SLR-TJ - 1

Max. Marks: 70

Seat No.

F.E. (Part – I) (CBCS) Examination, 2017 **ENGINEERING MATHEMATICS - I**

Day and Date: Monday, 11-12-2017

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

Instructions: 1) Figures to the **right** indicate **full** marks.

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

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct alternative:

14

1) The nth derivative of $\frac{1}{v}$ is

a)
$$\frac{(-1)^n n}{x^{n+1}}$$

b)
$$\frac{(-1)^{n}}{x^{n}}$$

c)
$$\frac{(-1)^n(n-1)!}{\sqrt{n}}$$

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

2) The nth term in the Taylor's series is

a)
$$\frac{f^n(h)}{n!}$$

b)
$$\frac{x^n}{n!}$$

b)
$$\frac{x^n}{n!}$$
 c) $\frac{x^n}{n!} f^n(h)$ d) $x^n f^{(n)}(h)$

d)
$$x^n f^{(n)}(h)$$

- 3) Which of the following is not true?
 - a) sinix = isinhx
- b) cosix = coshx c) tanix = itanhx d) cotix = icothx
- 4) The modulus and the amplitude of $2 + 2\sqrt{3}i$ are

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

b)
$$4, \frac{\pi}{3}$$

c)
$$4, \frac{\pi}{6}$$

d)
$$4, \frac{2\pi}{3}$$

5) If $y = xe^{2x}$ then $y_n =$

c)
$$2^n e^{2x} x + n2^{n-1} e^{2x}$$

d)
$$2^n e^{2x} x^2 + n2^{n-2} e^x$$

- 6) Cosh(x + iy) =
 - a) coshxcosy + isinhxsiny
- b) coshxcosy isinhxsiny
- c) coshxcoshy + isinhxsinhy
- d) sinhxsiny + icoshxcosy



7) The expansion of $tan^{-1}x$ in powers of x is

a)
$$1 - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} + \dots$$

b)
$$x + \frac{x^3}{3} + \frac{x^5}{5} + \frac{x^7}{7} + ...$$

c)
$$x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} + \dots$$

d)
$$x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + ...$$

8) If A is a matrix of order 4×3 then the rank of the matrix A is

- a) less than 3 or equal to 3
- b) greater than 3

c) greater than 4

d) none of these

9) The system of equations AX = B is inconsistent if

- a) rank of A \neq rank of (A : B)
- b) rank of A = rank of (A : B)
- c) rank of A = rank of B
- d) none of these

10) If X₁, X₂, X₃ are linearly dependent vectors then

a)
$$X_1 = X_2 = X_3$$

b)
$$X_1 = K_1 X_2 + K_2 X_3$$

d) None of these

a)
$$X_1 = X_2 = X_3$$

c) $X_1 = 0, X_2 = 0, X_3 = 0$

11) If
$$u = x^2 y \phi \left(\frac{y}{x} \right)$$
 then $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} =$

- a) 0
- b) u
- c) 2u
- d) 3u

12) If δx is an error in x, then $100 \times \frac{\partial x}{x}$ is called

a) absolute error in x

- b) relative error in x
- c) percentage error in x
- d) none of these

13) If x = uv, $y = \frac{u}{v}$, then $\frac{\partial(x, y)}{\partial(u, v)} = \frac{\partial(x, y)}{\partial(u, v)}$

- a) $\frac{-u}{u}$
- b) $-2\frac{u}{v}$
- c) $\frac{-u}{2v}$
- d) $\frac{u}{v}$

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

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

Seat No.

F.E. (Part – I) (CBCS) Examination, 2017 ENGINEERING MATHEMATICS – I

Day and Date: Monday, 11-12-2017 Marks: 56

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

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

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3) Use of calculator is allowed.

SECTION-I

2. Solve any three of the following:

a) Find nth derivative of $\frac{1}{6x^2 - 5x + 1}$.

b) Evaluate
$$\left(\frac{1+\sin\alpha+i\cos\alpha}{1+\sin\alpha-i\cos\alpha}\right)^n$$
.

