by a) A DC compound motor c) An AC series motor	<ul><li>b) A DC series motor</li><li>d) An AC shunt motor</li></ul>
7)	The function of duct in air conditioning a) air cooling b) air cleaning	g unit is c) air drying d) air distribution
8)	What will be the total flux emitted by a a) 754.2 lumens c) 60 lumens	a source of 60 candle power? b) 0.001326 lumens d) None of these
9)	For intermittent work which of the followal Core less furnace c) Either of above	owing furnace is suitable ? b) Indirect arc furnace d) Neither of above
10)	Induction heating takes place in a) Conducting but non magnetic mat b) Conducting materials may be mag c) Insulating materials d) Conducting and magnetic materia	netic or nonmagnetic materials
11)	Subcooling is a process of cooling the refrigeration system before a) Evaporation b) Throttling	
12)	Which of the following statement is coal Light consists of electromagnetic values b) Light consists of ultraviolet waves c) Light consists of infrared waves d) Light consists of gamma rays	
13)	The main application of indirect arc fu a) Steel c) Non-ferrous metals	irnace is to melt b) Iron d) None of the above
14)	Candela is the unit of a) Wavelength c) Luminous flux	<ul><li>b) Luminous intensity</li><li>d) Frequency</li></ul>



Seat	
No.	

# B.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date: Friday, 4-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

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

2) Make suitable assumption if necessary.

#### SECTION - I

### 2. Solve any three:

 $(3 \times 4 = 12)$ 

- 1) State and explain illumination.
- 2) With a neat sketch explain Ajax-Wyatt furnace.
- 3) Explain refrigeration cycle with neat diagram.
- 4) What is air conditioning? Discuss the role of air conditioning in our day to day life.
- 5) A 250V lamp has a total flux of 3000 lumens and takes a current of 0.8 A. Calculate lumens/watt and MSCP/Watt.

### 3. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) a) Discuss the general requirements of good lighting scheme.
  - b) What are the factors affecting in designing of lighting scheme?
- 2) What do you understand by refrigerator? Draw and explain electrical circuits used in a refrigerator.
- 3) A lamp of 500 Watts having MSCP of 1000 is suspended 2.7 m above the working plane.

#### Calculate:

- i) Illumination directly below the lamp at the working plane.
- ii) Lamp efficiency.
- iii) Illumination at a point 2.5 m away on the horizontal plane from vertically below the lamp.



4. Write short notes on the following (any three):

 $(3 \times 4 = 12)$ 

- 1) Design features of traction motor.
- 2) Current collection system for electric traction.
- 3) Quadrilateral speed-time curve.
- 4) Speed control of traction motors.
- 5) Discharging operation of battery in EV.

5. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) What do you mean by hybrid vehicles? What are motors to be selected for interconnection with hybrid vehicles?
- 2) What is specific energy consumption of a train? Discuss the various factors affecting it.
- 3) An electric train has quadrilateral speed time curve as follows:
  - i) Uniform acceleration from rest at 2 kmphps for 30 secs.
  - ii) Coasting for 50 secs.
  - iii) Uniform braking to rest for 20 secs.

If train is moving a uniform up gradient of 10/1000, train resistance is 40 N/tone, rotational inertia effect 10% of dead weight and duration of stop 30 secs, find the scheduled speed.



Seat	
No.	

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14

# B.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date: Friday, 4-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

- 2) Make suitable assumption 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. Choose the correct answer.
  - 1) Which of the following statement is correct?
    - a) Light consists of electromagnetic waves
    - b) Light consists of ultraviolet waves
    - c) Light consists of infrared waves
    - d) Light consists of gamma rays
  - 2) The main application of indirect arc furnace is to melt
    - a) Steel

b) Iron

c) Non-ferrous metals

d) None of the above

- 3) Candela is the unit of
  - a) Wavelength

b) Luminous intensity

c) Luminous flux

- d) Frequency
- 4) The efficiency of diesel locomotives is nearly
  - a) 20-25 percent

b) 35-40 percent

c) 50-55 percent

- d) 70-75 percent
- 5) Which locomotive has the highest operational availability?
  - a) Diesel

b) Electric

c) Steam

d) All have same availability



6)	The advantages of electric traction ov a) No pollution problems c) Better braking action	ver other methods is b) Faster acceleration d) All of the above
7)	What are the constituents in speed tinal Coasting c) Constant speed	me curve of train ? b) Initial acceleration d) All of these
8)	The magnitude for the tractive effort of the train depends on a) The adhesive weight b) Friction between the driving whee c) Both a) and b) d) Neither a) nor b)	
9)	A trolley bus runs on tyres driven by a) A DC compound motor c) An AC series motor	<ul><li>b) A DC series motor</li><li>d) An AC shunt motor</li></ul>
10)	The function of duct in air conditioning a) air cooling b) air cleaning	
11)	What will be the total flux emitted by a a) 754.2 lumens c) 60 lumens	a source of 60 candle power ? b) 0.001326 lumens d) None of these
12)	For intermittent work which of the folla) Core less furnace c) Either of above	owing furnace is suitable ? b) Indirect arc furnace d) Neither of above
13)	Induction heating takes place in a) Conducting but non magnetic mat b) Conducting materials may be mag c) Insulating materials d) Conducting and magnetic materia	netic or nonmagnetic materials
14)	Subcooling is a process of cooling the refrigeration system before a) Evaporation b) Throttling	e refrigerant in vapour compression c) Condensation d) Compression



Seat	
No.	

# B.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date: Friday, 4-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

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

2) Make suitable assumption if necessary.

#### SECTION - I

### 2. Solve any three:

 $(3 \times 4 = 12)$ 

- 1) State and explain illumination.
- 2) With a neat sketch explain Ajax-Wyatt furnace.
- 3) Explain refrigeration cycle with neat diagram.
- 4) What is air conditioning? Discuss the role of air conditioning in our day to day life.
- 5) A 250V lamp has a total flux of 3000 lumens and takes a current of 0.8 A. Calculate lumens/watt and MSCP/Watt.

### 3. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) a) Discuss the general requirements of good lighting scheme.
  - b) What are the factors affecting in designing of lighting scheme?
- 2) What do you understand by refrigerator? Draw and explain electrical circuits used in a refrigerator.
- 3) A lamp of 500 Watts having MSCP of 1000 is suspended 2.7 m above the working plane.

#### Calculate:

- i) Illumination directly below the lamp at the working plane.
- ii) Lamp efficiency.
- iii) Illumination at a point 2.5 m away on the horizontal plane from vertically below the lamp.



4. Write short notes on the following (any three):

 $(3 \times 4 = 12)$ 

- 1) Design features of traction motor.
- 2) Current collection system for electric traction.
- 3) Quadrilateral speed-time curve.
- 4) Speed control of traction motors.
- 5) Discharging operation of battery in EV.

### 5. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) What do you mean by hybrid vehicles? What are motors to be selected for interconnection with hybrid vehicles?
- 2) What is specific energy consumption of a train? Discuss the various factors affecting it.
- 3) An electric train has quadrilateral speed time curve as follows:
  - i) Uniform acceleration from rest at 2 kmphps for 30 secs.
  - ii) Coasting for 50 secs.
  - iii) Uniform braking to rest for 20 secs.

If train is moving a uniform up gradient of 10/1000, train resistance is 40 N/tone, rotational inertia effect 10% of dead weight and duration of stop 30 secs, find the scheduled speed.



Seat No.

### B.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 **ELECTRICAL ENERGY UTILIZATION AND TRACTION**

Day and Date: Friday, 4-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Make suitable assumption 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. Choose the correct answer.
  - 1) The advantages of electric traction over other methods is
    - a) No pollution problems
- b) Faster acceleration
- c) Better braking action
- d) All of the above
- 2) What are the constituents in speed time curve of train?
  - a) Coasting

b) Initial acceleration

c) Constant speed

- d) All of these
- 3) The magnitude for the tractive effort which is required for the propulsion of the train depends on
  - a) The adhesive weight
  - b) Friction between the driving wheel and the track
  - c) Both a) and b)
  - d) Neither a) nor b)
- 4) A trolley bus runs on tyres driven by
  - a) A DC compound motor
- b) A DC series motor
- c) An AC series motor
- d) An AC shunt motor
- 5) The function of duct in air conditioning unit is

  - a) air cooling b) air cleaning
    - c) air drying
- d) air distribution

14



6)	a) 754.2 lumens c) 60 lumens	b) 0.001326 lumens d) None of these
7)	For intermittent work which of the followal Core less furnace c) Either of above	owing furnace is suitable ? b) Indirect arc furnace d) Neither of above
8)	Induction heating takes place in a) Conducting but non magnetic mat b) Conducting materials may be mag c) Insulating materials d) Conducting and magnetic materia	netic or nonmagnetic materials
9)	Subcooling is a process of cooling the refrigeration system before a) Evaporation b) Throttling	e refrigerant in vapour compression c) Condensation d) Compression
10)	Which of the following statement is coa) Light consists of electromagnetic values b) Light consists of ultraviolet waves c) Light consists of infrared waves d) Light consists of gamma rays	
11)	The main application of indirect arc fu a) Steel c) Non-ferrous metals	urnace is to melt b) Iron d) None of the above
12)	Candela is the unit of a) Wavelength c) Luminous flux	<ul><li>b) Luminous intensity</li><li>d) Frequency</li></ul>
13)	The efficiency of diesel locomotives is a) 20-25 percent c) 50-55 percent	s nearly b) 35-40 percent d) 70-75 percent
14)	Which locomotive has the highest open a) Diesel c) Steam	erational availability ? b) Electric d) All have same availability



Seat	
No.	

# B.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date: Friday, 4-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

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

2) Make suitable assumption if necessary.

#### SECTION - I

### 2. Solve any three:

 $(3 \times 4 = 12)$ 

- 1) State and explain illumination.
- 2) With a neat sketch explain Ajax-Wyatt furnace.
- 3) Explain refrigeration cycle with neat diagram.
- 4) What is air conditioning? Discuss the role of air conditioning in our day to day life.
- 5) A 250V lamp has a total flux of 3000 lumens and takes a current of 0.8 A. Calculate lumens/watt and MSCP/Watt.

### 3. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) a) Discuss the general requirements of good lighting scheme.
  - b) What are the factors affecting in designing of lighting scheme?
- 2) What do you understand by refrigerator? Draw and explain electrical circuits used in a refrigerator.
- 3) A lamp of 500 Watts having MSCP of 1000 is suspended 2.7 m above the working plane.

#### Calculate:

- i) Illumination directly below the lamp at the working plane.
- ii) Lamp efficiency.
- iii) Illumination at a point 2.5 m away on the horizontal plane from vertically below the lamp.



4. Write short notes on the following (any three):

 $(3 \times 4 = 12)$ 

- 1) Design features of traction motor.
- 2) Current collection system for electric traction.
- 3) Quadrilateral speed-time curve.
- 4) Speed control of traction motors.
- 5) Discharging operation of battery in EV.

### 5. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) What do you mean by hybrid vehicles? What are motors to be selected for interconnection with hybrid vehicles?
- 2) What is specific energy consumption of a train? Discuss the various factors affecting it.
- 3) An electric train has quadrilateral speed time curve as follows:
  - i) Uniform acceleration from rest at 2 kmphps for 30 secs.
  - ii) Coasting for 50 secs.
  - iii) Uniform braking to rest for 20 secs.

If train is moving a uniform up gradient of 10/1000, train resistance is 40 N/tone, rotational inertia effect 10% of dead weight and duration of stop 30 secs, find the scheduled speed.

|--|--|

operating value. a) 1 to 2

### **SLR-TC - 509**

Seat		
No.	Set	P

### B.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2018

	\	ELECTRICAL I	_	I, TESTING A	ND MAINTENANCE	
•		d Date : Saturday 2.30 p.m. to 5.30	•		Max. Marks	: 70
		,	minutes in Ansone mark. Answer MCQ/	ver Book Page I Objective type	nould be solved in first 3 No. 3. Each question carried questions on Page No. Q.P. Set (P/Q/R/S) on To	es 3
			MCQ/Objecti	e Type Questi	ons	
Dura	atio	n : 30 Minutes			Marks	: 14
1.	Ch	oose the correct a	answer:		(1×14=	=14)
	1)	In fire extinguish	er we use			
		a) CO <sub>2</sub>	b) $SO_2$	c) O <sub>2</sub>	d) $H_2O$	
	2)	The torque of inc	duction motor is			
					proportional to V <sup>2</sup>	
		c) Inversely prop	portional to V	d) Inversel	y proportional to V <sup>2</sup>	
	3)	Brake test is	r	ethod of testing	machine.	
		a) Regenerative	b) Direct	c) Indirect	d) All of these	
	4)	Short circuit test	on transformer	s performed to	determine	
		a) Copper losse	S	b) Iron loss		
		c) Both a and b		d) None of	the above	
	5)	`	-		duction motor, the	
		duration of exces			d) 0.F.aaa	
		a) 2 sec	b) 5 Sec	c) a sec	d) 9.5 sec	

6) The impulse test level is determined by operating level is \_\_\_\_\_ times normal

b) 2 to 2.5 c) 4 to 5 d) 7 to 9

7)	As per I.E.C. for 66	6 kv system voltag	e, t	he impulse with	sta	nd voltage is
	a) 100 kv	b) 150 kv	c)	220 kv	d)	325 kv
8)	In Insulation resist	tance test of 132	kv	transformer, m	ninir	mum insulation
	resistance is					
	a) 250 M $\Omega$	b) 500 M $\Omega$	c)	750 MΩ	d)	1000 MΩ
9)	For induced type to system voltage + 1		st v	oltage is equal	to .	highest
	a) twice	b) thrice	c)	four times	d)	None of these
10)	In moisture proofne	ess test, humidity	is n	naintained to		
	a) 70%	b) 80%	c)	90%	d)	110%
11)	In dielectric absor	rption test by usi	ng	megger, insula	atio	n resistance is
	measured at regula	ar interval of	_ a	nd recorded.		
	a) 24 hour	b) 12 hour	c)	30 min	d)	5 min
12)	Polarization index	is greater than		for class A insu	ulat	ion.
	a) 1	b) 1.5	c)	2	d)	2.5
13)	While Installing ele	ectrical machines,	che	ecking of founda	tior	n for correct
	level is to be carrie	ed out then, we use	Э			
	a) Spirit level		b)	Dial indicator		
	c) Bearing puller		d)	Filler gauge		
14)	Thermal relays are	used for the prot	ect	ion of motors a	gair	nst over-current
	owing to					
	a) Short circuit		•	Heavy loads		
	c) Earth fault		d)	All the above		



Seat	
No.	

### B.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date: Saturday, 5-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

### SECTION - I

### 2. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) What are the objectives of testing of electrical machines?
- 2) What precautions should be taken to avoid the electric accidents?
- 3) Explain the workmen's safety devices.
- 4) What precautions to be taken to avoid the fire due to electric reason?
- 5) Explain the voltage ratio test of transformer.
- 6) Explain routine and breakdown maintenance of transformer.

### 3. Solve any two:

 $(2 \times 6 = 12)$ 

- 1) Explain various methods of artificial respiration.
- 2) Explain the back to back test for transformer.
- 3) Explain the term efficiency and regulation of transformer.

### SECTION - II

### 4. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain the type test and routine test of induction motor.
- 2) Explain the various tests of transformer oil.



- 3) What are the effects of mis-alignment in the installation of synchronous machine?
- 4) Explain the retardation test of synchronous machine.
- 5) Explain the commissioning test for induction motor.
- 6) Explain the maintenance schedule of breaker.

5. Solve any two: (2×6=12)

- 1) What are the requirements of foundations for installing induction motors?
- 2) Explain the commissioning tests of synchronous machine.
- 3) Explain the factory test and site test for induction motor.

**SLR-TC - 509** 

Seat		
No.	Set	Q

# B.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 5-5-2	018	Max. Marks: 70
-		

Time: 2.30 p.m. to 5.30 p.m.

c) Bearing puller

- 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.

d) Filler gauge

	ı	MCQ/Objective T	ype Questions	
Duratio	n : 30 Minutes			Marks: 14
1. Ch	oose the correct an	swer:		(1×14=14)
1)	In Insulation resistance is	tance test of 132	kv transformer, m	ninimum insulation
	a) 250 M $\Omega$	b) 500 M $\Omega$	c) 750 M $\Omega$	d) 1000 M $\Omega$
2)	For induced type to system voltage + 1		st voltage is equal	to highest
	a) twice	b) thrice	c) four times	d) None of these
3)	In moisture proofne	ess test, humidity	is maintained to	
	a) 70%	b) 80%	c) 90%	d) 110%
4)	In dielectric absormeasured at regula a) 24 hour	ar interval of	_ and recorded.	
5)	Polarization index	is greater than	for class A insu	ulation.
	a) 1	b) 1.5	c) 2	d) 2.5
6)	While Installing elelevel is to be carried		Э	tion for correct
	a) Spirit level		b) Dial indicator	

7)	Thermal relays are owing to	used for the prote	ection of motors a	gainst over-current
	a) Short circuit		b) Heavy loads	
	c) Earth fault		d) All the above	
8)	In fire extinguisher	we use		
	a) CO <sub>2</sub>		c) O <sub>2</sub>	d) H <sub>2</sub> O
9)	The torque of induc	ction motor is		
	a) Directly proporti	onal to V	b) Directly propor	tional to $V^2$
	c) Inversely propor	rtional to V	d) Inversely propo	ortional to V <sup>2</sup>
10)	Brake test is	metho	od of testing mach	ine.
	a) Regenerative	b) Direct	c) Indirect	d) All of these
11)	Short circuit test or	n transformer is pe	erformed to determ	ine
	a) Copper losses		b) Iron losses	
	c) Both a and b		d) None of the ab	ove
12)	While conducting n	nomentary overloa	ad test on inductior	n motor, the
	duration of excess	load 50 H.P. moto	or is	
	a) 2 sec	b) 5 sec	c) 8 sec	d) 9.5 sec
13)	The impulse test lev	el 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
14)	As per I.E.C. for 66	-	· · · · · · · · · · · · · · · · · · ·	stand voltage is
	a) 100 kv	b) 150 kv	c) 220 kv	d) 325 kv



Seat	
No.	

