SLR-TC – 1

Seat No.	

Set **P**

F.E. (Part – I) (CBCS) Examination, 2018
ENGINEERING MATHEMATICS – I

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Solve Q. No. **1** in **first 30 minutes**. **Each** question carries **one** mark.*
*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 alternative : **(14×1=14)**

1) The n^{th} derivative of $\frac{1}{(x+2)^2}$ is

a) $\frac{(-1)^n(n+1)!}{(x+2)^{n+2}}$ b) $\frac{(-1)^n.n!}{(x+2)^{n+2}}$ c) $\frac{(-1)^n(n+1)!}{(x-2)^{n+1}}$ d) $\frac{(-1)^n \cdot n!}{(x-2)^{n+1}}$

2) If $y = xe^{3x}$ then y_n =
a) $3n\ !\ xe^{3x}$ b) $3^n x\ e^{3x}$
c) $3^n\ e^{3x} x + n3^{n-1}\ e^{3x}$ d) $3^n\ e^{3x} x^2 + n3^{n-2}\ e^{3x}$

3) Expansion of sinhx in powers of x is
a) $x - \frac{x^3}{3!} + \frac{x^5}{5!} .....$ b) $1 + x + \frac{x^3}{3!} + ...$ c) $1 + \frac{x^2}{2} + \frac{x^4}{4} + ...$ d) None of these

4) Taylor's series expansion of $y = \frac{1}{x}$ about x = 1 is

a) $1+(x-1) + \frac{(x-1)^2}{2!} + ...$ b) $1 - (x-1) + (x-1)^2 - .....$

c) $1 - (x-1) + \frac{(x-1)^2}{2!} - .....$ d) None of these

P.T.O.

5) Which of the following is true ?
   a) cotix = icothx
   b) sechix = isecx
   c) tanix = –itanhx
   d) sinhx = –isinix

6) Cosh(x + iy) =
   a) coshx cosy + isinhx siny
   b) coshx cosy – isinhx siny
   c) coshx coshy + isinhx sinhy
   d) sinhx siny + icoshy cosx

7) The modulus and amplitude of $z - 2\sqrt{3}i$ are
   a) $4\sqrt{3}, \frac{-\pi}{3}$
   b) $4, \frac{-\pi}{3}$
   c) $4, \frac{-\pi}{6}$
   d) $4, \frac{-2\pi}{3}$

8) If the determinant of square matrix A of order m is equal to zero, then the rank of A is
   a) Less than m
   b) Greater than m
   c) Equal to m
   d) None of these

9) If the rank of A is r and number of variables is n then the number of linearly independent solutions of the system AX = 0 is
   a) n
   b) r
   c) n – r
   d) n + r

10) If 2, 3, 4 are the eigen values of matrix A, then |A| is equal to
   a) 9
   b) 24
   c) $\frac{1}{24}$
   d) $\frac{1}{9}$

11) If $Z = \sin^{-1}\left(\frac{x}{y}\right)$, then $\frac{\partial z}{\partial x} =$
   a) $\frac{1}{\sqrt{y^2 - x^2}}$
   b) $\frac{x}{\sqrt{y^2 - x^2}}$
   c) $\frac{y}{\sqrt{y^2 - x^2}}$
   d) $\frac{1}{\sqrt{x^2 - y^2}}$

12) If $u = \frac{x^{1/4} + y^{1/4}}{x^{1/5} + y^{1/5}}$, then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} =$
   a) 4u
   b) 20u
   c) $\frac{1}{20}u$
   d) 5u

13) If x = ucosv, y = usinv, then $\frac{\partial(x, y)}{\partial(u, v)} =$
   a) 1
   b) –1
   c) u
   d) –u

14) If δx is an error in x, then $\frac{\delta x}{x}$ is called
   a) Absolute error
   b) Percentage error
   c) Relative error
   d) None of these

Set P

SLR-TC – 1

Seat No.	

F.E. (Part – I) (CBCS) Examination, 2018
ENGINEERING MATHEMATICS – I

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

2. Solve **any three** : **9**

a) Find n^{th} derivative of $\frac{x^2}{(x-1)(2x+3)}$.

b) Find all the values of $(-i)^{1/3}$.

c) Simplify $\left[\frac{1+\sin\left(\frac{\pi}{8}\right)+i\cos\left(\frac{\pi}{8}\right)}{1+\sin\left(\frac{\pi}{8}\right)-i\cos\left(\frac{\pi}{8}\right)}\right]^8$.

d) Expand $3x^3 - 2x^2 + x - 4$ in powers of $(x + 2)$.

e) By using Maclaurins series expand $e^x \cdot \sin x$.

3. Solve **any three** : **9**

a) Evaluate $\lim_{x\to 0}\left(\frac{1}{x}\right)^{\tan x}$.

b) Find the values of a and b such that $\lim_{x\to 0}\frac{\sin x + ax + bx^3}{x^3} = 0$.

c) Prove that $\text{sech}^{-1}(\sin\theta) = \log\cot\left(\frac{\theta}{2}\right)$.

d) Find n^{th} derivative of sinx sin2x sin3x.

e) Separate into real and imaginary parts of $\sin^{-1}\left(\frac{3i}{4}\right)$.

Set P

4. Solve **any two** : **10**

a) State Leibnitz theorem.

If $y = \left[\log\left(x + \sqrt{x^2+1}\right)\right]^2$, prove that $y_{n+2}(0) = -n^2 y_n(0)$.

b) By using standard expansion prove that

$$e^{x\cdot\sin x} = 1 + x^2 + \frac{x^4}{3} + \frac{x^6}{120} + \text{.....}$$

c) If $i^{i^{i\ldots\infty}} = \alpha + i\beta$, prove that $\alpha^2 + \beta^2 = e^{-(4n+1)\pi\beta}$, where n is any positive integer.

SECTION – II

5. Solve **any three** of the following : **9**

a) Find the rank of the following matrix by reducing it into normal form.

$$\begin{bmatrix} 1 & 1 & -1 & 1 \\ 1 & 3 & 2 & 1 \\ 2 & 0 & 3 & 2 \\ 3 & 3 & 3 & 3 \end{bmatrix}$$

b) Find the value of λ and μ for which the system of equations : $x + 2y + 3z = 5$; $x + 3y - z = 4$; $x + 4y + \lambda z = \mu$ has a

i) Unique solution

ii) Many solution

iii) No solution.

c) If $u = \dfrac{x^2+y^2}{x+y}$, Show that $\left(\dfrac{\partial u}{\partial x} - \dfrac{\partial u}{\partial y}\right)^2 = 4\left(1 - \dfrac{\partial u}{\partial x} - \dfrac{\partial u}{\partial y}\right)$.

d) If $z = f(x, y)$ and $x = u^2 + v^2$, $y = 2uv$. Show that $u\dfrac{\partial z}{\partial u} - v\dfrac{\partial z}{\partial v} = 2\left(x^2 - y^2\right)^{1/2}\dfrac{\partial z}{\partial x}$.

e) Find the minimum value of $x^2 + y^2 + z^2$ when $x + y + z = 3a$.

6. Solve **any three** of the following : **9**

a) Find the eigen values and eigen vector corresponding to largest eigen value of the matrix

$$\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}.$$

b) Find the eigen value of the matrix A and also find eigen values of A^2

$$A = \begin{bmatrix} 2 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 0 & 2 \end{bmatrix}.$$

c) If u = f(r, s), where $r = \frac{x-y}{xy}$, $s = \frac{z-x}{zx}$, prove that $x^2 \frac{\partial u}{\partial x} + y^2 \frac{\partial u}{\partial y} + z^2 \frac{\partial u}{\partial z} = 0.$

d) If $u = \frac{xy}{z}$, $v = \frac{yz}{x}$, $w = \frac{zx}{y}$, find $\frac{\partial(u, v, w)}{\partial(x, y, z)}$.

e) Find the percentage error in the area of the ellipse. When an error of +1% is made by measuring major and minor axis.

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

a) Verify the Cayley-Hamilton theorem for the matrix A and also find A^{-1}

$$A = \begin{bmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}.$$

b) If $u = \tan^{-1}\left(\frac{x^3 + y^3}{x + y}\right)$, prove that

i) $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial z} = \sin 2u.$

ii) $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = \sin 4u - \sin 2u.$

c) Find the extreme values of the function $f(x, y) = x^3 + 3xy^2 - 3x^2 - 3y^2 + 4$.

Set P

SLR-TC – 1

Seat No.	

Set **Q**

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Duration : 30 Minutes Marks : 14

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a) Less than m b) Greater than m c) Equal to m d) None of these

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a) n b) r c) n – r d) n + r

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4) If $Z = \sin^{-1}\left(\frac{x}{y}\right)$, then $\frac{\partial z}{\partial x} =$
a) $\frac{1}{\sqrt{y^2 - x^2}}$ b) $\frac{x}{\sqrt{y^2 - x^2}}$ c) $\frac{y}{\sqrt{y^2 - x^2}}$ d) $\frac{1}{\sqrt{x^2 - y^2}}$

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SLR-TC – 1

Seat No.	

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Set Q

SLR-TC – 1

Seat No.	

Set R

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d) If $z = f(x, y)$ and $x = u^2 + v^2$, $y = 2uv$. Show that $u\dfrac{\partial z}{\partial u} - v\dfrac{\partial z}{\partial v} = 2\left(x^2 - y^2\right)^{1/2}\dfrac{\partial z}{\partial x}$.

e) Find the minimum value of $x^2 + y^2 + z^2$ when $x + y + z = 3a$.

6. Solve **any three** of the following : **9**

a) Find the eigen values and eigen vector corresponding to largest eigen value of the matrix

$$\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}.$$

b) Find the eigen value of the matrix A and also find eigen values of A^2

$$A = \begin{bmatrix} 2 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 0 & 2 \end{bmatrix}.$$

c) If u = f(r, s), where $r = \frac{x-y}{xy}$, $s = \frac{z-x}{zx}$, prove that $x^2 \frac{\partial u}{\partial x} + y^2 \frac{\partial u}{\partial y} + z^2 \frac{\partial u}{\partial z} = 0$.

d) If $u = \frac{xy}{z}$, $v = \frac{yz}{x}$, $w = \frac{zx}{y}$, find $\frac{\partial(u, v, w)}{\partial(x, y, z)}$.

e) Find the percentage error in the area of the ellipse. When an error of +1% is made by measuring major and minor axis.

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

a) Verify the Cayley-Hamilton theorem for the matrix A and also find A^{-1}

$$A = \begin{bmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}.$$

b) If $u = \tan^{-1}\left(\frac{x^3 + y^3}{x + y}\right)$, prove that

i) $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial z} = \sin 2u.$

ii) $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = \sin 4u - \sin 2u.$

c) Find the extreme values of the function $f(x, y) = x^3 + 3xy^2 - 3x^2 - 3y^2 + 4$.

Set R

SLR-TC – 1

Seat No.	

Set **S**

F.E. (Part – I) (CBCS) Examination, 2018
ENGINEERING MATHEMATICS – I

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Solve Q. No. **1** in **first 30 minutes**. **Each** question carries **one** mark.*
*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 alternative : **(14×1=14)**

1) If 2, 3, 4 are the eigen values of matrix A, then |A| is equal to

a) 9 b) 24 c) $\frac{1}{24}$ d) $\frac{1}{9}$

2) If $Z = \sin^{-1}\left(\frac{x}{y}\right)$, then $\frac{\partial z}{\partial x} =$

a) $\frac{1}{\sqrt{y^2 - x^2}}$ b) $\frac{x}{\sqrt{y^2 - x^2}}$ c) $\frac{y}{\sqrt{y^2 - x^2}}$ d) $\frac{1}{\sqrt{x^2 - y^2}}$

3) If $u = \frac{x^{1/4} + y^{1/4}}{x^{1/5} + y^{1/5}}$, then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} =$

a) 4u b) 20u c) $\frac{1}{20}u$ d) 5u

4) If x = ucosv, y = usinv, then $\frac{\partial(x, y)}{\partial(u, v)} =$

a) 1 b) –1 c) u d) –u

5) If δx is an error in x, then $\frac{\delta x}{x}$ is called

a) Absolute error b) Percentage error
c) Relative error d) None of these

6) The n^{th} derivative of $\frac{1}{(x+2)^2}$ is

a) $\frac{(-1)^n(n+1)!}{(x+2)^{n+2}}$ b) $\frac{(-1)^n.n!}{(x+2)^{n+2}}$ c) $\frac{(-1)^n(n+1)!}{(x-2)^{n+1}}$ d) $\frac{(-1)^n \cdot n!}{(x-2)^{n+1}}$

7) If $y = xe^{3x}$ then y_n =

a) $3n\ !\ xe^{3x}$ b) $3^n x\ e^{3x}$
c) $3^n\ e^{3x}\ x + n3^{n-1}\ e^{3x}$ d) $3^n\ e^{3x}\ x^2 + n3^{n-2}\ e^{3x}$

8) Expansion of sinhx in powers of x is

a) $x - \frac{x^3}{3!} + \frac{x^5}{5!} .....$ b) $1 + x + \frac{x^3}{3!} + ...$ c) $1 + \frac{x^2}{2} + \frac{x^4}{4} + ...$ d) None of these

9) Taylor's series expansion of $y = \frac{1}{x}$ about x = 1 is

a) $1+(x-1) + \frac{(x-1)^2}{2!} + ...$ b) $1 - (x - 1) + (x - 1)^2 - .....$

c) $1 - (x - 1) + \frac{(x-1)^2}{2!} - .....$ d) None of these

10) Which of the following is true ?

a) cotix = icothx b) sechix = isecx c) tanix = –itanhx d) sinhx = –isinix

11) Cosh(x + iy) =

a) coshx cosy + isinhx siny b) coshx cosy – isinhx siny
c) coshx coshy + isinhx sinhy d) sinhx siny + icoshy cosx

12) The modulus and amplitude of $z - 2\sqrt{3}i$ are

a) $4\sqrt{3}, \frac{-\pi}{3}$ b) $4, \frac{-\pi}{3}$ c) $4, \frac{-\pi}{6}$ d) $4, \frac{-2\pi}{3}$

13) If the determinant of square matrix A of order m is equal to zero, then the rank of A is

a) Less than m b) Greater than m c) Equal to m d) None of these

14) If the rank of A is r and number of variables is n then the number of linearly independent solutions of the system AX = 0 is

a) n b) r c) n – r d) n + r

SLR-TC – 1

Seat No.	

F.E. (Part – I) (CBCS) Examination, 2018
ENGINEERING MATHEMATICS – I

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

SECTION – I

2. Solve **any three** : **9**

a) Find n^{th} derivative of $\frac{x^2}{(x-1)(2x+3)}$.

b) Find all the values of $(-i)^{1/3}$.

c) Simplify $\left[\frac{1+\sin\left(\frac{\pi}{8}\right)+i\cos\left(\frac{\pi}{8}\right)}{1+\sin\left(\frac{\pi}{8}\right)-i\cos\left(\frac{\pi}{8}\right)}\right]^8$.

d) Expand $3x^3 - 2x^2 + x - 4$ in powers of $(x + 2)$.

e) By using Maclaurins series expand $e^x \cdot \sin x$.

3. Solve **any three** : **9**

a) Evaluate $\lim_{x\to 0}\left(\frac{1}{x}\right)^{\tan x}$.

b) Find the values of a and b such that $\lim_{x\to 0}\frac{\sin x + ax + bx^3}{x^3} = 0$.

c) Prove that $\text{sech}^{-1}(\sin\theta) = \log\cot\left(\frac{\theta}{2}\right)$.

d) Find n^{th} derivative of sinx sin2x sin3x.

e) Separate into real and imaginary parts of $\sin^{-1}\left(\frac{3i}{4}\right)$.

Set S

4. Solve **any two** : **10**

a) State Leibnitz theorem.

If $y = \left[\log\left(x + \sqrt{x^2+1}\right)\right]^2$, prove that $y_{n+2}(0) = -n^2 y_n(0)$.

b) By using standard expansion prove that

$$e^{x\cdot\sin x} = 1 + x^2 + \frac{x^4}{3} + \frac{x^6}{120} + \text{.....}$$

c) If $i^{i^{i\ldots\infty}} = \alpha + i\beta$, prove that $\alpha^2 + \beta^2 = e^{-(4n+1)\pi\beta}$, where n is any positive integer.

SECTION – II

5. Solve **any three** of the following : **9**

a) Find the rank of the following matrix by reducing it into normal form.

$$\begin{bmatrix} 1 & 1 & -1 & 1 \\ 1 & 3 & 2 & 1 \\ 2 & 0 & 3 & 2 \\ 3 & 3 & 3 & 3 \end{bmatrix}$$

b) Find the value of λ and μ for which the system of equations : $x + 2y + 3z = 5$; $x + 3y - z = 4$; $x + 4y + \lambda z = \mu$ has a

i) Unique solution

ii) Many solution

iii) No solution.

c) If $u = \dfrac{x^2+y^2}{x+y}$, Show that $\left(\dfrac{\partial u}{\partial x} - \dfrac{\partial u}{\partial y}\right)^2 = 4\left(1 - \dfrac{\partial u}{\partial x} - \dfrac{\partial u}{\partial y}\right)$.

d) If $z = f(x, y)$ and $x = u^2 + v^2$, $y = 2uv$. Show that $u\dfrac{\partial z}{\partial u} - v\dfrac{\partial z}{\partial v} = 2\left(x^2 - y^2\right)^{1/2}\dfrac{\partial z}{\partial x}$.

e) Find the minimum value of $x^2 + y^2 + z^2$ when $x + y + z = 3a$.

6. Solve **any three** of the following : **9**

a) Find the eigen values and eigen vector corresponding to largest eigen value of the matrix

$$\begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}.$$

b) Find the eigen value of the matrix A and also find eigen values of A^2

$$A = \begin{bmatrix} 2 & 0 & 1 \\ 0 & 2 & 0 \\ 1 & 0 & 2 \end{bmatrix}.$$

c) If u = f(r, s), where $r = \frac{x-y}{xy}$, $s = \frac{z-x}{zx}$, prove that $x^2 \frac{\partial u}{\partial x} + y^2 \frac{\partial u}{\partial y} + z^2 \frac{\partial u}{\partial z} = 0$.

d) If $u = \frac{xy}{z}$, $v = \frac{yz}{x}$, $w = \frac{zx}{y}$, find $\frac{\partial(u, v, w)}{\partial(x, y, z)}$.

e) Find the percentage error in the area of the ellipse. When an error of +1% is made by measuring major and minor axis.

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

a) Verify the Cayley-Hamilton theorem for the matrix A and also find A^{-1}

$$A = \begin{bmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{bmatrix}.$$

b) If $u = \tan^{-1}\left(\frac{x^3 + y^3}{x + y}\right)$, prove that

i) $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial z} = \sin 2u.$

ii) $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = \sin 4u - \sin 2u.$

c) Find the extreme values of the function $f(x, y) = x^3 + 3xy^2 - 3x^2 - 3y^2 + 4$.

Set S

SLR-TC – 2

Seat No.	

Set P

F.E. (Part – I) (CBCS) Examination, 2018
APPLIED MECHANICS

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 additional data, if required and state it **clearly**.*
*4) Figures to the **right** indicate **full** marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternatives (**1** mark **each**) : **(14×1=14)**

1) The algebraic sum of the two forces forming a couple is always equal to
   a) Magnitude of one of the forces b) Zero
   c) Negative number d) Positive number

2) If two forces F_1 and F_2 are acting on a particle and if $\theta = 180°$, then the resultant of the two forces is given as
   a) $F_1 + F_2$ b) $F_1 - F_2$ c) $F_1^2 + F_2^2$ d) None of these

3) The ratio of static friction to dynamic friction is always
   a) = 1 b) < 1 c) > 1 d) None of these

4) In the method of sections for trusses, the section must be passed so as to cut not more than
   a) two members b) three members
   c) four members d) five members

5) For a truss if 'n' is number of members and 'j' is number of joints then it is said to be deficient when
   a) $n < (2j - 3)$ b) $n > (2j - 3)$ c) $n = (2j - 3)$ d) $j = 2n - 3$

P.T.O.

6) The moment of inertia of a rectangle of base 'b' and height 'h' about its base is

a) $\frac{bh^3}{36}$ b) $\frac{bh^3}{24}$ c) $\frac{bh^3}{12}$ d) $\frac{bh^3}{3}$

7) Polar moment of inertia is given by

a) I_{XX}/I_{YY} b) $I_{XX} - I_{YY}$ c) $I_{XX} + I_{YY}$ d) $I_{XX} \times I_{YY}$

8) A body is moving with a velocity of 2 m/sec. After 4 seconds the velocity of the body becomes 5 m/sec. The acceleration of the body is

a) 0.5 m/sec^2 b) 0.75 m/sec^2 c) 1 m/sec^2 d) 1.5 m/sec^2

9) The motion of a bicycle wheel is

a) Linear b) Rotary

c) Translatory d) Rotary as well as translatory

10) Time of flight of a projectile is given by

a) $\frac{u\sin\alpha}{g}$ b) $\frac{u^2\sin\alpha}{g}$ c) $\frac{2u\sin\alpha}{g}$ d) $\frac{2u\sin^2\alpha}{g}$

11) The acceleration of a block sliding down on inclined plane is

a) Same as acceleration due to gravity

b) Less than acceleration due to gravity

c) Greater than acceleration due to gravity

d) Uniformly increasing

12) If coefficient of restitution is one, then the two bodies are

a) Perfectly plastic b) Partly elastic

c) Perfectly elastic d) None of these

13) The following category of energy is associated with conservation force

a) Kinetic energy b) Potential energy

c) Energy lost due to friction d) None of these

14) A lift is moving upwards with an acceleration 'g'. The pressure exerted by man on the floor of the lift is

a) Equal to his weight b) Zero

c) Double than his weight d) None

SLR-TC – 2

Seat No.	

F.E. (Part – I) (CBCS) Examination, 2018
APPLIED MECHANICS

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

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

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Assume additional data, if required and state it **clearly**.*
*3) Figures to the **right** indicate **full** marks.*

2. Solve **any four** out of six : **12**

a) Calculate the forces in the members AB and AD of the truss shown in Fig. 1

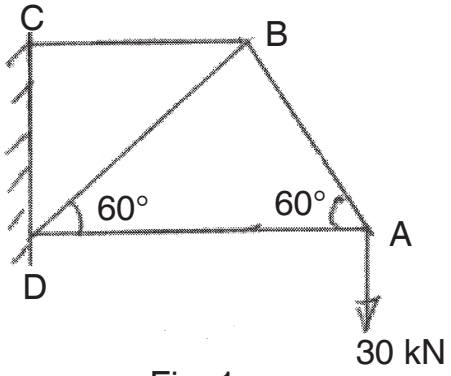

Fig. 1

b) State and derive expression for parallel axis theorem.

c) State and explain Lami's theorem.

d) Find the magnitude and direction of the resultant for the two forces acting at point O as shown in Fig. 2.

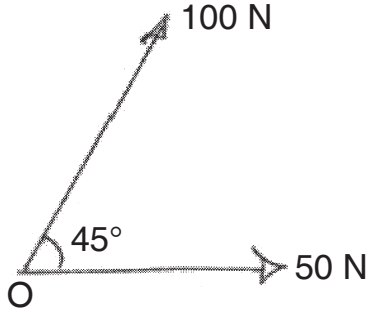

Fig. 2

e) Define and explain characteristics of couple.

Set P

f) Locate the centroidal XX axis for the T section given below in Fig. 3

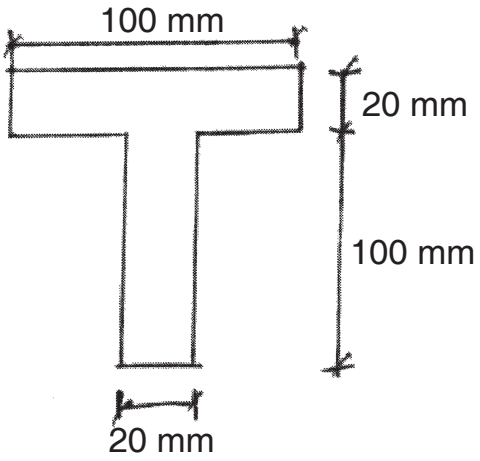

Fig. 3

3. Solve **any two** out of three : **16**

a) Analyze the overhanging beam loaded as shown in Fig. 4 below

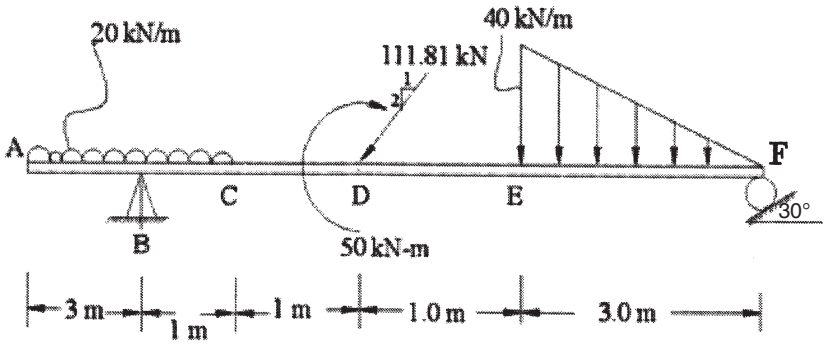

Fig. 4

b) Determine the magnitude and nature of the forces in the members BC, GC and GF of the truss shown in Fig. 5

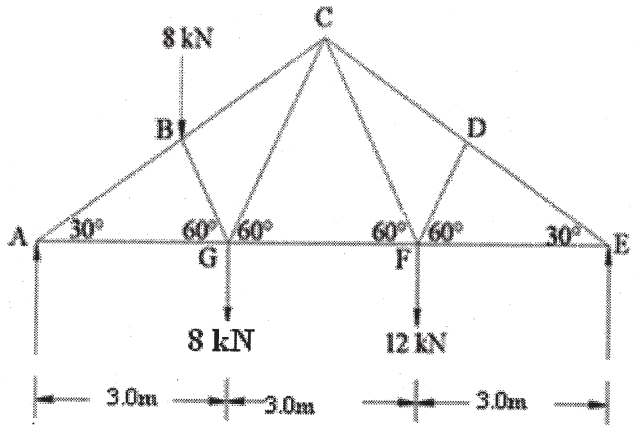

Fig. 5

c) The cross section of a plain concrete culvert is as shown in Fig. 6. Determine the moment of inertia about the horizontal centroidal axis.

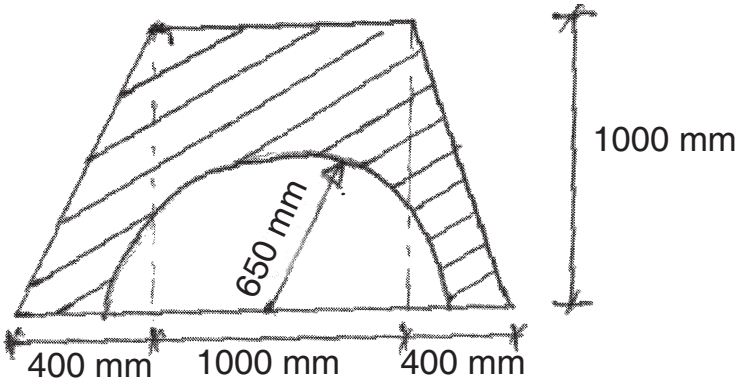

Fig. 6

4. Solve **any four** out of six : **12**

a) Derive equations of linear motion with uniform acceleration.

b) A small steel ball is shot vertically upwards from the top of a building 20m above the ground with an initial velocity of 15 m/s. Find

i) In what time it will reach the maximum height.

ii) How high above the building will the ball rise ?

c) Explain the need for banking of roads and superelevation of rails.

d) The rotation of a flywheel is governed by the equation $\omega = 3t^2 - 2t + 2$, where ω is in rad/sec and t is in sec. After 1 sec from the start, the angular displacement was 4 rad. Determine the angular displacement when t = 3 sec.

e) Enlist the types of motion curves and explain any one with neat sketch.

f) A ball 'A' of mass 0.25 kg moving on smooth horizontal table with velocity of 10 m/s strikes on identical stationary ball 'B' on the table. Find velocity of the ball 'B' just after the impact. The impact is perfectly plastic. Refer Fig. 7.