- c) By using Maclaurin series expand $log(1 + e^x)$.
- d) Expand $x^3 3x^2 + 4x + 3$ in powers of (x 2).

e) Prove that
$$(1+i\sqrt{3})^8 + (1-i\sqrt{3})^8 = -2^8$$
.

3. Solve **any three** of the following:

a) Find nth derivative of $e^{2x} \cdot sin\left(\frac{x}{2}\right) \cdot cos\left(\frac{x}{2}\right)$.

b) If
$$\lim_{x\to 0} \frac{x(1+a\cos x) - b\sin x}{x^3} = 1$$
, find a and b.

- c) Evaluate $\lim_{x \to \frac{\pi}{2}} (\sec x)^{\cot x}$.
- d) Prove that $tanh^{-1}(cos\theta) = cosh^{-1}(cosec\theta)$.
- e) If $\sin (\theta + i\phi) = \cos \alpha + i \sin \alpha$, then show that $\cos^2 \theta = \pm \sin \alpha$.

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4. Solve any two of the following:

10

- a) If $i^{\alpha+i\beta} = \alpha + i\beta$, prove that $\alpha^2 + \beta^2 = e^{-(4n+1)\pi\beta}$ where n is positive integer.
- b) If $y = \sin [m \sin^{-1} x]$, prove that $(1 x^2)y_{n+2} (2n + 1) xy_{n+1} + (m^2 n^2) y_n = 0$. Hence deduce that $y_n(0) = 0$ if n is even

$$y_{n}(0) = \left\lceil \left(n-2\right)^{2} - m^{2} \right\rceil ... \left(3^{2} - m^{2}\right) \left(1^{2} - m^{2}\right) \cdot m \text{ if n is odd.}$$

c) Prove that $e^{x \sin x} = 1 + x^2 + \frac{1}{3}x^4 + \frac{1}{120}x^6 + \dots$ (use standard expansions).

5. Solve any three of the following:

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a) Reduce the following matrix to normal form and hence find it's rank

b) Find the value of λ and μ for which 2x+3y+5z=9; 7x+3y-2z=8; $2x+3y+\lambda z=\mu$ has a i) Unique solution ii) Many solution iii) No solution.

c) If
$$z = f(u, v)$$
 and $u = x^2 - y^2$, $v = 2xy$, show that $x \frac{\partial z}{\partial x} - y \frac{\partial z}{\partial y} = 2(x^2 + y^2) \frac{\partial z}{\partial u}$.

d) If
$$z = x^3 - 3xy^2 + x + e^x \cos y + 1$$
, find the value of $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y}$.

e) Find the minimum value of $x^2 + y^2 + z^2$ subject to the condition ax + by + cz = P.

6. Solve any three of the following:

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

the matrix
$$\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$$
.

b) Find the eigen values of the matrix A and also find eigen values of A^{-1} , if

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

c) If z = f(x, y) and $x = e^u \cos y$, $y = e^u \sin y$, prove that

$$\left(\frac{\partial z}{\partial u}\right)^2 + \left(\frac{\partial z}{\partial v}\right)^2 = e^{2u} \left[\left(\frac{\partial z}{\partial x}\right)^2 + \left(\frac{\partial z}{\partial y}\right)^2 \right].$$

- d) If u=x (1 y) and v=xy, find the Jacobians $J=\frac{\partial(u,v)}{\partial(x,y)}$ and $J'=\frac{\partial(x,y)}{\partial(u,v)}$. Verify that JJ'=1.
- e) If the Kinetic energy $T = \frac{1}{2} mv^2$, find approximately the change in T as the mass m changes from 49 to 49.5 and the velocity v changes from 1600 to 1590.
- 7. Solve any two of the following:

 $(2 \times 5 = 10)$

a) Verify the Cayley – Hamilton theorem for the matrix

$$A = \begin{bmatrix} 7 & 2 & -2 \\ -6 & -1 & 2 \\ 6 & 2 & -1 \end{bmatrix}$$
 and also find A⁻¹.

b) If $u = \csc \left[\frac{x^{\frac{1}{2}} + y^{\frac{1}{2}}}{x^{\frac{1}{3}} + y^{\frac{1}{3}}} \right]$, find the value of

i)
$$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$$

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

c) Find the maximum and minimum values of the function

$$x^3 + 3xy^2 - 15x^2 - 15y^2 + 72x$$
.