# B.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date: Saturday, 5-5-2018

Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

#### SECTION - I

#### 2. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) What are the objectives of testing of electrical machines?
- 2) What precautions should be taken to avoid the electric accidents?
- 3) Explain the workmen's safety devices.
- 4) What precautions to be taken to avoid the fire due to electric reason?
- 5) Explain the voltage ratio test of transformer.
- 6) Explain routine and breakdown maintenance of transformer.

### 3. Solve any two:

 $(2 \times 6 = 12)$ 

- 1) Explain various methods of artificial respiration.
- 2) Explain the back to back test for transformer.
- 3) Explain the term efficiency and regulation of transformer.

#### SECTION - II

### 4. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain the type test and routine test of induction motor.
- 2) Explain the various tests of transformer oil.



- 3) What are the effects of mis-alignment in the installation of synchronous machine?
- 4) Explain the retardation test of synchronous machine.
- 5) Explain the commissioning test for induction motor.
- 6) Explain the maintenance schedule of breaker.

5. Solve any two: (2×6=12)

- 1) What are the requirements of foundations for installing induction motors?
- 2) Explain the commissioning tests of synchronous machine.
- 3) Explain the factory test and site test for induction motor.

**SLR-TC - 509** 

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## B.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2018 **ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE**

Day and Date: Saturday, 5-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 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

		mod/objective i	ypo daoonono		
Duratio	n : 30 Minutes				Marks: 14
1. Ch	oose the correct an	swer:			(1×14=14)
1)	While conducting r duration of excess	load 50 H.P. moto	or is		
	a) 2 sec	b) 5 sec	c) 8 sec	d) 9.5 sec	
2)	The impulse test lev operating value.	vel is determined by	y operating level is _	times	normal
	a) 1 to 2	b) 2 to 2.5	c) 4 to 5	d) 7 to 9	
3)	As per I.E.C. for 66	6 kv system voltag	e, the impulse with	stand volta	ge is
	a) 100 kv	b) 150 kv	c) 220 kv	d) 325 kv	
4)	In Insulation resistence is	tance test of 132	kv transformer, m	ninimum ins	sulation
	a) 250 M $\Omega$	b) 500 M $\Omega$	c) 750 M $\Omega$	d) 1000 M	Ω
5)	For induced type to system voltage + 1		st voltage is equal	to	highest
	a) twice	b) thrice	c) four times	d) None of	f these
6)	In moisture proofne	ess test, humidity	is maintained to		
	a) 70%	b) 80%	c) 90%	d) 110%	

7)	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
8)	Polarization index	is greater than	for class A insulation.		
	a) 1	b) 1.5	c)	2	d) 2.5
9)	While Installing elelevel is to be carried			ecking of founda	tion for correct
	a) Spirit level		b)	Dial indicator	
	c) Bearing puller		d)	Filler gauge	
10)	Thermal relays are owing to	used for the prot	ect	ion of motors a	gainst over-current
	a) Short circuit		b)	Heavy loads	
	c) Earth fault		d)	All the above	
11)	In fire extinguisher	we use			
	a) CO <sub>2</sub>	b) $SO_2$	c)	$O_2$	d) H <sub>2</sub> O
12)	The torque of indu	ction motor is			
	a) Directly proport	ional to V	b)	Directly propor	tional to V <sup>2</sup>
	c) Inversely propo	rtional to V	d)	Inversely propo	ortional to V <sup>2</sup>
13)	Brake test is	meth	od	of testing machi	ine.
	a) Regenerative	b) Direct	c)	Indirect	d) All of these
14)	Short circuit test or	n transformer is pe	erfo	rmed to determ	ine
	a) Copper losses		b)	Iron losses	
	c) Both a and b		d)	None of the ab	ove



Seat	
No.	

# B.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date: Saturday, 5-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

#### SECTION - I

#### 2. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) What are the objectives of testing of electrical machines?
- 2) What precautions should be taken to avoid the electric accidents?
- 3) Explain the workmen's safety devices.
- 4) What precautions to be taken to avoid the fire due to electric reason?
- 5) Explain the voltage ratio test of transformer.
- 6) Explain routine and breakdown maintenance of transformer.

### 3. Solve any two:

 $(2 \times 6 = 12)$ 

- 1) Explain various methods of artificial respiration.
- 2) Explain the back to back test for transformer.
- 3) Explain the term efficiency and regulation of transformer.

#### SECTION - II

### 4. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain the type test and routine test of induction motor.
- 2) Explain the various tests of transformer oil.



- 3) What are the effects of mis-alignment in the installation of synchronous machine?
- 4) Explain the retardation test of synchronous machine.
- 5) Explain the commissioning test for induction motor.
- 6) Explain the maintenance schedule of breaker.

5. Solve any two: (2×6=12)

- 1) What are the requirements of foundations for installing induction motors?
- 2) Explain the commissioning tests of synchronous machine.
- 3) Explain the factory test and site test for induction motor.

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Seat		
No.	Set	S

# B.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day	y and Date :	Saturday, 5-5-2018	Max. Marks: 70
<del>-</del>	0.00		

Time: 2.30 p.m. to 5.30 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 T	ype Questions	
Duratio	on: 30 Minutes			Marks: 14
1. Ch	oose the correct an	swer:		(1×14=14)
1)	In moisture proofn	ess test, humidity	is maintained to	
	a) 70%	b) 80%	c) 90%	d) 110%
2)	In dielectric abso measured at regul			ation resistance is
	a) 24 hour	b) 12 hour	c) 30 min	d) 5 min
3)	Polarization index	is greater than	for class A ins	ulation.
	a) 1	b) 1.5	c) 2	d) 2.5
4)	While Installing elelevel is to be carried		•	ation for correct
	a) Spirit level		b) Dial indicator	
	c) Bearing puller		d) Filler gauge	
5)	Thermal relays are owing to	e used for the prot	tection of motors a	gainst over-current
	a) Short circuit		b) Heavy loads	
	c) Earth fault		d) All the above	
6)	In fire extinguisher	we use		
	a) CO	b) SO.	c) O	d) H.O

7)	The torque of indu	ction motor is			
	a) Directly proport	ional to V	b) Directly propor	tior	nal to V <sup>2</sup>
	c) Inversely propo	rtional to V	d) Inversely propo	ortic	onal to V <sup>2</sup>
8)	Brake test is	meth	od of testing mach	ine.	
	a) Regenerative	b) Direct	c) Indirect	d)	All of these
9)	Short circuit test or	n transformer is pe	erformed to determ	ine	
	a) Copper losses		b) Iron losses		
	c) Both a and b		d) None of the ab	ove	9
10)	While conducting r	•		n m	otor, the
	duration of excess				
	a) 2 sec	b) 5 sec	c) 8 sec	d)	9.5 sec
11)	The impulse test lev	vel is determined by	y operating level is <sub>-</sub>		times normal
	operating value.				
	a) 1 to 2	·	•	,	
12)	As per I.E.C. for 66	•	•		•
	a) 100 kv	b) 150 kv	c) 220 kv	d)	325 kv
13)	In Insulation resis	tance test of 132	kv transformer, n	nini	mum insulation
	resistance is	1) 500 140	) 750 MO	15	4000 140
	a) 250 MΩ	•	•	-	
14)	For induced type to		est voltage is equal	to	highest
	system voltage + 1		·	-1\	Ni fill
	a) twice	b) thrice	c) four times	a)	ivone of these



Seat	
No.	

# B.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2018 ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date: Saturday, 5-5-2018

Time: 2.30 p.m. to 5.30 p.m.

#### SECTION - I

#### 2. Solve any four:

 $(4 \times 4 = 16)$ 

Marks: 56

- 1) What are the objectives of testing of electrical machines?
- 2) What precautions should be taken to avoid the electric accidents?
- 3) Explain the workmen's safety devices.
- 4) What precautions to be taken to avoid the fire due to electric reason?
- 5) Explain the voltage ratio test of transformer.
- 6) Explain routine and breakdown maintenance of transformer.

#### 3. Solve any two:

 $(2 \times 6 = 12)$ 

- 1) Explain various methods of artificial respiration.
- 2) Explain the back to back test for transformer.
- 3) Explain the term efficiency and regulation of transformer.

#### SECTION - II

### 4. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain the type test and routine test of induction motor.
- 2) Explain the various tests of transformer oil.



- 3) What are the effects of mis-alignment in the installation of synchronous machine?
- 4) Explain the retardation test of synchronous machine.
- 5) Explain the commissioning test for induction motor.
- 6) Explain the maintenance schedule of breaker.

5. Solve any two: (2×6=12)

- 1) What are the requirements of foundations for installing induction motors?
- 2) Explain the commissioning tests of synchronous machine.
- 3) Explain the factory test and site test for induction motor.



Seat	1	Set	В
No.		Jet	

	SWITCHGEAF	R AND PROTECTION	
Day and Date: Mone Time: 2.30 p.m. to 5	-	-	Total Marks : 70
Instructions :	<ul><li>3) Q. No. 1 is comin Answer Boomark.</li><li>4) Answer MCQ.</li></ul>	are compulsory.  Alle data whenever necessary.  Apple pulsory. It should be solved in file  Block Page No. 3. Each question  Block Pobjective type questions of  Bright graph (P/C)	n carries one n Page No. 3
Duration : 30 Minute	-	ive Type Questions	Marks : 14
1. Choose the corr	ect answer :		(1×14=14)
<ol> <li>Differential re a) Over curr</li> <li>Internal fa</li> </ol>	ent	rotect the equipment against. b) Reverse current d) None of the above	
<ul><li>2) Surge divert protected.</li><li>a) close to</li><li>c) in the mid</li></ul>		b) far away from d) none of the above	ratus to be
3) The IDMT re transformer a a) Heavy loa c) External s	elays are used for against	over current and earth fault p b) Internal short circuits d) All of the above	rotection of

d) Both inductance and capacitance system only5) The current rating of fuse wire is 5 A. The fusing current will be

a) Type of circuit breaker

b) Inductance of the system only

c) The capacitance of the system only

a) 5 A b) 2.5 A c) 1 A d) more than 5 A

P.T.O.

d) None of the above



	3 310	-2-	1 18811818 11811 88118 11811 88118 1181 88118 1181
6)	The fusing factor is		
	a) Always one	•	Always more than one
	c) Always less than one	d)	None of above
7)	A fuse should have		
	a) Low melting point	-	High conductivity
	c) Low cost	d)	All above
8)	The current chopping mainly occur		
	a) Air blast circuit breaker	,	Oil circuit breaker
	c) SF6 circuit breaker	d)	Vacuum circuit breaker
9)	In low oil circuit breaker, the oil pe	erform	s the function of
	a) only insulation		
	b) arc extinction only	:	
	c) both insulation and arc extinct	IOH	
10)	d) none of the above		
10)	Capacitive current breaking result a) Short circuit		Open circuit
	c) Voltage surges	,	None of the above
11\	Which statement is correct?	u)	TVOTE OF THE ABOVE
11)	a) SF6 gas is non corrosive		
	b) SF6 gas has high dielectric str	enath	
	c) SF6 gas is non toxic	-119	
	d) All above		
12)	Burden of a protective relay is the	powe	r
	a) Required to operate the circuit	break	er
	b) Absorbed by the circuit of		
	c) Developed by the relay circuit		
	d) None of the above		
13)	Directional relays are based on flo		
	a) Power b) Current	c)	Voltage wave d) All of the above
14)	_	t detec	t abnormal conditions in electrical
	circuits by measuring		
	a) Current during abnormal cond		
	b) Voltage during abnormal cond		local diffor during a series less
	•	ınınıes	which differ during normal and
	abnormal conditions		



Seat	
No.	

Day and Date: Monday, 7-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

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

2) Assume suitable data whenever necessary.

#### SECTION - I

### 2. Solve any three of the following:

 $(3 \times 4 = 12)$ 

- 1) Explain the theories of arc extinction.
- 2) Explain the selection criterion of a fuse for induction motor protection.
- 3) Explain working principle of vacuum circuit breaker.
- 4) Describe the types of isolators.

### 3. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) Derive an expression for restriking voltage and RRRV.
- 2) Explain direct testing of circuit breaker with diagram.
- 3) Explain making and breaking capacity of circuit breaker.

#### SECTION - II

## 4. Solve any three:

 $(4 \times 3 = 12)$ 

- Explain the meaning of percentage differential protection. Why is it necessary to provide bias setting?
- 2) Explain the static definite time over current relay with block diagram.
- 3) What is the difference between MHO and OFFSET MHO?
- 4) Explain the advantages and disadvantages of microprocessor based relays.

## 5. Attempt any two:

 $(8 \times 2 = 16)$ 

- 1) Describe Metal Oxide Surge Arrester (MOA) with neat diagram.
- 2) Derive mathematical expression for distance relay.
- 3) Describe microprocessor based reactance relay with schematic block diagram of interface.



Seat	
No.	

Set



# B.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2018 SWITCHGEAR AND PROTECTION

Day and Date: Monday, 7-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Assume suitable data whenever 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. Choose the correct answer:

 $(1 \times 14 = 14)$ 

- 1) The current chopping mainly occurs in
  - a) Air blast circuit breaker
- b) Oil circuit breaker

c) SF6 circuit breaker

- d) Vacuum circuit breaker
- 2) In low oil circuit breaker, the oil performs the function of
  - a) only insulation

- b) arc extinction only
- c) both insulation and arc extinction d) none of the above
- 3) Capacitive current breaking results in
  - a) Short circuit

b) Open circuit

c) Voltage surges

- d) None of the above
- 4) Which statement is correct?
  - a) SF6 gas is non corrosive
  - b) SF6 gas has high dielectric strength
  - c) SF6 gas is non toxic
  - d) All above
- 5) Burden of a protective relay is the power
  - a) Required to operate the circuit breaker
  - b) Absorbed by the circuit of
  - c) Developed by the relay circuit
  - d) None of the above

6)	Directional relays are based on flow	of
	a) Power b) Current	c) Voltage wave d) All of the above
7)	Protective relays are devices that de	etect abnormal conditions in electrical
	circuits by measuring	
	a) Current during abnormal condition	
	b) Voltage during abnormal condition	
	abnormal conditions	ties which differ during normal and
	d) None of the above	
8)	Differential relays are used to protect	t the equipment against.
	a) Over current	b) Reverse current
	c) Internal fault	d) None of the above
9)	Surge diverter should be located a	t the apparatus to be
	protected.	
	a) close to	b) far away from
	c) in the middle of	d) none of the above
10)		current and earth fault protection of
	transformer against	
	a) Heavy load	b) Internal short circuits
	c) External short circuits	•
11)	The rate of rise of restriking voltage	depends on
	a) Type of circuit breaker	
	b) Inductance of the system only	
	c) The capacitance of the system or	
	d) Both inductance and capacitance	
12)	The current rating of fuse wire is 5 A	_
	a) 5 A b) 2.5 A	c) 1 A d) more than 5 A
13)	The fusing factor is	
	a) Always one	b) Always more than one
	c) Always less than one	d) None of above
14)	A fuse should have	
	a) Low melting point	b) High conductivity
	c) Low cost	d) All above



Seat	
No.	

Day and Date: Monday, 7-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

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

2) Assume suitable data whenever necessary.

#### SECTION - I

### 2. Solve any three of the following:

 $(3 \times 4 = 12)$ 

- 1) Explain the theories of arc extinction.
- 2) Explain the selection criterion of a fuse for induction motor protection.
- 3) Explain working principle of vacuum circuit breaker.
- 4) Describe the types of isolators.

### 3. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) Derive an expression for restriking voltage and RRRV.
- 2) Explain direct testing of circuit breaker with diagram.
- 3) Explain making and breaking capacity of circuit breaker.

#### SECTION - II

## 4. Solve any three:

 $(4 \times 3 = 12)$ 

- 1) Explain the meaning of percentage differential protection. Why is it necessary to provide bias setting?
- 2) Explain the static definite time over current relay with block diagram.
- 3) What is the difference between MHO and OFFSET MHO?
- 4) Explain the advantages and disadvantages of microprocessor based relays.

## 5. Attempt any two:

 $(8 \times 2 = 16)$ 

- 1) Describe Metal Oxide Surge Arrester (MOA) with neat diagram.
- 2) Derive mathematical expression for distance relay.
- 3) Describe microprocessor based reactance relay with schematic block diagram of interface.



Seat No.	Set	R

Day and Date : Monday, 7-5-2018 Total Marks : 70

Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Assume suitable data whenever 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

1. Choose the correct answer:

1) The current rating of fuse wire is 5 A. The fusing current will be

- a) 5 A b) 2.5 A c) 1 A d) more than 5 A
- 2) The fusing factor is
  - a) Always one b) Always more than one
  - c) Always less than one d) None of above
- 3) A fuse should have
  - a) Low melting point b) High conductivity
  - c) Low cost d) All above
- 4) The current chopping mainly occurs in
  - a) Air blast circuit breaker b) Oil circuit breaker
  - c) SF6 circuit breaker d) Vacuum circuit breaker
- 5) In low oil circuit breaker, the oil performs the function of
  - a) only insulation
  - b) arc extinction only
  - c) both insulation and arc extinction
  - d) none of the above
- 6) Capacitive current breaking results in
  - a) Short circuit b) Open circuit
  - c) Voltage surges d) None of the above

7)	Which statement is correct?			
	a) SF6 gas is non corrosive			
	b) SF6 gas is non toxic	gtn		
	<ul><li>c) SF6 gas is non toxic</li><li>d) All above</li></ul>			
0/	Burden of a protective relay is the po		r	
0)	a) Required to operate the circuit broad			
	b) Absorbed by the circuit of	can		
	c) Developed by the relay circuit			
	d) None of the above			
9)	Directional relays are based on flow	of		
	a) Power b) Current	c)	Voltage wav	e d) All of the above
10)	Protective relays are devices that de	etec	t abnormal c	onditions in electrical
	circuits by measuring			
	<ul><li>a) Current during abnormal condition</li><li>b) Voltage during abnormal condition</li></ul>			
	c) Constantly the electrical quantit		which diffe	r during normal and
	abnormal conditions		winon amo	r danning morman ama
	d) None of the above			
11)	Differential relays are used to protect	t th	e equipment	against.
	a) Over current		Reverse cur	
	c) Internal fault	d)	None of the	above
12)	Surge diverter should be located a protected.	t		the apparatus to be
	a) close to	,	far away from	
	c) in the middle of	,	none of the	
13)	The IDMT relays are used for over transformer against	cu	rrent and ear	rth fault protection of
	a) Heavy load	,	Internal shor	
	c) External short circuits	,	All of the abo	ove
14)	The rate of rise of restriking voltage of	dep	ends on	
	a) Type of circuit breaker			
	<ul><li>b) Inductance of the system only</li><li>c) The capacitance of the system or</li></ul>	sky		
	d) Both inductance and capacitance	-	stem only	
	a, zon madotanoo ana oapaolanoo	Οy.	otorii oriiy	



Seat	
No.	