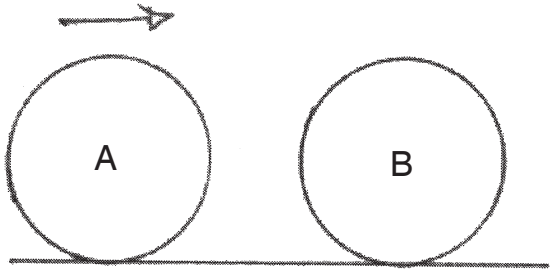

Fig. 7

5. Solve **any two** out of three : **16**

a) A bullet is fired upward at an angle of 30° with horizontal from point P on hill and hit the target which is 80 m lower than P. Initial velocity of bullet is 100 m/s. Calculate

i) the maximum height up to which bullet will reach above horizontal

ii) the velocity with which bullet strikes the ground

iii) total time of flight required.

b) In what distance will body 1 shown in Fig. 8 attain a velocity of a 3 m/s starting from rest ? Take coefficient of friction between blocks and plane as 0.2. Assume pulley is smooth. What is the tension in the chord ?

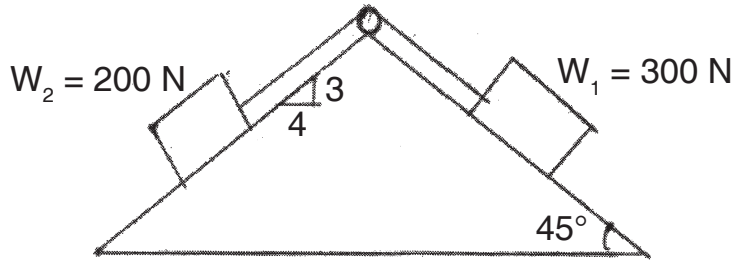

Fig. 8

c) A body weighing 300 N is pushed up at 30° inclined plane while 400 N force acting parallel to the plane. If initial velocity of body is 1.5 m/s and coefficient of kinetic friction μ = 0.2, what velocity will body have after moving 6 m ? Refer Fig. 9.

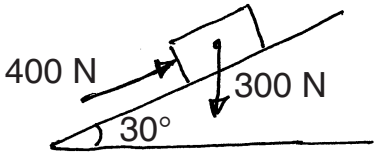

Fig. 9

SLR-TC – 2

Seat No.	

Set Q

F.E. (Part – I) (CBCS) Examination, 2018
APPLIED MECHANICS

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 additional data, if required and state it **clearly**.*
*4) Figures to the **right** indicate **full** marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternatives (**1** mark **each**) : **(14×1=14)**

1) A body is moving with a velocity of 2 m/sec. After 4 seconds the velocity of the body becomes 5 m/sec. The acceleration of the body is
   a) 0.5 m/sec^2 b) 0.75 m/sec^2 c) 1 m/sec^2 d) 1.5 m/sec^2

2) The motion of a bicycle wheel is
   a) Linear b) Rotary
   c) Translatory d) Rotary as well as translatory

3) Time of flight of a projectile is given by
   a) $\frac{u\sin\alpha}{g}$ b) $\frac{u^2\sin\alpha}{g}$ c) $\frac{2u\sin\alpha}{g}$ d) $\frac{2u\sin^2\alpha}{g}$

4) The acceleration of a block sliding down on inclined plane is
   a) Same as acceleration due to gravity
   b) Less than acceleration due to gravity
   c) Greater than acceleration due to gravity
   d) Uniformly increasing

P.T.O.

5) If coefficient of restitution is one, then the two bodies are
   a) Perfectly plastic b) Partly elastic
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6) The following category of energy is associated with conservation force
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7) A lift is moving upwards with an acceleration 'g'. The pressure exerted by man on the floor of the lift is
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8) The algebraic sum of the two forces forming a couple is always equal to
   a) Magnitude of one of the forces b) Zero
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9) If two forces F_1 and F_2 are acting on a particle and if $\theta = 180°$, then the resultant of the two forces is given as
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10) The ratio of static friction to dynamic friction is always
   a) = 1 b) < 1 c) > 1 d) None of these

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   c) four members d) five members

12) For a truss if 'n' is number of members and 'j' is number of joints then it is said to be deficient when
   a) $n < (2j - 3)$ b) $n > (2j - 3)$ c) $n = (2j - 3)$ d) $j = 2n - 3$

13) The moment of inertia of a rectangle of base 'b' and height 'h' about its base is
   a) $\frac{bh^3}{36}$ b) $\frac{bh^3}{24}$ c) $\frac{bh^3}{12}$ d) $\frac{bh^3}{3}$

14) Polar moment of inertia is given by
   a) I_{XX}/I_{YY} b) $I_{XX} - I_{YY}$ c) $I_{XX} + I_{YY}$ d) $I_{XX} \times I_{YY}$

———————

SLR-TC – 2

Seat No.	

F.E. (Part – I) (CBCS) Examination, 2018
APPLIED MECHANICS

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

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

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2. Solve **any four** out of six : **12**

a) Calculate the forces in the members AB and AD of the truss shown in Fig. 1

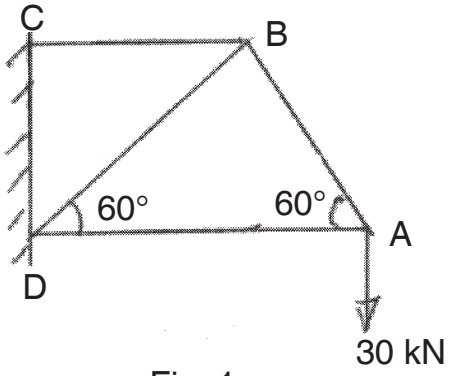

Fig. 1

b) State and derive expression for parallel axis theorem.

c) State and explain Lami's theorem.

d) Find the magnitude and direction of the resultant for the two forces acting at point O as shown in Fig. 2.

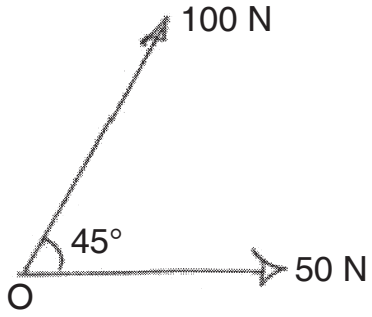

Fig. 2

e) Define and explain characteristics of couple.

Set Q

f) Locate the centroidal XX axis for the T section given below in Fig. 3

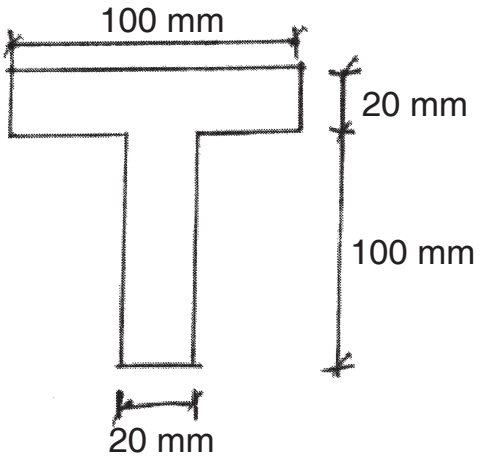

Fig. 3

3. Solve **any two** out of three : **16**

a) Analyze the overhanging beam loaded as shown in Fig. 4 below

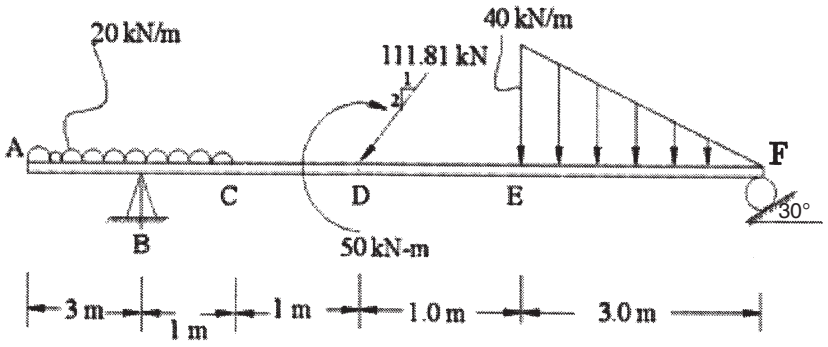

Fig. 4

b) Determine the magnitude and nature of the forces in the members BC, GC and GF of the truss shown in Fig. 5

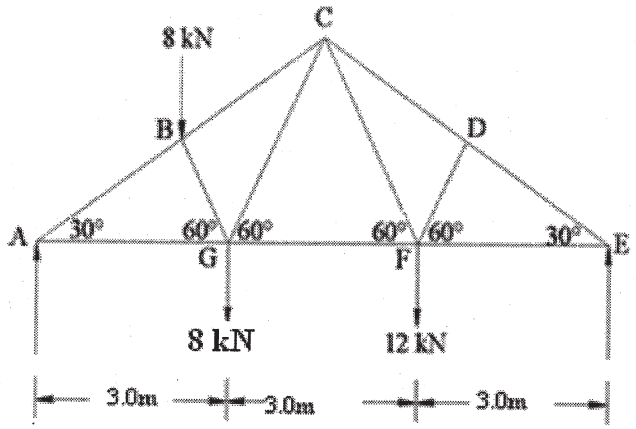

Fig. 5

c) The cross section of a plain concrete culvert is as shown in Fig. 6. Determine the moment of inertia about the horizontal centroidal axis.

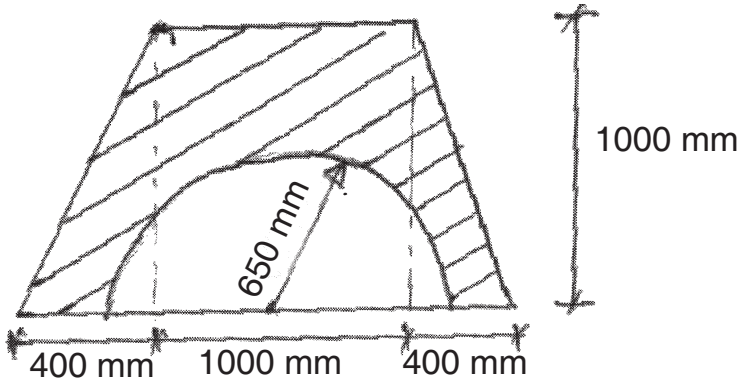

Fig. 6

4. Solve **any four** out of six : **12**

a) Derive equations of linear motion with uniform acceleration.

b) A small steel ball is shot vertically upwards from the top of a building 20m above the ground with an initial velocity of 15 m/s. Find

i) In what time it will reach the maximum height.

ii) How high above the building will the ball rise ?

c) Explain the need for banking of roads and superelevation of rails.

d) The rotation of a flywheel is governed by the equation $\omega = 3t^2 - 2t + 2$, where ω is in rad/sec and t is in sec. After 1 sec from the start, the angular displacement was 4 rad. Determine the angular displacement when t = 3 sec.

e) Enlist the types of motion curves and explain any one with neat sketch.

f) A ball 'A' of mass 0.25 kg moving on smooth horizontal table with velocity of 10 m/s strikes on identical stationary ball 'B' on the table. Find velocity of the ball 'B' just after the impact. The impact is perfectly plastic. Refer Fig. 7.

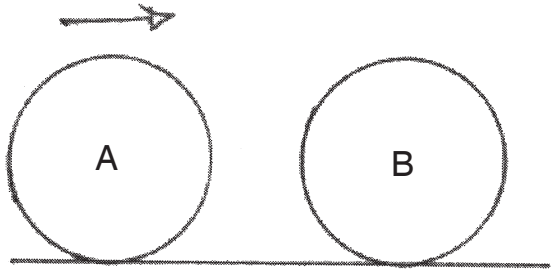

Fig. 7

5. Solve **any two** out of three : **16**

a) A bullet is fired upward at an angle of 30° with horizontal from point P on hill and hit the target which is 80 m lower than P. Initial velocity of bullet is 100 m/s. Calculate

i) the maximum height up to which bullet will reach above horizontal

ii) the velocity with which bullet strikes the ground

iii) total time of flight required.

b) In what distance will body 1 shown in Fig. 8 attain a velocity of a 3 m/s starting from rest ? Take coefficient of friction between blocks and plane as 0.2. Assume pulley is smooth. What is the tension in the chord ?

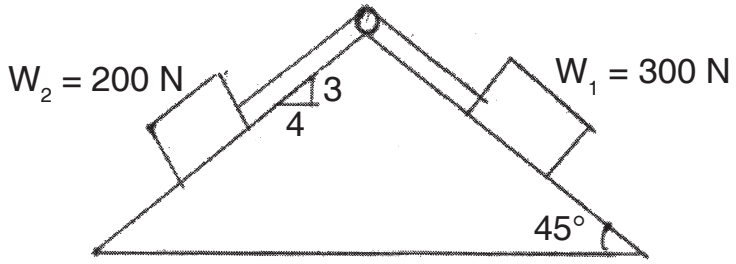

Fig. 8

c) A body weighing 300 N is pushed up at 30° inclined plane while 400 N force acting parallel to the plane. If initial velocity of body is 1.5 m/s and coefficient of kinetic friction μ = 0.2, what velocity will body have after moving 6 m ? Refer Fig. 9.

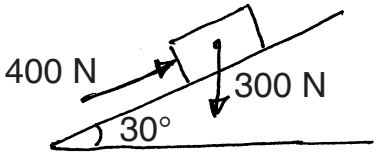

Fig. 9

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SLR-TC – 2

Seat No.	

Set R

F.E. (Part – I) (CBCS) Examination, 2018
APPLIED MECHANICS

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 additional data, if required and state it **clearly**.*
*4) Figures to the **right** indicate **full** marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternatives (**1** mark **each**) : **(14×1=14)**

1) For a truss if 'n' is number of members and 'j' is number of joints then it is said to be deficient when
a) $n < (2j - 3)$ b) $n > (2j - 3)$ c) $n = (2j - 3)$ d) $j = 2n - 3$

2) The moment of inertia of a rectangle of base 'b' and height 'h' about its base is
a) $\frac{bh^3}{36}$ b) $\frac{bh^3}{24}$ c) $\frac{bh^3}{12}$ d) $\frac{bh^3}{3}$

3) Polar moment of inertia is given by
a) I_{XX}/I_{YY} b) $I_{XX} - I_{YY}$ c) $I_{XX} + I_{YY}$ d) $I_{XX} \times I_{YY}$

4) A body is moving with a velocity of 2 m/sec. After 4 seconds the velocity of the body becomes 5 m/sec. The acceleration of the body is
a) 0.5 m/sec^2 b) 0.75 m/sec^2 c) 1 m/sec^2 d) 1.5 m/sec^2

5) The motion of a bicycle wheel is
a) Linear b) Rotary
c) Translatory d) Rotary as well as translatory

P.T.O.

6) Time of flight of a projectile is given by

a) $\frac{u\sin\alpha}{g}$ b) $\frac{u^2\sin\alpha}{g}$ c) $\frac{2u\sin\alpha}{g}$ d) $\frac{2u\sin^2\alpha}{g}$

7) The acceleration of a block sliding down on inclined plane is
   a) Same as acceleration due to gravity
   b) Less than acceleration due to gravity
   c) Greater than acceleration due to gravity
   d) Uniformly increasing

8) If coefficient of restitution is one, then the two bodies are
   a) Perfectly plastic b) Partly elastic
   c) Perfectly elastic d) None of these

9) The following category of energy is associated with conservation force
   a) Kinetic energy b) Potential energy
   c) Energy lost due to friction d) None of these

10) A lift is moving upwards with an acceleration 'g'. The pressure exerted by man on the floor of the lift is
   a) Equal to his weight b) Zero
   c) Double than his weight d) None

11) The algebraic sum of the two forces forming a couple is always equal to
   a) Magnitude of one of the forces b) Zero
   c) Negative number d) Positive number

12) If two forces F_1 and F_2 are acting on a particle and if $\theta = 180°$, then the resultant of the two forces is given as
   a) $F_1 + F_2$ b) $F_1 - F_2$ c) $F_1^2 + F_2^2$ d) None of these

13) The ratio of static friction to dynamic friction is always
   a) = 1 b) < 1 c) > 1 d) None of these

14) In the method of sections for trusses, the section must be passed so as to cut not more than
   a) two members b) three members
   c) four members d) five members

SLR-TC – 2

Seat No.	

F.E. (Part – I) (CBCS) Examination, 2018
APPLIED MECHANICS

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

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

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Assume additional data, if required and state it **clearly**.*
*3) Figures to the **right** indicate **full** marks.*

2. Solve **any four** out of six : **12**

a) Calculate the forces in the members AB and AD of the truss shown in Fig. 1

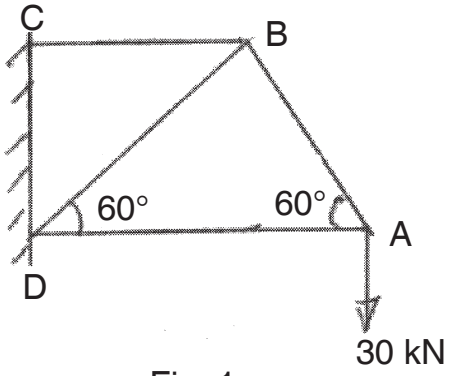

Fig. 1

b) State and derive expression for parallel axis theorem.

c) State and explain Lami's theorem.

d) Find the magnitude and direction of the resultant for the two forces acting at point O as shown in Fig. 2.

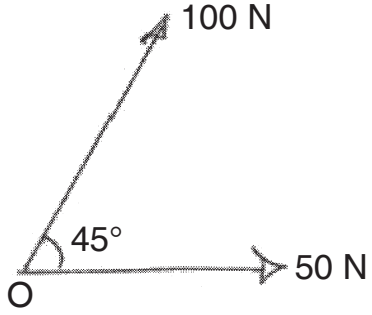

Fig. 2

e) Define and explain characteristics of couple.

Set R

f) Locate the centroidal XX axis for the T section given below in Fig. 3

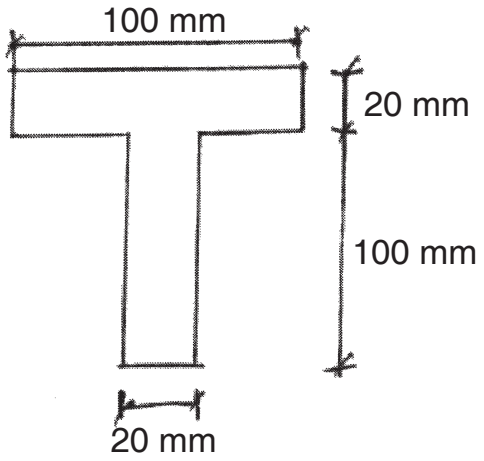

Fig. 3

3. Solve **any two** out of three : **16**

a) Analyze the overhanging beam loaded as shown in Fig. 4 below

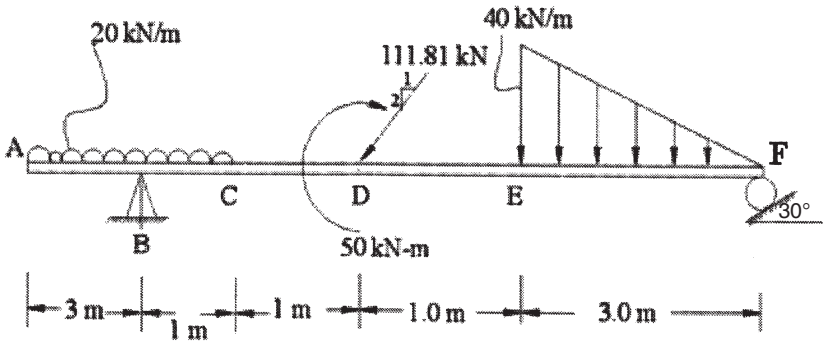

Fig. 4

b) Determine the magnitude and nature of the forces in the members BC, GC and GF of the truss shown in Fig. 5

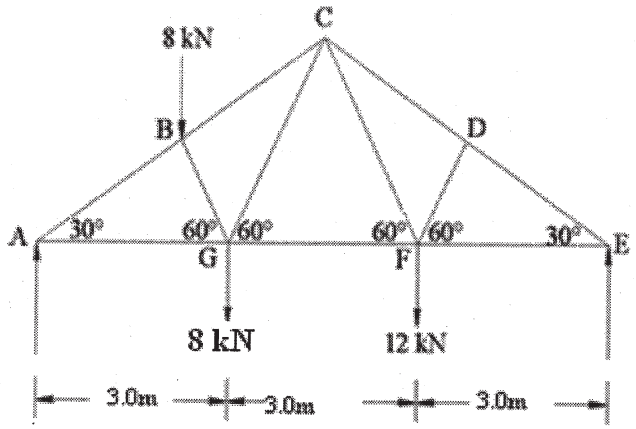

Fig. 5

c) The cross section of a plain concrete culvert is as shown in Fig. 6. Determine the moment of inertia about the horizontal centroidal axis.

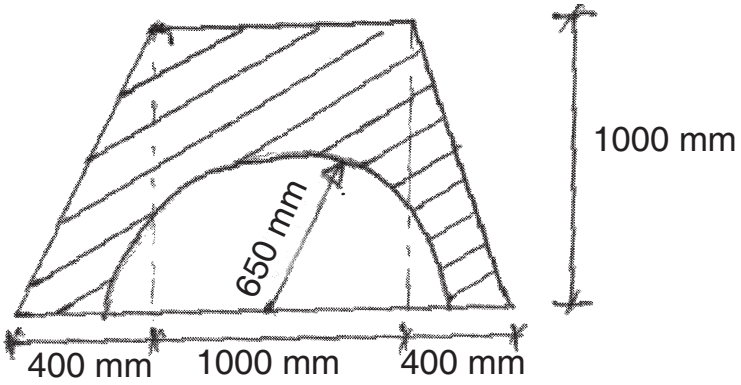

Fig. 6

4. Solve **any four** out of six : **12**

a) Derive equations of linear motion with uniform acceleration.

b) A small steel ball is shot vertically upwards from the top of a building 20m above the ground with an initial velocity of 15 m/s. Find

i) In what time it will reach the maximum height.

ii) How high above the building will the ball rise ?

c) Explain the need for banking of roads and superelevation of rails.

d) The rotation of a flywheel is governed by the equation $\omega = 3t^2 - 2t + 2$, where ω is in rad/sec and t is in sec. After 1 sec from the start, the angular displacement was 4 rad. Determine the angular displacement when t = 3 sec.

e) Enlist the types of motion curves and explain any one with neat sketch.

f) A ball 'A' of mass 0.25 kg moving on smooth horizontal table with velocity of 10 m/s strikes on identical stationary ball 'B' on the table. Find velocity of the ball 'B' just after the impact. The impact is perfectly plastic. Refer Fig. 7.

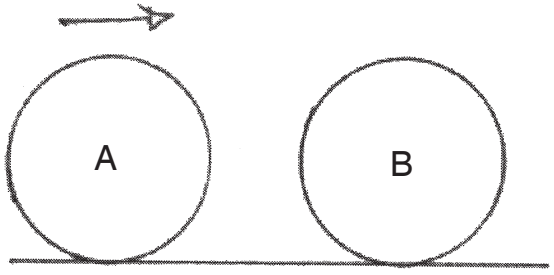

Fig. 7

5. Solve **any two** out of three : **16**

a) A bullet is fired upward at an angle of 30° with horizontal from point P on hill and hit the target which is 80 m lower than P. Initial velocity of bullet is 100 m/s. Calculate

i) the maximum height up to which bullet will reach above horizontal

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iii) total time of flight required.

b) In what distance will body 1 shown in Fig. 8 attain a velocity of a 3 m/s starting from rest ? Take coefficient of friction between blocks and plane as 0.2. Assume pulley is smooth. What is the tension in the chord ?

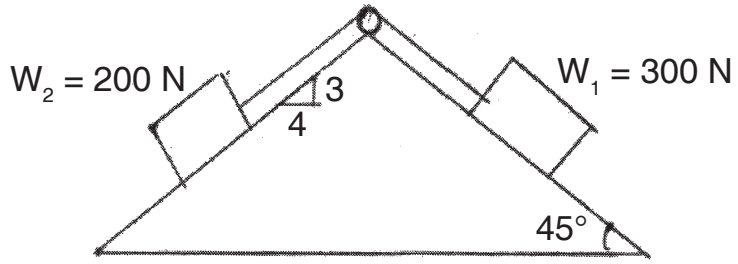

Fig. 8

c) A body weighing 300 N is pushed up at 30° inclined plane while 400 N force acting parallel to the plane. If initial velocity of body is 1.5 m/s and coefficient of kinetic friction μ = 0.2, what velocity will body have after moving 6 m ? Refer Fig. 9.

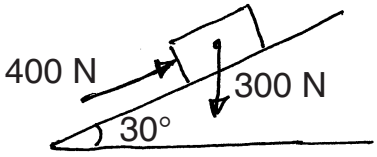

Fig. 9

SLR-TC – 2

Seat No.	

Set S

F.E. (Part – I) (CBCS) Examination, 2018
APPLIED MECHANICS

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.***
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternatives (**1** mark **each**) : **(14×1=14)**

1) Time of flight of a projectile is given by

a) $\frac{u\sin\alpha}{g}$ b) $\frac{u^2\sin\alpha}{g}$ c) $\frac{2u\sin\alpha}{g}$ d) $\frac{2u\sin^2\alpha}{g}$

2) The acceleration of a block sliding down on inclined plane is
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4) The following category of energy is associated with conservation force
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   c) Energy lost due to friction d) None of these

5) A lift is moving upwards with an acceleration 'g'. The pressure exerted by man on the floor of the lift is
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   c) Double than his weight d) None

6) The algebraic sum of the two forces forming a couple is always equal to
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7) If two forces F_1 and F_2 are acting on a particle and if $\theta = 180°$, then the resultant of the two forces is given as
   a) $F_1 + F_2$ b) $F_1 - F_2$ c) $F_1^2 + F_2^2$ d) None of these

8) The ratio of static friction to dynamic friction is always
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12) Polar moment of inertia is given by
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14) The motion of a bicycle wheel is
   a) Linear b) Rotary
   c) Translatory d) Rotary as well as translatory

SLR-TC – 2

Seat No.	

F.E. (Part – I) (CBCS) Examination, 2018
APPLIED MECHANICS

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

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

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Assume additional data, if required and state it **clearly**.*
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2. Solve **any four** out of six : **12**

a) Calculate the forces in the members AB and AD of the truss shown in Fig. 1

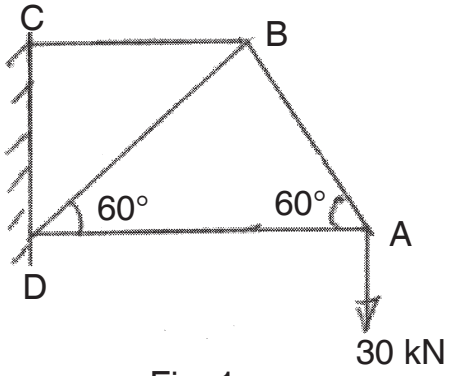

Fig. 1

b) State and derive expression for parallel axis theorem.

c) State and explain Lami's theorem.