Seat No.

F.E. (Part – I) (CBCS) Examination, 2017 **ENGINEERING MATHEMATICS - I**

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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct alternative:

- 14
- 1) If A is a matrix of order 4×3 then the rank of the matrix A is
 - a) less than 3 or equal to 3
- b) greater than 3

c) greater than 4

- d) none of these
- 2) The system of equations AX = B is inconsistent if
 - a) rank of A \neq rank of (A : B)
- b) rank of A = rank of (A : B)
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- d) none of these
- 3) If X₁, X₂, X₃ are linearly dependent vectors then

- b) $X_1 = K_1 X_2 + K_2 X_3$
- a) $X_1 = X_2 = X_3$ c) $X_1 = 0, X_2 = 0, X_3 = 0$
- d) None of these
- 4) If $u = x^2 y \phi \left(\frac{y}{x} \right)$ then $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} =$
 - a) 0
- b) u
- c) 2u
- d) 3u
- 5) If δx is an error in x, then $100 \times \frac{\partial x}{x}$ is called
 - a) absolute error in x

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SLR-TJ – 1

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6) If
$$x = uv$$
, $y = \frac{u}{v}$, then $\frac{\partial(x, y)}{\partial(u, v)} =$

- a) $\frac{-u}{v}$ b) $-2\frac{u}{v}$ c) $\frac{-u}{2v}$
- d) $\frac{u}{v}$

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

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

- 8) The nth derivative of $\frac{1}{y}$ is

- a) $\frac{(-1)^n n!}{x^{n+1}}$ b) $\frac{(-1)^n n!}{x^n}$ c) $\frac{(-1)^n (n-1)!}{x^n}$ d) $\frac{(-1)^n (n-1)!}{x^{n+1}}$
- 9) The nth term in the Taylor's series is
 - a) $\frac{f''(h)}{n!}$
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- d) xⁿf⁽ⁿ⁾(h)

- 10) Which of the following is not true?
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- d) $4, \frac{2\pi}{3}$

- 12) If $y = xe^{2x}$ then $y_n =$
 - a) 2n! xe^{2x}

- b) 2ⁿxe^{2x}
- c) $2^n e^{2x} x + n 2^{n-1} e^{2x}$
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- b) $x + \frac{x^3}{2} + \frac{x^5}{5} + \frac{x^7}{7} + ...$
- c) $x \frac{x^3}{3} + \frac{x^5}{5} \frac{x^7}{7} + ...$
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Seat No.

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-5-

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Seat No.

14

F.E. (Part – I) (CBCS) Examination, 2017 **ENGINEERING MATHEMATICS - I**

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$$Cosh(x + iy) =$$

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- 11) The nth derivative of $\frac{1}{2}$ is

- a) $\frac{(-1)^n n!}{v^{n+1}}$ b) $\frac{(-1)^n n!}{v^n}$ c) $\frac{(-1)^n (n-1)!}{v^n}$ d) $\frac{(-1)^n (n-1)!}{v^{n+1}}$
- 12) The nth term in the Taylor's series is
 - a) $\frac{f''(h)}{n!}$
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 - a) $4\sqrt{3}, \frac{\pi}{3}$ b) $4, \frac{\pi}{3}$ c) $4, \frac{\pi}{6}$

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 - c) Evaluate $\lim_{x \to \frac{\pi}{2}} (\sec x)^{\cot x}$.
 - d) Prove that $tanh^{-1}(cos\theta) = cosh^{-1}(cosec\theta)$.
 - e) If $\sin (\theta + i\phi) = \cos \alpha + i \sin \alpha$, then show that $\cos^2 \theta = \pm \sin \alpha$.