Day and Date: Monday, 7-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

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

2) Assume suitable data whenever necessary.

#### SECTION - I

### 2. Solve any three of the following:

 $(3 \times 4 = 12)$ 

- 1) Explain the theories of arc extinction.
- 2) Explain the selection criterion of a fuse for induction motor protection.
- 3) Explain working principle of vacuum circuit breaker.
- 4) Describe the types of isolators.

### 3. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) Derive an expression for restriking voltage and RRRV.
- 2) Explain direct testing of circuit breaker with diagram.
- 3) Explain making and breaking capacity of circuit breaker.

#### SECTION - II

## 4. Solve any three:

 $(4 \times 3 = 12)$ 

- Explain the meaning of percentage differential protection. Why is it necessary to provide bias setting?
- 2) Explain the static definite time over current relay with block diagram.
- 3) What is the difference between MHO and OFFSET MHO?
- 4) Explain the advantages and disadvantages of microprocessor based relays.

## 5. Attempt any two:

 $(8 \times 2 = 16)$ 

- 1) Describe Metal Oxide Surge Arrester (MOA) with neat diagram.
- 2) Derive mathematical expression for distance relay.
- 3) Describe microprocessor based reactance relay with schematic block diagram of interface.



Seat	
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Set

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# B.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2018 SWITCHGEAR AND PROTECTION

Day and Date: Monday, 7-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Assume suitable data whenever 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. Choose the correct answer:

 $(1 \times 14 = 14)$ 

- 1) Capacitive current breaking results in
  - a) Short circuit

b) Open circuit

c) Voltage surges

- d) None of the above
- 2) Which statement is correct?
  - a) SF6 gas is non corrosive
  - b) SF6 gas has high dielectric strength
  - c) SF6 gas is non toxic
  - d) All above
- 3) Burden of a protective relay is the power
  - a) Required to operate the circuit breaker
  - b) Absorbed by the circuit of
  - c) Developed by the relay circuit
  - d) None of the above
- 4) Directional relays are based on flow of
  - a) Power
  - b) Current
  - c) Voltage wave
  - d) All of the above



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5)	Protective relays are devices that of circuits by measuring a) Current during abnormal conditions to Constantly the electrical quantabnormal conditions d) None of the above	on on	
6)	Differential relays are used to prote <ul><li>a) Over current</li><li>c) Internal fault</li></ul>	b)	e equipment against. Reverse current None of the above
7)	Surge diverter should be located protected. a) close to c) in the middle of	b)	far away from none of the above
8)	The IDMT relays are used for over transformer against a) Heavy load c) External short circuits	b)	rrent and earth fault protection of Internal short circuits All of the above
9)	The rate of rise of restriking voltage a) Type of circuit breaker b) Inductance of the system only c) The capacitance of the system of d) Both inductance and capacitance	only	
10)	The current rating of fuse wire is 5 a) 5 A b) 2.5 A		ne fusing current will be 1 A d) more than 5 A
11)	The fusing factor is a) Always one c) Always less than one		Always more than one None of above
12)	A fuse should have a) Low melting point c) Low cost	,	High conductivity All above
13)	The current chopping mainly occurs a) Air blast circuit breaker c) SF6 circuit breaker	b)	Oil circuit breaker Vacuum circuit breaker
14)	In low oil circuit breaker, the oil per a) only insulation b) arc extinction only c) both insulation and arc extinctio d) none of the above		s the function of



Seat	
No.	

Day and Date: Monday, 7-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

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

2) Assume suitable data whenever necessary.

#### SECTION - I

### 2. Solve any three of the following:

 $(3 \times 4 = 12)$ 

- 1) Explain the theories of arc extinction.
- 2) Explain the selection criterion of a fuse for induction motor protection.
- 3) Explain working principle of vacuum circuit breaker.
- 4) Describe the types of isolators.

### 3. Solve any two:

 $(8 \times 2 = 16)$ 

- 1) Derive an expression for restriking voltage and RRRV.
- 2) Explain direct testing of circuit breaker with diagram.
- 3) Explain making and breaking capacity of circuit breaker.

#### SECTION - II

## 4. Solve any three:

 $(4 \times 3 = 12)$ 

- Explain the meaning of percentage differential protection. Why is it necessary to provide bias setting?
- 2) Explain the static definite time over current relay with block diagram.
- 3) What is the difference between MHO and OFFSET MHO?
- 4) Explain the advantages and disadvantages of microprocessor based relays.

## 5. Attempt any two:

 $(8 \times 2 = 16)$ 

- 1) Describe Metal Oxide Surge Arrester (MOA) with neat diagram.
- 2) Derive mathematical expression for distance relay.
- 3) Describe microprocessor based reactance relay with schematic block diagram of interface.

**SLR-TC - 512** 



Seat	Cot	D
No.	Set	

# B.E. (E&E) (Part – I) (CGPA) Examination, 2018 RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date: Tuesday, 8-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book on Page No. 3.

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 mark each)

1) Heliostats used for exploiting solar energy are called

a) diffusers

b) ponds

c) reflecting mirrors

d) mantle

2) For solar thermal electric plants, preferable area is

a) mountain tops

b) hot arid zones

c) coastal areas

d) high rainfall zones

3) Photovoltaic solar energy conversion system makes use of

a) fuel cell

b) solar cell

c) solar pond

d) none of the above

4) The output of a solar cell is of the order of

a) 0.1 W

b) 0.5 W

c) 1 W

d) 5 W

5) A module is a

a) newly installed solar cell

b) series parallel arrangement of solar cells

c) a series of solar cells when not used for power generation

d) none of the above

is the major disadvantage	e of solar cells for power generation.
a) lack of availability	b) large area requirement
c) variable power	d) high cost
Local winds are created due to	
a) differential heating of land and	water
b) differential heating of plains and	d mountains
c) any of the above	
d) none of the above	
What kind of energy does a wind to	urbine use ?
a) kinetic energy	b) potential energy
c) chemical energy	d) thermal energy
Geothermal energy is	
a) a renewable energy resource	b) alternative energy source
c) inexhaustible energy source	d) any of the above
Geologists believe that below the	earth's crust, the molten mass exists in
the form of	
a) magma b) vent	c) hot cell d) liquation
Tidal energy mainly utilises	
,	
, .	
•	energy of water
•	
	la Vicina a cita a <b>f</b> florida
	b) viscosity of fluids
•	d) discharge of fluids
	la) lugging yetigu
,	b) Incineration
c) Aerobic digestion	d) Decomposting
,	
Hydrogen can be stored as a	b) liquid
,	<ul><li>b) liquid</li><li>d) all of the above</li></ul>
	a) lack of availability c) variable power Local winds are created due to a) differential heating of land and of the body differential heating of plains and c) any of the above d) none of the above What kind of energy does a wind to a) kinetic energy c) chemical energy Geothermal energy is a) a renewable energy resource c) inexhaustible energy source Geologists believe that below the of the form of



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# B.E. (E&E) (Part – I) (CGPA) Examination, 2018 RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date: Tuesday, 8-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

#### SECTION - I

2. Attempt any 4 questions:

(4 marks each)

- 1) With neat sketch, explain working of solar cooker.
- 2) What are the non-conventional sources of energy and explain briefly?
- 3) Write short note on India's energy production and energy alternatives.
- 4) Write short note on solar thermal storage.
- 5) Explain:
  - i) Solar distillation
  - ii) Solar still.
- 6) Write short note on recent development in wind energy.

3. Attempt any 2 questions:

(6 marks each)

- 1) With the help of a neat sketch, describe any two solar air heaters.
- 2) With the help of a neat sketch, explain PV hybrid system.
- 3) Explain briefly with neat sketch about :
  - 1) Horizontal wind mills.
  - 2) Vertical wind mills.

## 

#### SECTION - II

#### 4. Attempt any 4 questions:

(4 marks each)

- 1) State and explain site selection criteria for biogas generation plant.
- 2) Write a short note on utilization of biogas.
- 3) Explain limitations and scope of tidal energy.
- 4) Explain with neat sketch, open cycle and closed cycle Ocean Thermal Electric Conversion system.
- 5) Discuss the various problems associated for storage and transportation of hydrogen gas.
- 6) What is geothermal energy? How can geothermal energy are utilized for electric power generation?

### 5. Attempt any 2 questions:

(6 marks each)

- 1) State various types of batteries and with neat sketch, explain different types of battery arrangements.
- 2) With advantages and disadvantages, explain single basin and double basin tidal power plants.
- 3) Explain with neat sketch, various part of geothermal energy system.



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No.	Set	Q

## B.E. (E&E) (Part – I) (CGPA) Examination, 2018 RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date: Tuesday, 8-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

**Instructions**: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book on Page No. 3.

> 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 mark each) 1. Choose the correct answer:

- 1) What kind of energy does a wind turbine use?
  - a) kinetic energy

b) potential energy

c) chemical energy

- d) thermal energy
- 2) Geothermal energy is
  - a) a renewable energy resource b) alternative energy source
- - c) inexhaustible energy source d) any of the above
- 3) Geologists believe that below the earth's crust, the molten mass exists in the form of
  - a) magma
- b) vent
- c) hot cell
- d) liquation

- 4) Tidal energy mainly utilises
  - 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
- 5) A rotameter measures
  - a) velocity of fluids

b) viscosity of fluids

c) density of fluids

d) discharge of fluids

14) Local winds are created due to

- a) differential heating of land and water
- b) differential heating of plains and mountains
- c) any of the above
- d) none of the above



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# B.E. (E&E) (Part – I) (CGPA) Examination, 2018 RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date: Tuesday, 8-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

#### SECTION - I

2. Attempt any 4 questions:

(4 marks each)

- 1) With neat sketch, explain working of solar cooker.
- 2) What are the non-conventional sources of energy and explain briefly?
- 3) Write short note on India's energy production and energy alternatives.
- 4) Write short note on solar thermal storage.
- 5) Explain:
  - i) Solar distillation
  - ii) Solar still.
- 6) Write short note on recent development in wind energy.

3. Attempt any 2 questions:

(6 marks each)

- 1) With the help of a neat sketch, describe any two solar air heaters.
- 2) With the help of a neat sketch, explain PV hybrid system.
- 3) Explain briefly with neat sketch about :
  - 1) Horizontal wind mills.
  - 2) Vertical wind mills.

# 

#### SECTION - II

#### 4. Attempt any 4 questions:

(4 marks each)

- 1) State and explain site selection criteria for biogas generation plant.
- 2) Write a short note on utilization of biogas.
- 3) Explain limitations and scope of tidal energy.
- 4) Explain with neat sketch, open cycle and closed cycle Ocean Thermal Electric Conversion system.
- 5) Discuss the various problems associated for storage and transportation of hydrogen gas.
- 6) What is geothermal energy? How can geothermal energy are utilized for electric power generation?

### 5. Attempt any 2 questions:

(6 marks each)

- 1) State various types of batteries and with neat sketch, explain different types of battery arrangements.
- 2) With advantages and disadvantages, explain single basin and double basin tidal power plants.
- 3) Explain with neat sketch, various part of geothermal energy system.

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<b>SLR-TC</b> – 51	2
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### B.E. (E&E) (Part – I) (CGPA) Examination, 2018 RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date: Tuesday, 8-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book on Page No. 3.

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 mark each)
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- 1) A module is a
  - a) newly installed solar cell
  - b) series parallel arrangement of solar cells
  - c) a series of solar cells when not used for power generation
  - d) none of the above
- 2) \_\_\_\_\_ is the major disadvantage of solar cells for power generation.
  - a) lack of availability
- b) large area requirement

c) variable power

- d) high cost
- 3) Local winds are created due to
  - a) differential heating of land and water
  - b) differential heating of plains and mountains
  - c) any of the above
  - d) none of the above
- 4) What kind of energy does a wind turbine use?
  - a) kinetic energy

b) potential energy

c) chemical energy

d) thermal energy



5)	Geothermal ener	rgy is			
	a) a renewable of	energy resource	b)	alternative en	ergy source
	c) inexhaustible	energy source	d)	any of the abo	ove
6)	Geologists believe the form of	ve that below the	ear	th's crust, the	molten mass exists in
	a) magma	b) vent	c)	hot cell	d) liquation
7)	Tidal energy mai	nly utilises			
,	a) kinetic energy of water				
	b) potential ener	gy of water			
	c) both kinetic a	s well as potential	en	ergy of water	
	d) none of the a	bove			
8)	A rotameter mea	sures			
	a) velocity of flui	ds	b)	viscosity of flu	ids
	c) density of fluid	ds	d)	discharge of fl	luids
9)	Hydrogen is prod	duced by			
	a) Electrolysis		b)	Incineration	
	c) Aerobic diges	stion	d)	Decomposting	9
10)	Hydrogen can be	e stored as a			
	a) compressed (	gas	b)	liquid	
	c) metal hydride		d)	all of the abov	re
11)		or exploiting solar			d
	a) diffusers		,	ponds	
4.0\	c) reflecting mirr		,	mantle	
12)	a) mountain tops	l electric plants, p		erable area is hot arid zones	
	c) coastal areas		,	high rainfall zo	
13)	•	ar energy conversi	-	_	
. 0)	a) fuel cell	ar onergy conversi		solar cell	
	c) solar pond		,	none of the ab	oove
14)	The output of a s	solar cell is of the	ord	er of	
	a) 0.1 W	b) 0.5 W	c)	1 W	d) 5 W

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### B.E. (E&E) (Part – I) (CGPA) Examination, 2018 RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date: Tuesday, 8-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

#### SECTION - I

2. Attempt any 4 questions:

(4 marks each)

- 1) With neat sketch, explain working of solar cooker.
- 2) What are the non-conventional sources of energy and explain briefly?
- 3) Write short note on India's energy production and energy alternatives.
- 4) Write short note on solar thermal storage.
- 5) Explain:
  - i) Solar distillation
  - ii) Solar still.
- 6) Write short note on recent development in wind energy.

3. Attempt any 2 questions:

(6 marks each)

- 1) With the help of a neat sketch, describe any two solar air heaters.
- 2) With the help of a neat sketch, explain PV hybrid system.
- 3) Explain briefly with neat sketch about :
  - 1) Horizontal wind mills.
  - 2) Vertical wind mills.



### SECTION - II

### 4. Attempt any 4 questions:

(4 marks each)

- 1) State and explain site selection criteria for biogas generation plant.
- 2) Write a short note on utilization of biogas.
- 3) Explain limitations and scope of tidal energy.
- 4) Explain with neat sketch, open cycle and closed cycle Ocean Thermal Electric Conversion system.
- 5) Discuss the various problems associated for storage and transportation of hydrogen gas.
- 6) What is geothermal energy? How can geothermal energy are utilized for electric power generation?

### 5. Attempt any 2 questions:

(6 marks each)

- 1) State various types of batteries and with neat sketch, explain different types of battery arrangements.
- 2) With advantages and disadvantages, explain single basin and double basin tidal power plants.
- 3) Explain with neat sketch, various part of geothermal energy system.

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### B.E. (E&E) (Part – I) (CGPA) Examination, 2018 RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date: Tuesday, 8-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book on Page No. 3.

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 mark each)

- 1) Geologists believe that below the earth's crust, the molten mass exists in the form of
  - a) magma
- b) vent
- c) hot cell
- d) liquation

- 2) Tidal energy mainly utilises
  - 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
- 3) A rotameter measures
  - a) velocity of fluids

b) viscosity of fluids

c) density of fluids

- d) discharge of fluids
- 4) Hydrogen is produced by
  - a) Electrolysis

- b) Incineration
- c) Aerobic digestion
- d) Decomposting

5)	Hydrogen can be stored as a				
	a) compressed gas	b) liquid			
	c) metal hydride	d) all of the above			
6)	Heliostats used for exploiting solar	energy are called			
	a) diffusers	b) ponds			
	c) reflecting mirrors	d) mantle			
7)	For solar thermal electric plants, p	referable area is			
	a) mountain tops	b) hot arid zones			
	c) coastal areas	d) high rainfall zones			
8)	Photovoltaic solar energy conversi	on system makes use of			
	a) fuel cell	b) solar cell			
	c) solar pond	d) none of the above			
9)	The output of a solar cell is of the	order of			
	a) 0.1 W b) 0.5 W	c) 1 W d) 5 W			
10)	A module is a				
	a) newly installed solar cell				
	b) series parallel arrangement of s	solar cells			
	c) a series of solar cells when not	t used for power generation			
	d) none of the above				
l1)	-	e of solar cells for power generation.			
	a) lack of availability	b) large area requirement			
	c) variable power	d) high cost			
12)	Local winds are created due to				
	a) differential heating of land and water				
	b) differential heating of plains and	d mountains			
	<ul><li>c) any of the above</li><li>d) none of the above</li></ul>				
۱۵)	•	umbino uno O			
13)	What kind of energy does a wind to				
	<ul><li>a) kinetic energy</li><li>c) chemical energy</li></ul>	<ul><li>b) potential energy</li><li>d) thermal energy</li></ul>			
۱۸۱	,	d) thermal energy			
14)	Geothermal energy is	h) alternative energy source			
	<ul><li>a) a renewable energy resource</li><li>c) inexhaustible energy source</li></ul>	<ul><li>b) alternative energy source</li><li>d) any of the above</li></ul>			
	of mexicaustible effergy source	a) any or the above			



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### B.E. (E&E) (Part – I) (CGPA) Examination, 2018 RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date: Tuesday, 8-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

#### SECTION - I

2. Attempt any 4 questions:

(4 marks each)

- 1) With neat sketch, explain working of solar cooker.
- 2) What are the non-conventional sources of energy and explain briefly?
- 3) Write short note on India's energy production and energy alternatives.
- 4) Write short note on solar thermal storage.
- 5) Explain:
  - i) Solar distillation
  - ii) Solar still.
- 6) Write short note on recent development in wind energy.