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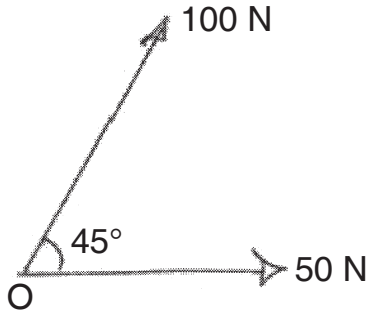

Fig. 2

e) Define and explain characteristics of couple.

Set S

f) Locate the centroidal XX axis for the T section given below in Fig. 3

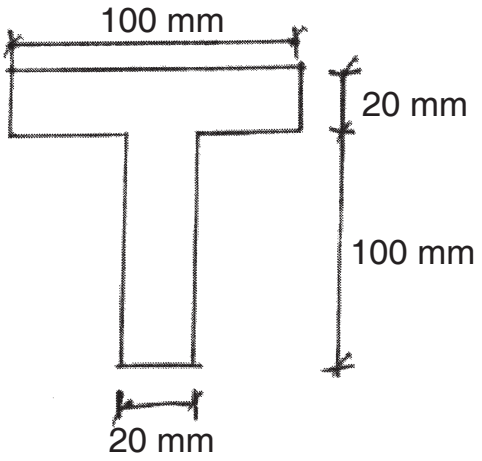

Fig. 3

3. Solve **any two** out of three : **16**

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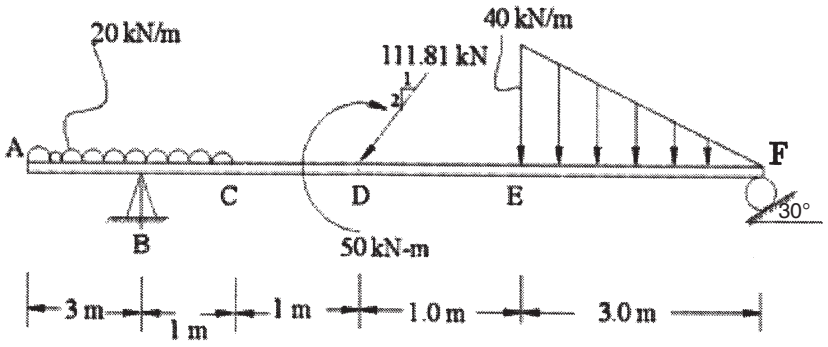

Fig. 4

b) Determine the magnitude and nature of the forces in the members BC, GC and GF of the truss shown in Fig. 5

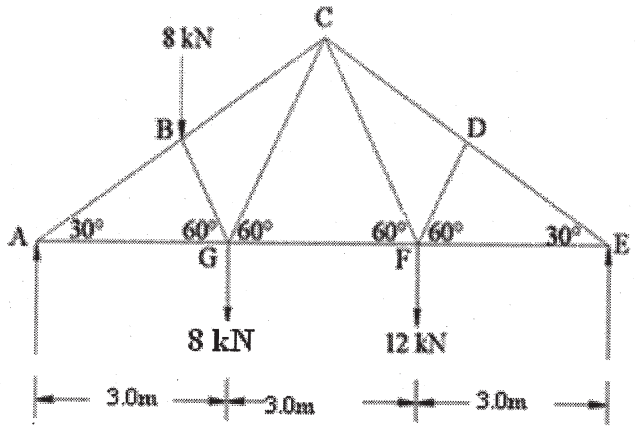

Fig. 5

c) The cross section of a plain concrete culvert is as shown in Fig. 6. Determine the moment of inertia about the horizontal centroidal axis.

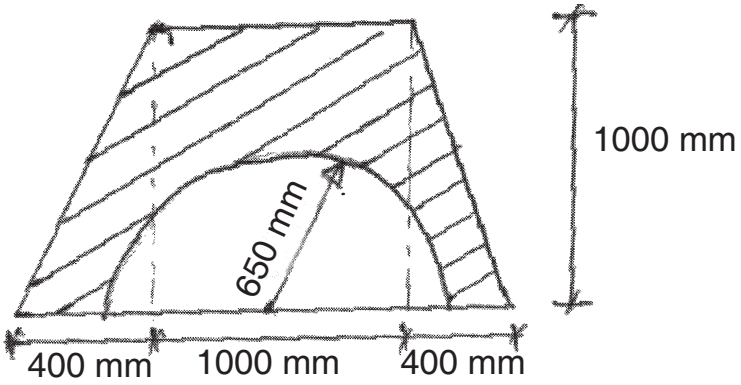

Fig. 6

4. Solve **any four** out of six : **12**

a) Derive equations of linear motion with uniform acceleration.

b) A small steel ball is shot vertically upwards from the top of a building 20m above the ground with an initial velocity of 15 m/s. Find

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ii) How high above the building will the ball rise ?

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d) The rotation of a flywheel is governed by the equation $\omega = 3t^2 - 2t + 2$, where ω is in rad/sec and t is in sec. After 1 sec from the start, the angular displacement was 4 rad. Determine the angular displacement when t = 3 sec.

e) Enlist the types of motion curves and explain any one with neat sketch.

f) A ball 'A' of mass 0.25 kg moving on smooth horizontal table with velocity of 10 m/s strikes on identical stationary ball 'B' on the table. Find velocity of the ball 'B' just after the impact. The impact is perfectly plastic. Refer Fig. 7.

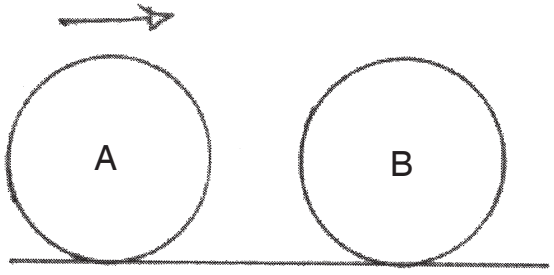

Fig. 7

5. Solve **any two** out of three : **16**

a) A bullet is fired upward at an angle of 30° with horizontal from point P on hill and hit the target which is 80 m lower than P. Initial velocity of bullet is 100 m/s. Calculate

i) the maximum height up to which bullet will reach above horizontal

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iii) total time of flight required.

b) In what distance will body 1 shown in Fig. 8 attain a velocity of a 3 m/s starting from rest ? Take coefficient of friction between blocks and plane as 0.2. Assume pulley is smooth. What is the tension in the chord ?

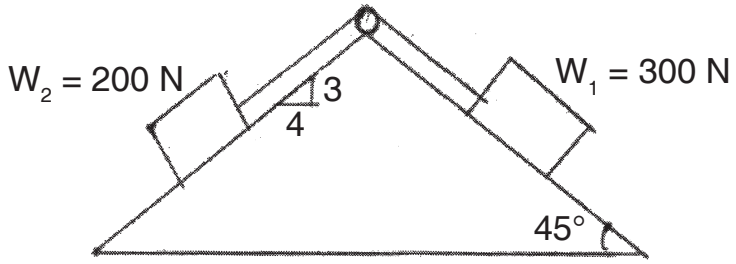


Fig. 8

c) A body weighing 300 N is pushed up at 30° inclined plane while 400 N force acting parallel to the plane. If initial velocity of body is 1.5 m/s and coefficient of kinetic friction μ = 0.2, what velocity will body have after moving 6 m ? Refer Fig. 9.

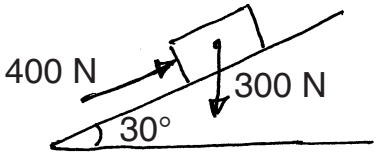


Fig. 9

SLR-TC – 3

Seat No.	

Set P

F.E. (Part – I) (CBCS) Examination, 2018
BASIC ELECTRICAL ENGINEERING

Day and Date : Saturday, 5-5-2018 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 : **(14×1=14)**

1) RMS value of supply voltage is 200 V then the maximum value is
   a) 200 × Form factor b) 200 × Power factor
   c) 200 × Peak factor d) None of these

2) A circuit has inductance of 2 H. If the circuit current changes at the rate of 10 A/second, then self induced emf is
   a) 5 V b) 0.2 V c) 20 V d) 10 V

3) 1 kWh is equivalent to _____ J.
   a) 860 b) 4.186 c) 36×10^5 d) 36000

4) Which of the following statement is true in case of a parallel circuit ?
   a) Voltage drop across each resistance is same
   b) Current flowing through each resistance is same
   c) Applied voltage is equal to sum of voltage drops across individual resistances
   d) Resistors are additive

5) Kirchoff's laws are applicable to
   a) a.c. circuits b) d.c. circuits
   c) a.c., d.c. and magnetic circuits d) None of these

6) Permeance of a magnetic circuit is _____ area of cross section of the circuit.
   a) Inversely proportional to b) Directly proportional to
   c) Independent of d) None of the above

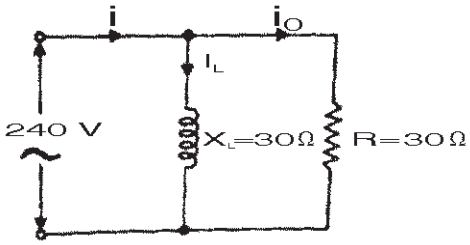
P.T.O.

7) If $e_1 = A \sin\omega t$ and $e_2 = B \sin(\omega t - \varphi)$, then
   a) e_1 lags e_2 by φ b) e_2 lags e_1 by φ
   c) e_2 leads e_1 by φ d) e_1 is in phase with e_2

8) The impedance of purely capacitive circuit is given by
   a) $z = R - jX_c$ b) $z = R + jX_c$
   c) $z = -jX_c$ d) $z = R$

9) For an AC circuit of impedance $Z = 3 + j4\ \Omega$, magnitude of the impedance is
   a) $\sqrt{3}$ b) $\sqrt{(3+4)}$ c) $\sqrt{4}$ d) $\sqrt{(9+16)}$

10) Power taken by circuit shown in figure is,



   a) 480 W b) 1200 W c) 1920 W d) 1322.5 W

11) For a balanced three phase system the total power consumed is given by
   a) $\sqrt{3}\, V_{ph} I_{ph} \cos\phi$ b) $V_{ph} I_{ph} \cos\phi$
   c) $\sqrt{3}\ V_L I_L \cos\phi$ d) $3\, V_L I_L \cos\phi$

12) The emf induced in a transformer depends upon
   a) Frequency b) Number of turns
   c) Maximum flux d) All of the above

13) A 2000/200 V, 20 kVA ideal transformer has 66 turns in the secondary. The number of primary turns is
   a) 440 b) 660 c) 550 d) 330

14) When the load is removed the motor that will run at the highest speed is the
   a) Shunt b) Series
   c) Cumulative compound d) Differentially compound

SLR-TC – 3

Seat No.	

F.E. (Part – I) (CBCS) Examination, 2018
BASIC ELECTRICAL ENGINEERING

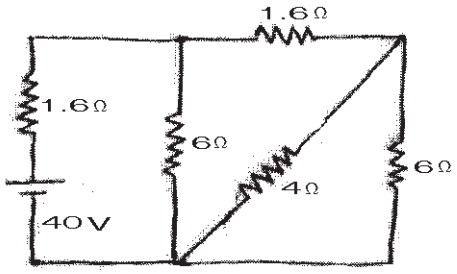
Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

a) The coil of an electromagnet, made up of copper has a resistance of 4Ω at a temperature of 22°C. After operating for 2 days, the coil current is 42 A at a terminal voltage of 210 V. Calculate the temperature of the coil at that time. Take temperature coefficient of resistance at 0°C to be 0.00427/°C.

b) Using Kirchoff's laws, find current through 4Ω resistance.



c) State maximum power transfer theorem. With neat diagram derive the condition for maximum power transfer in a circuit.

d) The magnetic circuit has effective iron length of 105 cm and an air gap of 2.5 mm. It is wound with 825 turns. If the relative permeability of iron is 1175, find the flux density in the air gap when winding carries a current of 1.2 A. Neglect leakage and fringing.

e) An immersion heater takes 1 hour to heat 50 kg of water from 20°C to boiling point. Calculate the power rating of the heater, assuming the heating equipment to have an efficiency of 90%.

f) Define following terms :

i) Cycle

ii) Time period

iii) Frequency

iv) Phase difference

3. Solve **any two** : **(2×6=12)**

a) A factory has 230 V supply from which following loads are taken.

i) Lighting : Two hundred lamps of 150 W, four hundred lamps of 100 W and five hundred lamps of 60 W.

ii) Heating : 100 kW.

iii) Motors : Output power of 44.76 kW with an average efficiency of 80%.

iv) Other : Various loads taking a current of 25 A.

Assuming that the lighting load is on for a period of 4 hours/day, the heating load for 10 hours/day and remainder for 2 hours/day. Calculate the weekly consumption of the factory in units, when working on six days per week and electrical energy bill for week if rate is Rs. 5 per unit.

b) State Faraday's laws of electromagnetic induction.

A flux of 0.5 mwb is produced by a coil of 900 turns wound on a ring with a current of 3A in it . Calculate :

i) The inductance of the coil.

ii) EMF induced in a coil when a current of 5 A is switched off, assuming the current to fall to zero in 1 ms.

c) Define and derive the expression for an average value of a.c. sinusoidal voltage.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

a) Derive the relation between voltage and current for a purely inductive circuit when A.C. supply is applied across it.

b) A 10Ω resistor and 400μF capacitor are connected in series to 60V supply. The circuit current is 5 A. Calculate supply frequency and phase angle between current and voltage.

c) Derive an expression for induced emf in a transformer in terms of frequency, maximum flux and the number of turns on the winding.

d) Explain working principle of 3 phase squirrel cage induction motor with its application.

e) Derive the relation between line and phase voltages and currents in balanced star connected 3-phase load.

f) R-L-C series circuit consists of resistance of 12 Ω, inductance of 0.15 H and capacitance of 100 μF. The series circuit is connected across 100 V, 50 Hz supply. Find,

i) Impedance

ii) Power factor

iii) Current

iv) Power consumed by circuit.

5. Solve **any two** : **(6×2=12)**

a) A 100 kVA single phase transformer has iron loss of 960 W. The full load copper loss is 1200 watts. Calculate efficiency at

i) Full load unity power factor

ii) Half load 0.8 lagging power factor.

b) Three impedances 10 + j0 Ω, 6 + j8 Ω and 4 – j9Ω are connected in parallel across 230 V, 50 Hz ac supply. Determine,

i) Current in each branch

ii) Power factor of each branch

iii) Total current.

c) Three coils, each having a resistances of 5 Ω and inductance of 0.02 H are connected in delta across a 440 V, 3-phase, 50 Hz supply. Calculate :

i) Line current

ii) Line voltage

iii) Power factor

iv) Total power absorbed.

———————

Set P

SLR-TC – 3

Seat No.	

Set Q

F.E. (Part – I) (CBCS) Examination, 2018
BASIC ELECTRICAL ENGINEERING

Day and Date : Saturday, 5-5-2018 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

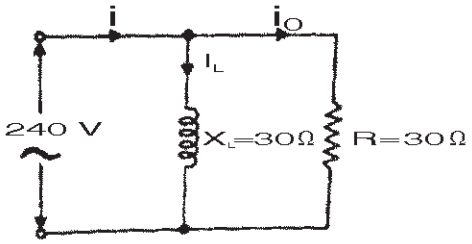
Duration : 30 Minutes Marks : 14

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

1) The impedance of purely capacitive circuit is given by
   a) $z = R - jX_c$ b) $z = R + jX_c$
   c) $z = -jX_c$ d) $z = R$

2) For an AC circuit of impedance $Z = 3 + j4\ \Omega$, magnitude of the impedance is
   a) $\sqrt{3}$ b) $\sqrt{(3+4)}$ c) $\sqrt{4}$ d) $\sqrt{(9+16)}$

3) Power taken by circuit shown in figure is,



   a) 480 W b) 1200 W c) 1920 W d) 1322.5 W

4) For a balanced three phase system the total power consumed is given by
   a) $\sqrt{3}\, V_{ph} I_{ph} \cos\phi$ b) $V_{ph} I_{ph} \cos\phi$
   c) $\sqrt{3}\ V_L I_L \cos\phi$ d) $3\, V_L I_L \cos\phi$

5) The emf induced in a transformer depends upon
   a) Frequency b) Number of turns
   c) Maximum flux d) All of the above

P.T.O.

6) A 2000/200 V, 20 kVA ideal transformer has 66 turns in the secondary. The number of primary turns is
   a) 440 b) 660 c) 550 d) 330

7) When the load is removed the motor that will run at the highest speed is the
   a) Shunt b) Series
   c) Cumulative compound d) Differentially compound

8) RMS value of supply voltage is 200 V then the maximum value is
   a) 200 × Form factor b) 200 × Power factor
   c) 200 × Peak factor d) None of these

9) A circuit has inductance of 2 H. If the circuit current changes at the rate of 10 A/second, then self induced emf is
   a) 5 V b) 0.2 V c) 20 V d) 10 V

10) 1 kWh is equivalent to _____ J.
   a) 860 b) 4.186 c) 36×10^5 d) 36000

11) Which of the following statement is true in case of a parallel circuit ?
   a) Voltage drop across each resistance is same
   b) Current flowing through each resistance is same
   c) Applied voltage is equal to sum of voltage drops across individual resistances
   d) Resistors are additive

12) Kirchoff's laws are applicable to
   a) a.c. circuits b) d.c. circuits
   c) a.c., d.c. and magnetic circuits d) None of these

13) Permeance of a magnetic circuit is _____ area of cross section of the circuit.
   a) Inversely proportional to b) Directly proportional to
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14) If $e_1 = A \sin\omega t$ and $e_2 = B \sin(\omega t - \varphi)$, then
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SLR-TC – 3

Seat No.	

F.E. (Part – I) (CBCS) Examination, 2018
BASIC ELECTRICAL ENGINEERING

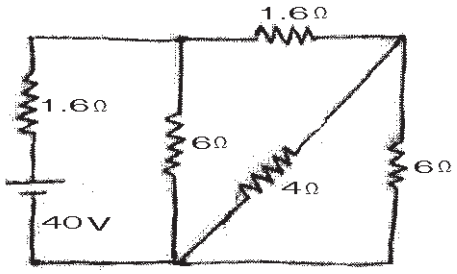
Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

a) The coil of an electromagnet, made up of copper has a resistance of 4Ω at a temperature of 22°C. After operating for 2 days, the coil current is 42 A at a terminal voltage of 210 V. Calculate the temperature of the coil at that time. Take temperature coefficient of resistance at 0°C to be 0.00427/°C.

b) Using Kirchoff's laws, find current through 4Ω resistance.



c) State maximum power transfer theorem. With neat diagram derive the condition for maximum power transfer in a circuit.

d) The magnetic circuit has effective iron length of 105 cm and an air gap of 2.5 mm. It is wound with 825 turns. If the relative permeability of iron is 1175, find the flux density in the air gap when winding carries a current of 1.2 A. Neglect leakage and fringing.

e) An immersion heater takes 1 hour to heat 50 kg of water from 20°C to boiling point. Calculate the power rating of the heater, assuming the heating equipment to have an efficiency of 90%.

f) Define following terms :

i) Cycle

ii) Time period

iii) Frequency

iv) Phase difference

3. Solve **any two** : **(2×6=12)**

a) A factory has 230 V supply from which following loads are taken.

i) Lighting : Two hundred lamps of 150 W, four hundred lamps of 100 W and five hundred lamps of 60 W.

ii) Heating : 100 kW.

iii) Motors : Output power of 44.76 kW with an average efficiency of 80%.

iv) Other : Various loads taking a current of 25 A.

Assuming that the lighting load is on for a period of 4 hours/day, the heating load for 10 hours/day and remainder for 2 hours/day. Calculate the weekly consumption of the factory in units, when working on six days per week and electrical energy bill for week if rate is Rs. 5 per unit.

b) State Faraday's laws of electromagnetic induction.

A flux of 0.5 mwb is produced by a coil of 900 turns wound on a ring with a current of 3A in it . Calculate :

i) The inductance of the coil.

ii) EMF induced in a coil when a current of 5 A is switched off, assuming the current to fall to zero in 1 ms.

c) Define and derive the expression for an average value of a.c. sinusoidal voltage.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

a) Derive the relation between voltage and current for a purely inductive circuit when A.C. supply is applied across it.

b) A 10Ω resistor and 400μF capacitor are connected in series to 60V supply. The circuit current is 5 A. Calculate supply frequency and phase angle between current and voltage.

c) Derive an expression for induced emf in a transformer in terms of frequency, maximum flux and the number of turns on the winding.

d) Explain working principle of 3 phase squirrel cage induction motor with its application.

e) Derive the relation between line and phase voltages and currents in balanced star connected 3-phase load.

f) R-L-C series circuit consists of resistance of 12 Ω, inductance of 0.15 H and capacitance of 100 μF. The series circuit is connected across 100 V, 50 Hz supply. Find,

i) Impedance

ii) Power factor

iii) Current

iv) Power consumed by circuit.

5. Solve **any two** : **(6×2=12)**

a) A 100 kVA single phase transformer has iron loss of 960 W. The full load copper loss is 1200 watts. Calculate efficiency at

i) Full load unity power factor

ii) Half load 0.8 lagging power factor.

b) Three impedances 10 + j0 Ω, 6 + j8 Ω and 4 – j9Ω are connected in parallel across 230 V, 50 Hz ac supply. Determine,

i) Current in each branch

ii) Power factor of each branch

iii) Total current.

c) Three coils, each having a resistances of 5 Ω and inductance of 0.02 H are connected in delta across a 440 V, 3-phase, 50 Hz supply. Calculate :

i) Line current

ii) Line voltage

iii) Power factor

iv) Total power absorbed.

———————

Set Q

SLR-TC – 3

Seat No.	

Set R

F.E. (Part – I) (CBCS) Examination, 2018
BASIC ELECTRICAL ENGINEERING

Day and Date : Saturday, 5-5-2018 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 : **(14×1=14)**

1) Kirchoff's laws are applicable to
   a) a.c. circuits b) d.c. circuits
   c) a.c., d.c. and magnetic circuits d) None of these

2) Permeance of a magnetic circuit is _____ area of cross section of the circuit.
   a) Inversely proportional to
   b) Directly proportional to
   c) Independent of
   d) None of the above

3) If $e_1 = A \sin\omega t$ and $e_2 = B \sin(\omega t - \varphi)$, then
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4) The impedance of purely capacitive circuit is given by
   a) $z = R - jX_c$ b) $z = R + jX_c$
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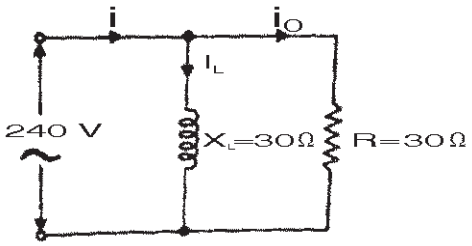
5) For an AC circuit of impedance $Z = 3 + j4\ \Omega$, magnitude of the impedance is
   a) $\sqrt{3}$ b) $\sqrt{(3+4)}$ c) $\sqrt{4}$ d) $\sqrt{(9+16)}$

P.T.O.

6) Power taken by circuit shown in figure is,



a) 480 W b) 1200 W c) 1920 W d) 1322.5 W

7) For a balanced three phase system the total power consumed is given by
a) $\sqrt{3}\, V_{ph} I_{ph} \cos\phi$ b) $V_{ph} I_{ph} \cos\phi$
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8) The emf induced in a transformer depends upon
a) Frequency b) Number of turns
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9) A 2000/200 V, 20 kVA ideal transformer has 66 turns in the secondary. The number of primary turns is
a) 440 b) 660 c) 550 d) 330

10) When the load is removed the motor that will run at the highest speed is the
a) Shunt b) Series
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11) RMS value of supply voltage is 200 V then the maximum value is
a) 200 × Form factor b) 200 × Power factor
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12) A circuit has inductance of 2 H. If the circuit current changes at the rate of 10 A/second, then self induced emf is
a) 5 V b) 0.2 V c) 20 V d) 10 V

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14) Which of the following statement is true in case of a parallel circuit ?
a) Voltage drop across each resistance is same
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_____

SLR-TC – 3

Seat No.	

F.E. (Part – I) (CBCS) Examination, 2018
BASIC ELECTRICAL ENGINEERING

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

a) The coil of an electromagnet, made up of copper has a resistance of 4Ω at a temperature of 22°C. After operating for 2 days, the coil current is 42 A at a terminal voltage of 210 V. Calculate the temperature of the coil at that time. Take temperature coefficient of resistance at 0°C to be 0.00427/°C.

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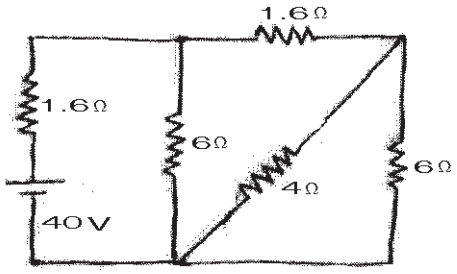

c) State maximum power transfer theorem. With neat diagram derive the condition for maximum power transfer in a circuit.

d) The magnetic circuit has effective iron length of 105 cm and an air gap of 2.5 mm. It is wound with 825 turns. If the relative permeability of iron is 1175, find the flux density in the air gap when winding carries a current of 1.2 A. Neglect leakage and fringing.

e) An immersion heater takes 1 hour to heat 50 kg of water from 20°C to boiling point. Calculate the power rating of the heater, assuming the heating equipment to have an efficiency of 90%.

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ii) Time period

iii) Frequency

iv) Phase difference

3. Solve **any two** : **(2×6=12)**

a) A factory has 230 V supply from which following loads are taken.

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SECTION – II

4. Attempt **any four** : **(4×4=16)**

a) Derive the relation between voltage and current for a purely inductive circuit when A.C. supply is applied across it.

b) A 10Ω resistor and 400μF capacitor are connected in series to 60V supply. The circuit current is 5 A. Calculate supply frequency and phase angle between current and voltage.

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i) Current in each branch

ii) Power factor of each branch

iii) Total current.

c) Three coils, each having a resistances of 5 Ω and inductance of 0.02 H are connected in delta across a 440 V, 3-phase, 50 Hz supply. Calculate :

i) Line current

ii) Line voltage

iii) Power factor

iv) Total power absorbed.

———————

Set R

SLR-TC – 3

Seat No.	

Set S

F.E. (Part – I) (CBCS) Examination, 2018
BASIC ELECTRICAL ENGINEERING

Day and Date : Saturday, 5-5-2018 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.*

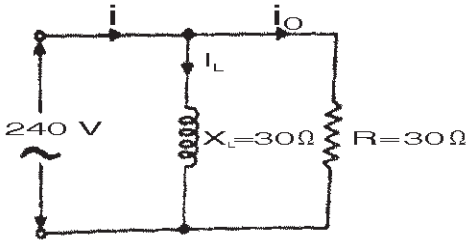
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Power taken by circuit shown in figure is,



a) 480 W b) 1200 W c) 1920 W d) 1322.5 W

2) For a balanced three phase system the total power consumed is given by
a) $\sqrt{3}\, V_{ph} I_{ph} \cos\phi$ b) $V_{ph} I_{ph} \cos\phi$
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3) The emf induced in a transformer depends upon
a) Frequency b) Number of turns
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4) A 2000/200 V, 20 kVA ideal transformer has 66 turns in the secondary. The number of primary turns is
a) 440 b) 660 c) 550 d) 330

5) When the load is removed the motor that will run at the highest speed is the
a) Shunt b) Series
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P.T.O.