Set R

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4. Solve any two of the following:

10

- a) If $i^{\alpha+i\beta} = \alpha + i\beta$, prove that $\alpha^2 + \beta^2 = e^{-(4n+1)\pi\beta}$ where n is positive integer.
- b) If $y = \sin [m \sin^{-1} x]$, prove that $(1 x^2)y_{n+2} (2n + 1) xy_{n+1} + (m^2 n^2) y_n = 0$. Hence deduce that $y_n(0) = 0$ if n is even

$$y_{n}(0) = \left\lceil \left(n-2\right)^{2} - m^{2} \right\rceil ... \left(3^{2} - m^{2}\right) \left(1^{2} - m^{2}\right) \cdot m \text{ if n is odd.}$$

c) Prove that $e^{x \sin x} = 1 + x^2 + \frac{1}{3}x^4 + \frac{1}{120}x^6 + \dots$ (use standard expansions).

5. Solve any three of the following:

9

a) Reduce the following matrix to normal form and hence find it's rank

b) Find the value of λ and μ for which 2x+3y+5z=9; 7x+3y-2z=8; $2x+3y+\lambda z=\mu$ has a i) Unique solution ii) Many solution iii) No solution.

c) If
$$z = f(u, v)$$
 and $u = x^2 - y^2$, $v = 2xy$, show that $x \frac{\partial z}{\partial x} - y \frac{\partial z}{\partial y} = 2(x^2 + y^2) \frac{\partial z}{\partial u}$.

d) If
$$z = x^3 - 3xy^2 + x + e^x \cos y + 1$$
, find the value of $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y}$.

e) Find the minimum value of $x^2 + y^2 + z^2$ subject to the condition ax + by + cz = P.

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

9

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

the matrix
$$\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$$
.

b) Find the eigen values of the matrix A and also find eigen values of A^{-1} , if

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

c) If z = f(x, y) and $x = e^u \cos y$, $y = e^u \sin y$, prove that

$$\left(\frac{\partial z}{\partial u}\right)^2 + \left(\frac{\partial z}{\partial v}\right)^2 = e^{2u} \left[\left(\frac{\partial z}{\partial x}\right)^2 + \left(\frac{\partial z}{\partial y}\right)^2 \right].$$

- d) If u=x (1 y) and v=xy, find the Jacobians $J=\frac{\partial(u,v)}{\partial(x,y)}$ and $J'=\frac{\partial(x,y)}{\partial(u,v)}$. Verify that JJ'=1.
- e) If the Kinetic energy $T = \frac{1}{2} mv^2$, find approximately the change in T as the mass m changes from 49 to 49.5 and the velocity v changes from 1600 to 1590.
- 7. Solve any two of the following:

 $(2 \times 5 = 10)$

a) Verify the Cayley – Hamilton theorem for the matrix

$$A = \begin{bmatrix} 7 & 2 & -2 \\ -6 & -1 & 2 \\ 6 & 2 & -1 \end{bmatrix}$$
 and also find A⁻¹.

b) If $u = \csc \left[\frac{x^{\frac{1}{2}} + y^{\frac{1}{2}}}{x^{\frac{1}{3}} + y^{\frac{1}{3}}} \right]$, find the value of

i)
$$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$$

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

c) Find the maximum and minimum values of the function

$$x^3 + 3xy^2 - 15x^2 - 15y^2 + 72x$$
.

SLR-TJ - 1

Max. Marks: 70

Seat	
No.	

F.E. (Part – I) (CBCS) Examination, 2017 **ENGINEERING MATHEMATICS - I**

Day and Date: Monday, 11-12-2017

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

Instructions: 1) Figures to the **right** indicate **full** marks.