3. Attempt any 2 questions:

(6 marks each)

- 1) With the help of a neat sketch, describe any two solar air heaters.
- 2) With the help of a neat sketch, explain PV hybrid system.
- 3) Explain briefly with neat sketch about :
  - 1) Horizontal wind mills.
  - 2) Vertical wind mills.

### SECTION - II

### 4. Attempt any 4 questions:

(4 marks each)

- 1) State and explain site selection criteria for biogas generation plant.
- 2) Write a short note on utilization of biogas.
- 3) Explain limitations and scope of tidal energy.
- 4) Explain with neat sketch, open cycle and closed cycle Ocean Thermal Electric Conversion system.
- 5) Discuss the various problems associated for storage and transportation of hydrogen gas.
- 6) What is geothermal energy? How can geothermal energy are utilized for electric power generation?

### 5. Attempt any 2 questions:

(6 marks each)

- 1) State various types of batteries and with neat sketch, explain different types of battery arrangements.
- 2) With advantages and disadvantages, explain single basin and double basin tidal power plants.
- 3) Explain with neat sketch, various part of geothermal energy system.

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### B.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2018 **FACTS AND HVDC**

Day and Date: Tuesday, 15-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Figures to the right indicate full marks.
- 3) Assume the suitable data whenever necessary.
- 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.

Type Questions
Marks: 14
14
s inductor whose effective reactance is
b) Continuous manner
d) None of above
e 1 and 2 on, 3 and 4 off give
b) + ve vtg, + ve current
d) - ve vtg, - ve current
ade for
b) Minimizing standly losses
d) All of the above
ensation is a
b) $Q = v^2/X \sin \delta/2$
d) $Q = 2V^2x/X_1 (1 - \sin \delta/2)$

5)	The dynamic compen	sator is type of		
	a) Toppings of Trans	former	b) TCR	
	c) FC-TCR		d) TSC	
6)	The most fast operation	on of compensation	on is	
	a) TSSC	b) GCSC	c) TCSC	d) All of above
7)	The type static compe	ensator is equivale	ent to	
	a) SSSC		b) Tapping's of	transformer
	c) QBT		d) Synchronous	s motor
8)	The first commercially	used HVDC link	was built in	
	a) 2006	b) 1954	c) 1986	d) Yet to be built
9)	Reactive power to HV	DC system may b	e supplied from	
	a) AC filters		b) Shunt capacitors	
	c) SVS		d) All of the abo	ove
10)	As compared to HVA	C line, the corona	and radio interf	erence on a HVDC
	line are			
	a) Lower		b) More	
	c) The same		d) All of the abo	ove
11)	A 12-pulse bridge is p	oreferred in HVDC	because	
	a) It eliminates certain	n harmonics		
	b) It results in better p	oower factor		
	c) Series connection	of converters on [	D.C. side is bette	er
	d) All of above			
12)	In HVDC transmission	-		kept near
	a) 0°	b) 15°	c) 30°	d) 90°
13)	Fault on a two terminal DC link is removed by			
	a) Breakers on DC side		b) Breakers on AC side	
	c) Current control of o	converters	d) All of above	
14) A commutation group is defined as, group of valves in which only				
	valves conducts.			
	a) One	b) Two	c) Three	d) Four



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# B.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2018 FACTS AND HVDC

Day and Date: Tuesday, 15-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) **Assume** the suitable data **whenever** necessary.

### SECTION - I

### 2. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain in detail basic types of FACTS Controller.
- 2) Explain merits and demerits of STATCOM.
- 3) Explain variable impedance type series compensator.
- 4) Explain GTO Thyristor Controlled Series Compensator.
- 5) Explain objective of a series compensator.

### 3. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Draw block diagram and characteristics of TSC.
- 2) Explain in detail power flow in AC system.
- 3) Explain how stability margin is increased when series compensator is used for transmission line.

### 

### SECTION - II

4. Solve any four: (4×4=16)

- 1) Explain modified Vd-Id converter control characteristics.
- 2) Explain the IPC scheme of firing angle generation.
- 3) Explain power control in HVDC system with neat block diagram.
- 4) Explain with neat diagram the different types of DC links.
- 5) Write a short note on current and extinction angle controls.
- 5. Solve any two: (6×2=12)
  - 1) Explain the analysis of bridge converter with overlap less than 60 degree.
  - 2) Give detailed comparison between HVDC and AC transmission.
  - 3) Explain layout of HVDC substation with neat diagram.

Set P



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### B.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2018 **FACTS AND HVDC**

Day and Date: Tuesday, 15-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Figures to the right indicate full marks.
- 3) Assume the suitable data whenever necessary.
- 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	<b>Type Questions</b>	S	
Duration: 30 Minutes			Marks: 1	4
1. Choose the correct	answer:		1	4
1) The first comme	rcially used HVDC	link was built in		
a) 2006	b) 1954	c) 1986	d) Yet to be built	
2) Reactive power	to HVDC system m	ay be supplied fr	rom	
a) AC filters		b) Shunt ca	pacitors	
c) SVS		d) All of the	above	
<ol><li>As compared to line are</li></ol>	HVAC line, the co	rona and radio in	terference on a HVDC	
a) Lower		b) More		
c) The same		d) All of the	above	
4) A 12-pulse bridg	ge is preferred in H	VDC because		

d) All of above

a) It eliminates certain harmonics b) It results in better power factor

5)	In HVDC transmission systa) 0° b)	stem, rectifier 15°		kept near d) 90°	
6)	Fault on a two terminal De	C link is remov	ved by		
	a) Breakers on DC side		b) Breakers on AC side		
	c) Current control of converters		d) All of above		
7)	A commutation group is d	efined as, grou	up of valves in w	hich only	
	valves conducts.				
	a) One b)	Two	c) Three	d) Four	
8)	Shunt connected, thyristovaried in a		ductor whose eff	fective reactance is	
	a) Stepwise manner		b) Continuous i	manner	
	c) Linear manner		d) None of abo	ve	
9)	In single phase full conve	erter, device 1	and 2 on, 3 and	4 off give	
	a) + ve vtg, - ve current		b) + ve vtg, + ve current		
	c) - ve vtg, + ve current		d) - ve vtg, - ve current		
10)	0) TSC - TCR type var generator is made for				
	a) Dynamic compensation		b) Minimizing s	tandly losses	
	c) Increasing operating fl	exibility	d) All of the abo	ove	
11)	Reactive power a capacitive compensation is a				
	a) $Q = 2v^2/X (1 - \cos \delta)$		b) $Q = v^2/X \sin \theta$	δ/2	
	c) Q = E1 E2/X sin $\delta$		d) $Q = 2V^2x/X_L$	$(1 - \sin \delta/2)$	
12)	The dynamic compensato	or is type of			
	a) Toppings of Transformer		b) TCR		
	c) FC-TCR		d) TSC		
13)	The most fast operation of	of compensation	on is		
	a) TSSC b)	GCSC	c) TCSC	d) All of above	
14)	The type static compensa	ntor is equivale	ent to	<u> </u>	
	a) SSSC		b) Tapping's of	transformer	
	c) QBT		d) Synchronous	s motor	



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# B.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2018 FACTS AND HVDC

Day and Date: Tuesday, 15-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Assume the suitable data whenever necessary.

### SECTION - I

### 2. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain in detail basic types of FACTS Controller.
- 2) Explain merits and demerits of STATCOM.
- 3) Explain variable impedance type series compensator.
- 4) Explain GTO Thyristor Controlled Series Compensator.
- 5) Explain objective of a series compensator.

### 3. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Draw block diagram and characteristics of TSC.
- 2) Explain in detail power flow in AC system.
- 3) Explain how stability margin is increased when series compensator is used for transmission line.

### 

### SECTION - II

4. Solve any four: (4×4=16)

- 1) Explain modified Vd-Id converter control characteristics.
- 2) Explain the IPC scheme of firing angle generation.
- 3) Explain power control in HVDC system with neat block diagram.
- 4) Explain with neat diagram the different types of DC links.
- 5) Write a short note on current and extinction angle controls.

5. Solve any two: (6×2=12)

- 1) Explain the analysis of bridge converter with overlap less than 60 degree.
- 2) Give detailed comparison between HVDC and AC transmission.
- 3) Explain layout of HVDC substation with neat diagram.

Set Q

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Set F

## B.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2018 FACTS AND HVDC

Day and Date: Tuesday, 15-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

- **Instructions**: 1) **All** questions are **compulsory**.
  - 2) Figures to the right indicate full marks.
  - 3) Assume the suitable data whenever necessary.
  - 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	8
Duration: 30 Minutes			Marks: 14
1. Choose the corre	ct answer :		14
1) The dynamic c	ompensator is type o	f	
a) Toppings of	f Transformer	b) TCR	
c) FC-TCR		d) TSC	
2) The most fast	operation of compens	ation is	
a) TSSC	•		d) All of above
3) The type static	compensator is equi	valent to	
a) SSSC		b) Tapping's	s of transformer
c) QBT		d) Synchron	ous motor
4) The first comm	ercially used HVDC I	ink was built in	
a) 2006	b) 1954	c) 1986	d) Yet to be built
5) Reactive power	r to HVDC system ma	ay be supplied fr	om
a) AC filters		b) Shunt cap	pacitors
c) SVS		d) All of the	above

6)	s) As compared to HVAC line, the corona and radio interference on a HVDC line are				
	a) Lower	b) More			
	c) The same	d) All of the abo	ove		
7)	A 12-pulse bridge is preferred in HVDC				
	a) It eliminates certain harmonics	) It eliminates certain harmonics			
	b) It results in better power factor				
	<ul><li>c) Series connection of converters on E</li><li>d) All of above</li></ul>	D.C. side is bette	er		
8)	In HVDC transmission system, rectifier	firing angle a is	kept near		
•,	a) 0° b) 15°		d) 90°		
9)	Fault on a two terminal DC link is remove	•	,		
-,	a) Breakers on DC side	b) Breakers on AC side			
	c) Current control of converters	,			
10)	A commutation group is defined as, group	up of valves in wl	hich only		
	valves conducts.		-		
	a) One b) Two	c) Three	d) Four		
l 1)	Shunt connected, thyristor switches incovaried in a	luctor whose eff	ective reactance is		
	a) Stepwise manner	b) Continuous manner			
	c) Linear manner	d) None of abou	ve		
12)	2) In single phase full converter, device 1 and 2 on, 3 and 4 off give				
	a) + ve vtg, - ve current	b) + ve vtg, + ve current			
	c) - ve vtg, + ve current	d) $-$ ve vtg, $-$ ve	e current		
13)	TSC - TCR type var generator is made	for	<u>-</u>		
	a) Dynamic compensation	b) Minimizing standly losses			
	c) Increasing operating flexibility	d) All of the abo	ove		
14)	Reactive power a capacitive compensa-				
	a) $Q = 2v^2/X (1 - \cos \delta)$	b) $Q = v^2/X \sin \theta$			
	c) Q = E1 E2/X sin $\delta$	d) $Q = 2V^2x/X_L$	(1 – sin δ/2)		



Seat	
No.	

# B.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2018 FACTS AND HVDC

Day and Date: Tuesday, 15-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) **Assume** the suitable data **whenever** necessary.

SECTION - I

### 2. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain in detail basic types of FACTS Controller.
- 2) Explain merits and demerits of STATCOM.
- 3) Explain variable impedance type series compensator.
- 4) Explain GTO Thyristor Controlled Series Compensator.
- 5) Explain objective of a series compensator.

### 3. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Draw block diagram and characteristics of TSC.
- 2) Explain in detail power flow in AC system.
- 3) Explain how stability margin is increased when series compensator is used for transmission line.

### 

### SECTION - II

4. Solve any four: (4×4=16)

- 1) Explain modified Vd-Id converter control characteristics.
- 2) Explain the IPC scheme of firing angle generation.
- 3) Explain power control in HVDC system with neat block diagram.
- 4) Explain with neat diagram the different types of DC links.
- 5) Write a short note on current and extinction angle controls.

5. Solve any two: (6×2=12)

- 1) Explain the analysis of bridge converter with overlap less than 60 degree.
- 2) Give detailed comparison between HVDC and AC transmission.
- 3) Explain layout of HVDC substation with neat diagram.

Set R



Seat No.

### B.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2018 **FACTS AND HVDC**

Day and Date: Tuesday, 15-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Figures to the right indicate full marks.
- 3) **Assume** the suitable data **whenever** necessary.
- 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/Obje	ctive Type Questions	
Duration: 30 Minutes	Marks	: 14
1. Choose the correct answer:		14
As compared to HVAC line, the line are	ne corona and radio interference on a HVDC	
a) Lower	b) More	
c) The same	d) All of the above	
2) A 12-pulse bridge is preferred	in HVDC because	
a) It eliminates certain harmor		
b) It results in better power fac		
c) Series connection of conve	erters on D.C. side is better	
d) All of above		

c) 30° a) 0° b) 15°

4) 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) All of above

3) In HVDC transmission system, rectifier firing angle a is kept near

d) 90°

5)	A commutation group valves conducts.	is defined as, gro	up of valves i	n which only	
	a) One	b) Two	c) Three	d) Four	
6)	Shunt connected, thy varied in a		ductor whose	e effective reactance is	
	a) Stepwise manner		b) Continuo	ous manner	
	c) Linear manner		d) None of	above	
7)	In single phase full co	nverter, device 1	and 2 on, 3	and 4 off give	
	a) + ve vtg, - ve curre	ent	b) + ve vtg,	+ ve current	
	c) - ve vtg, + ve curre	ent	d) – ve vtg,	<ul><li>ve current</li></ul>	
8)	TSC - TCR type var g	enerator is made	for		
	a) Dynamic compensa	ation	b) Minimizir	ng standly losses	
	c) Increasing operating	g flexibility	d) All of the	above	
9)	9) Reactive power a capacitive compensation is a				
	a) $Q = 2v^2/X (1 - \cos x)$	δ)	b) $Q = v^2/X$	$\sin \delta/2$	
	c) Q = E1 E2/X sin $\delta$		d) $Q = 2V^2x$	$x/X_L (1 - \sin \delta/2)$	
10)	The dynamic compens	sator is type of			
	a) Toppings of Transf	ormer	b) TCR		
	c) FC-TCR		d) TSC		
11)	The most fast operation	on of compensation	on is		
	a) TSSC	b) GCSC	c) TCSC	d) All of above	
12)	The type static compe	nsator is equivale	ent to		
	a) SSSC		b) Tapping'	s of transformer	
	c) QBT		d) Synchroi	nous motor	
13)	The first commercially	used HVDC link	was built in		
	a) 2006	b) 1954	c) 1986	d) Yet to be built	
14)	Reactive power to HV	DC system may b	e supplied f	rom	
	a) AC filters		b) Shunt ca	pacitors	
	c) SVS		d) All of the	above	



Seat	
No.	

# B.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2018 FACTS AND HVDC

Day and Date: Tuesday, 15-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

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

3) Assume the suitable data whenever necessary.

### SECTION - I

### 2. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain in detail basic types of FACTS Controller.
- 2) Explain merits and demerits of STATCOM.
- 3) Explain variable impedance type series compensator.
- 4) Explain GTO Thyristor Controlled Series Compensator.
- 5) Explain objective of a series compensator.

### 3. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Draw block diagram and characteristics of TSC.
- 2) Explain in detail power flow in AC system.
- 3) Explain how stability margin is increased when series compensator is used for transmission line.

### 

### SECTION - II

4. Solve any four: (4×4=16)

- 1) Explain modified Vd-Id converter control characteristics.
- 2) Explain the IPC scheme of firing angle generation.
- 3) Explain power control in HVDC system with neat block diagram.
- 4) Explain with neat diagram the different types of DC links.
- 5) Write a short note on current and extinction angle controls.

5. Solve any two: (6×2=12)

- 1) Explain the analysis of bridge converter with overlap less than 60 degree.
- 2) Give detailed comparison between HVDC and AC transmission.
- 3) Explain layout of HVDC substation with neat diagram.

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# B.E. (Electrical and Electronics Engg.) (Part – II) (New) (CGPA) Examination, 2018 ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 17-5-2018	Total Marks : 70
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Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Assume the suitable data whenever 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**

Dur	ation : 30 Minutes				Mar	ks : 14
1.	Choose the correct	answer:			(1×1	14=14)
	1) The material us	ed for making perma	anent magnet is			
	A) Cast iron	B) Soft steel	C) Hard steel	D)	Silicon steel	
	, .	or of the induction more	otor will be		if the	
	A) Low, low	B) High, high	C) High, low	D)	Low, high	
	3) Turbo-alternator	rs are of				
	A) Salient	B) Non-Salient	C) Circular	D)	None of the a	above
	4) Iron losses of a	machine are				
	<ul><li>A) Directly prop</li></ul>	ortional to flux densi	ty			
	B) Directly prop	ortional to the squar	e of flux density			
	C) Inversely pro	portional to flux den	sity			
	D) Inversely pro	portional to the squa	are of flux density	1		
	5) Which is non-ma	agnetic material?				
	A) Nickel	B) Cobalt	C) Aluminium	D)	Gadolinium	P.T.O.

6)	magnets is	es, the material p	preferred for pole	snoes of electro-
	A) Pure iron	B) Aluminium	C) Copper	D) Lead
7)	The percentage of	silicon in transfori	mer stampings is	usually limited to
	A) 0.4%	B) 1.4%	C) 4%	D) 14%
8)	In an alternator, wh waveform?	ich of the followin	ng coils will have I	EMF closer to sine
	A) Concentrated wi	inding in full pitch	coils	
	B) Concentrated wi			
	C) Distributed wind			
	D) Distributed wind			
9)	In transformers, the generally used for	e cylindrical windir	ng with rectangula	ar conductors is
	A) Low voltage win	_	B) High voltage	•
	C) Tertiary voltage	winding	D) Any of the at	pove
10)	The dimensions of	a dc machine prir	•	
	A) KW output		B) Work done p	
	C) Exposed surface		D) None of the	
11)	The heat generated mainly by	I in the transform	er is dissipated to	the surroundings
	A) Conduction	B) Convection	C) Radiation	D) All of the above
12)	Larger values of air induction motors of	gap flux density	can be adopted v	vhile designing
	A) Larger output		B) Larger diame	eter of rotor
	C) Both A) and B) a	above	D) None of the	above
13)	When D is the diam the best power factor	or can be obtaine	ed when $(P = no.)$	of poles)
	A) D = L			D) D = 1.35 P $\sqrt{L}$
14)	The average value range	of specific electric	c loading of induc	ction motors is in the
	A) 5000 to 45000 a	mpere conductor	s/meter	
	B) 50 to 450 amper			
	C) 500 to 4500 amp			
	D) 5 to 50 ampere	conductors/meter		



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## B.E. (Electrical and Elctronics Engg.) (Part – II) (New) (CGPA) Examination, 2018 ELECTRICAL MACHINE DESIGN

Day and Date: Thursday, 17-5-2018

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

2) Assume the suitable data whenever necessary.