6) RMS value of supply voltage is 200 V then the maximum value is
   a) 200 × Form factor
   b) 200 × Power factor
   c) 200 × Peak factor
   d) None of these

7) A circuit has inductance of 2 H. If the circuit current changes at the rate of 10 A/second, then self induced emf is
   a) 5 V
   b) 0.2 V
   c) 20 V
   d) 10 V

8) 1 kWh is equivalent to _____ J.
   a) 860
   b) 4.186
   c) 36×10^5
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9) Which of the following statement is true in case of a parallel circuit ?
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   c) $\sqrt{4}$
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SLR-TC – 3

Seat No.	

F.E. (Part – I) (CBCS) Examination, 2018
BASIC ELECTRICAL ENGINEERING

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Attempt **any four** : **(4×4=16)**

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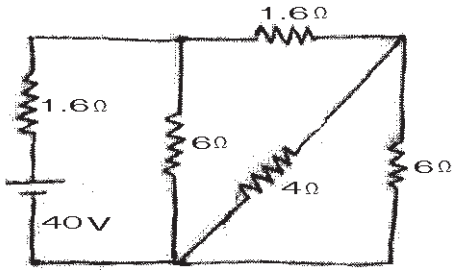

c) State maximum power transfer theorem. With neat diagram derive the condition for maximum power transfer in a circuit.

d) The magnetic circuit has effective iron length of 105 cm and an air gap of 2.5 mm. It is wound with 825 turns. If the relative permeability of iron is 1175, find the flux density in the air gap when winding carries a current of 1.2 A. Neglect leakage and fringing.

e) An immersion heater takes 1 hour to heat 50 kg of water from 20°C to boiling point. Calculate the power rating of the heater, assuming the heating equipment to have an efficiency of 90%.

f) Define following terms :

i) Cycle

ii) Time period

iii) Frequency

iv) Phase difference

3. Solve **any two** : **(2×6=12)**

a) A factory has 230 V supply from which following loads are taken.

i) Lighting : Two hundred lamps of 150 W, four hundred lamps of 100 W and five hundred lamps of 60 W.

ii) Heating : 100 kW.

iii) Motors : Output power of 44.76 kW with an average efficiency of 80%.

iv) Other : Various loads taking a current of 25 A.

Assuming that the lighting load is on for a period of 4 hours/day, the heating load for 10 hours/day and remainder for 2 hours/day. Calculate the weekly consumption of the factory in units, when working on six days per week and electrical energy bill for week if rate is Rs. 5 per unit.

b) State Faraday's laws of electromagnetic induction.

A flux of 0.5 mwb is produced by a coil of 900 turns wound on a ring with a current of 3A in it . Calculate :

i) The inductance of the coil.

ii) EMF induced in a coil when a current of 5 A is switched off, assuming the current to fall to zero in 1 ms.

c) Define and derive the expression for an average value of a.c. sinusoidal voltage.

SECTION – II

4. Attempt **any four** : **(4×4=16)**

a) Derive the relation between voltage and current for a purely inductive circuit when A.C. supply is applied across it.

b) A 10Ω resistor and 400μF capacitor are connected in series to 60V supply. The circuit current is 5 A. Calculate supply frequency and phase angle between current and voltage.

c) Derive an expression for induced emf in a transformer in terms of frequency, maximum flux and the number of turns on the winding.

d) Explain working principle of 3 phase squirrel cage induction motor with its application.

e) Derive the relation between line and phase voltages and currents in balanced star connected 3-phase load.

f) R-L-C series circuit consists of resistance of 12 Ω, inductance of 0.15 H and capacitance of 100 μF. The series circuit is connected across 100 V, 50 Hz supply. Find,

i) Impedance

ii) Power factor

iii) Current

iv) Power consumed by circuit.

5. Solve **any two** : **(6×2=12)**

a) A 100 kVA single phase transformer has iron loss of 960 W. The full load copper loss is 1200 watts. Calculate efficiency at

i) Full load unity power factor

ii) Half load 0.8 lagging power factor.

b) Three impedances 10 + j0 Ω, 6 + j8 Ω and 4 – j9Ω are connected in parallel across 230 V, 50 Hz ac supply. Determine,

i) Current in each branch

ii) Power factor of each branch

iii) Total current.

c) Three coils, each having a resistances of 5 Ω and inductance of 0.02 H are connected in delta across a 440 V, 3-phase, 50 Hz supply. Calculate :

i) Line current

ii) Line voltage

iii) Power factor

iv) Total power absorbed.

———————

Set S

SLR-TC – 4

Seat No.	

Set P

F.E. (Part – I) (CBCS) Examination, 2018
BASIC MECHANICAL ENGINEERING

Day and Date : Monday, 7-5-2018 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 : **(14×1=14)**

1) An isothermal process is governed by
   a) Boyle's law b) Charle's law
   c) Joules law d) Gay Lussac's law

2) Pollution in the form of smoke and ash is associated with
   a) Thermal power plant b) Hydro power plant
   c) Nuclear power plant d) Diesel power plant

3) Which of the following power plant requires maximum area ?
   a) Steam power plant b) Gas power plant
   c) Nuclear power plant d) Diesel power plant

4) Internal energy of gas is given by
   a) du = Cp x dt b) du = Cv x dt
   c) du = cp x cv x dt d) none of above

5) Conversion of all the heat into equivalent amount of work is impossible according to
   a) Zeroth law of thermodynamics b) 1^{st} law of thermodynamics
   c) 2^{nd} law of thermodynamics d) 3^{rd} law of thermodynamics

P.T.O.

6) In split air conditioner
   a) All components are placed in compact box
   b) Compressor and condenser are placed outside the room
   c) Compressor and condenser are placed inside the room
   d) Evaporator is outside the room

7) Which of the following is an impulse turbine ?
   a) Pelton wheel b) Francis turbine
   c) Kaplan turbine d) None of above

8) Which of the following drive is associated with slip phenomenon ?
   a) Belt drive b) Chain drive
   c) Gear drive d) None of these

9) Enhancing the beauty and symmetry of product is taken in following design
   a) Ergonomic consideration b) Aesthetic consideration
   c) Refrigeration d) Air conditioning

10) The property of material which enables to be drawn into wires
   a) Toughness b) Hardness c) Malleability d) Ductility

11) Which of the following is constant volume cycle ?
   a) Otto cycle b) Diesel cycle
   c) Rankine cycle d) None of these

12) In two stroke engine one power stroke is obtained in
   a) One revolution of crankshaft b) Two revolution of crankshaft
   c) Four revolution of crankshaft d) None

13) Generally sheet metals are welded by following joining process
   a) Arc welding b) Spot welding
   c) TIG welding d) None of these

14) In which of the following process diameter of workpiece is reduced ?
   a) Facing b) Knurling c) Turning d) Parting off

SLR-TC – 4

Seat No.	

F.E. (Part – I) (CBCS) Examination, 2018
BASIC MECHANICAL ENGINEERING

Day and Date : Monday, 7-5-2018 Marks : 56

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

***Instructions** : 1) **Neat** diagrams must be drawn **whenever** necessary.*
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*6) **Use** of log tables and non-programmable single memory calculator is **allowed**.*

SECTION – I

2. Answer **any five** of the following : **15**

a) Explain thermodynamic equilibrium in brief.

b) A system undergoes a cycle consisting of 4 processes. The heat and work transfer are tabulated below. Prove that the table is consistent with first law of thermodynamics. Determine change in internal energy for each process.

Process	Q(kJ)	W (kN-m)
1 – 2	1700	495
2 – 3	–1600	0
3 – 4	–900	–255
4 – 1	1040	0

c) Draw a neat sketch of window air conditioner. Label the parts.

d) Derive an expression of work done in polytropic process.

e) Explain in brief working of single acting reciprocating pump.

f) Differentiate between impulse and reaction turbine.

g) Compare BWR and PWR.

3. Solve **any one** out of **a)** and **b)** and solve **any two** out of **c**) to **f**) : **13**

a) Steam enters a steam turbine with a velocity of 40 m/s and enthalpy of 2500 kJ/kg and leaves with a velocity of 90 m/s and enthalpy of 2030 J/kg. The heat lost from the turbine to the surroundings is 240 kJ/min. Find the power developed by the turbine if the steam flow rate is 7200 kg/hr. **5**

b) With the help of neat sketch explain working of stem (thermal) power plant. **5**

c) Air having specific volume of 0.3 m^3/kg and pressure 5.5 bar expands polytropically until its specific volume becomes 0.5 m^3/kg. The expansion follows the law $pv^{1.3} = C$. For 1 kg mass, calculate work done and change in internal energy during the process. Take R = 287 Nm/kgK and C_v = 0.7 kJ/kgK for air. **4**

d) Explain the working of centrifugal compressor with the help of neat sketch. What is the function of diffuser ring ? **4**

e) With the help of neat sketch explain working of hydroelectric power plant. **4**

f) A fluid system undergoes a non-flow frictionless process following the pressure volume relation as p = (4.5/v) + 2 where 'p' is in bar and 'v' is in m^3. During the process, the volume changes from 0.12 m^3 to 0.04 m^3. The system rejects 40 kJ of heat. Determine the work done and change in internal energy. **4**

SECTION – II

4. Answer **any five** of the following : **(5×3=15)**

a) What are various applications of I.C. engines ?

b) How velocity rario is determined in compound belt drives ?

c) Write a note on chain drive.

d) Explain creative design, adoptive design and development design.

e) Explain the terms : Brittleness, Malleability and ductility.

f) Explain the processes of diesel cycle using P-V diagram.

g) Write a note on soldering process.

5. Solve **any one** out of **a)** and **b)** and solve **any two** out of **c**) to **f**) : **13**

a) A cross belt connects two pulleys of 500 mm diameter, 2 m apart. The initial tension in the belt is 500 N. If the coefficient of friction between belt and pulley is 0.3, find the power transmitted at 700 rpm. Also calculate the length of the belt. **5**

b) Explain riveting process and types of riveted joints. **5**

c) A 4-stroke engine working on Otto cycle has a swept volume of 0.1 m^3. The compression ratio is 7. The condition at the start of the cycle: pressure 0.1 MPa and temperature 90°C. The heat addition at constant volume is 100 kJ/cycle. Find air standard efficiency and temperatures at key points in the cycle. Assume air as working substance, Cv = 0.718 kJ/kgK and γ =1.4.

d) Explain aesthetic considerations in design. **4**

e) Explain various processes performed on drilling machine. **4**

f) Explain with neat sketch manual metal arc welding, write advantages, disadvantages. **4**

SLR-TC – 4

Seat No.	

Set Q

F.E. (Part – I) (CBCS) Examination, 2018
BASIC MECHANICAL ENGINEERING

Day and Date : Monday, 7-5-2018 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 : **(14×1=14)**

1) Which of the following drive is associated with slip phenomenon ?

a) Belt drive b) Chain drive

c) Gear drive d) None of these

2) Enhancing the beauty and symmetry of product is taken in following design

a) Ergonomic consideration b) Aesthetic consideration

c) Refrigeration d) Air conditioning

3) The property of material which enables to be drawn into wires

a) Toughness b) Hardness c) Malleability d) Ductility

4) Which of the following is constant volume cycle ?

a) Otto cycle b) Diesel cycle

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5) In two stroke engine one power stroke is obtained in

a) One revolution of crankshaft b) Two revolution of crankshaft

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P.T.O.

6) Generally sheet metals are welded by following joining process
   a) Arc welding b) Spot welding
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13) In split air conditioner
   a) All components are placed in compact box
   b) Compressor and condenser are placed outside the room
   c) Compressor and condenser are placed inside the room
   d) Evaporator is outside the room

14) Which of the following is an impulse turbine ?
   a) Pelton wheel b) Francis turbine
   c) Kaplan turbine d) None of above

Seat No.	

F.E. (Part – I) (CBCS) Examination, 2018
BASIC MECHANICAL ENGINEERING

Day and Date : Monday, 7-5-2018 Marks : 56

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

***Instructions** : 1) **Neat** diagrams must be drawn **whenever** necessary.*
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SECTION – I

2. Answer **any five** of the following : **15**

a) Explain thermodynamic equilibrium in brief.

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Process	Q(kJ)	W (kN-m)
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3 – 4	–900	–255
4 – 1	1040	0

c) Draw a neat sketch of window air conditioner. Label the parts.

d) Derive an expression of work done in polytropic process.

e) Explain in brief working of single acting reciprocating pump.

f) Differentiate between impulse and reaction turbine.

g) Compare BWR and PWR.

3. Solve **any one** out of **a)** and **b)** and solve **any two** out of **c**) to **f**) : **13**

a) Steam enters a steam turbine with a velocity of 40 m/s and enthalpy of 2500 kJ/kg and leaves with a velocity of 90 m/s and enthalpy of 2030 J/kg. The heat lost from the turbine to the surroundings is 240 kJ/min. Find the power developed by the turbine if the steam flow rate is 7200 kg/hr. **5**

b) With the help of neat sketch explain working of stem (thermal) power plant. **5**

c) Air having specific volume of 0.3 m^3/kg and pressure 5.5 bar expands polytropically until its specific volume becomes 0.5 m^3/kg. The expansion follows the law $pv^{1.3} = C$. For 1 kg mass, calculate work done and change in internal energy during the process. Take R = 287 Nm/kgK and C_v = 0.7 kJ/kgK for air. **4**

d) Explain the working of centrifugal compressor with the help of neat sketch. What is the function of diffuser ring ? **4**

e) With the help of neat sketch explain working of hydroelectric power plant. **4**

f) A fluid system undergoes a non-flow frictionless process following the pressure volume relation as p = (4.5/v) + 2 where 'p' is in bar and 'v' is in m^3. During the process, the volume changes from 0.12 m^3 to 0.04 m^3. The system rejects 40 kJ of heat. Determine the work done and change in internal energy. **4**

SECTION – II

4. Answer **any five** of the following : **(5×3=15)**

a) What are various applications of I.C. engines ?

b) How velocity rario is determined in compound belt drives ?

c) Write a note on chain drive.

d) Explain creative design, adoptive design and development design.

e) Explain the terms : Brittleness, Malleability and ductility.

f) Explain the processes of diesel cycle using P-V diagram.

g) Write a note on soldering process.

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a) A cross belt connects two pulleys of 500 mm diameter, 2 m apart. The initial tension in the belt is 500 N. If the coefficient of friction between belt and pulley is 0.3, find the power transmitted at 700 rpm. Also calculate the length of the belt. **5**

b) Explain riveting process and types of riveted joints. **5**

c) A 4-stroke engine working on Otto cycle has a swept volume of 0.1m^3. The compression ratio is 7. The condition at the start of the cycle: pressure 0.1 MPa and temperature 90°C. The heat addition at constant volume is 100 kJ/cycle. Find air standard efficiency and temperatures at key points in the cycle. Assume air as working substance, Cv = 0.718 kJ/kgK
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d) Explain aesthetic considerations in design. **4**

e) Explain various processes performed on drilling machine. **4**

f) Explain with neat sketch manual metal arc welding, write advantages, disadvantages. **4**

Set Q

SLR-TC – 4

Seat No.	

Set **R**

F.E. (Part – I) (CBCS) Examination, 2018
BASIC MECHANICAL ENGINEERING

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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1) Conversion of all the heat into equivalent amount of work is impossible according to
   a) Zeroth law of thermodynamics
   b) 1st law of thermodynamics
   c) 2nd law of thermodynamics
   d) 3rd law of thermodynamics

2) In split air conditioner
   a) All components are placed in compact box
   b) Compressor and condenser are placed outside the room
   c) Compressor and condenser are placed inside the room
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3) Which of the following is an impulse turbine ?
   a) Pelton wheel
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6) The property of material which enables to be drawn into wires
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7) Which of the following is constant volume cycle ?
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SLR-TC – 4

Seat No.	

F.E. (Part – I) (CBCS) Examination, 2018
BASIC MECHANICAL ENGINEERING

Day and Date : Monday, 7-5-2018 Marks : 56

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

***Instructions** : 1) **Neat** diagrams must be drawn **whenever** necessary.*
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SECTION – I

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SECTION – II

4. Answer **any five** of the following : **(5×3=15)**

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Set R

SLR-TC – 4

Seat No.	

Set S

F.E. (Part – I) (CBCS) Examination, 2018
BASIC MECHANICAL ENGINEERING

Day and Date : Monday, 7-5-2018 Total Marks : 70
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The property of material which enables to be drawn into wires

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P.T.O.

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SLR-TC – 4

Seat No.	

F.E. (Part – I) (CBCS) Examination, 2018
BASIC MECHANICAL ENGINEERING

Day and Date : Monday, 7-5-2018 Marks : 56

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

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*4) Q. No. **2** and .Q. No. **4** are short answer type question.*
*5) Q. **3** and Q. **5** are long answer type question.*
*6) **Use** of log tables and non-programmable single memory calculator is **allowed**.*

SECTION – I

2. Answer **any five** of the following : **15**

a) Explain thermodynamic equilibrium in brief.

b) A system undergoes a cycle consisting of 4 processes. The heat and work transfer are tabulated below. Prove that the table is consistent with first law of thermodynamics. Determine change in internal energy for each process.

Process	Q(kJ)	W (kN-m)
1 – 2	1700	495
2 – 3	–1600	0
3 – 4	–900	–255
4 – 1	1040	0

c) Draw a neat sketch of window air conditioner. Label the parts.

d) Derive an expression of work done in polytropic process.

e) Explain in brief working of single acting reciprocating pump.

f) Differentiate between impulse and reaction turbine.

g) Compare BWR and PWR.

3. Solve **any one** out of **a)** and **b)** and solve **any two** out of **c**) to **f**) : **13**

a) Steam enters a steam turbine with a velocity of 40 m/s and enthalpy of 2500 kJ/kg and leaves with a velocity of 90 m/s and enthalpy of 2030 J/kg. The heat lost from the turbine to the surroundings is 240 kJ/min. Find the power developed by the turbine if the steam flow rate is 7200 kg/hr. **5**

b) With the help of neat sketch explain working of stem (thermal) power plant. **5**

c) Air having specific volume of 0.3 m^3/kg and pressure 5.5 bar expands polytropically until its specific volume becomes 0.5 m^3/kg. The expansion follows the law $pv^{1.3} = C$. For 1 kg mass, calculate work done and change in internal energy during the process. Take R = 287 Nm/kgK and C_v = 0.7 kJ/kgK for air. **4**

d) Explain the working of centrifugal compressor with the help of neat sketch. What is the function of diffuser ring ? **4**

e) With the help of neat sketch explain working of hydroelectric power plant. **4**

f) A fluid system undergoes a non-flow frictionless process following the pressure volume relation as p = (4.5/v) + 2 where 'p' is in bar and 'v' is in m^3. During the process, the volume changes from 0.12 m^3 to 0.04 m^3. The system rejects 40 kJ of heat. Determine the work done and change in internal energy. **4**

SECTION – II

4. Answer **any five** of the following : **(5×3=15)**

a) What are various applications of I.C. engines ?

b) How velocity rario is determined in compound belt drives ?

c) Write a note on chain drive.

d) Explain creative design, adoptive design and development design.

e) Explain the terms : Brittleness, Malleability and ductility.

f) Explain the processes of diesel cycle using P-V diagram.

g) Write a note on soldering process.

5. Solve **any one** out of **a)** and **b)** and solve **any two** out of **c**) to **f**) : **13**

a) A cross belt connects two pulleys of 500 mm diameter, 2 m apart. The initial tension in the belt is 500 N. If the coefficient of friction between belt and pulley is 0.3, find the power transmitted at 700 rpm. Also calculate the length of the belt. **5**

b) Explain riveting process and types of riveted joints. **5**

c) A 4-stroke engine working on Otto cycle has a swept volume of 0.1m^3. The compression ratio is 7. The condition at the start of the cycle: pressure 0.1 MPa and temperature 90°C. The heat addition at constant volume is 100 kJ/cycle. Find air standard efficiency and temperatures at key points in the cycle. Assume air as working substance, Cv = 0.718 kJ/kgK and γ =1.4.

d) Explain aesthetic considerations in design. **4**

e) Explain various processes performed on drilling machine. **4**

f) Explain with neat sketch manual metal arc welding, write advantages, disadvantages. **4**

Set S

SLR-TC – 5

Seat No.	

Set P

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING MATHEMATICS – II

Day and Date : Monday, 14-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) To solve the non-homogeneous differential equation $(x – y – z)\,dx – (2x – 2y – 3)\,dy = 0$, we shall put
a) $x + y = v$ b) $x – y = v$ c) $x = X + h, y = Y + k$ d) $x = X – h, y = Y – k$

2) The orthogonal trajectory of $r = a\theta$ is
a) $r = ce^{-\theta^2/2}$ b) $r = ce^{\theta/2}$ c) $r = ce^{\theta^2/2}$ d) $r = ce^{-\theta/2}$

3) The unit tangent vector to the curve $x = t^2 + 1, y = 4t – 3, z = 3t^2 – 6t$ at $t = 1$ is
a) $\frac{1}{\sqrt{5}}(i + 2k)$ b) $\frac{1}{\sqrt{5}}(i + 2j)$ c) $\frac{1}{\sqrt{3}}(i + j + k)$ d) $\frac{1}{\sqrt{6}}(i + 2j + k)$

4) If $\phi = \log(x^2 + y^2 + z^2)$ and $\bar{r} = xi + yj + zk$, then $\nabla\phi$ is
a) $\frac{\bar{r}}{r^2}$ b) $\frac{2\bar{r}}{r}$ c) $\frac{\bar{r}}{r}$ d) $\frac{2\bar{r}}{r^2}$

5) If $\bar{F} = (x + y + 1)i + j – (x + y)k$ then curl $\bar{F}$ is
a) $i + j – k$ b) $i – j + k$ c) $– i + j – k$ d) $– i – j + k$

6) The geometric series $1 + r + r^2 + r^3 + \ldots$ is convergent if
a) $|r| \leq 1$ b) $|r| \geq 1$ c) $|r| < 1$ d) $|r| > 1$

P.T.O.

7) By Cauchy's n^{th} root test, the series $\sum_n \left(1+\frac{1}{n}\right)^{n^2}$ is

a) convergent b) divergent c) oscillating d) none of these

8) The value of $\int_0^\infty \frac{e^{-x}}{x^2}\,dx$ is

a) 1 b) 0 c) –1 d) ∞

9) The value of $B\left(\frac{5}{2}, \frac{1}{2}\right)$ is

a) $\frac{\pi}{3}$ b) $\frac{\pi}{8}$ c) $\frac{3\pi}{8}$ d) $\frac{8\pi}{3}$

10) For the curve $y^2 (a – x) = x^3$ which of the following is not true ?

a) The curve is symmetrical about y axis

b) Curve passes through origin

c) ∃ one tangent parallel to y axis

d) The x-axis is a tangent at origin

11) The arc length of the curve y = f(x) between x = a and x = b (b > a) is given by

a) $\int_a^b y\,dx$ b) $\int_a^b y^2\,dx$ c) $\int_a^b \sqrt{1+\left(\frac{dx}{dy}\right)^2}\,dx$ d) $\int_a^b \sqrt{1+\left(\frac{dy}{dx}\right)^2}\,dx$

12) The area enclosed by the curve $y^2 = x$ and the lines x = 0 to x = 4 is _____

a) $\frac{16}{3}$ b) $\frac{32}{3}$ c) 16 d) 32

13) The value of $\int_0^1 \int_0^{\pi/2} r\sin\theta\,d\theta\,dr$ =

a) $\frac{1}{2}$ b) $\frac{\pi}{2}$ c) 0 d) $\frac{-1}{2}$

14) For $\int_0^{4a} \int_x^{2\sqrt{ax}} f(x, y)\,dy\,dx$ change of integration, we get

a) $\int_0^a \int_{x^2/4a}^{x} f(x, y)\,dx\,dy$ b) $\int_0^{4a} \int_{y^2/4a}^{y} f(x, y)\,dx\,dy$

c) $\int_{y^2/4a}^{y} \int_0^{2a} f(x, y)\,dx\,dy$ d) $\int_0^{4a} \int_{y^2/2a}^{y} f(x, y)dx\,dy$

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Seat No.	

F.E. (Part – II) (CBCS) Examination, 2018

ENGINEERING MATHEMATICS – II

Day and Date : Monday, 14-5-2018 Marks : 56

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

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*

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

3) ***Use*** *of non-programmable calculator is* ***allowed****.*

SECTION – I

2. Attempt **any three** : **9**

a) Solve $(2x + y + 1)dx + (4x + 2y – 1)\, dy = 0$.

b) Find the orthogonal trajectory for $r^n = a^n \cos n\theta$.

c) A particle moves such that its position vector is given by

$\bar{r} = \cos \omega t\, i + \sin \omega t\, j$, then

Show that :

i) velocity $\bar{v}$ is perpendicular to $\bar{r}$

ii) acceleration $\bar{a}$ and $\bar{r}$ are oppositely directed.

d) If $\bar{u} = x^2y\, i + y^2x^3\, j – 3x^2z^2\, k$ and

$\bar{v} = 2xz^2\, i – yz\, j + x^2y^3\, k$

find $\nabla \cdot (\bar{u} \times \bar{v})$ at (1, 2, 1).

e) Test the convergence of $\sum_n \frac{2+n}{(1+n)^p}$.

3. Attempt **any three** : **9**

a) Examine the convergence of $\left[\left(\frac{2}{1}\right)^2 - \frac{2}{1}\right] + \left[\left(\frac{3}{2}\right)^2 - \left(\frac{3}{2}\right)\right]^2 + \left[\left(\frac{4}{3}\right)^4 - \frac{4}{3}\right]^3 + \ldots$

b) Solve $(y - 2x^2)dx - x(1 - xy)dy = 0$.

c) Solve $\frac{dy}{dx} + 2y \tan x = \sin x$ with y = 0 at $x = \frac{\pi}{3}$.

d) Prove that a vector field $\bar{F}$ given by

$\bar{F} = (ysinz - sinx)i + (xsinz + 2yz)j + (xycosz + y^2)k$ is irrotational.

e) Solve $y\frac{dx}{dy} = x + yx^2 \log y$.

4. Attempt **any two** : **10**

a) A constant e.m.f. E volts is applied to a circuit containing a constant resistance R ohms in series and a constant inductance L henries. The current i at any time t is given by $L\frac{di}{dt} + Ri = E$.

If the initial current is zero, show that the current builds upto half its theoretical maximum value in $\frac{L}{R}\log^2$ seconds.

b) Find the constants a, b, c if the normal to the surface $ax^2 + yz + bxz^3 = c$ at point P(1, 2, 1) is parallel to the normal to the surface $y^2 + xz = 61$ at (10, 1, 6).

c) Examine for absolute and conditional convergence :

i) $5 - \frac{10}{3} + \frac{20}{9} - \frac{40}{27} + \ldots$

ii) $\sum \frac{(-1)^n (n+1)^n}{(2n)^n}$.

SECTION – II

5. Solve **any three** out of five : **(3×3=9)**

a) Evaluate $\int_0^\infty x^4 e^{-x^6} dx$.

b) Show that $\int_0^\infty \frac{\log(1+ax^2)}{x^2} dx = \pi.\sqrt{a}$ (a>0).

c) Trace the curve $x^2y^2 = a^2 (y^2 - x^2)$ with full justification.

d) Trace the curve $x = a\cos^3\theta$, $y = b\sin^3\theta$ with full justification.

e) Find the mass of the lamina in the form of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, if the density at any point varies as the product of the distance from the axes of the ellipse.

6. Solve **any three** out of five : **(3×3=9)**

a) Evaluate $\int_0^3 x^{5/2}(3-x)^{1/2}\,dx$.

b) Trace the curve $y(x^2 + 4a^2) = 8a^3$ with full justification.

c) Find the length of the curve

$x = ae^{\theta}\sin\theta$

$y = ae^{\theta}\cos\theta$ from $\theta = 0$ to $\theta = \pi/2$.

d) Evaluate by changing to polar co-ordinates $\int_0^a \int_0^x \frac{x^3}{\sqrt{x^2+y^2}}\,dy\,dx$.

e) Evaluate $\int_0^4 \int_0^{2\sqrt{z}} \int_0^{\sqrt{4z-x^2}} dz\,dx\,dy$.