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

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct alternative:

14

1) If X₁, X₂, X₃ are linearly dependent vectors then

a)
$$X_1 = X_2 = X_3$$

b)
$$X_1 = K_1 X_2 + K_2 X_3$$

c)
$$X_1 = 0$$
, $X_2 = 0$, $X_3 = 0$

d) None of these

2) If
$$u = x^2 y \phi \left(\frac{y}{x} \right)$$
 then $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} =$

- a) 0
- b) u
- c) 2u
- d) 3u
- 3) If δx is an error in x, then $100 \times \frac{\partial x}{x}$ is called
 - a) absolute error in x

- b) relative error in x
- c) percentage error in x
- d) none of these

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

- a) $\frac{-u}{v}$ b) $-2\frac{u}{v}$ c) $\frac{-u}{2v}$
- d) $\frac{u}{v}$



5) 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)
$$\frac{y}{\sqrt{y^2-x^2}}$$

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) $\frac{1}{\sqrt{x^2 - y^2}}$

6) The nth derivative of
$$\frac{1}{x}$$
 is

a)
$$\frac{(-1)^n n!}{x^{n+1}}$$

b)
$$\frac{(-1)^{n} n!}{x^{n}}$$

c)
$$\frac{(-1)^n(n-1)}{x^n}$$

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

7) The nth term in the Taylor's series is

a)
$$\frac{f^n(h)}{n!}$$

b)
$$\frac{x^n}{n!}$$

c)
$$\frac{x^n}{n!} f^n(h)$$
 d) $x^n f^{(n)}(h)$

d)
$$x^n f^{(n)}(h)$$

8) Which of the following is not true?

a)
$$sinix = isinhx$$

d)
$$cotix = icothx$$

9) The modulus and the amplitude of $2 + 2\sqrt{3}i$ are

a)
$$4\sqrt{3}, \frac{\pi}{3}$$

b)
$$4, \frac{\pi}{3}$$

c)
$$4, \frac{\pi}{6}$$

d)
$$4, \frac{2\pi}{3}$$

10) If $y = xe^{2x}$ then $y_n =$

c)
$$2^n e^{2x} x + n2^{n-1} e^{2x}$$

d)
$$2^n e^{2x} x^2 + n2^{n-2} e^x$$

11) Cosh(x + iy) =

12) The expansion of $tan^{-1}x$ in powers of x is

a)
$$1 - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} + \dots$$

b)
$$x + \frac{x^3}{3} + \frac{x^5}{5} + \frac{x^7}{7} + ...$$

c)
$$x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} + \dots$$

d)
$$x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + ...$$

13) If A is a matrix of order 4×3 then the rank of the matrix A is

- a) less than 3 or equal to 3
- b) greater than 3

c) greater than 4

d) none of these

14) The system of equations AX = B is inconsistent if

- a) rank of A \neq rank of (A : B)
- b) rank of A = rank of (A:B)
- c) rank of A = rank of B
- d) none of these

Seat No.

F.E. (Part – I) (CBCS) Examination, 2017 ENGINEERING MATHEMATICS – I

Day and Date: Monday, 11-12-2017 Marks: 56

Time: 3.00 p.m. to 6.00 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 of the following:
 - a) Find nth derivative of $\frac{1}{6x^2 5x + 1}$.
 - b) Evaluate $\left(\frac{1+\sin\alpha+i\cos\alpha}{1+\sin\alpha-i\cos\alpha}\right)^n$.
 - c) By using Maclaurin series expand $log(1 + e^x)$.
 - d) Expand $x^3 3x^2 + 4x + 3$ in powers of (x 2).
 - e) Prove that $(1+i\sqrt{3})^8 + (1-i\sqrt{3})^8 = -2^8$.
- 3. Solve any three of the following:
 - a) Find nth derivative of $e^{2x} \cdot sin\left(\frac{x}{2}\right) \cdot cos\left(\frac{x}{2}\right)$.
 - b) If $\lim_{x\to 0} \frac{x(1+a\cos x) b\sin x}{x^3} = 1$, find a and b.
 - c) Evaluate $\lim_{x \to \frac{\pi}{2}} (\sec x)^{\cot x}$.
 - d) Prove that $tanh^{-1}(cos\theta) = cosh^{-1}(cosec\theta)$.
 - e) If $\sin (\theta + i\phi) = \cos \alpha + i \sin \alpha$, then show that $\cos^2 \theta = \pm \sin \alpha$.