SECTION - I

### 2. Solve any four:

 $(4 \times 4 = 16)$ 

Marks: 56

- a) Explain the different magnetic materials used for electrical machines.
- b) Explain various types of windings used in transformer.
- c) Estimate no load current per phase for 6600/400 V, 50 Hz, single phase core type transformer from following data:

Net cross section area of iron =  $130 \text{ cm}^2$ , maximum flux density =  $1.2 \text{ wb/m}^2$ , mean length of flux path = 270 cm, specific iron loss = 2.1 W/kg, specific gravity of iron = 7.5 gm/cc, effect of joints = air gap of 1 mm.

- d) Explain the choice of flux density and choice of current density in designing of transformer.
- e) Derive an output equation of 1 phase shell type transformer.

### 3. Solve any two:

 $(6 \times 2 = 12)$ 

- a) Estimate the main dimensions of core for a 100 KVA, 11 KV/415 V, 50 Hz, three phase core transformer. EMF/turn = 5 V, stacking factor = 0.9, a flux density of 1.4 wb/m², current density of 2.6A/Sq. mm, window space factor of 0.3, use three stepped core.
- b) Design cooling arrangement for 250 KVA, 6600/400 V, 50 Hz, three phase delta/star oil immersed natural cooled transformer with the following data:
  - i) Winding temperature rise not be exceed 50°C
  - ii) Total losses at 90°C are 5 KW
  - iii) Tank dimensions  $H \times W \times L = 125 \times 100 \times 50$  (all in cm)
  - iv) Oil level = 1.15 cm.

Sketch the diagram to show the cooling arrangement.

c) Why stepped cores are used in transformer? Explain different core section used for transformer.



### SECTION - II

### 4. Solve any four:

 $(4 \times 4 = 16)$ 

- a) What are different factors for making the choice of specific loading for an alternator?
- b) Derive an expression for Dispersion coefficient in an induction motor.
- c) An 11 KW, 3-phase, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing a 9 conductors. Calculate the value of bar and end ring current. The number of rotor bars is 64. The machine has the efficiency of 0.86 and power factor of 0.82. The rotor MMF = 85% stator MMF. Also find the bar and end ring section if current density is 5A/mm<sup>2</sup>.
- d) Explain the concept of B60 in an induction motor.
- e) Discuss the factors that determine the choice of air gap length in induction motor.

### 5. Solve any two:

 $(6 \times 2 = 12)$ 

- a) Explain procedure to draw circle diagram of 3 \$\phi\$ induction motor.
- b) Determine the no. of stator and rotor slots, no. of rotor conductor and area of 30 KW, 3-phase, 50 Hz, 400 V, 6 poles slip ring induction motor.
   D = 40 cm, efficiency = 0.8, power factor = 0.8, flux per pole = 12.4 mWb, current density = 4 A/mm², winding factor = 0.96, rotor voltage at slip ring at standstill about 200 V.
- c) Derive the expression for bar current and end ring current for a three phase induction motor.

Set P

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### B.E. (Electrical and Electronics Engg.) (Part – II) (New) (CGPA) Examination, 2018 **ELECTRICAL MACHINE DESIGN**

Total Marks: 70 Day and Date: Thursday, 17-5-2018

Time: 2.30 p.m. to 5.30 p.m.

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

- 2) **Assume** the suitable data **whenever** necessary.
- 3) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each guestion 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:

 $(1\times14=14)$ 

- 1) In an alternator, which of the following coils will have EMF closer to sine waveform?
  - A) Concentrated winding in full pitch coils
  - B) Concentrated winding in short pitch coils
  - C) Distributed winding in full pitch coils
  - D) Distributed winding in short pitch coils
- 2) 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

3) The dimensions of a dc machine primarily depend on

A) KW output

B) Work done per revolution

C) Exposed surface

D) None of the above

4) The heat generated in the transformer is dissipated to the surroundings mainly by

A) Conduction

B) Convection C) Radiation

D) All of the above

5)	induction motors of			vhile designing
	A) Larger output		B) Larger diame	eter of rotor
	C) Both A) and B) a	above	D) None of the a	above
6)	When D is the diam	or can be obtaine	d when $(P = no. c)$	of poles)
	A) D = L	B) $D = PF$	C) $D = \sqrt{(PL)}$	D) D = 1.35 P $\sqrt{L}$
7)	The average value range	of specific electric	c loading of induc	tion motors is in the
	A) 5000 to 45000 a	mpere conductor	s/meter	
	B) 50 to 450 amper			
	C) 500 to 4500 amp			
0)	D) 5 to 50 ampere			
8)	The material used f		_	D) Cilicon stool
٥)	A) Cast iron	•	•	,
9)	The power factor of magnetizing curren		tor will be	if the
	A) Low, low	B) High, high	C) High, low	D) Low, high
10)	Turbo-alternators a	re of		
	A) Salient	B) Non-Salient	C) Circular	D) None of the above
11)	Iron losses of a ma	chine are		
	A) Directly proportion	onal to flux densit	у	
	B) Directly proportion	onal to the square	e of flux density	
	C) Inversely propor	tional to flux dens	sity	
	D) Inversely propor	tional to the squa	re of flux density	
12)	Which is non-magn	etic material ?		
	A) Nickel	B) Cobalt	C) Aluminium	D) Gadolinium
13)	In electrical machin magnets is	es, the material p	referred for pole	shoes of electro-
	A) Pure iron	B) Aluminium	C) Copper	D) Lead
14)	The percentage of	silicon in transforr	mer stampings is	usually limited to
	A) 0.4%	B) 1.4%	C) 4%	D) 14%



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## B.E. (Electrical and Elctronics Engg.) (Part – II) (New) (CGPA) Examination, 2018 ELECTRICAL MACHINE DESIGN

Day and Date: Thursday, 17-5-2018

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

2) **Assume** the suitable data **whenever** necessary.

SECTION - I

### 2. Solve any four:

 $(4 \times 4 = 16)$ 

Marks: 56

- a) Explain the different magnetic materials used for electrical machines.
- b) Explain various types of windings used in transformer.
- c) Estimate no load current per phase for 6600/400 V, 50 Hz, single phase core type transformer from following data:

Net cross section area of iron =  $130 \text{ cm}^2$ , maximum flux density =  $1.2 \text{ wb/m}^2$ , mean length of flux path = 270 cm, specific iron loss = 2.1 W/kg, specific gravity of iron = 7.5 gm/cc, effect of joints = air gap of 1 mm.

- d) Explain the choice of flux density and choice of current density in designing of transformer.
- e) Derive an output equation of 1 phase shell type transformer.

### 3. Solve **any two**:

 $(6 \times 2 = 12)$ 

- a) Estimate the main dimensions of core for a 100 KVA, 11 KV/415 V, 50 Hz, three phase core transformer. EMF/turn = 5 V, stacking factor = 0.9, a flux density of 1.4 wb/m², current density of 2.6A/Sq. mm, window space factor of 0.3, use three stepped core.
- b) Design cooling arrangement for 250 KVA, 6600/400 V, 50 Hz, three phase delta/star oil immersed natural cooled transformer with the following data:
  - i) Winding temperature rise not be exceed 50°C
  - ii) Total losses at 90°C are 5 KW
  - iii) Tank dimensions  $H \times W \times L = 125 \times 100 \times 50$  (all in cm)
  - iv) Oil level = 1.15 cm.

Sketch the diagram to show the cooling arrangement.

c) Why stepped cores are used in transformer? Explain different core section used for transformer.



### SECTION - II

### 4. Solve any four:

 $(4 \times 4 = 16)$ 

- a) What are different factors for making the choice of specific loading for an alternator?
- b) Derive an expression for Dispersion coefficient in an induction motor.
- c) An 11 KW, 3-phase, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing a 9 conductors. Calculate the value of bar and end ring current. The number of rotor bars is 64. The machine has the efficiency of 0.86 and power factor of 0.82. The rotor MMF = 85% stator MMF. Also find the bar and end ring section if current density is 5A/mm<sup>2</sup>.
- d) Explain the concept of B60 in an induction motor.
- e) Discuss the factors that determine the choice of air gap length in induction motor.

### 5. Solve any two:

 $(6 \times 2 = 12)$ 

- a) Explain procedure to draw circle diagram of 3 φ induction motor.
- b) Determine the no. of stator and rotor slots, no. of rotor conductor and area of 30 KW, 3-phase, 50 Hz, 400 V, 6 poles slip ring induction motor.
   D = 40 cm, efficiency = 0.8, power factor = 0.8, flux per pole = 12.4 mWb, current density = 4 A/mm², winding factor = 0.96, rotor voltage at slip ring at standstill about 200 V.
- c) Derive the expression for bar current and end ring current for a three phase induction motor.

Set Q

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### B.E. (Electrical and Electronics Engg.) (Part – II) (New) (CGPA) Examination, 2018 **ELECTRICAL MACHINE DESIGN**

Day and Date : Thursday, 17-5-2018	Total Marks: 70
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Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Assume the suitable data whenever 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

	7	op of Page.							
		MCQ/Objective	Type Questions						
Dur	ation : 30 Minutes			Mar	ks : 14				
1.	Choose the correct a	nswer:		(1×1	14=14)				
	1) Which is non-mag	netic material?							
	A) Nickel	B) Cobalt	C) Aluminium	D) Gadolinium					
	In electrical mach magnets is	ines, the material	preferred for pole	shoes of electro-					
	A) Pure iron	B) Aluminium	C) Copper	D) Lead					
	3) The percentage o	f silicon in transfo	rmer stampings is	usually limited to					
	A) 0.4%	B) 1.4%	C) 4%	D) 14%					
	4) In an alternator, which of the following coils will have EMF closer to sine waveform?								
A) Concentrated winding in full pitch coils									
	B) Concentrated	winding in short pi	tch coils						
	<ul><li>C) Distributed win</li></ul>	iding in full pitch c	oils						
	D) Distributed win	iding in short pitch	coils						

: 14

5)	In transformers, the cylindrical winding with rectangular conductors is generally used for						
	A) Low voltage win	ding	B)	High voltage	win	ding	
	C) Tertiary voltage	winding	D)	Any of the ab	ove	)	
6)	The dimensions of a dc machine primarily depend on						
	A) KW output		B)	Work done p	er re	evolution	
	C) Exposed surface	е	D)	None of the a	abov	ve .	
7)	The heat generated in the transformer mainly by			er is dissipated to the surroundings			
	A) Conduction	B) Convection	C)	Radiation	D)	All of the above	
8)	Larger values of air gap flux density can be adopted while designing induction motors of						
	A) Larger output		B)	Larger diame	eter	of rotor	
	C) Both A) and B) a	above	D)	None of the a	abov	ve .	
9)		Then D is the diameter and L is the length of rotor of an induction motor, e best power factor can be obtained when $(P = no. of poles)$					
	A) $D = L$	B) D = PF	C)	$D = \sqrt{(PL)}$	D)	$D = 1.35 P\sqrt{L}$	
10)	The average value of specific electric loading of induction motors is in the range  A) 5000 to 45000 ampere conductors/meter  B) 50 to 450 ampere conductors/meter  C) 500 to 4500 ampere conductors/meter  D) 5 to 50 ampere conductors/meter						
11)	The material used to	for making perma	nen	t magnet is			
	A) Cast iron	B) Soft steel	C)	Hard steel	D)	Silicon steel	
12)	The power factor of magnetizing current		otor -	will be		if the	
	A) Low, low	B) High, high	C)	High, low	D)	Low,high	
13)	Turbo-alternators a	re of					
	A) Salient	B) Non-Salient	C)	Circular	D)	None of the above	
14)	Iron losses of a machine are						
	A) Directly proportional to flux density						
	B) Directly proportional to the square of flux density						
	C) Inversely proportional to flux density						
	D) Inversely proportional to the square of flux density						



Seat	
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## B.E. (Electrical and Elctronics Engg.) (Part – II) (New) (CGPA) Examination, 2018 ELECTRICAL MACHINE DESIGN

Day and Date: Thursday, 17-5-2018

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

2) Assume the suitable data whenever necessary.

SECTION - I

### 2. Solve any four:

 $(4 \times 4 = 16)$ 

Marks: 56

- a) Explain the different magnetic materials used for electrical machines.
- b) Explain various types of windings used in transformer.
- c) Estimate no load current per phase for 6600/400 V, 50 Hz, single phase core type transformer from following data:

Net cross section area of iron =  $130 \text{ cm}^2$ , maximum flux density =  $1.2 \text{ wb/m}^2$ , mean length of flux path = 270 cm, specific iron loss = 2.1 W/kg, specific gravity of iron = 7.5 gm/cc, effect of joints = air gap of 1 mm.

- d) Explain the choice of flux density and choice of current density in designing of transformer.
- e) Derive an output equation of 1 phase shell type transformer.

### 3. Solve any two:

 $(6 \times 2 = 12)$ 

- a) Estimate the main dimensions of core for a 100 KVA, 11 KV/415 V, 50 Hz, three phase core transformer. EMF/turn = 5 V, stacking factor = 0.9, a flux density of 1.4 wb/m², current density of 2.6A/Sq. mm, window space factor of 0.3, use three stepped core.
- b) Design cooling arrangement for 250 KVA, 6600/400 V, 50 Hz, three phase delta/star oil immersed natural cooled transformer with the following data:
  - i) Winding temperature rise not be exceed 50°C
  - ii) Total losses at 90°C are 5 KW
  - iii) Tank dimensions  $H \times W \times L = 125 \times 100 \times 50$  (all in cm)
  - iv) Oil level = 1.15 cm.

Sketch the diagram to show the cooling arrangement.

c) Why stepped cores are used in transformer? Explain different core section used for transformer.

### 

### SECTION - II

### 4. Solve any four:

 $(4 \times 4 = 16)$ 

- a) What are different factors for making the choice of specific loading for an alternator?
- b) Derive an expression for Dispersion coefficient in an induction motor.
- c) An 11 KW, 3-phase, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing a 9 conductors. Calculate the value of bar and end ring current. The number of rotor bars is 64. The machine has the efficiency of 0.86 and power factor of 0.82. The rotor MMF = 85% stator MMF. Also find the bar and end ring section if current density is 5A/mm<sup>2</sup>.
- d) Explain the concept of B60 in an induction motor.
- e) Discuss the factors that determine the choice of air gap length in induction motor.

### 5. Solve any two:

 $(6 \times 2 = 12)$ 

- a) Explain procedure to draw circle diagram of 3 φ induction motor.
- b) Determine the no. of stator and rotor slots, no. of rotor conductor and area of 30 KW, 3-phase, 50 Hz, 400 V, 6 poles slip ring induction motor.
   D = 40 cm, efficiency = 0.8, power factor = 0.8, flux per pole = 12.4 mWb, current density = 4 A/mm², winding factor = 0.96, rotor voltage at slip ring at standstill about 200 V.
- c) Derive the expression for bar current and end ring current for a three phase induction motor.

Set R



### B.E. (Electrical and Electronics Engg.) (Part – II) (New) (CGPA) Examination, 2018 **ELECTRICAL MACHINE DESIGN**

Day and Date: Thursday, 17-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Assume the suitable data whenever 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.

	I	MCQ/Objective T	ype Questions		
Dura	ation : 30 Minutes			Marks: 14	1
1.	Choose the correct ar	nswer:		(1×14=14)	)
	1) The dimensions of	a dc machine pri	marily depend or	1	
	A) KW output		B) Work done	per revolution	
	C) Exposed surfac	e	D) None of the	above	
	2) The heat generate mainly by	d in the transform	er is dissipated to	o the surroundings	
	A) Conduction	B) Convection	C) Radiation	D) All of the above	
	3) Larger values of ai induction motors o	• .	can be adopted	while designing	
	A) Larger output		B) Larger diam	eter of rotor	
	C) Both A) and B)	above	D) None of the	above	
	4) When D is the diar the best power fac				
	A) $D = L$	B) D = PF	C) $D = \sqrt{(PL)}$	D) D = 1.35 P $\sqrt{L}$	

14



5)	The average value range	of specific electric	c loading of induc	ction motors is in the
	A) 5000 to 45000 a	mpere conductor	s/meter	
	B) 50 to 450 amper	e conductors/me	ter	
	C) 500 to 4500 amp			
	D) 5 to 50 ampere of	conductors/meter	•	
6)	The material used for	or making perma	nent magnet is	
	A) Cast iron	B) Soft steel	C) Hard steel	D) Silicon steel
7)	The power factor of magnetizing current			if the
	A) Low, low	B) High, high	C) High, low	D) Low,high
8)	Turbo-alternators ar	re of		
	A) Salient	B) Non-Salient	C) Circular	D) None of the above
9)	Iron losses of a mad	chine are		
	A) Directly proportion	onal to flux densit	ty	
	B) Directly proportion	onal to the square	e of flux density	
	C) Inversely proport	tional to flux dens	sity	
	D) Inversely proport	tional to the squa	re of flux density	
10)	Which is non-magne	etic material ?		
	A) Nickel	B) Cobalt	C) Aluminium	D) Gadolinium
11)	In electrical machine magnets is	es, the material p	oreferred for pole	shoes of electro-
	A) Pure iron	B) Aluminium	C) Copper	D) Lead
12)	The percentage of s	silicon in transfori	mer stampings is	usually limited to
	A) 0.4%	B) 1.4%	C) 4%	D) 14%
13)	In an alternator, whi waveform ?	ich of the followin	ng coils will have	EMF closer to sine
	A) Concentrated wi	nding in full pitch	coils	
	B) Concentrated wi	nding in short pite	ch coils	
	C) Distributed windi	ng in full pitch co	oils	
	D) Distributed windi	ng in short pitch	coils	
14)	In transformers, the generally used for	cylindrical windir	ng with rectangul	ar conductors is
	A) Low voltage wind	ding	B) High voltage	winding
	C) Tertiary voltage	winding	D) Any of the al	oove



Seat	
No.	