7. Solve **any two** out of three : **(5×2=10)**

a) Prove that $\int_0^1 \frac{x^{2n}}{\sqrt{1-x^2}}\,dx = \frac{(2n)!}{2^{2n}(n!)^2}\cdot\frac{\pi}{2}$ if n is an integer.

b) Trace the curve $r = a(1 + \cos\theta)$ with full justification and hence find the perimeter of the cardioid.

c) Find by double integration the mass of a thin plate bounded by $y^2 = x$ and $y = x^3$ if the density at any point varies as the square of its distance from the origin.

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Set P

SLR-TC – 5

Seat No.	

Set Q

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING MATHEMATICS – II

Day and Date : Monday, 14-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

N.B. : 1) ***All*** *questions are* ***compulsory****.*
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5) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The value of $\int_0^\infty \frac{e^{-x}}{x^2}\,dx$ is
a) 1 b) 0 c) –1 d) ∞

2) The value of $B\left(\frac{5}{2}, \frac{1}{2}\right)$ is
a) $\frac{\pi}{3}$ b) $\frac{\pi}{8}$ c) $\frac{3\pi}{8}$ d) $\frac{8\pi}{3}$

3) For the curve $y^2 (a - x) = x^3$ which of the following is not true ?
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P.T.O.

5) The area enclosed by the curve $y^2 = x$ and the lines $x = 0$ to $x = 4$ is _____

a) $\frac{16}{3}$ b) $\frac{32}{3}$ c) 16 d) 32

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c) $\int_{y^2/4a}^y \int_0^{2a} f(x, y) \, dx \, dy$ d) $\int_0^{4a} \int_{y^2/2a}^y f(x, y) dx \, dy$

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11) If $\phi = \log (x^2 + y^2 + z^2)$ and $\bar{r} = xi + yj + zk$, then $\nabla\phi$ is

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

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a) $i + j – k$ b) $i – j + k$ c) $– i + j – k$ d) $– i – j + k$

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_____

SLR-TC – 5

Seat No.	

F.E. (Part – II) (CBCS) Examination, 2018

ENGINEERING MATHEMATICS – II

Day and Date : Monday, 14-5-2018 Marks : 56

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

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*

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SECTION – I

2. Attempt **any three** : **9**

a) Solve $(2x + y + 1)dx + (4x + 2y – 1)\, dy = 0$.

b) Find the orthogonal trajectory for $r^n = a^n \cos n\theta$.

c) A particle moves such that its position vector is given by

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Show that :

i) velocity $\bar{v}$ is perpendicular to $\bar{r}$

ii) acceleration $\bar{a}$ and $\bar{r}$ are oppositely directed.

d) If $\bar{u} = x^2y\, i + y^2x^3\, j – 3x^2z^2\, k$ and

$\bar{v} = 2xz^2\, i – yz\, j + x^2y^3\, k$

find $\nabla \cdot (\bar{u} \times \bar{v})$ at (1, 2, 1).

e) Test the convergence of $\sum_n \frac{2+n}{(1+n)^p}$.

Set Q

3. Attempt **any three** : **9**

a) Examine the convergence of $\left[\left(\frac{2}{1}\right)^2 - \frac{2}{1}\right] + \left[\left(\frac{3}{2}\right)^2 - \left(\frac{3}{2}\right)\right]^2 + \left[\left(\frac{4}{3}\right)^4 - \frac{4}{3}\right]^3 + \ldots$

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e) Solve $y\frac{dx}{dy} = x + yx^2 \log y$.

4. Attempt **any two** : **10**

a) A constant e.m.f. E volts is applied to a circuit containing a constant resistance R ohms in series and a constant inductance L henries. The current i at any time t is given by $L\frac{di}{dt} + Ri = E$.

If the initial current is zero, show that the current builds upto half its theoretical maximum value in $\frac{L}{R}\log^2$ seconds.

b) Find the constants a, b, c if the normal to the surface $ax^2 + yz + bxz^3 = c$ at point P(1, 2, 1) is parallel to the normal to the surface $y^2 + xz = 61$ at (10, 1, 6).

c) Examine for absolute and conditional convergence :

i) $5 - \frac{10}{3} + \frac{20}{9} - \frac{40}{27} + \ldots$

ii) $\sum \frac{(-1)^n (n+1)^n}{(2n)^n}$.

SECTION – II

5. Solve **any three** out of five : **(3×3=9)**

a) Evaluate $\int_0^\infty x^4 e^{-x^6} dx$.

b) Show that $\int_0^\infty \frac{\log(1+ax^2)}{x^2} dx = \pi.\sqrt{a}$ (a>0).

c) Trace the curve $x^2y^2 = a^2 (y^2 - x^2)$ with full justification.

d) Trace the curve $x = a\cos^3\theta$, $y = b\sin^3\theta$ with full justification.

e) Find the mass of the lamina in the form of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, if the density at any point varies as the product of the distance from the axes of the ellipse.

6. Solve **any three** out of five : **(3×3=9)**

a) Evaluate $\int_0^3 x^{5/2}(3-x)^{1/2}\,dx$.

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e) Evaluate $\int_0^4 \int_0^{2\sqrt{z}} \int_0^{\sqrt{4z-x^2}} dz\,dx\,dy$.

7. Solve **any two** out of three : **(5×2=10)**

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b) Trace the curve $r = a(1 + \cos\theta)$ with full justification and hence find the perimeter of the cardioid.

c) Find by double integration the mass of a thin plate bounded by $y^2 = x$ and $y = x^3$ if the density at any point varies as the square of its distance from the origin.

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Set Q

SLR-TC – 5

Seat No.	

Set R

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING MATHEMATICS – II

Day and Date : Monday, 14-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

N.B. : 1) ***All*** *questions are* ***compulsory****.*
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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.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) If $\bar{F} = (x + y + 1)i + j - (x + y)k$ then curl $\bar{F}$ is
a) $i + j - k$ b) $i - j + k$ c) $-i + j - k$ d) $-i - j + k$

2) The geometric series $1 + r + r^2 + r^3 + \ldots$ is convergent if
a) $|r| \leq 1$ b) $|r| \geq 1$ c) $|r| < 1$ d) $|r| > 1$

3) By Cauchy's n^{th} root test, the series $\sum_n \left(1+\frac{1}{n}\right)^{n^2}$ is
a) convergent b) divergent c) oscillating d) none of these

4) The value of $\int_0^\infty \frac{e^{-x}}{x^2}\,dx$ is
a) 1 b) 0 c) –1 d) ∞

5) The value of $B\left(\frac{5}{2}, \frac{1}{2}\right)$ is
a) $\frac{\pi}{3}$ b) $\frac{\pi}{8}$ c) $\frac{3\pi}{8}$ d) $\frac{8\pi}{3}$

P.T.O.

6) For the curve $y^2 (a - x) = x^3$ which of the following is not true ?
   a) The curve is symmetrical about y axis
   b) Curve passes through origin
   c) $\exists$ one tangent parallel to y axis
   d) The x-axis is a tangent at origin

7) The arc length of the curve y = f(x) between x = a and x = b (b > a) is given by

   a) $\int_a^b y\,dx$ b) $\int_a^b y^2\,dx$ c) $\int_a^b \sqrt{1+\left(\frac{dx}{dy}\right)^2}\,dx$ d) $\int_a^b \sqrt{1+\left(\frac{dy}{dx}\right)^2}\,dx$

8) The area enclosed by the curve $y^2 = x$ and the lines x = 0 to x = 4 is _____

   a) $\frac{16}{3}$ b) $\frac{32}{3}$ c) 16 d) 32

9) The value of $\int_0^1 \int_0^{\pi/2} r\sin\theta\,d\theta\,dr$ =

   a) $\frac{1}{2}$ b) $\frac{\pi}{2}$ c) 0 d) $\frac{-1}{2}$

10) For $\int_0^{4a} \int_x^{2\sqrt{ax}} f(x, y)\,dy\,dx$ change of integration, we get

   a) $\int_0^a \int_{x^2/4a}^{x} f(x, y)\,dx\,dy$ b) $\int_0^{4a} \int_{y^2/4a}^{y} f(x, y)\,dx\,dy$

   c) $\int_{y^2/4a}^{y} \int_0^{2a} f(x, y)\,dx\,dy$ d) $\int_0^{4a} \int_{y^2/2a}^{y} f(x, y)dx\,dy$

11) To solve the non-homogeneous differential equation
   $(x - y - z)\,dx - (2x - 2y - 3)\,dy = 0$, we shall put
   a) x + y = v b) x – y = v c) x = X + h, y = Y + k d) x = X – h, y = Y – k

12) The orthogonal trajectory of $r = a\theta$ is

   a) $r = ce^{-\theta^2/2}$ b) $r = ce^{\theta/2}$ c) $r = ce^{\theta^2/2}$ d) $r = ce^{-\theta/2}$

13) The unit tangent vector to the curve $x = t^2 + 1$, $y = 4t - 3$, $z = 3t^2 - 6t$ at t = 1 is

   a) $\frac{1}{\sqrt{5}}(i + 2k)$ b) $\frac{1}{\sqrt{5}}(i + 2j)$ c) $\frac{1}{\sqrt{3}}(i + j + k)$ d) $\frac{1}{\sqrt{6}}(i + 2j + k)$

14) If $\phi = \log (x^2 + y^2 + z^2)$ and $\bar{r} = xi + yj + zk$, then $\nabla\phi$ is

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

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SLR-TC – 5

Seat No.	

F.E. (Part – II) (CBCS) Examination, 2018

ENGINEERING MATHEMATICS – II

Day and Date : Monday, 14-5-2018 Marks : 56

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

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*

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

3) ***Use*** *of non-programmable calculator is* ***allowed****.*

SECTION – I

2. Attempt **any three** : **9**

a) Solve $(2x + y + 1)dx + (4x + 2y – 1)\, dy = 0$.

b) Find the orthogonal trajectory for $r^n = a^n \cos n\theta$.

c) A particle moves such that its position vector is given by

$\bar{r} = \cos \omega t\, i + \sin \omega t\, j$, then

Show that :

i) velocity $\bar{v}$ is perpendicular to $\bar{r}$

ii) acceleration $\bar{a}$ and $\bar{r}$ are oppositely directed.

d) If $\bar{u} = x^2y\, i + y^2x^3\, j – 3x^2z^2\, k$ and

$\bar{v} = 2xz^2\, i – yz\, j + x^2y^3\, k$

find $\nabla \cdot (\bar{u} \times \bar{v})$ at (1, 2, 1).

e) Test the convergence of $\sum_n \frac{2+n}{(1+n)^p}$.

Set R

3. Attempt **any three** : **9**

a) Examine the convergence of $\left[\left(\frac{2}{1}\right)^2 - \frac{2}{1}\right] + \left[\left(\frac{3}{2}\right)^2 - \left(\frac{3}{2}\right)\right]^2 + \left[\left(\frac{4}{3}\right)^4 - \frac{4}{3}\right]^3 + \ldots$

b) Solve $(y - 2x^2)dx - x(1 - xy)dy = 0$.

c) Solve $\frac{dy}{dx} + 2y \tan x = \sin x$ with y = 0 at $x = \frac{\pi}{3}$.

d) Prove that a vector field $\bar{F}$ given by

$\bar{F} = (ysinz - sinx)i + (xsinz + 2yz)j + (xycosz + y^2)k$ is irrotational.

e) Solve $y\frac{dx}{dy} = x + yx^2 \log y$.

4. Attempt **any two** : **10**

a) A constant e.m.f. E volts is applied to a circuit containing a constant resistance R ohms in series and a constant inductance L henries. The current i at any time t is given by $L\frac{di}{dt} + Ri = E$.

If the initial current is zero, show that the current builds upto half its theoretical maximum value in $\frac{L}{R}\log^2$ seconds.

b) Find the constants a, b, c if the normal to the surface $ax^2 + yz + bxz^3 = c$ at point P(1, 2, 1) is parallel to the normal to the surface $y^2 + xz = 61$ at (10, 1, 6).

c) Examine for absolute and conditional convergence :

i) $5 - \frac{10}{3} + \frac{20}{9} - \frac{40}{27} + \ldots$

ii) $\sum \frac{(-1)^n (n+1)^n}{(2n)^n}$.

SECTION – II

5. Solve **any three** out of five : **(3×3=9)**

a) Evaluate $\int_0^\infty x^4 e^{-x^6} dx$.

b) Show that $\int_0^\infty \frac{\log(1+ax^2)}{x^2} dx = \pi.\sqrt{a}$ (a>0).

c) Trace the curve $x^2y^2 = a^2 (y^2 - x^2)$ with full justification.

d) Trace the curve $x = a\cos^3\theta$, $y = b\sin^3\theta$ with full justification.

e) Find the mass of the lamina in the form of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, if the density at any point varies as the product of the distance from the axes of the ellipse.

6. Solve **any three** out of five : **(3×3=9)**

a) Evaluate $\int_0^3 x^{5/2}(3-x)^{1/2}\,dx$.

b) Trace the curve $y(x^2 + 4a^2) = 8a^3$ with full justification.

c) Find the length of the curve

$x = ae^{\theta}\sin\theta$

$y = ae^{\theta}\cos\theta$ from $\theta = 0$ to $\theta = \pi/2$.

d) Evaluate by changing to polar co-ordinates $\int_0^a \int_0^x \frac{x^3}{\sqrt{x^2+y^2}}\,dy\,dx$.

e) Evaluate $\int_0^4 \int_0^{2\sqrt{z}} \int_0^{\sqrt{4z-x^2}} dz\,dx\,dy$.

7. Solve **any two** out of three : **(5×2=10)**

a) Prove that $\int_0^1 \frac{x^{2n}}{\sqrt{1-x^2}}\,dx = \frac{(2n)!}{2^{2n}(n!)^2}\cdot\frac{\pi}{2}$ if n is an integer.

b) Trace the curve $r = a(1 + \cos\theta)$ with full justification and hence find the perimeter of the cardioid.

c) Find by double integration the mass of a thin plate bounded by $y^2 = x$ and $y = x^3$ if the density at any point varies as the square of its distance from the origin.

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Set R

SLR-TC – 5

Seat No.	

Set S

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING MATHEMATICS – II

Day and Date : Monday, 14-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) For the curve $y^2 (a - x) = x^3$ which of the following is not true ?
   a) The curve is symmetrical about y axis
   b) Curve passes through origin
   c) $\exists$ one tangent parallel to y axis
   d) The x-axis is a tangent at origin

2) The arc length of the curve y = f(x) between x = a and x = b (b > a) is given by
   a) $\int_a^b y\,dx$ b) $\int_a^b y^2\,dx$ c) $\int_a^b \sqrt{1+\left(\frac{dx}{dy}\right)^2}\,dx$ d) $\int_a^b \sqrt{1+\left(\frac{dy}{dx}\right)^2}\,dx$

3) The area enclosed by the curve $y^2 = x$ and the lines x = 0 to x = 4 is _____
   a) $\frac{16}{3}$ b) $\frac{32}{3}$ c) 16 d) 32

4) The value of $\int_0^1 \int_0^{\pi/2} r \sin\theta\, d\theta\, dr$ =
   a) $\frac{1}{2}$ b) $\frac{\pi}{2}$ c) 0 d) $\frac{-1}{2}$

P.T.O.

5) For $\int_0^{4a}\int_x^{2\sqrt{ax}} f(x, y)\, dy\, dx$ change of integration, we get

a) $\int_0^a\int_{x^2/4a}^x f(x, y)\, dx\, dy$ b) $\int_0^{4a}\int_{y^2/4a}^y f(x, y)\, dx\, dy$

c) $\int_{y^2/4a}^y\int_0^{2a} f(x, y)\, dx\, dy$ d) $\int_0^{4a}\int_{y^2/2a}^y f(x, y)dx\, dy$

6) To solve the non-homogeneous differential equation $(x – y – z)\, dx – (2x – 2y – 3)\, dy = 0$, we shall put

a) $x + y = v$ b) $x – y = v$ c) $x = X + h, y = Y + k$ d) $x = X – h, y = Y – k$

7) The orthogonal trajectory of $r = a\theta$ is

a) $r = ce^{-\theta^2/2}$ b) $r = ce^{\theta/2}$ c) $r = ce^{\theta^2/2}$ d) $r = ce^{-\theta/2}$

8) The unit tangent vector to the curve $x = t^2 + 1, y = 4t – 3, z = 3t^2 – 6t$ at $t = 1$ is

a) $\frac{1}{\sqrt{5}}(i + 2k)$ b) $\frac{1}{\sqrt{5}}(i + 2j)$ c) $\frac{1}{\sqrt{3}}(i + j + k)$ d) $\frac{1}{\sqrt{6}}(i + 2j + k)$

9) If $\phi = \log(x^2 + y^2 + z^2)$ and $\bar{r} = xi + yj + zk$, then $\nabla\phi$ is

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

10) If $\bar{F} = (x + y + 1)i + j – (x + y)k$ then curl $\bar{F}$ is

a) $i + j – k$ b) $i – j + k$ c) $– i + j – k$ d) $– i – j + k$

11) The geometric series $1 + r + r^2 + r^3 + \ldots$ is convergent if

a) $|r| \leq 1$ b) $|r| \geq 1$ c) $|r| < 1$ d) $|r| > 1$

12) By Cauchy's n^{th} root test, the series $\sum_n \left(1 + \frac{1}{n}\right)^{n^2}$ is

a) convergent b) divergent c) oscillating d) none of these

13) The value of $\int_0^\infty \frac{e^{-x}}{x^2}\, dx$ is

a) 1 b) 0 c) –1 d) ∞

14) The value of $B\left(\frac{5}{2}, \frac{1}{2}\right)$ is

a) $\frac{\pi}{3}$ b) $\frac{\pi}{8}$ c) $\frac{3\pi}{8}$ d) $\frac{8\pi}{3}$

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SLR-TC – 5

Seat No.	

F.E. (Part – II) (CBCS) Examination, 2018

ENGINEERING MATHEMATICS – II

Day and Date : Monday, 14-5-2018 Marks : 56

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

N.B. *: 1)* ***All*** *questions are* ***compulsory****.*

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

3) ***Use*** *of non-programmable calculator is* ***allowed****.*

SECTION – I

2. Attempt **any three** : **9**

a) Solve $(2x + y + 1)dx + (4x + 2y – 1)\, dy = 0$.

b) Find the orthogonal trajectory for $r^n = a^n \cos n\theta$.

c) A particle moves such that its position vector is given by

$\bar{r} = \cos \omega t\, i + \sin \omega t\, j$, then

Show that :

i) velocity $\bar{v}$ is perpendicular to $\bar{r}$

ii) acceleration $\bar{a}$ and $\bar{r}$ are oppositely directed.

d) If $\bar{u} = x^2y\, i + y^2x^3\, j – 3x^2z^2\, k$ and

$\bar{v} = 2xz^2\, i – yz\, j + x^2y^3\, k$

find $\nabla \cdot (\bar{u} \times \bar{v})$ at (1, 2, 1).

e) Test the convergence of $\sum_n \frac{2+n}{(1+n)^p}$.

3. Attempt **any three** : **9**

a) Examine the convergence of $\left[\left(\frac{2}{1}\right)^2 - \frac{2}{1}\right] + \left[\left(\frac{3}{2}\right)^2 - \left(\frac{3}{2}\right)\right]^2 + \left[\left(\frac{4}{3}\right)^4 - \frac{4}{3}\right]^3 + \ldots$

b) Solve $(y - 2x^2)dx - x(1 - xy)dy = 0$.

c) Solve $\frac{dy}{dx} + 2y \tan x = \sin x$ with y = 0 at $x = \frac{\pi}{3}$.

d) Prove that a vector field $\bar{F}$ given by

$\bar{F} = (ysinz - sinx)i + (xsinz + 2yz)j + (xycosz + y^2)k$ is irrotational.

e) Solve $y\frac{dx}{dy} = x + yx^2 \log y$.

4. Attempt **any two** : **10**

a) A constant e.m.f. E volts is applied to a circuit containing a constant resistance R ohms in series and a constant inductance L henries. The current i at any time t is given by $L\frac{di}{dt} + Ri = E$.

If the initial current is zero, show that the current builds upto half its theoretical maximum value in $\frac{L}{R}\log^2$ seconds.

b) Find the constants a, b, c if the normal to the surface $ax^2 + yz + bxz^3 = c$ at point P(1, 2, 1) is parallel to the normal to the surface $y^2 + xz = 61$ at (10, 1, 6).

c) Examine for absolute and conditional convergence :

i) $5 - \frac{10}{3} + \frac{20}{9} - \frac{40}{27} + \ldots$

ii) $\sum \frac{(-1)^n (n+1)^n}{(2n)^n}$.

SECTION – II

5. Solve **any three** out of five : **(3×3=9)**

a) Evaluate $\int_0^\infty x^4 e^{-x^6} dx$.

b) Show that $\int_0^\infty \frac{\log(1+ax^2)}{x^2} dx = \pi.\sqrt{a}$ (a>0).

c) Trace the curve $x^2y^2 = a^2 (y^2 - x^2)$ with full justification.

d) Trace the curve $x = a\cos^3\theta$, $y = b\sin^3\theta$ with full justification.

e) Find the mass of the lamina in the form of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, if the density at any point varies as the product of the distance from the axes of the ellipse.

6. Solve **any three** out of five : **(3×3=9)**

a) Evaluate $\int_0^3 x^{5/2}(3-x)^{1/2}\, dx$.

b) Trace the curve $y(x^2 + 4a^2) = 8a^3$ with full justification.

c) Find the length of the curve

$x = ae^{\theta}\sin\theta$

$y = ae^{\theta}\cos\theta$ from $\theta = 0$ to $\theta = \pi/2$.

d) Evaluate by changing to polar co-ordinates $\int_0^a \int_0^x \frac{x^3}{\sqrt{x^2+y^2}}\, dy\, dx$.

e) Evaluate $\int_0^4 \int_0^{2\sqrt{z}} \int_0^{\sqrt{4z-x^2}} dz\, dx\, dy$.

7. Solve **any two** out of three : **(5×2=10)**

a) Prove that $\int_0^1 \frac{x^{2n}}{\sqrt{1-x^2}}\, dx = \frac{(2n)!}{2^{2n}(n!)^2} \cdot \frac{\pi}{2}$ if n is an integer.

b) Trace the curve $r = a(1 + \cos\theta)$ with full justification and hence find the perimeter of the cardioid.

c) Find by double integration the mass of a thin plate bounded by $y^2 = x$ and $y = x^3$ if the density at any point varies as the square of its distance from the origin.

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Set S

SLR-TC – 6

Seat No.	

Set P

F.E. (Part – II) (CBCS Pattern) Examination, 2018
BASIC CIVIL ENGINEERING

Day and Date : Wednesday, 16-5-2018 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) Assume suitable data, **if necessary** and mention it **clearly**.*
*5) Use of non programmable calculator is **allowed**.*
*6) Marks to the **right** hand indicate **full** marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Following sub branch of civil Engineering is related with supply of water to crops.
   a) Environmental Engg. b) Foundation Engg.
   c) Irrigation d) Soil Mechanics

2) Equivalent nominal scale of representative fraction 1/100 will be
   a) 1 cm = 1 m b) 1 cm = 10 m
   c) 1 cm = 100 m d) 1 cm = 1000 m

3) Open cross staff is used for obtaining _____ offsets.
   a) Perpendicular b) Oblique c) Both a) and b) d) None

4) If Reduced Bearing of a line is 139°, its quadrantal bearing is
   a) S 39° W b) N 39° E c) S 41° E d) S 41° W

P.T.O.

5) Check leveling is used for
   a) Establishment of new B.M.
   b) Checking of survey work carried out
   c) Survey in hilly area
   d) Road survey

6) Borrow pit on both sides of a road is for
   a) Drainage of water
   b) Obtaining soil for use in road construction
   c) Tree plantation
   d) Berm

7) Natural surface water resources does not include
   a) River b) Sea
   c) Lakes d) Percolation Tanks

8) The lowest part of a structure which transfers the load to the soil is known as
   a) Super structure b) Sub structure c) Plinth d) Basement

9) Height of the building is restricted by a line drawn from rear boundary of plot at an angle of _____
   a) 33.5° b) 43.5° c) 53.5° d) 63.5°

10) For better roominess the desirable ratio of length to breadth of room is
   a) 0.2 to 0.5 b) 0.8 to 0.1 c) 1.2 to 1.5 d) 0.8 to 0.5

11) The standard size of a brick is
   a) 190 mm × 90 mm × 90 mm b) 180 mm × 100 mm × 90 mm
   c) 180 mm × 90 mm × 90 mm d) 190 mm × 190 mm × 90 mm

12) Hardware, software, data and people; these are the components of _____
   a) GPS b) Remote Sensing
   c) GIS d) Total station

13) Compound wall helps to achieve _____
   a) Circulation b) External privacy
   c) Aspect d) Prospect

14) Green city concept encourages
   a) Mass transportation b) Pollution free city
   c) Use of non conventional energy d) All the above

_____

SLR-TC – 6

Seat No.	

F.E. (Part – II) (CBCS Pattern) Examination, 2018
BASIC CIVIL ENGINEERING

Day and Date : Wednesday, 16-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Assume suitable data, **if necessary** and mention it **clearly**.*
*3) Use of non programmable calculator is **allowed**.*
*4) Marks to the **right** hand indicate **full** marks.*

SECTION – I

2. Solve **any four** out of the following seven questions : **(4×3=12)**

a) Which are the sub branches of Civil Engineering ? Describe any one.

b) A Civil engineer is supposed to follow different steps during construction of a house. Which are these steps ?

c) Which are the errors in chaining ? Describe any one.

d) Which instruments are used for finding bearing of lines ? Write principle of working of any one.

e) What are the characteristics of contour map ?

f) Give classification of Bridges. Draw sketch of any one.

g) Draw a neat sketch of structure of a road showing different layers in it.

3. Solve **any two** out of the following **three** questions : **(8×2=16)**

a) The plan of an old survey plotted to a scale of 1 cm = 50 m was found to have shrunk; so that a line originally 100 mm long was found to measure 95 mm now. The plan was also recorded that 30 m chain used in survey was 50 mm too short. The area of a plot on this map was measured by a planimeter now and was 15000 mm^2. Find the true area on field.

b) The following bearings were observed while running a closed traverse ABCDA.

Line	F.B.	B.B.
AB	S(45° 30')W	N(41° 15')E
BC	S(80° 45')W	N(79° 30')E
CD	N(19° 30')E	S(20° 00')W
DA	S(80° 00')E	N(80° 00')W

i) At what stations you suspect local attraction and by how much amount ?

ii) Find out corrected bearings in the same system of bearings.

iii) Tabulate the results. Draw the traverse.

c) In running fly levels from a B.M. of R.L. 487.500, the following readings were taken.

B.S. 1.245 2.075 3.125 (on new B.M.)

F.S. 0.780 2.010

From the last position of the instrument, the positions of five pegs are to be fixed on a uniform falling slope of 1 in 100, the R.L. of first peg being 489.600. Work out the staff readings for setting out the pegs and complete the leveling field book page as usual. Apply checks.

SECTION – II

4. Solve **any four** out of following **six** questions : **(4×4=16)**

a) State the functions of following components of the building.
i) D.P.C. ii) Plinth iii) Parapet iv) Lintel

b) Discuss the requirements of earthquake resistant structures.

c) Define the terms :
i) F.S.I. ii) Building line
iii) Carpet area iv) Built up area.

d) State the uses of plastic as a building material.

e) What is curing of concrete ? Why it is required ?

f) Discuss the concept of energy efficient building.

5. Solve **any two** out of following three questions : **(6×2=12)**

a) Compare load bearing structure with RCC framed structure.

b) State and discuss different principles of planning.

c) What is Geographic Information System ? Give its applications in engineering.

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Set P

SLR-TC – 6

Seat No.	

Set Q

F.E. (Part – II) (CBCS Pattern) Examination, 2018
BASIC CIVIL ENGINEERING

Day and Date : Wednesday, 16-5-2018 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) Assume suitable data, **if necessary** and mention it **clearly**.*
*5) Use of non programmable calculator is **allowed**.*
*6) Marks to the **right** hand indicate **full** marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The lowest part of a structure which transfers the load to the soil is known as
a) Super structure b) Sub structure c) Plinth d) Basement

2) Height of the building is restricted by a line drawn from rear boundary of plot at an angle of _____
a) 33.5° b) 43.5° c) 53.5° d) 63.5°

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4) The standard size of a brick is
a) 190 mm × 90 mm × 90 mm b) 180 mm × 100 mm × 90 mm
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P.T.O.

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   a) Circulation b) External privacy
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8) Following sub branch of civil Engineering is related with supply of water to crops.
   a) Environmental Engg. b) Foundation Engg.
   c) Irrigation d) Soil Mechanics

9) Equivalent nominal scale of representative fraction 1/100 will be
   a) 1 cm = 1 m b) 1 cm = 10 m
   c) 1 cm = 100 m d) 1 cm = 1000 m

10) Open cross staff is used for obtaining _____ offsets.
   a) Perpendicular b) Oblique c) Both a) and b) d) None

11) If Reduced Bearing of a line is 139°, its quadrantal bearing is
   a) S 39° W b) N 39° E c) S 41° E d) S 41° W

12) Check leveling is used for
   a) Establishment of new B.M.
   b) Checking of survey work carried out
   c) Survey in hilly area
   d) Road survey

13) Borrow pit on both sides of a road is for
   a) Drainage of water
   b) Obtaining soil for use in road construction
   c) Tree plantation
   d) Berm

14) Natural surface water resources does not include
   a) River b) Sea
   c) Lakes d) Percolation Tanks

_____

SLR-TC – 6

Seat No.	

F.E. (Part – II) (CBCS Pattern) Examination, 2018
BASIC CIVIL ENGINEERING

Day and Date : Wednesday, 16-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Assume suitable data, **if necessary** and mention it **clearly**.*
*3) Use of non programmable calculator is **allowed**.*
*4) Marks to the **right** hand indicate **full** marks.*

SECTION – I

2. Solve **any four** out of the following seven questions : **(4×3=12)**

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c) Which are the errors in chaining ? Describe any one.

d) Which instruments are used for finding bearing of lines ? Write principle of working of any one.

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f) Give classification of Bridges. Draw sketch of any one.

g) Draw a neat sketch of structure of a road showing different layers in it.

3. Solve **any two** out of the following **three** questions : **(8×2=16)**

a) The plan of an old survey plotted to a scale of 1 cm = 50 m was found to have shrunk; so that a line originally 100 mm long was found to measure 95 mm now. The plan was also recorded that 30 m chain used in survey was 50 mm too short. The area of a plot on this map was measured by a planimeter now and was 15000 mm^2. Find the true area on field.

b) The following bearings were observed while running a closed traverse ABCDA.

Line	F.B.	B.B.
AB	S(45° 30')W	N(41° 15')E
BC	S(80° 45')W	N(79° 30')E
CD	N(19° 30')E	S(20° 00')W
DA	S(80° 00')E	N(80° 00')W

i) At what stations you suspect local attraction and by how much amount ?

ii) Find out corrected bearings in the same system of bearings.

iii) Tabulate the results. Draw the traverse.

c) In running fly levels from a B.M. of R.L. 487.500, the following readings were taken.

B.S. 1.245 2.075 3.125 (on new B.M.)

F.S. 0.780 2.010

From the last position of the instrument, the positions of five pegs are to be fixed on a uniform falling slope of 1 in 100, the R.L. of first peg being 489.600. Work out the staff readings for setting out the pegs and complete the leveling field book page as usual. Apply checks.

SECTION – II

4. Solve **any four** out of following **six** questions : **(4×4=16)**

a) State the functions of following components of the building.
i) D.P.C. ii) Plinth iii) Parapet iv) Lintel

b) Discuss the requirements of earthquake resistant structures.

c) Define the terms :
i) F.S.I. ii) Building line
iii) Carpet area iv) Built up area.

d) State the uses of plastic as a building material.

e) What is curing of concrete ? Why it is required ?

f) Discuss the concept of energy efficient building.

5. Solve **any two** out of following three questions : **(6×2=12)**

a) Compare load bearing structure with RCC framed structure.

b) State and discuss different principles of planning.

c) What is Geographic Information System ? Give its applications in engineering.

_____

Set Q

SLR-TC – 6

Seat No.	

Set R

F.E. (Part – II) (CBCS Pattern) Examination, 2018
BASIC CIVIL ENGINEERING

Day and Date : Wednesday, 16-5-2018 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) Assume suitable data, **if necessary** and mention it **clearly**.*
*5) Use of non programmable calculator is **allowed**.*
*6) Marks to the **right** hand indicate **full** marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Check leveling is used for
   a) Establishment of new B.M.
   b) Checking of survey work carried out
   c) Survey in hilly area
   d) Road survey

2) Borrow pit on both sides of a road is for
   a) Drainage of water
   b) Obtaining soil for use in road construction
   c) Tree plantation
   d) Berm

3) Natural surface water resources does not include
   a) River b) Sea
   c) Lakes d) Percolation Tanks

P.T.O.

4) The lowest part of a structure which transfers the load to the soil is known as
   a) Super structure b) Sub structure c) Plinth d) Basement

5) Height of the building is restricted by a line drawn from rear boundary of plot at an angle of _____
   a) 33.5° b) 43.5° c) 53.5° d) 63.5°

6) For better roominess the desirable ratio of length to breadth of room is
   a) 0.2 to 0.5 b) 0.8 to 0.1 c) 1.2 to 1.5 d) 0.8 to 0.5

7) The standard size of a brick is
   a) 190 mm × 90 mm × 90 mm b) 180 mm × 100 mm × 90 mm
   c) 180 mm × 90 mm × 90 mm d) 190 mm × 190 mm × 90 mm

8) Hardware, software, data and people; these are the components of _____
   a) GPS b) Remote Sensing
   c) GIS d) Total station

9) Compound wall helps to achieve _____
   a) Circulation b) External privacy
   c) Aspect d) Prospect

10) Green city concept encourages
   a) Mass transportation b) Pollution free city
   c) Use of non conventional energy d) All the above

11) Following sub branch of civil Engineering is related with supply of water to crops.
   a) Environmental Engg. b) Foundation Engg.
   c) Irrigation d) Soil Mechanics

12) Equivalent nominal scale of representative fraction 1/100 will be
   a) 1 cm = 1 m b) 1 cm = 10 m
   c) 1 cm = 100 m d) 1 cm = 1000 m

13) Open cross staff is used for obtaining _____ offsets.
   a) Perpendicular b) Oblique c) Both a) and b) d) None

4) If Reduced Bearing of a line is 139°, its quadrantal bearing is
   a) S 39° W b) N 39° E c) S 41° E d) S 41° W

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SLR-TC – 6

Seat No.	

F.E. (Part – II) (CBCS Pattern) Examination, 2018
BASIC CIVIL ENGINEERING

Day and Date : Wednesday, 16-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Assume suitable data, **if necessary** and mention it **clearly**.*
*3) Use of non programmable calculator is **allowed**.*
*4) Marks to the **right** hand indicate **full** marks.*

SECTION – I

2. Solve **any four** out of the following seven questions : **(4×3=12)**

a) Which are the sub branches of Civil Engineering ? Describe any one.

b) A Civil engineer is supposed to follow different steps during construction of a house. Which are these steps ?

c) Which are the errors in chaining ? Describe any one.

d) Which instruments are used for finding bearing of lines ? Write principle of working of any one.

e) What are the characteristics of contour map ?

f) Give classification of Bridges. Draw sketch of any one.

g) Draw a neat sketch of structure of a road showing different layers in it.

3. Solve **any two** out of the following **three** questions : **(8×2=16)**

a) The plan of an old survey plotted to a scale of 1 cm = 50 m was found to have shrunk; so that a line originally 100 mm long was found to measure 95 mm now. The plan was also recorded that 30 m chain used in survey was 50 mm too short. The area of a plot on this map was measured by a planimeter now and was 15000 mm^2. Find the true area on field.

b) The following bearings were observed while running a closed traverse ABCDA.

Line	F.B.	B.B.
AB	S(45° 30')W	N(41° 15')E
BC	S(80° 45')W	N(79° 30')E
CD	N(19° 30')E	S(20° 00')W
DA	S(80° 00')E	N(80° 00')W

i) At what stations you suspect local attraction and by how much amount ?

ii) Find out corrected bearings in the same system of bearings.

iii) Tabulate the results. Draw the traverse.

c) In running fly levels from a B.M. of R.L. 487.500, the following readings were taken.

B.S. 1.245 2.075 3.125 (on new B.M.)

F.S. 0.780 2.010

From the last position of the instrument, the positions of five pegs are to be fixed on a uniform falling slope of 1 in 100, the R.L. of first peg being 489.600. Work out the staff readings for setting out the pegs and complete the leveling field book page as usual. Apply checks.

SECTION – II

4. Solve **any four** out of following **six** questions : **(4×4=16)**

a) State the functions of following components of the building.
i) D.P.C. ii) Plinth iii) Parapet iv) Lintel

b) Discuss the requirements of earthquake resistant structures.

c) Define the terms :
i) F.S.I. ii) Building line
iii) Carpet area iv) Built up area.

d) State the uses of plastic as a building material.

e) What is curing of concrete ? Why it is required ?

f) Discuss the concept of energy efficient building.

5. Solve **any two** out of following three questions : **(6×2=12)**

a) Compare load bearing structure with RCC framed structure.

b) State and discuss different principles of planning.

c) What is Geographic Information System ? Give its applications in engineering.

_____

Set R

SLR-TC – 6

Seat No.	

Set S

F.E. (Part – II) (CBCS Pattern) Examination, 2018
BASIC CIVIL ENGINEERING

Day and Date : Wednesday, 16-5-2018 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) Assume suitable data, **if necessary** and mention it **clearly**.*
*5) Use of non programmable calculator is **allowed**.*
*6) Marks to the **right** hand indicate **full** marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) For better roominess the desirable ratio of length to breadth of room is
a) 0.2 to 0.5 b) 0.8 to 0.1 c) 1.2 to 1.5 d) 0.8 to 0.5

2) The standard size of a brick is
a) 190 mm × 90 mm × 90 mm b) 180 mm × 100 mm × 90 mm
c) 180 mm × 90 mm × 90 mm d) 190 mm × 190 mm × 90 mm

3) Hardware, software, data and people; these are the components of _____
a) GPS b) Remote Sensing
c) GIS d) Total station

4) Compound wall helps to achieve _____
a) Circulation b) External privacy
c) Aspect d) Prospect

P.T.O.

5) Green city concept encourages
   a) Mass transportation b) Pollution free city
   c) Use of non conventional energy d) All the above

6) Following sub branch of civil Engineering is related with supply of water to crops.
   a) Environmental Engg. b) Foundation Engg.
   c) Irrigation d) Soil Mechanics

7) Equivalent nominal scale of representative fraction 1/100 will be
   a) 1 cm = 1 m b) 1 cm = 10 m
   c) 1 cm = 100 m d) 1 cm = 1000 m

8) Open cross staff is used for obtaining _____ offsets.
   a) Perpendicular b) Oblique c) Both a) and b) d) None

9) If Reduced Bearing of a line is 139°, its quadrantal bearing is
   a) S 39° W b) N 39° E c) S 41° E d) S 41° W

10) Check leveling is used for
   a) Establishment of new B.M.
   b) Checking of survey work carried out
   c) Survey in hilly area
   d) Road survey

11) Borrow pit on both sides of a road is for
   a) Drainage of water
   b) Obtaining soil for use in road construction
   c) Tree plantation
   d) Berm

12) Natural surface water resources does not include
   a) River b) Sea
   c) Lakes d) Percolation Tanks

13) The lowest part of a structure which transfers the load to the soil is known as
   a) Super structure b) Sub structure c) Plinth d) Basement

14) Height of the building is restricted by a line drawn from rear boundary of plot at an angle of _____
   a) 33.5° b) 43.5° c) 53.5° d) 63.5°

SLR-TC – 6

Seat No.	

F.E. (Part – II) (CBCS Pattern) Examination, 2018
BASIC CIVIL ENGINEERING

Day and Date : Wednesday, 16-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Assume suitable data, **if necessary** and mention it **clearly**.*
*3) Use of non programmable calculator is **allowed**.*
*4) Marks to the **right** hand indicate **full** marks.*

SECTION – I

2. Solve **any four** out of the following seven questions : **(4×3=12)**

a) Which are the sub branches of Civil Engineering ? Describe any one.

b) A Civil engineer is supposed to follow different steps during construction of a house. Which are these steps ?

c) Which are the errors in chaining ? Describe any one.

d) Which instruments are used for finding bearing of lines ? Write principle of working of any one.

e) What are the characteristics of contour map ?

f) Give classification of Bridges. Draw sketch of any one.

g) Draw a neat sketch of structure of a road showing different layers in it.

3. Solve **any two** out of the following **three** questions : **(8×2=16)**

a) The plan of an old survey plotted to a scale of 1 cm = 50 m was found to have shrunk; so that a line originally 100 mm long was found to measure 95 mm now. The plan was also recorded that 30 m chain used in survey was 50 mm too short. The area of a plot on this map was measured by a planimeter now and was 15000 mm^2. Find the true area on field.

b) The following bearings were observed while running a closed traverse ABCDA.

Line	F.B.	B.B.
AB	S(45° 30')W	N(41° 15')E
BC	S(80° 45')W	N(79° 30')E
CD	N(19° 30')E	S(20° 00')W
DA	S(80° 00')E	N(80° 00')W

i) At what stations you suspect local attraction and by how much amount ?

ii) Find out corrected bearings in the same system of bearings.

iii) Tabulate the results. Draw the traverse.

c) In running fly levels from a B.M. of R.L. 487.500, the following readings were taken.

B.S. 1.245 2.075 3.125 (on new B.M.)

F.S. 0.780 2.010

From the last position of the instrument, the positions of five pegs are to be fixed on a uniform falling slope of 1 in 100, the R.L. of first peg being 489.600. Work out the staff readings for setting out the pegs and complete the leveling field book page as usual. Apply checks.

SECTION – II

4. Solve **any four** out of following **six** questions : **(4×4=16)**

a) State the functions of following components of the building.
i) D.P.C. ii) Plinth iii) Parapet iv) Lintel

b) Discuss the requirements of earthquake resistant structures.

c) Define the terms :
i) F.S.I. ii) Building line
iii) Carpet area iv) Built up area.

d) State the uses of plastic as a building material.

e) What is curing of concrete ? Why it is required ?

f) Discuss the concept of energy efficient building.

5. Solve **any two** out of following three questions : **(6×2=12)**

a) Compare load bearing structure with RCC framed structure.

b) State and discuss different principles of planning.

c) What is Geographic Information System ? Give its applications in engineering.

_____

SLR-TC – 7

Seat No.	

Set P

F.E. (Part II) (CBCS) Examination, 2018
BASIC ELECTRONICS

Day and Date : Friday, 18-5-2018 Total Marks : 35
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 15 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 : 15 Minutes Marks : 7

1. Multiple choice question : **(1×7=7)**

1) The Boolean expression A+AB is equal to
   a) A b) A(1 + B)
   c) A.A d) All of these

2) Two's complement can be calculated from one's complement by
   a) adding 2 in it
   b) adding 1 in it
   c) substracting 1 from it
   d) none of these

3) Following expression represents which law ?

$$A(B + C) = AB + AC$$

   a) Commutative law
   b) Associative law
   c) Distributive law
   d) De Morgan's theorem

4) In centre tap full wave rectifier, if input voltage is $V_m \sin \omega t$ then PIV across any diode will be

a) $2V_m$ b) V_m

c) $V_m / \sqrt{2}$ d) $V_m/2$

5) N type impurity is also called as

a) Donar impurity

b) Acceptor impurity

c) Negative type impurity

d) Both a and c

6) Ideal diode in reverse bias offers _____ resistance and it is equivalent to _____ switch.

a) zero ,open

b) zero , closed

c) infinite , closed

d) infinite , open

7) In PTC as temperature increases, resistance

a) Increases

b) Decreases

c) Remains same

d) Become zero

_____

SLR-TC – 7

Seat No.	

F.E. (Part II) (CBCS) Examination, 2018
BASIC ELECTRONICS

Day and Date : Friday, 18-5-2018 Marks : 28
Time : 10.00 a.m. to 12.00 noon

***Instruction** : **All** questions are **compulsory**.*

SECTION – I

2. Attempt **any two** : **(2×3=6)**
   1) Explain avalanche and zener breakdown mechanism in reverse biased zener diode.
   2) Explain working of BJT transistor as a switch.
   3) Draw and explain input and output characteristics of CE configuration.

3. Attempt **any two** : **(2×4=8)**
   1) Compare different transistor configuration on the basis of input resistance, output resistance, voltage gain and current gain.
   2) For bridge rectifier, derive for
      i) I_m ii) V_{DC}
      iii) Ripple factor iv) Efficiency
   3) Why filter circuit is needed ? Explain capacitor filter.

SECTION – II

4. Attempt **any two** : **(2×3=6)**
   1) State the parameters for selection of transducer.
   2) Explain thermocouple transducer.
   3) Explain following gates with symbol, equation and truth table.
      i) XOR ii) NOR iii) AND

Set P

5. Attempt **any two** : **(2×4=8)**

1) Derive basic gates using NAND universal gate.

2) State and prove De Morgan's theorem.

3) Perform the following arithmetic operations using 2's complement method. Show the result in decimal form.

i) $(35)_{10} - (34)_{10}$ ii) $(26)_8 - (15)_8$

Seat No.	

SLR-TC – 7

Set Q

F.E. (Part II) (CBCS) Examination, 2018
BASIC ELECTRONICS

Day and Date : Friday, 18-5-2018 Total Marks : 35
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 15 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 : 15 Minutes Marks : 7

1. Multiple choice question : **(1×7=7)**

1) Following expression represents which law ?

$$A(B + C) = AB + AC$$

a) Commutative law
b) Associative law
c) Distributive law
d) De Morgan's theorem

2) In centre tap full wave rectifier, if input voltage is $V_m \sin \omega t$ then PIV across any diode will be

a) $2V_m$ b) V_m
c) $V_m / \sqrt{2}$ d) $V_m/2$

3) N type impurity is also called as

a) Donar impurity
b) Acceptor impurity
c) Negative type impurity
d) Both a and c

P.T.O.

4) Ideal diode in reverse bias offers _____ resistance and it is equivalent to _____ switch.
   a) zero ,open
   b) zero , closed
   c) infinite , closed
   d) infinite , open

5) In PTC as temperature increases, resistance
   a) Increases
   b) Decreases
   c) Remains same
   d) Become zero

6) The Boolean expression A+AB is equal to
   a) A
   b) A(1 + B)
   c) A.A
   d) All of these

7) Two's complement can be calculated from one's complement by
   a) adding 2 in it
   b) adding 1 in it
   c) substracting 1 from it
   d) none of these

_____

SLR-TC – 7

Seat No.	

F.E. (Part II) (CBCS) Examination, 2018
BASIC ELECTRONICS

Day and Date : Friday, 18-5-2018 Marks : 28
Time : 10.00 a.m. to 12.00 noon

***Instruction** : **All** questions are **compulsory**.*

SECTION – I

2. Attempt **any two** : **(2×3=6)**
   1) Explain avalanche and zener breakdown mechanism in reverse biased zener diode.
   2) Explain working of BJT transistor as a switch.
   3) Draw and explain input and output characteristics of CE configuration.

3. Attempt **any two** : **(2×4=8)**
   1) Compare different transistor configuration on the basis of input resistance, output resistance, voltage gain and current gain.
   2) For bridge rectifier, derive for
      i) I_m ii) V_{DC}
      iii) Ripple factor iv) Efficiency
   3) Why filter circuit is needed ? Explain capacitor filter.

SECTION – II

4. Attempt **any two** : **(2×3=6)**
   1) State the parameters for selection of transducer.
   2) Explain thermocouple transducer.
   3) Explain following gates with symbol, equation and truth table.
      i) XOR ii) NOR iii) AND

Set Q

5. Attempt **any two** : **(2×4=8)**

1) Derive basic gates using NAND universal gate.

2) State and prove De Morgan's theorem.

3) Perform the following arithmetic operations using 2's complement method. Show the result in decimal form.

i) $(35)_{10} - (34)_{10}$ ii) $(26)_8 - (15)_8$

SLR-TC – 7

Seat No.	

Set **R**

F.E. (Part II) (CBCS) Examination, 2018
BASIC ELECTRONICS

Day and Date : Friday, 18-5-2018 Total Marks : 35
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 15 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 : 15 Minutes Marks : 7

1. Multiple choice question : **(1×7=7)**

1) N type impurity is also called as
   a) Donar impurity
   b) Acceptor impurity
   c) Negative type impurity
   d) Both a and c

2) Ideal diode in reverse bias offers _____ resistance and it is equivalent to _____ switch.
   a) zero ,open
   b) zero , closed
   c) infinite , closed
   d) infinite , open

3) In PTC as temperature increases, resistance
   a) Increases b) Decreases
   c) Remains same d) Become zero

4) The Boolean expression A+AB is equal to

a) A b) A(1 + B)

c) A.A d) All of these

5) Two's complement can be calculated from one's complement by

a) adding 2 in it

b) adding 1 in it

c) substracting 1 from it

d) none of these

6) Following expression represents which law ?

$$A(B + C) = AB + AC$$

a) Commutative law

b) Associative law

c) Distributive law

d) De Morgan's theorem

7) In centre tap full wave rectifier, if input voltage is $V_m \sin \omega t$ then PIV across any diode will be

a) $2V_m$ b) V_m

c) $V_m / \sqrt{2}$ d) $V_m/2$

———————

SLR-TC – 7

Seat No.	

F.E. (Part II) (CBCS) Examination, 2018
BASIC ELECTRONICS

Day and Date : Friday, 18-5-2018 Marks : 28
Time : 10.00 a.m. to 12.00 noon

***Instruction** : **All** questions are **compulsory**.*

SECTION – I

2. Attempt **any two** : **(2×3=6)**
   1) Explain avalanche and zener breakdown mechanism in reverse biased zener diode.
   2) Explain working of BJT transistor as a switch.
   3) Draw and explain input and output characteristics of CE configuration.

3. Attempt **any two** : **(2×4=8)**
   1) Compare different transistor configuration on the basis of input resistance, output resistance, voltage gain and current gain.
   2) For bridge rectifier, derive for
      i) I_m ii) V_{DC}
      iii) Ripple factor iv) Efficiency
   3) Why filter circuit is needed ? Explain capacitor filter.

SECTION – II

4. Attempt **any two** : **(2×3=6)**
   1) State the parameters for selection of transducer.
   2) Explain thermocouple transducer.
   3) Explain following gates with symbol, equation and truth table.
      i) XOR ii) NOR iii) AND

Set R

5. Attempt **any two** : **(2×4=8)**

   1) Derive basic gates using NAND universal gate.

   2) State and prove De Morgan's theorem.

   3) Perform the following arithmetic operations using 2's complement method. Show the result in decimal form.

      i) $(35)_{10} - (34)_{10}$ ii) $(26)_8 - (15)_8$

Seat No.	

SLR-TC – 7

Set S

F.E. (Part II) (CBCS) Examination, 2018
BASIC ELECTRONICS

Day and Date : Friday, 18-5-2018 Total Marks : 35
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 15 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 : 15 Minutes Marks : 7

1. Multiple choice question : **(1×7=7)**

1) In centre tap full wave rectifier, if input voltage is $V_m \sin \omega t$ then PIV across any diode will be

a) $2V_m$ b) V_m

c) $V_m / \sqrt{2}$ d) $V_m/2$

2) N type impurity is also called as

a) Donar impurity

b) Acceptor impurity

c) Negative type impurity

d) Both a and c

3) Ideal diode in reverse bias offers _____ resistance and it is equivalent to _____ switch.

a) zero ,open

b) zero , closed

c) infinite , closed

d) infinite , open

P.T.O.

4) In PTC as temperature increases, resistance
   a) Increases
   b) Decreases
   c) Remains same
   d) Become zero

5) The Boolean expression A+AB is equal to
   a) A
   b) A(1 + B)
   c) A.A
   d) All of these

6) Two's complement can be calculated from one's complement by
   a) adding 2 in it
   b) adding 1 in it
   c) substracting 1 from it
   d) none of these

7) Following expression represents which law ?

   $A(B + C) = AB + AC$

   a) Commutative law
   b) Associative law
   c) Distributive law
   d) De Morgan's theorem

SLR-TC – 7

Seat No.	

F.E. (Part II) (CBCS) Examination, 2018
BASIC ELECTRONICS

Day and Date : Friday, 18-5-2018 Marks : 28
Time : 10.00 a.m. to 12.00 noon

***Instruction** : **All** questions are **compulsory**.*

SECTION – I

2. Attempt **any two** : **(2×3=6)**
   1) Explain avalanche and zener breakdown mechanism in reverse biased zener diode.
   2) Explain working of BJT transistor as a switch.
   3) Draw and explain input and output characteristics of CE configuration.

3. Attempt **any two** : **(2×4=8)**
   1) Compare different transistor configuration on the basis of input resistance, output resistance, voltage gain and current gain.
   2) For bridge rectifier, derive for
      i) I_m ii) V_{DC}
      iii) Ripple factor iv) Efficiency
   3) Why filter circuit is needed ? Explain capacitor filter.

SECTION – II

4. Attempt **any two** : **(2×3=6)**
   1) State the parameters for selection of transducer.
   2) Explain thermocouple transducer.
   3) Explain following gates with symbol, equation and truth table.
      i) XOR ii) NOR iii) AND

Set S

5. Attempt **any two** : **(2×4=8)**

   1) Derive basic gates using NAND universal gate.

   2) State and prove De Morgan's theorem.

   3) Perform the following arithmetic operations using 2's complement method. Show the result in decimal form.

      i) $(35)_{10} - (34)_{10}$ ii) $(26)_8 - (15)_8$

SLR-TC – 9

Seat No.	

Set P

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING PHYSICS

Day and Date : Wednesday, 23-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

Constants *: 1) Avogadro's no., N = 6.02 ×10 ^{26}/k.mol.*
2) Velocity of light, c = 3 ×10 ^{8}m/sec.
3) Charge of electron, e = 1.6 ×10 $^{-19}$C.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

SECTION – I

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

1) Semiconductor materials are of _____ group elements.
a) 3rd b) 4th c) 5th d) 6th

2) The fermi direct distribution function is given by

a) $f(E) = \frac{1}{1+e^{(E-Ef)/KT}}$ b) $f(E) = \frac{1}{1-e^{(E-Ef)/KT}}$

c) $f(E) = \frac{1}{1+e^{(E+Ef)/KT}}$ d) $f(E) = \frac{1}{1-e^{(E+Ef)/KT}}$

3) The Miller indices of the plane parallel to x and y axes are
a) (1 0 0) b) (0 1 0) c) (0 0 1) d) (1 1 1)

4) The co-ordination number for BCC crystal structure is
a) 12 b) 8 c) 6 d) 5

P.T.O.