## B.E. (Electrical and Elctronics Engg.) (Part – II) (New) (CGPA) Examination, 2018 ELECTRICAL MACHINE DESIGN

Day and Date: Thursday, 17-5-2018

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

2) Assume the suitable data whenever necessary.

SECTION - I

### 2. Solve any four:

 $(4 \times 4 = 16)$ 

Marks: 56

- a) Explain the different magnetic materials used for electrical machines.
- b) Explain various types of windings used in transformer.
- c) Estimate no load current per phase for 6600/400 V, 50 Hz, single phase core type transformer from following data:

Net cross section area of iron =  $130 \text{ cm}^2$ , maximum flux density =  $1.2 \text{ wb/m}^2$ , mean length of flux path = 270 cm, specific iron loss = 2.1 W/kg, specific gravity of iron = 7.5 gm/cc, effect of joints = air gap of 1 mm.

- d) Explain the choice of flux density and choice of current density in designing of transformer.
- e) Derive an output equation of 1 phase shell type transformer.

### 3. Solve **any two**:

 $(6 \times 2 = 12)$ 

- a) Estimate the main dimensions of core for a 100 KVA, 11 KV/415 V, 50 Hz, three phase core transformer. EMF/turn = 5 V, stacking factor = 0.9, a flux density of 1.4 wb/m², current density of 2.6A/Sq. mm, window space factor of 0.3, use three stepped core.
- b) Design cooling arrangement for 250 KVA, 6600/400 V, 50 Hz, three phase delta/star oil immersed natural cooled transformer with the following data:
  - i) Winding temperature rise not be exceed 50°C
  - ii) Total losses at 90°C are 5 KW
  - iii) Tank dimensions  $H \times W \times L = 125 \times 100 \times 50$  (all in cm)
  - iv) Oil level = 1.15 cm.

Sketch the diagram to show the cooling arrangement.

c) Why stepped cores are used in transformer? Explain different core section used for transformer.

### 

#### SECTION - II

### 4. Solve any four:

 $(4 \times 4 = 16)$ 

- a) What are different factors for making the choice of specific loading for an alternator?
- b) Derive an expression for Dispersion coefficient in an induction motor.
- c) An 11 KW, 3-phase, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing a 9 conductors. Calculate the value of bar and end ring current. The number of rotor bars is 64. The machine has the efficiency of 0.86 and power factor of 0.82. The rotor MMF = 85% stator MMF. Also find the bar and end ring section if current density is 5A/mm<sup>2</sup>.
- d) Explain the concept of B60 in an induction motor.
- e) Discuss the factors that determine the choice of air gap length in induction motor.

### 5. Solve any two:

 $(6 \times 2 = 12)$ 

- a) Explain procedure to draw circle diagram of 3 φ induction motor.
- b) Determine the no. of stator and rotor slots, no. of rotor conductor and area of 30 KW, 3-phase, 50 Hz, 400 V, 6 poles slip ring induction motor.
   D = 40 cm, efficiency = 0.8, power factor = 0.8, flux per pole = 12.4 mWb, current density = 4 A/mm², winding factor = 0.96, rotor voltage at slip ring at standstill about 200 V.
- c) Derive the expression for bar current and end ring current for a three phase induction motor.

Set S



Seat	Set	D
No.	Set	

Day and Date: Saturday, 19-5-2018	Total Marks : 70
Time: 2.30 p.m. to 5.30 p.m.	

- Instructions: 1) All questions are compulsory.
  - 2) Figure to the right indicates maximum marks.
  - 3) Assume the suitable data whenever necessary.
  - 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

Duratio	on : 30 Minutes			Marks: 14
1. Ch	oose the correct answer:			(1×14=14)
1)	industries are rui	n by family mem	bers.	
ŕ	a) Cottage	b) SSI		
	c) Tiny	d) Large sc	ale industries	
2)	Micro economy deals with			
	a) Whole economy	b) Smaller	unit of economy	
	c) Only public sector	d) Only priv	ate sector	
3)	Under perfect competition, price demand and	ce is determined	I by the interaction	of total
	a) Total supply	b) Total cos	st	
	c) Total utility	d) Total pro	duction	
4)	The short run Average Cost Cu	ırve is	shaped.	
	a) V b) U	c) L	d) Any of the	above

5)	) In function of management the actual performance of sub ordinates is guided towards common goal.		
	<ul><li>a) Staffing</li><li>c) Leadership</li></ul>	•	Controlling Directing
6)	When a firm's average revenue is a) Super profit c) Sub-normal profit	b)	al to its average cost, it gets Normal profit None of the above
7)	are called as mini indu	stri	es.
	a) SSI b) Cottage	c)	Tiny d) None of these
8)	a) Self-confidence c) Foresightness	rene b) d)	eur. Risk takeover All of these
9)	The main disadvantage of line organical and the second of the level executives have to do b) Structure is rigid c) Communication delays occur d) All of the above		
10)	The most popular type of organisa Constructions is a) Line organization c) Functional organization	b)	used for Civil Engineering  Line and staff organisation  Effective organization
11)	Routing prescribes the a) Flow of material in the plant c) Proper utilization of machines	•	•
12)	<ul><li>In inventory control, the economic</li><li>a) Optimum lot size</li><li>b) Highest level of inventory</li><li>c) Lot corresponding to break-eve</li><li>d) Capability of a plant to produce</li></ul>	n p	
13)	The appellate authority for an indu a) Management c) High court/Supreme Court	b)	al dispute is Labour court Board of directors
14)	The management of thefo in nature.	rm (	of business organization is totalitarian
	<ul><li>a) Cooperative</li><li>c) Individual proprietorship</li></ul>	,	Partnership All of the above



Seat	
No.	

Day and Date: Saturday, 19-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

- 2) Figure to the **right** indicates **maximum** marks.
- 3) Assume the suitable data whenever necessary.

SECTION - I

### 2. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain in detail line and staff organization.
- 2) Explain Partnership Organization.
- 3) Explain make and buy decision.
- 4) Write short notes on economic lot size.
- 5) Explain the Science and Technological Development of Country.

### 3. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Explain macro and micro economy in brief.
- 2) Explain the Science and Technological Development of Country.
- 3) Define value engineering and value analysis in brief along with advantages.

### SECTION - II

4. Solve any four: (4×4=16)

- 1) Explain rules and advantages of industrial safety.
- 2) Explain staffing and controlling in the organization.
- 3) Describe importance of industrial management.
- 4) Write a short note on project planning tools.
- 5) State and explain the qualities of entrepreneur in brief.
- 5. Solve any two: (6×2=12)
  - 1) Write the salient features of Indian Electricity Act, 2003.
  - 2) Explain detail procedure for formation of public limited company.
  - 3) Explain the management information system in detail.

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Seat	Sot	
No.	Set	Q

Day and Date: Saturday, 19-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

- 2) Figure to the **right** indicates **maximum** marks.
- 3) Assume the suitable data whenever necessary.
- 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	on : 30 Minutes		Marks: 14
1. Cł	noose the correct answer :		(1×14=14)
1)	<ul><li>a) are qualities of Entral</li><li>a) Self-confidence</li><li>c) Foresightness</li></ul>	repreneur. b) Risk takeover d) All of these	
2)	<ul> <li>The main disadvantage of line a) Top level executives have to</li> <li>b) Structure is rigid</li> <li>c) Communication delays occur</li> <li>d) All of the above</li> </ul>	o do excessive work	
3)	<ul> <li>The most popular type of organ</li> <li>Constructions is</li> <li>a) Line organization</li> <li>c) Functional organization</li> </ul>	b) Line and staff organisation d) Effective organization	



4)	Routing prescribes the a) Flow of material in the plant c) Proper utilization of machines	<ul><li>b) Proper utilization of man power</li><li>d) Inspection of final product</li></ul>
5)	In inventory control, the economic a) Optimum lot size b) Highest level of inventory c) Lot corresponding to break-eve d) Capability of a plant to produce	en point
6)	The appellate authority for an indual Amanagement c) High court/Supreme Court	b) Labour court
7)	in nature.	orm of business organization is totalitarian b) Partnership
	<ul><li>a) Cooperative</li><li>c) Individual proprietorship</li></ul>	d) All of the above
8)	industries are run by	
	<ul><li>a) Cottage</li><li>c) Tiny</li></ul>	<ul><li>b) SSI</li><li>d) Large scale industries</li></ul>
9)	Micro economy deals with	
	<ul><li>a) Whole economy</li><li>c) Only public sector</li></ul>	<ul><li>b) Smaller unit of economy</li><li>d) Only private sector</li></ul>
10)	• • • • •	s determined by the interaction of total
	demand and a) Total supply	b) Total cost
	c) Total utility	d) Total production
11)	The short run Average Cost Curve	
12\	a) V b) U	c) L d) Any of the above gement the actual performance of sub-
12)	ordinates is guided towards comma) Staffing	on goal. b) Controlling
13)	c) Leadership When a firm's average revenue is	d) Directing equal to its average cost, it gets
10)	<ul><li>a) Super profit</li><li>c) Sub-normal profit</li></ul>	b) Normal profit
14)	are called as mini indu	
	a) SSI b) Cottage	c) Tiny d) None of these



Seat	
No.	

Day and Date: Saturday, 19-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

- 2) Figure to the **right** indicates **maximum** marks.
- 3) Assume the suitable data whenever necessary.

#### SECTION - I

### 2. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain in detail line and staff organization.
- 2) Explain Partnership Organization.
- 3) Explain make and buy decision.
- 4) Write short notes on economic lot size.
- 5) Explain the Science and Technological Development of Country.

### 3. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Explain macro and micro economy in brief.
- 2) Explain the Science and Technological Development of Country.
- 3) Define value engineering and value analysis in brief along with advantages.

### SECTION - II

4. Solve any four: (4×4=16)

- 1) Explain rules and advantages of industrial safety.
- 2) Explain staffing and controlling in the organization.
- 3) Describe importance of industrial management.
- 4) Write a short note on project planning tools.
- 5) State and explain the qualities of entrepreneur in brief.
- 5. Solve any two: (6×2=12)
  - 1) Write the salient features of Indian Electricity Act, 2003.
  - 2) Explain detail procedure for formation of public limited company.
  - 3) Explain the management information system in detail.

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Seat	Cat	В
No.	Set	K

Day and Date: Saturday,	19-5-2018	Total Marks: 70
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Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Figure to the **right** indicates **maximum** marks.
- 3) Assume the suitable data whenever necessary.
- 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

Dura	ation : 30 Minu	tes		Marks: 14	
1.	1. Choose the correct answer:				
	,	s guided towards con	•	•	
	2) When a firm a) Super p c) Sub-nor	rofit	is equal to its a b) Normal p d) None of		
	3)a) SSI	are called as mini in b) Cottage		d) None of these	
	a) Self-cor c) Foresig		epreneur. b) Risk take d) All of the		



5)	The main disadvantage of line organisation is  a) Top level executives have to do excessive work b) Structure is rigid c) Communication delays occur d) All of the above		
6)	The most popular type of organisa Constructions is	tior	used for Civil Engineering
	<ul><li>a) Line organization</li><li>c) Functional organization</li></ul>		Line and staff organisation Effective organization
7)	Routing prescribes the a) Flow of material in the plant c) Proper utilization of machines	•	· · · · · · · · · · · · · · · · · · ·
8)	In inventory control, the economic a) Optimum lot size b) Highest level of inventory c) Lot corresponding to break-eve d) Capability of a plant to produce	n p	
9)	The appellate authority for an indu a) Management c) High court/Supreme Court	b)	Labour court
10)	The management of thefo in nature.	rm	of business organization is totalitarian
	<ul><li>a) Cooperative</li><li>c) Individual proprietorship</li></ul>		Partnership All of the above
11)	industries are run by		
	<ul><li>a) Cottage</li><li>c) Tiny</li></ul>	•	SSI Large scale industries
12)	Micro economy deals with a) Whole economy c) Only public sector		Smaller unit of economy Only private sector
13)	Under perfect competition, price is demand and	s d	etermined by the interaction of total
	a) Total supply c) Total utility	,	Total cost Total production
14)	The short run Average Cost Curve		
	a) V b) U	c)	L d) Any of the above



Seat	
No.	

Day and Date: Saturday, 19-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

- 2) Figure to the **right** indicates **maximum** marks.
- 3) Assume the suitable data whenever necessary.

SECTION - I

### 2. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain in detail line and staff organization.
- 2) Explain Partnership Organization.
- 3) Explain make and buy decision.
- 4) Write short notes on economic lot size.
- 5) Explain the Science and Technological Development of Country.

### 3. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Explain macro and micro economy in brief.
- 2) Explain the Science and Technological Development of Country.
- 3) Define value engineering and value analysis in brief along with advantages.

### SECTION - II

4. Solve any four: (4×4=16)

- 1) Explain rules and advantages of industrial safety.
- 2) Explain staffing and controlling in the organization.
- 3) Describe importance of industrial management.
- 4) Write a short note on project planning tools.
- 5) State and explain the qualities of entrepreneur in brief.
- 5. Solve any two: (6×2=12)
  - 1) Write the salient features of Indian Electricity Act, 2003.
  - 2) Explain detail procedure for formation of public limited company.
  - 3) Explain the management information system in detail.

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Seat	
No.	

### B.E. (Electrical and Electronics Engineering) (Part – II) (New CGPA) Examination, 2018 ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date: Saturday, 19-5-2018 Total Marks: 70

Time: 2.30 p.m. to 5.30 p.m.

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

- 2) Figure to the **right** indicates **maximum** marks.
- 3) **Assume** the suitable data **whenever** necessary.
- 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:

 $(1 \times 14 = 14)$ 

- 1) The most popular type of organisation used for Civil Engineering Constructions is
  - a) Line organization

- b) Line and staff organisation
- c) Functional organization
- d) Effective organization
- 2) Routing prescribes the
  - a) Flow of material in the plant
- b) Proper utilization of man power
- c) Proper utilization of machines d) Inspection of final product
- 3) In inventory control, the economic order quantity is the
  - a) Optimum lot size
  - b) Highest level of inventory
  - c) Lot corresponding to break-even point
  - d) Capability of a plant to produce

4)	The appellate authority for an inca) Management c) High court/Supreme Court	b) Labour court		
5)	in nature.	form of business organization is totalitarian		
	<ul><li>a) Cooperative</li><li>c) Individual proprietorship</li></ul>	b) Partnership		
- \				
6)	industries are run			
	<ul><li>a) Cottage</li><li>c) Tiny</li></ul>	<ul><li>b) SSI</li><li>d) Large scale industries</li></ul>		
7)	Micro economy deals with	d) Large codic induction		
,,	a) Whole economy	b) Smaller unit of economy		
	<ul><li>a) Whole economy</li><li>c) Only public sector</li></ul>	d) Only private sector		
8)		is determined by the interaction of total		
	,	b) Total cost		
	c) Total utility	d) Total production		
9)	The short run Average Cost Curv			
	•	c) L d) Any of the above		
10)		agement the actual performance of sub-		
	ordinates is guided towards com a) Staffing	b) Controlling		
	c) Leadership	d) Directing		
11)	•	s equal to its average cost, it gets		
,				
	<ul><li>a) Super profit</li><li>c) Sub-normal profit</li></ul>	d) None of the above		
12)	are called as mini inc	dustries.		
	a) SSI b) Cottage	c) Tiny d) None of these		
13)	are qualities of Entre	•		
	a) Self-confidence	b) Risk takeover		
	c) Foresightness	d) All of these		
14)	The main disadvantage of line or a) Top level executives have to b) Structure is rigid c) Communication delays occur d) All of the above			



Seat	
No.	

Day and Date: Saturday, 19-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

Instructions: 1) All questions are compulsory.

- 2) Figure to the **right** indicates **maximum** marks.
- 3) Assume the suitable data whenever necessary.

#### SECTION - I

### 2. Solve any four:

 $(4 \times 4 = 16)$ 

- 1) Explain in detail line and staff organization.
- 2) Explain Partnership Organization.
- 3) Explain make and buy decision.
- 4) Write short notes on economic lot size.
- 5) Explain the Science and Technological Development of Country.

### 3. Solve any two:

 $(6 \times 2 = 12)$ 

- 1) Explain macro and micro economy in brief.
- 2) Explain the Science and Technological Development of Country.
- 3) Define value engineering and value analysis in brief along with advantages.

### SECTION - II

4. Solve any four: (4×4=16)

- 1) Explain rules and advantages of industrial safety.
- 2) Explain staffing and controlling in the organization.
- 3) Describe importance of industrial management.
- 4) Write a short note on project planning tools.
- 5) State and explain the qualities of entrepreneur in brief.
- 5. Solve any two: (6×2=12)
  - 1) Write the salient features of Indian Electricity Act, 2003.
  - 2) Explain detail procedure for formation of public limited company.
  - 3) Explain the management information system in detail.

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Seat	
No.	

Set P

### B.E. (E&E) (Part – II) (New CGPA) Examination, 2018 Elective – II: ENERGY CONSERVATION AND AUDITING

Day	and Date	: Tuesday, 22-5-2018	Max. Marks : 70
<del></del> -	0.00	. 5.00	

Time: 2.30 p.m. to 5.30 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.