5) Optimum reverberation time for music is
   a) 0.5 to 1 second b) 0 to 1 second
   c) 1 to 2 second d) above 5 second

6) Sound waves having the following frequencies are audible to human beings
   a) 5 Hz b) 27000 Hz c) 5000 Hz d) 50000 Hz

7) Length contraction equation is given by
   a) $L = Lo\sqrt{1 - v^2/c^2}$ b) $L = Lo(1 - v^2/c^2)$
   c) $L = Lo\sqrt{1 + v^2/c^2}$ d) $L = Lo\sqrt{1 - c^2/v^2}$

SECTION – II

8) The grating constant is given by the equation
   a) no. of lines per cm b) no. of lines per inch
   c) 2.54/no. of lines per cm d) 1/no. of lines per cm

9) In Laurentz's half shade polarimeter, the half part of Laurentz's plate is of _____ and half is of _____
   a) quartz, calcite b) calcite, tourmaline
   c) glass, calcite d) glass, quartz

10) Stimulate absorption process is mathematically represented by equation
   a) $A + h\gamma \rightarrow A^*$ b) $A^* + h\gamma \rightarrow 2h\gamma + A$
   c) $A^* \rightarrow A + h\gamma$ d) $A^* + h\gamma \rightarrow A + h\gamma$

11) The fractional refractive index change (Δ) is given by
   a) $\Delta = n_1 - n_2$ b) $\Delta = n_2 - n_1$ c) $\Delta = (n_1 - n_2)/n_1$ d) $\Delta = (n_2 - n_1)/n_1$

12) The innermost region of the optical fibre is called
   a) Cladding b) Sheath c) Core d) Coating

13) Energy released per fission of a $_{92}U^{235}$ nucleus is nearly
   a) 200 eV b) 200 MeV c) 20 eV d) 20 MeV

14) The chirality of zigzag CNT is
   a) (a, 0) b) (a, a) c) (a, b) d) (b, 0)

_____

SLR-TC – 9

Seat No.	

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING PHYSICS

Day and Date : Wednesday, 23-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Make suitable assumptions, if **necessary**.*
*2) Figures to the **right** indicate **full** marks.*

SECTION – I

2. Attempt **any five** of the following : **15**
   a) Define the terms (1) valance band (2) conduction band (3) forbidden band.
   b) Define co-ordination number and obtain its values for SC, BCC and FCC crystals.
   c) State the basic requirements for acoustically good hall.
   d) State the properties of ultrasonic waves.
   e) Explain in detail Bragg's Law.
   f) A current of 50 A is established in a slab of Cu 0.5 cm thick and 2 cm wide. The slab is placed in a magnetic field B of 1.5 T. The magnetic field is perpendicular to the plane of the slab and to the current. The free electron concentration in copper is 8.4×10^{28} electron/m^3. What will be the magnitude of Hall voltage across the width of the slab ?
   g) Calculate the mass of proton moving with a velocity 0.8 C. the rest mass of a proton is 1.67×10^{-27} kg.

3. Define symmetry elements in a crystal ? Explain the various types of symmetry elements present in a cubic crystal. **5**

OR

Derive the expression for relativistic mass variation to show $m = \frac{mo}{\sqrt{1-\frac{v^2}{c^2}}}$.

Set P

4. Attempt **any two** of the following : **8**

   a) Explain effect of impurity concentration on Fermi level.

   b) Define atomic packing factor. Calculate packing factor for SC, BCC and FCC.

   c) Explain detection methods of ultrasonic waves.

   d) State fundamental postulates of special theory of relativity. Explain "Time dilation" phenomenon with mathematical expression.

SECTION – II

5. Attempt **any five** of the following : **15**

   a) Explain positive and negative crystals.

   b) Define : (i) Population inversion (ii) Pumping (iii) Metastable state.

   c) Explain with neat diagram structure of optical fiber.

   d) Explain the types of carbon nano tubes with diagrams.

   e) Explain with diagram (i) Spontaneous emission (ii) Stimulated emission.

   f) The numerical aperture of an optical fiber is 0.5 and the core refractive index is 1.54. Find the refractive index of the cladding.

   g) Calculate specific rotation, if the plane of polarization is rotated through 22° length of tube is 20 cm and concentration of sugar solution is 20%.

6. Obtain the expression for acceptance angle, numerical aperture and fractional refractive index change of an optical fiber. **5**

   OR

   Explain the main features of the design and working of a nuclear fission reactor.

7. Attempt **any two** of the following : **8**

   a) Define resolving power of an optical instrument. Derive an expression for the resolving power of a plane diffraction grating.

   b) Write a note on : Semiconductor LASER.

   c) Explain theory of plane diffraction grating.

   d) Explain : (i) Proton – Proton cycle, (ii) Carbon Nitrogen cycle.

SLR-TC – 9

Seat No.	

Set Q

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING PHYSICS

Day and Date : Wednesday, 23-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Make suitable assumptions,* ***if necessary****.*
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4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

Constants *: 1) Avogadro's no., $N = 6.02 \times 10^{26}$/k.mol.*
2) Velocity of light, $c = 3 \times 10^{8}$m/sec.
3) Charge of electron, $e = 1.6 \times 10^{-19}$C.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

SECTION – I

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

1) The Miller indices of the plane parallel to x and y axes are
a) (1 0 0) b) (0 1 0) c) (0 0 1) d) (1 1 1)

2) The co-ordination number for BCC crystal structure is
a) 12 b) 8 c) 6 d) 5

3) Optimum reverberation time for music is
a) 0.5 to 1 second b) 0 to 1 second
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4) Sound waves having the following frequencies are audible to human beings
a) 5 Hz b) 27000 Hz
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5) Length contraction equation is given by

a) $L = Lo\sqrt{1 - v^2/c^2}$ b) $L = Lo(1 - v^2/c^2)$

c) $L = Lo\sqrt{1 + v^2/c^2}$ d) $L = Lo\sqrt{1 - c^2/v^2}$

6) Semiconductor materials are of _____ group elements.
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a) $f(E) = \frac{1}{1 + e^{(E-Ef)/KT}}$ b) $f(E) = \frac{1}{1 - e^{(E-Ef)/KT}}$

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SECTION – II

8) Stimulate absorption process is mathematically represented by equation
a) $A + h\gamma \rightarrow A^*$ b) $A^* + h\gamma \rightarrow 2h\gamma + A$
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a) $\Delta = n_1 - n_2$ b) $\Delta = n_2 - n_1$ c) $\Delta = (n_1 - n_2)/n_1$ d) $\Delta = (n_2 - n_1)/n_1$

10) The innermost region of the optical fibre is called
a) Cladding b) Sheath c) Core d) Coating

11) Energy released per fission of a $_{92}U^{235}$ nucleus is nearly
a) 200 eV b) 200 MeV c) 20 eV d) 20 MeV

12) The chirality of zigzag CNT is
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13) The grating constant is given by the equation
a) no. of lines per cm b) no. of lines per inch
c) 2.54/no. of lines per cm d) 1/no. of lines per cm

14) In Laurentz's half shade polarimeter, the half part of Laurentz's plate is of _____ and half is of _____
a) quartz, calcite b) calcite, tourmaline
c) glass, calcite d) glass, quartz

_____

SLR-TC – 9

Seat No.	

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING PHYSICS

Day and Date : Wednesday, 23-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Make suitable assumptions, if **necessary**.*
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SECTION – I

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   e) Explain in detail Bragg's Law.
   f) A current of 50 A is established in a slab of Cu 0.5 cm thick and 2 cm wide. The slab is placed in a magnetic field B of 1.5 T. The magnetic field is perpendicular to the plane of the slab and to the current. The free electron concentration in copper is 8.4×10^{28} electron/m^3. What will be the magnitude of Hall voltage across the width of the slab ?
   g) Calculate the mass of proton moving with a velocity 0.8 C. the rest mass of a proton is 1.67×10^{-27} kg.

3. Define symmetry elements in a crystal ? Explain the various types of symmetry elements present in a cubic crystal. **5**

OR

Derive the expression for relativistic mass variation to show $m = \frac{mo}{\sqrt{1-\frac{v^2}{c^2}}}$.

Set Q

4. Attempt **any two** of the following : **8**

   a) Explain effect of impurity concentration on Fermi level.

   b) Define atomic packing factor. Calculate packing factor for SC, BCC and FCC.

   c) Explain detection methods of ultrasonic waves.

   d) State fundamental postulates of special theory of relativity. Explain "Time dilation" phenomenon with mathematical expression.

SECTION – II

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   e) Explain with diagram (i) Spontaneous emission (ii) Stimulated emission.

   f) The numerical aperture of an optical fiber is 0.5 and the core refractive index is 1.54. Find the refractive index of the cladding.

   g) Calculate specific rotation, if the plane of polarization is rotated through 22° length of tube is 20 cm and concentration of sugar solution is 20%.

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   OR

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7. Attempt **any two** of the following : **8**

   a) Define resolving power of an optical instrument. Derive an expression for the resolving power of a plane diffraction grating.

   b) Write a note on : Semiconductor LASER.

   c) Explain theory of plane diffraction grating.

   d) Explain : (i) Proton – Proton cycle, (ii) Carbon Nitrogen cycle.

Set Q

SLR-TC – 9

Seat No.	

Set R

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING PHYSICS

Day and Date : Wednesday, 23-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Make suitable assumptions,* ***if necessary****.*
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3) Charge of electron, e = 1.6 ×10 $^{-19}$C.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

SECTION – I

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

1) Optimum reverberation time for music is
a) 0.5 to 1 second b) 0 to 1 second
c) 1 to 2 second d) above 5 second

2) Sound waves having the following frequencies are audible to human beings
a) 5 Hz b) 27000 Hz c) 5000 Hz d) 50000 Hz

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c) $L = Lo\sqrt{1 + v^2/c^2}$ d) $L = Lo\sqrt{1 - c^2/v^2}$

4) Semiconductor materials are of _____ group elements.
a) 3rd b) 4th c) 5th d) 6th

P.T.O.

5) The fermi direct distribution function is given by

a) $f(E) = \frac{1}{1+e^{(E-Ef)}/KT}$ b) $f(E) = \frac{1}{1-e^{(E-Ef)}/KT}$

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6) The Miller indices of the plane parallel to x and y axes are
a) (1 0 0) b) (0 1 0) c) (0 0 1) d) (1 1 1)

7) The co-ordination number for BCC crystal structure is
a) 12 b) 8 c) 6 d) 5

SECTION – II

8) The innermost region of the optical fibre is called
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a) no. of lines per cm b) no. of lines per inch
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12) In Laurentz's half shade polarimeter, the half part of Laurentz's plate is of _____ and half is of _____
a) quartz, calcite b) calcite, tourmaline
c) glass, calcite d) glass, quartz

13) Stimulate absorption process is mathematically represented by equation
a) $A + h\gamma \rightarrow A^*$ b) $A^* + h\gamma \rightarrow 2h\gamma + A$
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_____

SLR-TC – 9

Seat No.	

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING PHYSICS

Day and Date : Wednesday, 23-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Make suitable assumptions, if **necessary**.*
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SECTION – I

2. Attempt **any five** of the following : **15**
   a) Define the terms (1) valance band (2) conduction band (3) forbidden band.
   b) Define co-ordination number and obtain its values for SC, BCC and FCC crystals.
   c) State the basic requirements for acoustically good hall.
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   g) Calculate the mass of proton moving with a velocity 0.8 C. the rest mass of a proton is 1.67×10^{-27} kg.

3. Define symmetry elements in a crystal ? Explain the various types of symmetry elements present in a cubic crystal. **5**

OR

Derive the expression for relativistic mass variation to show $m = \frac{mo}{\sqrt{1-\frac{v^2}{c^2}}}$.

Set R

4. Attempt **any two** of the following : **8**

   a) Explain effect of impurity concentration on Fermi level.

   b) Define atomic packing factor. Calculate packing factor for SC, BCC and FCC.

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   d) State fundamental postulates of special theory of relativity. Explain "Time dilation" phenomenon with mathematical expression.

SECTION – II

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   a) Explain positive and negative crystals.

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   c) Explain with neat diagram structure of optical fiber.

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   e) Explain with diagram (i) Spontaneous emission (ii) Stimulated emission.

   f) The numerical aperture of an optical fiber is 0.5 and the core refractive index is 1.54. Find the refractive index of the cladding.

   g) Calculate specific rotation, if the plane of polarization is rotated through 22° length of tube is 20 cm and concentration of sugar solution is 20%.

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   OR

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   a) Define resolving power of an optical instrument. Derive an expression for the resolving power of a plane diffraction grating.

   b) Write a note on : Semiconductor LASER.

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Set R

SLR-TC – 9

Seat No.	

Set S

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING PHYSICS

Day and Date : Wednesday, 23-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

SECTION – I

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

1) The co-ordination number for BCC crystal structure is
a) 12 b) 8 c) 6 d) 5

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P.T.O.

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a) $f(E) = \frac{1}{1+e^{(E-Ef)}/KT}$ b) $f(E) = \frac{1}{1-e^{(E-Ef)}/KT}$

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SLR-TC – 9

Seat No.	

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING PHYSICS

Day and Date : Wednesday, 23-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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SECTION – I

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SLR-TC – 10

Seat No.	

Set P

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING CHEMISTRY

Day and Date : Friday, 25-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

*ii) **Answer MCQ/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 correct option : **14**

1) Chloride content is determined by
   a) Complexometric titration b) Iodometric titration
   c) Mohrs method d) EDTA method

2) _____ is used as oxygen carrier catalyst.
   a) $Mg(OH)_2$ b) $Fe(OH)_2$ c) $Mn(OH)_2$ d) $Ca(OH)_2$

3) _____ is not as green solvent.
   a) Supper critical CO_2 b) H_2O
   c) C_6H_6 d) H_2O_2

4) Rate of corrosion is maximum in _____ medium.
   a) Acidic b) Basic c) Neutral d) Aqueous

5) Good lubricant should have
   a) Low aniline point b) High cloud point
   c) High flash point d) Low oiliness

6) In corrosion cathodic metal get
   a) Protected b) Corroded c) Decomposed d) Activated

7) Unstable oxide film formation takes place in _____ metal.
   a) Gold b) Molybdenum c) Sodium d) Aluminium

8) Bakelite is formed by combination of formaldehyde and
   a) Phenol b) Formic acid
   c) Methyl alcohol d) Benzene

P.T.O.

9) The process of vulcanization makes rubber
   a) Hard b) Soft c) More elastic d) None of these

10) Number of gram equivalent solute present in 1 liter solution is called
   a) Normality b) Molality c) Molarity d) Mole fraction

11) An example of primary fuel is
   a) Natural gases b) Petrol
   c) Wood charcoal d) Coke

12) Higher calorific value of fuel assume that it
   a) Contains H_2O in liquid form
   b) Contains H_2O in vapor form
   c) Ignore H_2O in vapor form
   d) Contains H_2O in both liquid and vapor form

13) Which of the following gas can not be used as carrier gas in GC ?
   a) Nitrogen b) Argon c) Oxygen d) All of these

14) The main constituent of glass is
   a) CaO b) SiO_2 c) Al_2O_3 d) Boron

SLR-TC – 10

Seat No.	

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING CHEMISTRY

Day and Date : Friday, 25-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Attempt **all** questions.*
2) Draw neat diagram wherever necessary.
*3) Figures to **right** indicate **full** marks.*

SECTION – I

2. A) Attempt **any two** : **8**

a) Explain hydrogen evolution mechanism of wet corrosion.

b) Describe the greener pathway for manufacture of indigo.

c) A sample of water on analysis was found to contain following impurities in mg/lit.

Impurities	Amount	Mole.wt
$Mg(HCO_3)_2$	20 mg/lit	146
$Ca(HCO_3)_2$	14 mg/lit	162
$CaSO_4$	16 mg/lit	136
$MgCl_2$	10 mg/lit	95

Calculate the temporary, permanent and total hardness of water.

B) Attempt **any two** : **6**

a) Define lubricant. Write functions of lubricant.

b) Define :

i) Fire point

ii) Viscosity index

iii) Pour point

c) Define reverse osmosis. Explain the process of reverse osmosis with advantages.

3. A) Attempt **any two** : **8**

a) Describe any four principles of green chemistry.

b) Explain mechanism of thin film lubrication.

c) Explain Anodic protection method of corrosion.

B) Attempt the following : **6**

a) Explain factors influencing rate of corrosion.

b) In an acid value determination experiment 6 gm of an oil sample required 3.1 ml N/10 KOH solution for neutralization to phenolphthalein end point, calculate acid value of oil sample.

SECTION – II

4. A) Attempt **any two** : **8**

a) Define glass. Explain manufacture of glass by tank furnace.

b) Explain construction, working of bomb calorimeter used for measurement of calorific value of fuel.

c) A sample of coal contains C = 81.5%, O = 9.5%, H = 6%, S = 1.6%, N = 0.4%, Ash = 1.0%, latent heat of steam = 587 kcal/kg, calculate HCV and LCV of coal sample.

B) Attempt the following : **6**

a) Explain thermosetting and thermosoftening plastics.

b) Define alloy. Write any five purposes of alloying.

c) What is the weight of AgNO3 required to prepare 0.05N in 500 ml and 0.05 M in 700 ml aqueous solution. (Molecular weight of $AgNO_3$ = 170).

5. A) Attempt **any two** : **8**

a) Explain refining process of crude oil.

b) Explain transfer molding process for molding of plastic into articles.

c) Define fuel. Write characteristics of good fuel.

B) Solve the following : **6**

a) Draw neat and labeled diagram of GLC.

b) 62.5 gm vinyl chloride was polymerized to form polymer of molecular weight 18000, calculate degree of polymerization.

$$nCH_2 = CHCl \longrightarrow --(--CH_2 - CHCl--)_n--$$

Vinyl chloride Polyvinyl chloride

OR

B) Solve the following : **6**

a) Define glass transition temperature, melting temperature and degree of polymerization.

b) A polymer has following population

10 molecules have molecular weight each 6000

15 molecules have molecular weight each 8000

20 molecules have molecular weight each 15000

30 molecules have molecular weight each 16000

Calculate its number average molecular weight.

SLR-TC – 10

Seat No.	

Set Q

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING CHEMISTRY

Day and Date : Friday, 25-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose correct option : **14**

1) Bakelite is formed by combination of formaldehyde and
   a) Phenol b) Formic acid
   c) Methyl alcohol d) Benzene

2) The process of vulcanization makes rubber
   a) Hard b) Soft c) More elastic d) None of these

3) Number of gram equivalent solute present in 1 liter solution is called
   a) Normality b) Molality c) Molarity d) Mole fraction

4) An example of primary fuel is
   a) Natural gases b) Petrol
   c) Wood charcoal d) Coke

5) Higher calorific value of fuel assume that it
   a) Contains H_2O in liquid form
   b) Contains H_2O in vapor form
   c) Ignore H_2O in vapor form
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   a) Low aniline point b) High cloud point
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13) In corrosion cathodic metal get
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14) Unstable oxide film formation takes place in _____ metal.
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_____

SLR-TC – 10

Seat No.	

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING CHEMISTRY

Day and Date : Friday, 25-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Attempt **all** questions.*
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SECTION – I

2. A) Attempt **any two** : **8**

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ii) Viscosity index

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c) Define reverse osmosis. Explain the process of reverse osmosis with advantages.

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a) Describe any four principles of green chemistry.

b) Explain mechanism of thin film lubrication.

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a) Explain factors influencing rate of corrosion.

b) In an acid value determination experiment 6 gm of an oil sample required 3.1 ml N/10 KOH solution for neutralization to phenolphthalein end point, calculate acid value of oil sample.

SECTION – II

4. A) Attempt **any two** : **8**

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b) Explain construction, working of bomb calorimeter used for measurement of calorific value of fuel.

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Vinyl chloride Polyvinyl chloride

OR

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SLR-TC – 10

Seat No.	

Set R

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING CHEMISTRY

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

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose correct option : **14**

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2) In corrosion cathodic metal get
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3) Unstable oxide film formation takes place in _____ metal.
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6) Number of gram equivalent solute present in 1 liter solution is called
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7) An example of primary fuel is
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_____

Seat No.	

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING CHEMISTRY

Day and Date : Friday, 25-5-2018 Marks : 56
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SECTION – I

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SECTION – II

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Vinyl chloride Polyvinyl chloride

OR

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Calculate its number average molecular weight.

SLR-TC – 10

Seat No.	

Set S

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING CHEMISTRY

Day and Date : Friday, 25-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose correct option : **14**

1) Number of gram equivalent solute present in 1 liter solution is called
   a) Normality b) Molality
   c) Molarity d) Mole fraction

2) An example of primary fuel is
   a) Natural gases b) Petrol
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3) Higher calorific value of fuel assume that it
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_____

SLR-TC – 10

Seat No.	

F.E. (Part – II) (CBCS) Examination, 2018
ENGINEERING CHEMISTRY

Day and Date : Friday, 25-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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SECTION – I

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SECTION – II

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Vinyl chloride Polyvinyl chloride

OR

B) Solve the following : **6**

a) Define glass transition temperature, melting temperature and degree of polymerization.

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20 molecules have molecular weight each 15000

30 molecules have molecular weight each 16000

Calculate its number average molecular weight.

SLR-TC-700

Seat No.	

Set P

F.E. (Part - II) (Old – CGPA) Examination - 2018
BASIC ELECTRONICS AND COMPUTER PROGRAMMING

Day and Date: Friday,18-05-2018 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.**
3) Figures to the **right** indicates **maximum** marks.
4) Assume **suitable** data if necessary.

MCQ/Objective Type Questions.

Duration: 30 Minutes Marks:14

SECTION – I
(BASIC ELECTRONICS)

Q.1 Choose the correct answer. **07**

1) See back effect is observed in _____.
   a) LVDT b) Strain gauge
   c) RTD d) Thermocouple

2) The average value of half wave rectifier is _____.
   a) 0.159Vm b) 0.318Vm
   c) 0.637Vm d) 0.707Vm

3) Zener diode can be used as _____.
   a) Regulator b) Filter
   c) Amplifier d) Oscillator

4) Material used for LED is _____.
   a) GaAs b) CdSe
   c) PbS d) None of above

5) The _____ impurity is called as donor impurity.
   a) trivalent b) tetravalent
   c) pentavalent d) none of these

6) _____ can be used in camera for determining light intensity.
   a) LED b) Diode
   c) Transistor d) LDR

7) Transistor connected in common base configuration has _____.
   a) high input and low output resistance
   b) low input and low output resistance
   c) high input and high output resistance
   d) low input and high output resistance

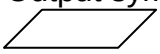
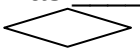
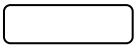
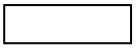
SECTION – II
(Computer Programming)

07

8) C languages are converted into machine language with the help of _____.
   a) An editor
   b) An operating system
   c) A complier
   d) None of above

9) C keywords are also known as _____.
   a) Reserved words
   b) Related words
   c) Relational words
   d) Recorded words

10) If a is an integer variable, a=5/2; will return a value _____.
   a) 2.5
   b) 3
   c) 2
   d) 0

11) Input /Output symbols in flowcharts are shown as _____.
   a) 
   b) 
   c) 
   d) 

12) A pointer is _____.
   a) A keyword used to create variables
   b) A variable that stores address of an instruction
   c) A variable that stores address of other variable
   d) All of the above

13) Structure is collection of _____
   a) only array
   b) only characters
   c) different data types
   d) union only

14) The parameters in the functions definition are _____.
   a) Actual
   b) Formal
   c) Dummy
   d) Optional

Seat No.	

Set **P**

F.E. (Part - II) (Old - CGPA) Examination - 2018
BASIC ELECTRONICS AND COMPUTER PROGRAMMING

Day and Date: Friday,18-05-2018 Max. Marks: 56
Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Figures to the **right** indicates **maximum** marks.
2) Assume **suitable** data if necessary.

Section – I
(Basic Electronics)

Q.2 Solve any four. **16**

1) Explain working of transistor as a switch.
2) Explain capacitor filter with suitable diagrams.
3) Prove that NAND and NOR are Universal Gates.
4) Explain photo electric pick up in detail.
5) Subtract using 2's complement.
$(512)_8$-$(345)_8$

Q.3 Solve any two. **12**

1) Explain full wave bridge rectifier with suitable diagram and derive expression for ripple factor, efficiency.
2) State and prove the DeMorgan's Theorem.
3) Explain CE configuration I/P and O/P characteristics with suitable diagrams.

SECTION - II
(Computer Programming)

Q.4 Attempt any four. **16**

1) What is flowchart? Draw a flowchart to check whether number is negative or positive.
2) Explain entry controlled loop and exit controlled loop in 'C' language.
3) Explain different string library functions.
4) Write a 'C' program to display the following output.

   1

   1 2

   1 2 3

   1 2 3 4

   1 2 3 4 5

5) What is pointer? Explain the use of * and & in pointers.

Q.5 Attempt any two. **12**

a) Explain different operators used in C language with example.

b) Write a menu driven program in 'C' language which calculates
   1) Area of circle
   2) Area of triangle
   3) Area of square

c) Explain call by value and call by reference in a function with example.

SLR-TC – 528

Seat No.	

Set P

T.E. (Part – I) (All Branches) (CGPA) Examination, 2018
SOCIOLOGY
Introduction to Sociology (Self Learning) HSS

Day and Date : Saturday, 12-5-2018 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*3) **Answer MCQ/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=10)**

1) Which of the following are not the characteristics of caste system ?
a) Inequality b) Hierarchy c) Exclusion d) Openness

2) Which of the following is the demographic factor of social change ?
a) Migration-immigration b) Technological innovation
c) Smart city d) None of the above

3) Sociology has been derived from the latin word "societus" and "logas" which means
a) friend or companion and science
b) society and laws
c) sociability and science
d) society and science

4) Social change is responsible for
a) social progress b) social evolution
c) social disorganisation d) all the above

5) Which of the following will not be considered as primary group ?
a) Family b) Peer group
c) Neighbourhood d) Crowd

6) Social movements essentially need
a) Social action b) Collective mobilization
c) Leadership d) All the above

7) What is the long form of SEZ ?
   a) Special Earth Zone
   b) Special Economic Zone
   c) Special Equality Zone
   d) Social Economic Zone

8) Which of the following is not the example of renewable energy ?
   a) Wind energy b) Solar energy c) Coal energy d) Bio energy

9) Who generally sets the standard for style of living in urban areas ?
   a) Middle class urbanities
   b) Urban elites
   c) Slum-dwellers
   d) Migrants

10) Who has been a pioneer of India against corruption movement ?
   a) Anna Hazare
   b) Medha Patkar
   c) Sundarlal Bahuguna
   d) J.P. Narayan

SLR-TC – 528

Seat No.	

T.E. (Part – I) (All Branches) (CGPA) Examination, 2018
SOCIOLOGY
Introduction to Sociology (Self Learning) HSS

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 noon

Instructions *: I) Attempt* ***any 4*** *from the following questions.*
II) Figures to the ***right*** *indicate* ***full*** *marks.*

2. What is social movement ? Elucidate the significance of environmental movements in India. **10**

3. Define social institution and explain the characteristics of nuclear family. **10**

4. Define social change. Explain changes that happened after mobile revolution in India. **10**

5. Whether Industrialization leads to endangering environment ? Discuss. **10**

6. What are the problems of high population density states ? **10**

7. What is caste ? Discuss the changing nature of caste system in India. **10**

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Set P

SLR-TC – 528

Seat No.	

Set Q

T.E. (Part – I) (All Branches) (CGPA) Examination, 2018
SOCIOLOGY
Introduction to Sociology (Self Learning) HSS

Day and Date : Saturday, 12-5-2018 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

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   c) Leadership
   d) All the above

SLR-TC – 528

Seat No.	