		Top of Page.		
		MCQ/Objective Ty	pe Questions	
Dur	atio	n : 30 Minutes	Marks: 14	
1.	1. Choose the correct answer:			
	1)	The judicious and effective use of encompetitive positions this can be the		
		a) Energy conservation	b) Energy management	
		c) Energy policy	d) Energy audit	
	2)	Which of the following would be of imenergy management programme?	portance in the success of an	
		a) Communication b) Awareness	c) Motivation d) All of these	
	3)	Which of the following is not consider	ed for external bench marking?	
		a) Scale of operation	b) Vintage of technology	
		c) Energy price	d) Quality of raw material and products	
4) The legal frame work for energy efficiency in India is given by			ency in India is given by	
		a) Electricity Act, 2003	b) Electricity Conservation Act, 2001	
		c) Electricity Act, 1958	d) Indian Electricity Act, 1910	
	5)	The ratio of current year's production	to the reference year's production is	
		a) Demand factor	b) Production factor	
		c) Utilization factor	d) Load factor	

6)	What does the concept of true value of money imply?					
	<ul> <li>a) Present value of money</li> </ul>		b)	b) Future value of money		
	c) Discounting of cas	sh flows	d)	All of these		
7)	The major source of	electrical power	gei	neration in Ind	ia is	
	a) Thermal	o) Hydel	c)	Nuclear	d) Wind	
8)	One unit of Electricity	is equivalent to			Kcal heat units.	
	a) 800	o) 860	c)	400	d) 680	
9)	An Energy policy progoal and integrating					
	a) Budget		b)	Delivery mech	hanism	
	c) Action plan		d)	Foundation		
10)	One tonne of oil equi	valent is				
	a) 10,000 Kcal	o) 1000 Kcal	c)	1000 kg. of oi	il d) 10,000 Mcal	
11)	When the current lag caused mainly due to	_		alternating cur	rent system it is	
	a) Resistive load		b)	Capacitive loa	ad	
	c) Inductive load		d)	None of the a	bove	
12)	The proposed interna	ational standard	for	energy manag	gement is	
	a) ISO 9001	a) ICO 14000		100 14001	D 100 -001	
	a) 150 9001	) 15O 14000	C)	150 14001	d) ISO 5001	
13)	Energy intensity is th	,	,		d) ISO 5001	
13)	,	e ratio of			,	
13)	Energy intensity is th	e ratio of /GDP	b)	GDP/Fuel co	nsumption	
ŕ	Energy intensity is that a) Fuel consumption	e ratio of /GDP sumption	b) d)	GDP/Fuel con	nsumption umption/GDP	
ŕ	Energy intensity is that a) Fuel consumption c) GDP/Energy cons	e ratio of /GDP sumption P rating of a mo	b) d) tor	GDP/Fuel conestindicates	nsumption umption/GDP	
ŕ	Energy intensity is that a) Fuel consumption c) GDP/Energy constant Name plate KW or H	e ratio of /GDP sumption P rating of a motor	b) d) tor b)	GDP/Fuel con Energy consuindicates Output KW of	nsumption umption/GDP	



Seat	
No.	

## B.E. (E&E) (Part – II) (New CGPA) Examination, 2018 Elective – II: ENERGY CONSERVATION AND AUDITING

Day and Date: Tuesday, 22-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

Instruction: Attempt any two questions from each Section.

### SECTION - I

### 2. Solve any three questions:

 $(3 \times 4 = 12)$ 

- 1) What is the difference between commercial and non-commercial energy? Give examples.
- 2) Explain the Bachat lamp Yojana Scheme.
- 3) What is meant by Energy bench marking? How it is helpful for energy audit?
- 4) Explain the difference between Energy Conservation and Energy efficiency with a suitable example.

### 3. Solve any two questions:

- 1) List ten strategic measures for meeting the future energy requirements in India.
- 2) Explain the difference between Standards and Labeling.
- 3) Write short note on:
  - a) Thermography
  - b) Smart metering.

### 

### SECTION - II

4. Answer any three questions:

 $(3 \times 4 = 12)$ 

- 1) Explain ways by which employees can be motivated on energy management.
- 2) Explain briefly the operation of ESCO.
- 3) What is the essential difference between CPM and PERT?
- 4) Explain the steps involved in project development cycle.
- 5. Answer any two questions:

- 1) List the duties and responsibilities of an energy manager.
- 2) Explain in detail the project budget planning process.
- 3) Explain what you understand by energy monitoring and targeting.

Seat	
No.	

Set Q

### B.E. (E&E) (Part – II) (New CGPA) Examination, 2018 Elective – II: ENERGY CONSERVATION AND AUDITING

Day and Date: Tuesday, 22-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 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**

			•	•			
Dur	atio	n : 30 Minutes					Marks: 14
1.	Ch	oose the correct ans	swer:				(14×1=14)
	1)	One unit of Electricit	ty is equivalent to			Kcal heat ur	nits.
		a) 800	b) 860	c) 400		d) 680	
	2)	An Energy policy progoal and integrating					
		a) Budget		b) Deli	very mec	hanism	
		c) Action plan		d) Fou	ndation		
	3)	One tonne of oil equ	iivalent is				
		a) 10,000 Kcal	b) 1000 Kcal	c) 100	0 kg. of o	il d) 10,000	Mcal
	4)	When the current lag	-		nating cur	rent system	it is
		a) Resistive load		b) Cap	acitive loa	ad	
		c) Inductive load		d) Non	e of the a	bove	
	5)	The proposed intern	ational standard	for ener	gy manag	gement is	
		a) ISO 9001	b) ISO 14000	c) ISO	14001	d) ISO 500	1
	6)	Energy intensity is the	ne ratio of				
		a) Fuel consumption	n/GDP	b) GDF	P/Fuel co	nsumption	
		c) GDP/Energy con	sumption	d) Ene	rgy consu	umption/GDP	P.T.O.

7)	Name plate KW or HP rating of a motor indicates		
	a) Input KW to the motor	b) Output KW of the motor	
	c) Minimum input KW to the motor	d) Maximum input KW to the motor	
8)	The judicious and effective use of en competitive positions this can be the		
	a) Energy conservation	b) Energy management	
	c) Energy policy	d) Energy audit	
9)	Which of the following would be of imenergy management programme?	nportance in the success of an	
	a) Communication b) Awareness	c) Motivation d) All of these	
10)	Which of the following is not consider	ered for external bench marking?	
	a) Scale of operation	b) Vintage of technology	
	c) Energy price	d) Quality of raw material and produc	cts
11)	The legal frame work for energy effic	ciency in India is given by	_
	a) Electricity Act, 2003	b) Electricity Conservation Act, 2001	1
	c) Electricity Act, 1958	d) Indian Electricity Act, 1910	
12)	The ratio of current year's production	n to the reference year's production is	
	a) Demand factor	b) Production factor	
	c) Utilization factor	d) Load factor	
13)	What does the concept of true value	of money imply ?	
	a) Present value of money	b) Future value of money	
	c) Discounting of cash flows	d) All of these	
14)	The major source of electrical power	generation in India is	_
,	•	c) Nuclear d) Wind	_



Seat	
No.	

## B.E. (E&E) (Part – II) (New CGPA) Examination, 2018 Elective – II: ENERGY CONSERVATION AND AUDITING

Day and Date: Tuesday, 22-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

Instruction: Attempt any two questions from each Section.

### SECTION - I

### 2. Solve any three questions:

 $(3 \times 4 = 12)$ 

- What is the difference between commercial and non-commercial energy?
   Give examples.
- 2) Explain the Bachat lamp Yojana Scheme.
- 3) What is meant by Energy bench marking? How it is helpful for energy audit?
- 4) Explain the difference between Energy Conservation and Energy efficiency with a suitable example.

### 3. Solve any two questions:

- 1) List ten strategic measures for meeting the future energy requirements in India.
- 2) Explain the difference between Standards and Labeling.
- 3) Write short note on:
  - a) Thermography
  - b) Smart metering.

### 

### SECTION - II

4. Answer any three questions:

 $(3 \times 4 = 12)$ 

- 1) Explain ways by which employees can be motivated on energy management.
- 2) Explain briefly the operation of ESCO.
- 3) What is the essential difference between CPM and PERT?
- 4) Explain the steps involved in project development cycle.
- 5. Answer any two questions:

 $(2 \times 8 = 16)$ 

- 1) List the duties and responsibilities of an energy manager.
- 2) Explain in detail the project budget planning process.
- 3) Explain what you understand by energy monitoring and targeting.

\_\_\_\_

Seat	
No.	

Set R

### B.E. (E&E) (Part – II) (New CGPA) Examination, 2018 Elective – II: ENERGY CONSERVATION AND AUDITING

Day and Date: Tuesday, 22-5-2018 Max. Marks: 70

Time: 2.30 p.m. to 5.30 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.

		•	Top of Page.				
			MCQ/Objective	Туре	Questions	<b>3</b>	
Dur	atio	n : 30 Minutes					Marks: 14
1.	Ch	noose the correct a	answer:				(14×1=14)
	1)	The ratio of curre	nt year's product	ion to	the referen	ce year's prod	uction is
		a) Demand facto	r	b)	Production	factor	
		c) Utilization fact	or	d)	Load facto	r	
	2)	What does the co	ncept of true val	ue of i	money imply	/?	
		a) Present value	of money	b)	Future valu	ue of money	
		c) Discounting of	cash flows	d)	All of these	)	
	3)	The major source	e of electrical pow	ver ge	neration in I	ndia is	
		a) Thermal	b) Hydel	c)	Nuclear	d) Wind	
	4)	One unit of Electr	ricity is equivalen	t to _		Kcal heat ı	units.
		a) 800	b) 860	c)	400	d) 680	
	5)	An Energy policy goal and integrati	•			• .	
		a) Budget		b)	Delivery m	echanism	
		c) Action plan		d)	Foundation	า	

6)	One tonne of oil equivalent is	
	a) 10,000 Kcal b) 1000 Kcal	c) 1000 kg. of oil d) 10,000 Mcal
7)	When the current lags the voltage in caused mainly due to	· · · · · · · · · · · · · · · · · · ·
	a) Resistive load	b) Capacitive load
	c) Inductive load	d) None of the above
8)	The proposed international standard	for energy management is
	a) ISO 9001 b) ISO 14000	c) ISO 14001 d) ISO 5001
9)	Energy intensity is the ratio of	
	a) Fuel consumption/GDP	b) GDP/Fuel consumption
	c) GDP/Energy consumption	d) Energy consumption/GDP
10)	Name plate KW or HP rating of a mo	tor indicates
	a) Input KW to the motor	b) Output KW of the motor
	c) Minimum input KW to the motor	d) Maximum input KW to the motor
11)	The judicious and effective use of en competitive positions this can be the	
	a) Energy conservation	b) Energy management
	c) Energy policy	d) Energy audit
12)	Which of the following would be of in energy management programme?	nportance in the success of an
	a) Communication b) Awareness	c) Motivation d) All of these
13)	Which of the following is not conside	red for external bench marking?
	a) Scale of operation	b) Vintage of technology
	c) Energy price	d) Quality of raw material and products
14)	The legal frame work for energy effic	iency in India is given by
	a) Electricity Act, 2003	b) Electricity Conservation Act, 2001
	c) Electricity Act, 1958	d) Indian Electricity Act, 1910



Seat	
No.	

## B.E. (E&E) (Part – II) (New CGPA) Examination, 2018 Elective – II: ENERGY CONSERVATION AND AUDITING

Day and Date: Tuesday, 22-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

Instruction: Attempt any two questions from each Section.

### SECTION - I

### 2. Solve any three questions:

 $(3 \times 4 = 12)$ 

- 1) What is the difference between commercial and non-commercial energy? Give examples.
- 2) Explain the Bachat lamp Yojana Scheme.
- 3) What is meant by Energy bench marking? How it is helpful for energy audit?
- 4) Explain the difference between Energy Conservation and Energy efficiency with a suitable example.

### 3. Solve any two questions:

- 1) List ten strategic measures for meeting the future energy requirements in India.
- 2) Explain the difference between Standards and Labeling.
- 3) Write short note on:
  - a) Thermography
  - b) Smart metering.

### 

### SECTION - II

4. Answer any three questions:

 $(3 \times 4 = 12)$ 

- 1) Explain ways by which employees can be motivated on energy management.
- 2) Explain briefly the operation of ESCO.
- 3) What is the essential difference between CPM and PERT?
- 4) Explain the steps involved in project development cycle.
- 5. Answer any two questions:

- 1) List the duties and responsibilities of an energy manager.
- 2) Explain in detail the project budget planning process.
- 3) Explain what you understand by energy monitoring and targeting.


Seat	
No.	

### B.E. (E&E) (Part – II) (New CGPA) Examination, 2018 **Elective - II: ENERGY CONSERVATION AND AUDITING**

Max. Marks: 70 Day and Date: Tuesday, 22-5-2018

Time: 2.30 p.m. to 5.30 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	
Dur	ration: 30 Minutes	Marks: 14	
1.	Choose the correct answer:	(14×1=14)	
	1) One tonne of oil equivalent is		
	a) 10,000 Kcal b) 1000 Kcal	c) 1000 kg. of oil d) 10,000 Mcal	
	When the current lags the voltage caused mainly due to	,	
	a) Resistive load	b) Capacitive load	
	c) Inductive load	d) None of the above	
	3) The proposed international standa	rd for energy management is	
	a) ISO 9001 b) ISO 14000	c) ISO 14001 d) ISO 5001	
	<ul> <li>4) Energy intensity is the ratio of</li> <li>a) Fuel consumption/GDP</li> <li>b) GDP/Fuel consumption</li> <li>c) GDP/Energy consumption</li> <li>d) Energy consumption/GDP</li> </ul>		
5) Name plate KW or HP rating of a motor indicates			
	a) Input KW to the motor	b) Output KW of the motor	
	c) Minimum input KW to the moto	r d) Maximum input KW to the motor	

6)	The judicious and effective use of energy to maximise profit and enhance competitive positions this can be the definition of				
	a) Energy conserv	ation	b)	Energy mana	gement
	c) Energy policy		d)	Energy audit	
7)	Which of the following would be of im energy management programme?		npo	rtance in the s	uccess of an
	a) Communication	b) Awareness	c)	Motivation	d) All of these
8)	Which of the follow	ring is not conside	red	for external be	ench marking?
	a) Scale of operati	on	b)	Vintage of ted	chnology
	c) Energy price		d)	Quality of raw	material and products
9) The legal frame work for energy efficiency in India is given by			iven by		
	a) Electricity Act, 2	2003	b)	Electricity Co	nservation Act, 2001
	c) Electricity Act, 1	958	d)	Indian Electri	city Act, 1910
10)	The ratio of current	t year's production	to	the reference	year's production is
	a) Demand factor		b)	Production fa	ctor
	c) Utilization factor	r	d)	Load factor	
11)	What does the con	cept of true value	of ı	money imply?	
	a) Present value o	f money	b)	Future value	of money
	c) Discounting of c	cash flows	d)	All of these	
12)	The major source of	of electrical power	ge	neration in Ind	ia is
	a) Thermal	b) Hydel	c)	Nuclear	d) Wind
13)	One unit of Electric	city is equivalent to			Kcal heat units.
	a) 800	b) 860	c)	400	d) 680
14)	An Energy policy p goal and integrating				ting performance anization's culture.
	a) Budget		b)	Delivery mec	hanism
	c) Action plan		d)	Foundation	



Seat	
No.	

## B.E. (E&E) (Part – II) (New CGPA) Examination, 2018 Elective – II: ENERGY CONSERVATION AND AUDITING

Day and Date: Tuesday, 22-5-2018 Marks: 56

Time: 2.30 p.m. to 5.30 p.m.

**Instruction**: Attempt **any two** questions from **each** Section.

### SECTION - I

### 2. Solve any three questions:

 $(3 \times 4 = 12)$ 

- 1) What is the difference between commercial and non-commercial energy? Give examples.
- 2) Explain the Bachat lamp Yojana Scheme.
- 3) What is meant by Energy bench marking? How it is helpful for energy audit?
- 4) Explain the difference between Energy Conservation and Energy efficiency with a suitable example.

### 3. Solve any two questions:

- List ten strategic measures for meeting the future energy requirements in India.
- 2) Explain the difference between Standards and Labeling.
- 3) Write short note on:
  - a) Thermography
  - b) Smart metering.

### 

### SECTION - II

4. Answer any three questions:

 $(3 \times 4 = 12)$ 

- 1) Explain ways by which employees can be motivated on energy management.
- 2) Explain briefly the operation of ESCO.
- 3) What is the essential difference between CPM and PERT?
- 4) Explain the steps involved in project development cycle.
- 5. Answer any two questions:

 $(2 \times 8 = 16)$ 

- 1) List the duties and responsibilities of an energy manager.
- 2) Explain in detail the project budget planning process.
- 3) Explain what you understand by energy monitoring and targeting.

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Seat		
No.	Set	P

B.E. (E&E) (Old) (Part - Elective – II : HIGH VOLTAGE	– II) Examination, 2018 E DC TRANSMISSION (HVDC	<b>C</b> )
Day and Date : Saturday, 12-5-2018 Time : 2.30 p.m. to 5.30 p.m.	•	л Marks : 100
<b>one</b> mark.	oulsory. It should be solved in er Book Page No. 3. Each question ejective type questions on Pag	on carries
only. Don't forget of Page.	t to mention, Q.P. Set (P/Q/R/S	) on Top
MCQ/Objective	Type Questions	
Duration: 30 Minutes		Marks: 20
1. Choose the correct answer:		(20×1=20)
1) Most frequent type of fault in DC sy	/stem is	,
<ul> <li>a) Converter internal fault</li> </ul>	b) DC line fault	
c) Commutation failure	d) Arc back and arc through	
2) A system is said to be weak if SCR		
a) Less than 3 b) Less than 1	c) More than 5 d) 3 to 5	
3) Modern HVDC systems are all	h) C plugg gapyantana	
<ul><li>a) 3-pulse converters</li><li>c) 24-pluse converters</li></ul>	<ul><li>b) 6-pluse converters</li><li>d) 12-pulse converters</li></ul>	
4) In 12- pulse connections, transform		
a) Delta/Delta (both)	iers are connected	
b) Star/Star (both)		
c) Star/Delta (both)		
d) One Star/Star and other Star/De	elta	
5) If a angle of advance is 30° and over will be	erlap angle is 12°, the extension	angle
a) 42° b) (30/2)°	c) 18° d) 21°	
6) A surge diverter is used across the	DC CB to	
<ul> <li>a) Limit recovery voltage</li> </ul>	<ul><li>b) Limit fault current</li></ul>	
c) Absorb the arc energy	d) All of the above	
7) Which of the following is a series co		
a) UPFC b) STATCOM	,	
Series compensation is primarily re     improve voltage profile		
<ul><li>a) improve voltage profile</li><li>c) reduce fault currents</li></ul>	<ul><li>b) improve stability</li><li>d) all of the above</li></ul>	
of reduce ladit currents	a) all of the above	



9)	Multi terminal systems are		
•		b) Parallel connecte	ed
		d) All of above`	
10)	HVDC transmission commercially beg	gán in the year,	
,			) 1970
11)	HVDC transmission is opted when	3, 1331	.,
,	a) Bulk power transfer is needed		
	b) Improvement of stability		
	c) Long distance and cable transmis	sion is required	
		sion is required	
10\	d) All of the above	sually on the AC eide	o oro
12)	Filters used in 12-pulse converters us		
		b) 11th, 13th and hig	
10\	Characteristic of a conventor in the re-	d) only high-pass fil	iter
13)	Characteristic of a converter is the re	_	
		b) DC output voltag	e and id
		d) None of these	
14)	The initial HVDC valves were		
		b) Thyristors	
\		d) None of above	
15)	In a monopolar system usually the po	ole is	
	a) Positive		
	b) Negative		
	c) Positive and negative		
	d) Alternatively positive and negative		
16)	Thyristor valves came into operation		
			) 2000
17)	12-pulse converters are used in mode	ern converters beca	use of
	a) Reduced current		
	b) Reduced ripple		
	c) Increased voltage and reduced ha	ırmonics	
	d) Both (b) and (c)		
18)	Power transfer in DC line depends or	1	
	a) Sending and receiving end voltage	es	
	b) Number of pulses in the rectifier		
	c) Line resistance		
	d) None of the above		
19)	The common control done in the con-	verters is	
,	a) Rectifier as both voltage and curre		
	b) Inverter as both voltage and curre		
	c) Inverter as current controller		
	d) Rectifier as voltage controller and	inverter as current of	controller
20)			
	a) IGBT valves		
	b) Light or optically triggered thyristo	r valves	
	c) Mercury arc valves		
	d) MOSFET's and GTO valves		
	a, ividdi E i dana a i d vaived		



Seat	
No.	