T.E. (Part – I) (All Branches) (CGPA) Examination, 2018
SOCIOLOGY
Introduction to Sociology (Self Learning) HSS

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 noon

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Set Q

SLR-TC – 528

Seat No.	

Set R

T.E. (Part – I) (All Branches) (CGPA) Examination, 2018
SOCIOLOGY
Introduction to Sociology (Self Learning) HSS

Day and Date : Saturday, 12-5-2018 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Figures to the **right** indicate **full** marks.*
*2) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*3) **Answer MCQ/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

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P.T.O.

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SLR-TC – 528

Seat No.	

T.E. (Part – I) (All Branches) (CGPA) Examination, 2018
SOCIOLOGY
Introduction to Sociology (Self Learning) HSS

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 noon

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———————-

Set R

SLR-TC – 528

Seat No.	

Set S

T.E. (Part – I) (All Branches) (CGPA) Examination, 2018
SOCIOLOGY
Introduction to Sociology (Self Learning) HSS

Day and Date : Saturday, 12-5-2018 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

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

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P.T.O.

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SLR-TC – 528

Seat No.	

T.E. (Part – I) (All Branches) (CGPA) Examination, 2018
SOCIOLOGY
Introduction to Sociology (Self Learning) HSS

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 noon

Instructions *: I) Attempt* ***any 4*** *from the following questions.*
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Set S

SLR-TC – 529

Seat No.	

Set P

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
SELF LEARNING – HSS – PROFESSIONAL ETHICS & HUMAN VALUES

Day and Date : Saturday, 12-5-2018 Max. Marks : 50
Time : 10.00 a.m. to 12.00 Noon

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

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(10×1=10)**

1) Breaking the law is called as
   A) Crime B) Punishment
   C) Value D) All of the above

2) CSR means
   A) Corporate Social Responsibility B) Cooperation and Society Right
   C) Class Social Representative D) None of the above

3) Kohlberg is related to
   A) Moral development B) Motivation
   C) Team work D) Values

4) In SWOT, T represents
   A) Team work B) Threats
   C) Theory D) None of the above

5) IPR stands for
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P.T.O.

6) Rights theory is related to
   A) Motivation B) Ethics
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8) Unity of thoughts, word, honest deeds and open mindedness is called as
   A) Ethics B) Integrity
   C) Moral D) None of the above

9) Any occupation/job that requires expertise, skill, knowledge, self regulation and concerned service to the public is called as
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10) FMEA, F stands for
   A) Fatigue B) Force
   C) Failure D) None of the above

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SLR-TC – 529

Seat No.	

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
SELF LEARNING – HSS – PROFESSIONAL ETHICS & HUMAN VALUES

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 Noon

***Note** : 1) Answer **any four full** questions from the **remaining**.*
*2) Figures to **right** indicate **full** marks.*
*3) Make suitable assumptions, if required and state them **clearly**.*

2. Explain collective bargaining in detail. **10**

3. Define ethics, moral and human values. Explain the objectives of studying these issues. **10**

4. What is safety ? Explain the various factors that influence the perception of risk. **10**

5. What is professional ethics ? Why to study this ? Explain engineering ethics. **10**

6. Explain the risk benefit analysis. **10**

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Set P

SLR-TC – 529

Seat No.	

Set Q

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
SELF LEARNING – HSS – PROFESSIONAL ETHICS & HUMAN VALUES

Day and Date : Saturday, 12-5-2018 Max. Marks : 50
Time : 10.00 a.m. to 12.00 Noon

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MCQ/Objective Type Questions

Marks : 10

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P.T.O.

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SLR-TC – 529

Seat No.	

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
SELF LEARNING – HSS – PROFESSIONAL ETHICS & HUMAN VALUES

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 Noon

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Set Q

SLR-TC – 529

Seat No.	

Set R

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
SELF LEARNING – HSS – PROFESSIONAL ETHICS & HUMAN VALUES

Day and Date : Saturday, 12-5-2018 Max. Marks : 50
Time : 10.00 a.m. to 12.00 Noon

***Note** : 1) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*
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MCQ/Objective Type Questions

Marks : 10

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SLR-TC – 529

Seat No.	

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
SELF LEARNING – HSS – PROFESSIONAL ETHICS & HUMAN VALUES

Day and Date : Saturday, 12-5-2018 Marks : 40
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Set R

SLR-TC – 529

Seat No.	

Set S

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
SELF LEARNING – HSS – PROFESSIONAL ETHICS & HUMAN VALUES

Day and Date : Saturday, 12-5-2018 Max. Marks : 50
Time : 10.00 a.m. to 12.00 Noon

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MCQ/Objective Type Questions

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SLR-TC – 529

Seat No.	

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
SELF LEARNING – HSS – PROFESSIONAL ETHICS & HUMAN VALUES

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 Noon

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Set S

SLR-TC – 530

Seat No.	

Set **P**

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
ECONOMICS
(Self Learning – H.S.S.)

Day and Date : Saturday, 12-5-2018 Total Marks : 50
Time : 10.00 a.m. to 12.00 noon

Instructions *: 1) Figures at* ***right*** *indicates marks.*
2) Q. No. ***1*** *is* ***compulsory****. It should be solved in Answer Book on Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
3) Answer MCQ/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 alternatives :

1) The cost which does not increase with increased production is
   a) Constant cost b) Marginal cost
   c) Fixed cost d) Variable cost

2) New economic policy was adopted in the year
   a) 1981 b) 1991 c) 2000 d) 2006

3) Which is the common factor influences demand and supply, directly and inversely, respectively ?
   a) Stock of money in economy b) Price level
   c) Market fluctuations d) Psychology of people

4) Monetary policy aims at
   a) Increase in industrial production
   b) Increase in volume of trade
   c) Price stability
   d) Cost control

5) Which is a general feature of oligopoly market ?

P.T.O.

a) Free entry and exit
b) Only one producer
c) Interdependence of firms
d) Perfect mobility of factor

6) Social welfare is maximum when
a) Prices are increasing
b) Prices are falling
c) Prices are constant but goods are not available
d) Goods are available at affordable prices

7) Inflation is effect of
a) Rise in supply of money
b) Stringency in money supply
c) Money supply is constant
d) Adequate money with RBI

8) Consumption expenditure normally increases when
a) Income increases
b) Income decreases
c) Income constant
d) Income has no relation with consumption

9) Trade cycles can be controlled effectively
a) By monetary policy alone
b) By fiscal policy alone
c) By both policies simultaneously
d) It cannot be controlled at all

10) International trade can be beneficial to countries
a) Having absolute cost advantage
b) Having comparative cost advantage
c) Having both above
d) Having no cost advantage

SLR-TC – 530

Seat No.	

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
ECONOMICS
(Self Learning – H.S.S.)

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 Noon

Instructions *: 1) Attempt* ***any four*** *questions out of Q.* ***2*** *to Q.* ***7****.*
2) Figures at ***right*** *indicate marks.*

2. Explain the role of Govt. in formulating and implementing economic policies and its implementation towards achieving economic welfare. **10**

3. Explain features of perfect competition and state why it not a reality. **10**

4. What do you understand by macroeconomic policies of Govt. ? How the national income are increased by such policies ? **10**

5. "Exercising proper control on economy is major function of Central Bank. How such controls are exercised through monetary policy ? **10**

6. A business firm aims to maximize profit. How the firms can maximize profit by controlling their costs effectively ? **10**

7. International trade has become a reality. Having divergent interests how both countries can have advantage from the trade ? **10**

Set P

SLR-TC – 530

Seat No.	

Set Q

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
ECONOMICS
(Self Learning – H.S.S.)

Day and Date : Saturday, 12-5-2018 Total Marks : 50
Time : 10.00 a.m. to 12.00 noon

Instructions *: 1) Figures at* ***right*** *indicates marks.*
2) Q. No. ***1*** *is* ***compulsory****. It should be solved in Answer Book on Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
3) ***Answer MCQ/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 alternatives :

1) Trade cycles can be controlled effectively
   a) By monetary policy alone
   b) By fiscal policy alone
   c) By both policies simultaneously
   d) It cannot be controlled at all

2) International trade can be beneficial to countries
   a) Having absolute cost advantage
   b) Having comparative cost advantage
   c) Having both above
   d) Having no cost advantage

3) Inflation is effect of
   a) Rise in supply of money
   b) Stringency in money supply
   c) Money supply is constant
   d) Adequate money with RBI

P.T.O.

4) Consumption expenditure normally increases when
   a) Income increases
   b) Income decreases
   c) Income constant
   d) Income has no relation with consumption

5) The cost which does not increase with increased production is
   a) Constant cost b) Marginal cost
   c) Fixed cost d) Variable cost

6) New economic policy was adopted in the year
   a) 1981 b) 1991 c) 2000 d) 2006

7) Which is the common factor influences demand and supply, directly and inversely, respectively ?
   a) Stock of money in economy b) Price level
   c) Market fluctuations d) Psychology of people

8) Monetary policy aims at
   a) Increase in industrial production
   b) Increase in volume of trade
   c) Price stability
   d) Cost control

9) Which is a general feature of oligopoly market ?
   a) Free entry and exit b) Only one producer
   c) Interdependence of firms d) Perfect mobility of factor

10) Social welfare is maximum when
   a) Prices are increasing
   b) Prices are falling
   c) Prices are constant but goods are not available
   d) Goods are available at affordable prices

SLR-TC – 530

Seat No.	

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
ECONOMICS
(Self Learning – H.S.S.)

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 noon

Instructions *: 1) Attempt* ***any four*** *questions out of Q.* ***2*** *to Q.* ***7****.*
2) Figures at ***right*** *indicate marks.*

2. Explain the role of Govt. in formulating and implementing economic policies and its implementation towards achieving economic welfare. **10**

3. Explain features of perfect competition and state why it not a reality. **10**

4. What do you understand by macroeconomic policies of Govt. ? How the national income are increased by such policies ? **10**

5. "Exercising proper control on economy is major function of Central Bank. How such controls are exercised through monetary policy ? **10**

6. A business firm aims to maximize profit. How the firms can maximize profit by controlling their costs effectively ? **10**

7. International trade has become a reality. Having divergent interests how both countries can have advantage from the trade ? **10**

Set Q

Set Q

SLR-TC – 530

Seat No.	

Set R

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
ECONOMICS
(Self Learning – H.S.S.)

Day and Date : Saturday, 12-5-2018 Total Marks : 50
Time : 10.00 a.m. to 12.00 noon

Instructions *: 1) Figures at* ***right*** *indicates marks.*
2) Q. No. ***1*** *is* ***compulsory****. It should be solved in Answer Book on Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
3) ***Answer MCQ/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 alternatives :

1) Which is a general feature of oligopoly market ?
   a) Free entry and exit
   b) Only one producer
   c) Interdependence of firms
   d) Perfect mobility of factor

2) Social welfare is maximum when
   a) Prices are increasing
   b) Prices are falling
   c) Prices are constant but goods are not available
   d) Goods are available at affordable prices

3) Trade cycles can be controlled effectively
   a) By monetary policy alone
   b) By fiscal policy alone
   c) By both policies simultaneously
   d) It cannot be controlled at all

4) International trade can be beneficial to countries
   a) Having absolute cost advantage
   b) Having comparative cost advantage
   c) Having both above
   d) Having no cost advantage

5) Which is the common factor influences demand and supply, directly and inversely, respectively ?
   a) Stock of money in economy
   b) Price level
   c) Market fluctuations
   d) Psychology of people

6) Monetary policy aims at
   a) Increase in industrial production
   b) Increase in volume of trade
   c) Price stability
   d) Cost control

7) The cost which does not increase with increased production is
   a) Constant cost
   b) Marginal cost
   c) Fixed cost
   d) Variable cost

8) New economic policy was adopted in the year
   a) 1981 b) 1991 c) 2000 d) 2006

9) Inflation is effect of
   a) Rise in supply of money
   b) Stringency in money supply
   c) Money supply is constant
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10) Consumption expenditure normally increases when
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   b) Income decreases
   c) Income constant
   d) Income has no relation with consumption

SLR-TC – 530

Seat No.	

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
ECONOMICS
(Self Learning – H.S.S.)

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 noon

Instructions *: 1) Attempt* ***any four*** *questions out of Q.* ***2*** *to Q.* ***7****.*
2) Figures at ***right*** *indicate marks.*

2. Explain the role of Govt. in formulating and implementing economic policies and its implementation towards achieving economic welfare. **10**

3. Explain features of perfect competition and state why it not a reality. **10**

4. What do you understand by macroeconomic policies of Govt. ? How the national income are increased by such policies ? **10**

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Set R

SLR-TC – 530

Seat No.	

Set S

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
ECONOMICS
(Self Learning – H.S.S.)

Day and Date : Saturday, 12-5-2018 Total Marks : 50
Time : 10.00 a.m. to 12.00 noon

Instructions *: 1) Figures at* ***right*** *indicates marks.*
2) Q. No. ***1*** *is* ***compulsory****. It should be solved in Answer Book on Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
3) ***Answer MCQ/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 alternatives :

1) Which is the common factor influences demand and supply, directly and inversely, respectively ?

a) Stock of money in economy b) Price level
c) Market fluctuations d) Psychology of people

2) Monetary policy aims at

a) Increase in industrial production
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c) Price stability
d) Cost control

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a) Free entry and exit b) Only one producer
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P.T.O.

4) Social welfare is maximum when
   a) Prices are increasing
   b) Prices are falling
   c) Prices are constant but goods are not available
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   a) Rise in supply of money
   b) Stringency in money supply
   c) Money supply is constant
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   a) By monetary policy alone
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   c) Having both above
   d) Having no cost advantage

9) The cost which does not increase with increased production is
   a) Constant cost
   b) Marginal cost
   c) Fixed cost
   d) Variable cost

10) New economic policy was adopted in the year
   a) 1981 b) 1991 c) 2000 d) 2006

SLR-TC – 530

Seat No.	

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
ECONOMICS
(Self Learning – H.S.S.)

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 noon

Instructions *: 1) Attempt* ***any four*** *questions out of Q.* ***2*** *to Q.* ***7****.*
2) Figures at ***right*** *indicate marks.*

2. Explain the role of Govt. in formulating and implementing economic policies and its implementation towards achieving economic welfare. **10**

3. Explain features of perfect competition and state why it not a reality. **10**

4. What do you understand by macroeconomic policies of Govt. ? How the national income are increased by such policies ? **10**

5. "Exercising proper control on economy is major function of Central Bank. How such controls are exercised through monetary policy ? **10**

6. A business firm aims to maximize profit. How the firms can maximize profit by controlling their costs effectively ? **10**

7. International trade has become a reality. Having divergent interests how both countries can have advantage from the trade ? **10**

Set S

SLR-TC – 531

Seat No.	

Set P

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
Self Learning (HSS)
STRESS AND COPING

Day and Date : Saturday, 12-5-2018 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Solve **any 4** from Q. No. **2** to Q. No. **7**.*
*2) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*
3) Answer MCQ/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. A) Choose the correct answer : **5**

1) The word stress is derived from Latin word which means
   a) Draw tight
   b) Stimulus
   c) Force
   d) Attitude

2) Eustress is also known as
   a) Destructive stress
   b) Constructive stress
   c) Imaginative stress
   d) None of these

3) Stress that is not health for organisation or for the individual is known as
   a) Eustress
   b) Distress
   c) Resistance
   d) None of these

4) Stress is a state of tension experienced by an
   a) Organisation
   b) Group
   c) Individual
   d) None of these

5) Depression, anxiety and moodiness are _____ symptoms of stress.
   a) Medical
   b) Emotional
   c) Behavioral
   d) None of these

B) Match the pairs : **5**

A	**B**
1) Role conflict	1) Sleeplessness
2) Role ambiguity	2) Social support
3) Behavioural consequences	3) Uncertainty
4) Friends and colleagues	4) Different roles
5) Psychological consequences	5) Job dissatisfaction

_____

SLR-TC – 531

Seat No.	

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
Self Learning (HSS)
STRESS AND COPING

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 noon

Instructions *: Solve* ***any 4*** *from Q. No.* ***2*** *to Q. No.* ***7.***

2. Define stress and explain in detail biological and environmental stressors. **10**

3. Explain the various coping styles to stress. **10**

4. Elaborate the role of social support in mitigating stress. **10**

5. Stress management techniques help to manage stress. Elaborate this statement. **10**

6. Discuss the various consequences of stress. **10**

7. Explain the historical perspective of stress. **10**

Set P

SLR-TC – 531

Seat No.	

Set Q

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
Self Learning (HSS)
STRESS AND COPING

Day and Date : Saturday, 12-5-2018 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Solve **any 4** from Q. No. **2** to Q. No. **7**.*
*2) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*3) **Answer MCQ/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. A) Match the pairs : **5**

A	B
1) Role conflict	1) Sleeplessness
2) Role ambiguity	2) Social support
3) Behavioural consequences	3) Uncertainty
4) Friends and colleagues	4) Different roles
5) Psychological consequences	5) Job dissatisfaction

B) Choose the correct answer : **5**

1) Eustress is also known as
   a) Destructive stress
   b) Constructive stress
   c) Imaginative stress
   d) None of these

2) Stress is a state of tension experienced by an
   a) Organisation
   b) Group
   c) Individual
   d) None of these

3) The word stress is derived from Latin word which means
   a) Draw tight
   b) Stimulus
   c) Force
   d) Attitude

4) Depression, anxiety and moodiness are _____ symptoms of stress.
   a) Medical
   b) Emotional
   c) Behavioral
   d) None of these

5) Stress that is not health for organisation or for the individual is known as
   a) Eustress
   b) Distress
   c) Resistance
   d) None of these

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SLR-TC – 531

Seat No.	

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
Self Learning (HSS)
STRESS AND COPING

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 noon

Instructions *: Solve* ***any 4*** *from Q. No.* ***2*** *to Q. No.* ***7.***

2. Define stress and explain in detail biological and environmental stressors. **10**

3. Explain the various coping styles to stress. **10**

4. Elaborate the role of social support in mitigating stress. **10**

5. Stress management techniques help to manage stress. Elaborate this statement. **10**

6. Discuss the various consequences of stress. **10**

7. Explain the historical perspective of stress. **10**

Set Q

SLR-TC – 531

Seat No.	

Set R

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
Self Learning (HSS)
STRESS AND COPING

Day and Date : Saturday, 12-5-2018 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Solve **any 4** from Q. No. **2** to Q. No. **7**.*
*2) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*
3) Answer MCQ/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. A) Choose the correct answer : **5**

1) Stress is a state of tension experienced by an
   a) Organisation
   b) Group
   c) Individual
   d) None of these

2) The word stress is derived from Latin word which means
   a) Draw tight
   b) Stimulus
   c) Force
   d) Attitude

3) Depression, anxiety and moodiness are _____ symptoms of stress.
   a) Medical
   b) Emotional
   c) Behavioral
   d) None of these

4) Stress that is not health for organisation or for the individual is known as
   a) Eustress
   b) Distress
   c) Resistance
   d) None of these

5) Eustress is also known as
   a) Destructive stress
   b) Constructive stress
   c) Imaginative stress
   d) None of these

B) Match the pairs : **5**

A	**B**
1) Role conflict	1) Sleeplessness
2) Role ambiguity	2) Social support
3) Behavioural consequences	3) Uncertainty
4) Friends and colleagues	4) Different roles
5) Psychological consequences	5) Job dissatisfaction

SLR-TC – 531

Seat No.	

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
Self Learning (HSS)
STRESS AND COPING

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 noon

Instructions *: Solve* ***any 4*** *from Q. No.* ***2*** *to Q. No.* ***7.***

2. Define stress and explain in detail biological and environmental stressors. **10**

3. Explain the various coping styles to stress. **10**

4. Elaborate the role of social support in mitigating stress. **10**

5. Stress management techniques help to manage stress. Elaborate this statement. **10**

6. Discuss the various consequences of stress. **10**

7. Explain the historical perspective of stress. **10**

Set R

SLR-TC – 531

Seat No.	

Set S

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
Self Learning (HSS)
STRESS AND COPING

Day and Date : Saturday, 12-5-2018 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

***Instructions** : 1) Solve **any 4** from Q. No. **2** to Q. No. **7**.*
*2) Q. No. **1** is **compulsory**. It should be solved in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*3) **Answer MCQ/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. A) Match the pairs : **5**

A	B
1) Role conflict	1) Sleeplessness
2) Role ambiguity	2) Social support
3) Behavioural consequences	3) Uncertainty
4) Friends and colleagues	4) Different roles
5) Psychological consequences	5) Job dissatisfaction

B) Choose the correct answer : **5**

1) Depression, anxiety and moodiness are _____ symptoms of stress.

a) Medical

b) Emotional

c) Behavioral

d) None of these

P.T.O.

2) Stress that is not health for organisation or for the individual is known as
   a) Eustress
   b) Distress
   c) Resistance
   d) None of these
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   a) Destructive stress
   b) Constructive stress
   c) Imaginative stress
   d) None of these
4) The word stress is derived from Latin word which means
   a) Draw tight
   b) Stimulus
   c) Force
   d) Attitude
5) Stress is a state of tension experienced by an
   a) Organisation
   b) Group
   c) Individual
   d) None of these

_____

SLR-TC – 531

Seat No.	

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
Self Learning (HSS)
STRESS AND COPING

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 noon

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2. Define stress and explain in detail biological and environmental stressors. **10**

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5. Stress management techniques help to manage stress. Elaborate this statement. **10**

6. Discuss the various consequences of stress. **10**

7. Explain the historical perspective of stress. **10**

Set S

SLR-TC – 532

Seat No.	

Set P

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMENT (Self Learning (HSS))

Day and Date : Saturday, 12-5-2018 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

N.B. *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 20 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) Attempt ***all*** *questions.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 20 Minutes Marks : 10

1. Choose the correct answer :

1) To apply for a patent, an inventor must
   a) File an application at a patent office which must comply with formal and technical requirements
   b) Draft the full specification of the patent they seek, which cannot be later amended
   c) Demonstrate that their invention works
   d) None of the above

2) All of the following are examples of intellectual property protections EXCEPT
   a) Copyrights b) Patents c) Contracts d) Trademarks

3) Intellectual Property Rights are result of
   a) Mental work b) Physical work
   c) Technical work d) Communication

P.T.O.

4) No patent shall be granted in respect of an invention relating to
   a) Atomic Energy b) Bio Energy
   c) Solar Energy d) Wind Energy

5) Which of the following is not specifically protected by intellectual property legislation ?
   a) Industrial designs b) Trademarks
   c) Copyrights d) Trade secrets

6) The legislation covering intellectual property right in India for Information Technology is
   a) Information Technology Act 2003
   b) Information Technology Act 2000
   c) Information Technology Act 2008
   d) None of the above

7) The first Patent law was enacted in India in the year
   a) 1856 b) 1880 c) 1905 d) 1850

8) What is the term of a patent ?
   a) 35 years b) 25 years c) 20 years d) 15 years

9) What is copyright meant for
   a) Film work b) Books
   c) Essay d) All the above

10) A person develops a new process for making cheese from milk having low fats and cholesterol. He wishes to protect it. Which form of IPR would be suitable ?
   a) Patent b) Copyright
   c) Trademarks d) Industrial design

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SLR-TC – 532

Seat No.	

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMENT (Self Learning (HSS))

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 noon

N.B. *: 1) Attempt **all** questions.*
*2) Figures to the **right** indicate **full** marks.*

2. What are the essential requirements for granting patent ? Explain in detail. **10**

3. Elaborate the Indian Patent Act, 1970. **10**

OR

3. Explain role of confidentiality and information security in technology development. **10**

4. Write short notes on **any four** : **20**

1) Copyrights.
2) Trade secrets.
3) Bio technology and intellectual property.
4) Publication and examination of patent applications.
5) Protection of traditional knowledge.
6) Copyright issues in creative works.

———————

Set P

SLR-TC – 532

Seat No.	

Set Q

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMENT (Self Learning (HSS))

Day and Date : Saturday, 12-5-2018 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

N.B. *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 20 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) Attempt ***all*** *questions.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 20 Minutes Marks : 10

1. Choose the correct answer :

1) What is copyright meant for

a) Film work b) Books
c) Essay d) All the above

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a) 35 years b) 25 years c) 20 years d) 15 years

P.T.O.

5) To apply for a patent, an inventor must
   a) File an application at a patent office which must comply with formal and technical requirements
   b) Draft the full specification of the patent they seek, which cannot be later amended
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   a) Industrial designs b) Trademarks
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   b) Information Technology Act 2000
   c) Information Technology Act 2008
   d) None of the above

_____

SLR-TC – 532

Seat No.	

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMENT (Self Learning (HSS))

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 noon

N.B. *: 1) Attempt **all** questions.*
*2) Figures to the **right** indicate **full** marks.*

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3. Elaborate the Indian Patent Act, 1970. **10**

OR

3. Explain role of confidentiality and information security in technology development. **10**

4. Write short notes on **any four** : **20**

1) Copyrights.
2) Trade secrets.
3) Bio technology and intellectual property.
4) Publication and examination of patent applications.
5) Protection of traditional knowledge.
6) Copyright issues in creative works.

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Set Q

SLR-TC – 532

Seat No.	

Set R

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMENT (Self Learning (HSS))

Day and Date : Saturday, 12-5-2018 Max. Marks : 50
Time : 10.00 a.m. to 12.00 noon

N.B. *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 20 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) Attempt ***all*** *questions.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 20 Minutes Marks : 10

1. Choose the correct answer :

1) Which of the following is not specifically protected by intellectual property legislation ?

a) Industrial designs b) Trademarks
c) Copyrights d) Trade secrets

2) The legislation covering intellectual property right in India for Information Technology is

a) Information Technology Act 2003
b) Information Technology Act 2000
c) Information Technology Act 2008
d) None of the above

3) What is copyright meant for

a) Film work b) Books
c) Essay d) All the above

P.T.O.

4) A person develops a new process for making cheese from milk having low fats and cholesterol. He wishes to protect it. Which form of IPR would be suitable ?

a) Patent b) Copyright

c) Trademarks d) Industrial design

5) Intellectual Property Rights are result of

a) Mental work b) Physical work

c) Technical work d) Communication

6) No patent shall be granted in respect of an invention relating to

a) Atomic Energy b) Bio Energy

c) Solar Energy d) Wind Energy

7) To apply for a patent, an inventor must

a) File an application at a patent office which must comply with formal and technical requirements

b) Draft the full specification of the patent they seek, which cannot be later amended

c) Demonstrate that their invention works

d) None of the above

8) All of the following are examples of intellectual property protections EXCEPT

a) Copyrights b) Patents c) Contracts d) Trademarks

9) The first Patent law was enacted in India in the year

a) 1856 b) 1880 c) 1905 d) 1850

10) What is the term of a patent ?

a) 35 years b) 25 years c) 20 years d) 15 years

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Seat No.	

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMENT (Self Learning (HSS))

Day and Date : Saturday, 12-5-2018 Marks : 40
Time : 10.00 a.m. to 12.00 noon

N.B. *: 1) Attempt **all** questions.*
*2) Figures to the **right** indicate **full** marks.*

2. What are the essential requirements for granting patent ? Explain in detail. **10**

3. Elaborate the Indian Patent Act, 1970. **10**

OR

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4. Write short notes on **any four** : **20**

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Set R

SLR-TC – 532

Seat No.	

Set S

T.E. (All Branches) (Part – I) (CGPA) Examination, 2018
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMENT (Self Learning (HSS))

Day and Date : Saturday, 12-5-2018 Max. Marks : 50
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MCQ/Objective Type Questions

Duration : 20 Minutes Marks : 10

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a) Mental work b) Physical work

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SLR-TC – 532

Seat No.	

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Set S