# B.E. (E&E) (Old) (Part – II) Examination, 2018 Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)

Day and Date: Saturday, 12-5-2018

Time: 2.30 p.m. to 5.30 p.m.

#### SECTION - I

### 2. Answer any four questions :

 $(4 \times 5 = 20)$ 

Marks: 80

- a) Write the advantages and disadvantages of HVDC transmission system.
- b) Explain the requirements of firing angle scheme and explain IPC scheme.
- c) What is misfire? Explain its causes and remedies.
- d) Explain EPC scheme in detail.
- e) Explain with neat diagram the different types of DC links.
- f) Draw and explain over current protection.

## 3. Answer any two questions:

 $(10 \times 2 = 20)$ 

- a) Draw and explain typical HVDC converter station in detail.
- b) Compare EHVAC and HVDC transmission with suitable comments.
- c) Explain the over voltage protection of converter in detail.

#### SECTION - II

# 4. Answer any four questions:

- a) Explain the current margin method for protection of MTDC system.
- b) Write short note on AC filters.
- c) Explain the voltage limiting control for MTDC system.



- d) Explain with neat diagram the working of FC-TCR.
- e) Write a short note on SVC.
- f) Explain DC filters.
- 5. Answer **any two** questions:

- a) What are the causes of generation of harmonics and what are the troubles caused by it?
- b) Derive an expression for characteristic harmonics.
- c) Explain the concept of reactive power compensation.



Seat		
No.	Set	Q

# B.E. (E&E) (Old) (Part – II) Examination, 2018 Elective – II: HIGH VOLTAGE DC TRANSMISSION (HVDC)

Day and Date: Saturday, 12-5-2018 Max. Marks: 100

Time: 2.30 p.m. to 5.30 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:

 $(20 \times 1 = 20)$ 

- 1) Thyristor valves came into operation in the year
  - a) 1950
- b) 1954
- c) 1972
- d) 2000
- 2) 12-pulse converters are used in modern converters because of
  - a) Reduced current
  - b) Reduced ripple
  - c) Increased voltage and reduced harmonics
  - d) Both (b) and (c)
- 3) Power transfer in DC line depends on
  - a) Sending and receiving end voltages
  - b) Number of pulses in the rectifier
  - c) Line resistance
  - d) None of the above
- 4) The common control done in the converters is
  - a) Rectifier as both voltage and current controller
  - b) Inverter as both voltage and current controller
  - c) Inverter as current controller
  - d) Rectifier as voltage controller and inverter as current controller
- 5) HVDC-VSC scheme employs
  - a) IGBT valves
  - b) Light or optically triggered thyristor valves
  - c) Mercury arc valves
  - d) MOSFET's and GTO valves
- 6) Most frequent type of fault in DC system is
  - a) Converter internal fault
- b) DC line fault
- c) Commutation failure
- d) Arc back and arc through

7)	A system is said to be weak if SCR is	S			
,	a) Less than 3 b) Less than 1		More than 5	d)	3 to 5
8)	Modern HVDC systems are all	·		•	
	a) 3-pulse converters		6-pluse conver		
۵,	c) 24-pluse converters	- /	12-pulse conve	erte	rs
9)	In 12- pulse connections, transforme	rs a	are connected		
	a) Delta/Delta (both)				
	<ul><li>b) Star/Star (both)</li><li>c) Star/Delta (both)</li></ul>				
	d) One Star/Star and other Star/Delt	a			
10)	If a angle of advance is 30° and over		angle is 12°. th	e e	extension angle
. • /	will be	الماد			
	a) 42° b) (30/2)°	c)	18°	d)	21°
11)	A surge diverter is used across the D	C	CB to		
	a) Limit recovery voltage	b)	Limit fault curre	ent	
40\	c) Absorb the arc energy	d)	All of the above	e	- 0
12)	Which of the following is a series cor				
10\	a) UPFC b) STATCOM			u)	10731
13)	Series compensation is primarily res			.,	
	a) improve voltage profile	,	improve stabilit	-	
1/1)	c) reduce fault currents Multi terminal systems are	u)	all of the above	;	
17)	a) Series connected	h)	Parallel connec	etec	1
	c) Ring connected	,	All of above	,,,,,	•
15)	HVDC transmission commercially be		n in the year,		
-	a) 1935 b) 1950		1954	d)	1970
16)	HVDC transmission is opted when				
	a) Bulk power transfer is needed				
	b) Improvement of stability	oio	n ic required		
	<ul><li>c) Long distance and cable transmis</li><li>d) All of the above</li></ul>	510	ii is required		
17)	Filters used in 12-pulse converters u	sua	ally on the AC si	de	are
,	a) 5 <sup>th</sup> , 7 <sup>th</sup> and high-pass		11th, 13th and h		
	c) 6 <sup>th</sup> , 12 <sup>th</sup> and high-pass	d)	only high-pass	filte	er
18)	Characteristic of a converter is the re				
	a) AC voltage and ld	,	DC output volta	age	and Id
10)	c) DC power and ld	a)	None of these		
19)	The initial HVDC valves were a) IGATS	h)	Thyristors		
	c) Mercury arc rectifiers		None of above		
20)	In a monopolar system usually the pe				
,	a) Positive				
	b) Negative				
	c) Positive and negative				
	d) Alternatively positive and negative	Э			



Seat	
No.	

# B.E. (E&E) (Old) (Part – II) Examination, 2018 Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)

Day and Date: Saturday, 12-5-2018

Time: 2.30 p.m. to 5.30 p.m.

#### SECTION - I

### 2. Answer any four questions :

 $(4 \times 5 = 20)$ 

Marks: 80

- a) Write the advantages and disadvantages of HVDC transmission system.
- b) Explain the requirements of firing angle scheme and explain IPC scheme.
- c) What is misfire? Explain its causes and remedies.
- d) Explain EPC scheme in detail.
- e) Explain with neat diagram the different types of DC links.
- f) Draw and explain over current protection.

## 3. Answer any two questions:

 $(10 \times 2 = 20)$ 

- a) Draw and explain typical HVDC converter station in detail.
- b) Compare EHVAC and HVDC transmission with suitable comments.
- c) Explain the over voltage protection of converter in detail.

#### SECTION - II

# 4. Answer any four questions:

- a) Explain the current margin method for protection of MTDC system.
- b) Write short note on AC filters.
- c) Explain the voltage limiting control for MTDC system.



- d) Explain with neat diagram the working of FC-TCR.
- e) Write a short note on SVC.
- f) Explain DC filters.
- 5. Answer **any two** questions:

- a) What are the causes of generation of harmonics and what are the troubles caused by it?
- b) Derive an expression for characteristic harmonics.
- c) Explain the concept of reactive power compensation.



Seat		
No.	Set	R

# B.E. (E&E) (Old) (Part – II) Examination, 2018 **Elective – II: HIGH VOLTAGE DC TRANSMISSION (HVDC)**

Day and Date : Saturday	12-5-2018	May	Marks: 10	$\cap$
Day and Date . Saturday	', 12-3-2010	IVIAX.	IVIAINS. IV	JU

Time: 2.30 p.m. to 5.30 p.m.

- Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each guestion 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  $(20 \times 1 = 20)$ 

- 1. Choose the correct answer:
  - 1) HVDC transmission is opted when
    - a) Bulk power transfer is needed
    - b) Improvement of stability
    - c) Long distance and cable transmission is required
    - d) All of the above
  - 2) Filters used in 12-pulse converters usually on the AC side are
    - a) 5<sup>th</sup>, 7<sup>th</sup> and high-pass
- b) 11th, 13th and high-pass
- c) 6<sup>th</sup>, 12<sup>th</sup> and high-pass
- d) only high-pass filter
- 3) Characteristic of a converter is the relation between
  - a) AC voltage and Id
- b) DC output voltage and ld

c) DC power and ld

- d) None of these
- 4) The initial HVDC valves were
  - a) IGATS

- b) Thyristors
- c) Mercury arc rectifiers
- d) None of above
- 5) In a monopolar system usually the pole is
  - a) Positive
  - b) Negative
  - c) Positive and negative
- d) Alternatively positive and negative 6) Thyristor valves came into operation in the year
  - a) 1950
- b) 1954
- c) 1972
- d) 2000
- 7) 12-pulse converters are used in modern converters because of
  - a) Reduced current
  - b) Reduced ripple
  - c) Increased voltage and reduced harmonics
  - d) Both (b) and (c)



8)	Power transfer in DC line depends o			
	a) Sending and receiving end voltag	es		
	b) Number of pulses in the rectifier			
	c) Line resistance			
	d) None of the above			
9)	The common control done in the con	ıveı	ters is	
•	a) Rectifier as both voltage and curr	ent	controller	
	b) Inverter as both voltage and curre	ent	controller	
	c) Inverter as current controller			
	d) Rectifier as voltage controller and	lin۱	verter as curren	t controller
10)	HVDC-VSC scheme employs			
•	a) IGBT valves			
	b) Light or optically triggered thyristo	or v	alves	
	c) Mercury arc valves			
	d) MOSFÉT's and GTO valves			
11)	Most frequent type of fault in DC sys	ten	n is	
	a) Converter internal fault	b)	DC line fault	
	c) Commutation failure	d)	Arc back and a	rc through
12)	A system is said to be weak if SCR is	S		
	a) Less than 3 b) Less than 1	c)	More than 5	d) 3 to 5
13)	Modern HVDC systems are all			
	a) 3-pulse converters	b)	6-pluse conver	ters
	c) 24-pluse converters		12-pulse conve	erters
14)	In 12- pulse connections, transforme	rs a	are connected	
	a) Delta/Delta (both)			
	b) Star/Star (both)			
	c) Star/Delta (both)			
	d) One Star/Star and other Star/Delt			
15)	If a angle of advance is 30° and over	rlap	angle is 12°, th	e extension angle
	will be			
	a) 42° b) (30/2)°	,	18°	d) 21°
16)	A surge diverter is used across the D			
	a) Limit recovery voltage	,	Limit fault curre	
\	c) Absorb the arc energy		All of the above	
17)	Which of the following is a series cor			
	a) UPFC b) STATCOM		TCSC	d) TCPST
18)	Series compensation is primarily res			
	a) improve voltage profile	b)	improve stabilit	:y
	c) reduce fault currents	d)	all of the above	)
19)	Multi terminal systems are			
•	a) Series connected	b)	Parallel connec	cted
	c) Ring connected	d)	All of above	
20)	HVDC transmission commercially be		n in the year,	
-	a) 1935 b) 1950		1954	d) 1970



Seat	
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# B.E. (E&E) (Old) (Part – II) Examination, 2018 Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)

Day and Date: Saturday, 12-5-2018

Time: 2.30 p.m. to 5.30 p.m.

#### SECTION - I

### 2. Answer any four questions :

 $(4 \times 5 = 20)$ 

Marks: 80

- a) Write the advantages and disadvantages of HVDC transmission system.
- b) Explain the requirements of firing angle scheme and explain IPC scheme.
- c) What is misfire? Explain its causes and remedies.
- d) Explain EPC scheme in detail.
- e) Explain with neat diagram the different types of DC links.
- f) Draw and explain over current protection.

# 3. Answer any two questions:

 $(10 \times 2 = 20)$ 

- a) Draw and explain typical HVDC converter station in detail.
- b) Compare EHVAC and HVDC transmission with suitable comments.
- c) Explain the over voltage protection of converter in detail.

#### SECTION - II

# 4. Answer any four questions:

- a) Explain the current margin method for protection of MTDC system.
- b) Write short note on AC filters.
- c) Explain the voltage limiting control for MTDC system.



- d) Explain with neat diagram the working of FC-TCR.
- e) Write a short note on SVC.
- f) Explain DC filters.
- 5. Answer **any two** questions:

- a) What are the causes of generation of harmonics and what are the troubles caused by it?
- b) Derive an expression for characteristic harmonics.
- c) Explain the concept of reactive power compensation.



Seat		
No.	Set	S

Elective – II : HIGH VOLTAGE	•					
Day and Date: Saturday, 12-5-2018 Time: 2.30 p.m. to 5.30 p.m.	Max. Marks : 100					
minutes in Answer one mark. 2) Answer MCQ/Obje	Book Page No. 3. Each question carries ective type questions on Page No. 3 to mention, Q.P. Set (P/Q/R/S) on Top					
MCQ/Objective Type Questions						
Duration: 30 Minutes  1. Choose the correct answer:  1) A surge diverter is used across the Eap Limit recovery voltage c) Absorb the arc energy 2) Which of the following is a series coral UPFC b) STATCOM 3) Series compensation is primarily resal improve voltage profile c) reduce fault currents 4) Multi terminal systems are a) Series connected c) Ring connected 5) HVDC transmission commercially be	b) Limit fault current d) All of the above nnected FACTS device ? c) TCSC d) TCPST orted to b) improve stability d) all of the above b) Parallel connected d) All of above					
<ul> <li>a) 1935</li> <li>b) 1950</li> <li>6) HVDC transmission is opted when <ul> <li>a) Bulk power transfer is needed</li> <li>b) Improvement of stability</li> <li>c) Long distance and cable transmis</li> <li>d) All of the above</li> </ul> </li> <li>7) Filters used in 12-pulse converters u <ul> <li>a) 5th, 7th and high-pass</li> <li>c) 6th, 12th and high-pass</li> </ul> </li> <li>8) Characteristic of a converter is the research and statement of the pass</li> </ul>	c) 1954 d) 1970 ssion is required sually on the AC side are b) 11 <sup>th</sup> , 13 <sup>th</sup> and high-pass d) only high-pass filter					

b) DC output voltage and ldd) None of these

a) AC voltage and Id
c) DC power and Id
9) The initial HVDC valves were
a) IGATS

c) Mercury arc rectifiers

b) Thyristorsd) None of above



10)	In a monopolar system usually the pole is a) Positive				
	b) Negative				
	c) Positive and ne		_		
11\	d) Alternatively po			ho voor	
11)	Thyristor valves ca a) 1950	b) 1954	U)		d) 2000
a) 1950 b) 1954 c) 1972 d 12) 12-pulse converters are used in modern converters becau					
,	a) Reduced current				
	b) Reduced ripple				
	c) Increased voltage and reduced harmonics				
	d) Both (b) and (c)				
13)	Power transfer in DC line depends on				
	a) Sending and receiving end voltages				
	b) Number of pulses in the rectifier				
	<ul><li>c) Line resistance</li><li>d) None of the above</li></ul>				
14)	The common control done in the converters is				
,	a) Rectifier as both voltage and current controller				
	b) Inverter as both voltage and current controller				
	c) Inverter as curre				
4 =\	d) Rectifier as voltage controller and inverter as current controller				
15)	HVDC-VSC scheme employs				
	<ul><li>a) IGBT valves</li><li>b) Light or optically triggered thyristor valves</li></ul>				
	c) Mercury arc valves				
	d) MOSFET's and GTO valves				
16)	Most frequent type of fault in DC system is				
,	a) Converter interr	_		DC line fault	
	c) Commutation fa	ailure	d)	Arc back and a	rc through
17)	A system is said to	be weak if SCR is	S		
	a) Less than 3	b) Less than 1	c)	More than 5	d) 3 to 5
18)	Modern HVDC sys				
	a) 3-pulse convert		b)	6-pluse conver	ters
	c) 24-pluse conve		,	12-pulse conve	erters
19)	In 12- pulse conne		rs a	are connected	
	a) Delta/Delta (bot				
	b) Star/Star (both)				
	c) Star/Delta (both)				
	d) One Star/Star a				
20)	If a angle of advan	ce is 30° and over	lap	angle is 12°, th	e extension angle
	will be	1) (00/0)		100	1) 040
	a) 42°	b) (30/2)°	C)	18°	d) 21°



Seat	
No.	

# B.E. (E&E) (Old) (Part – II) Examination, 2018 Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)

Day and Date: Saturday, 12-5-2018

Time: 2.30 p.m. to 5.30 p.m.

SECTION - I

### 2. Answer any four questions:

 $(4 \times 5 = 20)$ 

Marks: 80

- a) Write the advantages and disadvantages of HVDC transmission system.
- b) Explain the requirements of firing angle scheme and explain IPC scheme.
- c) What is misfire? Explain its causes and remedies.
- d) Explain EPC scheme in detail.
- e) Explain with neat diagram the different types of DC links.
- f) Draw and explain over current protection.

## 3. Answer any two questions:

 $(10 \times 2 = 20)$ 

- a) Draw and explain typical HVDC converter station in detail.
- b) Compare EHVAC and HVDC transmission with suitable comments.
- c) Explain the over voltage protection of converter in detail.

SECTION - II

# 4. Answer any four questions :

- a) Explain the current margin method for protection of MTDC system.
- b) Write short note on AC filters.
- c) Explain the voltage limiting control for MTDC system.



- d) Explain with neat diagram the working of FC-TCR.
- e) Write a short note on SVC.
- f) Explain DC filters.
- 5. Answer **any two** questions:

- a) What are the causes of generation of harmonics and what are the troubles caused by it?
- b) Derive an expression for characteristic harmonics.
- c) Explain the concept of reactive power compensation.