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4. Solve any two of the following:

10

- a) If $i^{\alpha+i\beta} = \alpha + i\beta$, prove that $\alpha^2 + \beta^2 = e^{-(4n+1)\pi\beta}$ where n is positive integer.
- b) If $y = \sin [m \sin^{-1} x]$, prove that $(1 x^2)y_{n+2} (2n + 1) xy_{n+1} + (m^2 n^2) y_n = 0$. Hence deduce that $y_n(0) = 0$ if n is even

$$y_{n}(0) = \left\lceil \left(n-2\right)^{2} - m^{2} \right\rceil ... \left(3^{2} - m^{2}\right) \left(1^{2} - m^{2}\right) \cdot m \text{ if n is odd.}$$

c) Prove that $e^{x \sin x} = 1 + x^2 + \frac{1}{3}x^4 + \frac{1}{120}x^6 + \dots$ (use standard expansions).

5. Solve any three of the following:

9

a) Reduce the following matrix to normal form and hence find it's rank

b) Find the value of λ and μ for which 2x+3y+5z=9; 7x+3y-2z=8; $2x+3y+\lambda z=\mu$ has a i) Unique solution ii) Many solution iii) No solution.

c) If
$$z = f(u, v)$$
 and $u = x^2 - y^2$, $v = 2xy$, show that $x \frac{\partial z}{\partial x} - y \frac{\partial z}{\partial y} = 2(x^2 + y^2) \frac{\partial z}{\partial u}$.

d) If
$$z = x^3 - 3xy^2 + x + e^x \cos y + 1$$
, find the value of $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y}$.

e) Find the minimum value of $x^2 + y^2 + z^2$ subject to the condition ax + by + cz = P.

6. Solve any three of the following:

9

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

the matrix
$$\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$$
.

b) Find the eigen values of the matrix A and also find eigen values of A^{-1} , if

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

c) If z = f(x, y) and $x = e^u \cos y$, $y = e^u \sin y$, prove that

$$\left(\frac{\partial z}{\partial u}\right)^2 + \left(\frac{\partial z}{\partial v}\right)^2 = e^{2u} \left[\left(\frac{\partial z}{\partial x}\right)^2 + \left(\frac{\partial z}{\partial y}\right)^2 \right].$$

- d) If u=x (1 y) and v=xy, find the Jacobians $J=\frac{\partial(u,v)}{\partial(x,y)}$ and $J'=\frac{\partial(x,y)}{\partial(u,v)}$. Verify that JJ'=1.
- e) If the Kinetic energy $T = \frac{1}{2} mv^2$, find approximately the change in T as the mass m changes from 49 to 49.5 and the velocity v changes from 1600 to 1590.
- 7. Solve any two of the following:

 $(2 \times 5 = 10)$

a) Verify the Cayley – Hamilton theorem for the matrix

$$A = \begin{bmatrix} 7 & 2 & -2 \\ -6 & -1 & 2 \\ 6 & 2 & -1 \end{bmatrix}$$
 and also find A⁻¹.

b) If $u = \csc \left[\frac{x^{\frac{1}{2}} + y^{\frac{1}{2}}}{x^{\frac{1}{3}} + y^{\frac{1}{3}}} \right]$, find the value of

i)
$$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$$

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

c) Find the maximum and minimum values of the function

$$x^3 + 3xy^2 - 15x^2 - 15y^2 + 72x$$
.

NEW NEW TRANSPORT THE TRANSPOR	SLR-TJ – 2

Seat			
No.		Set	P
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No.				Set P
	F.E. (I	• •	S) Examination, MECHANICS	2017
-	and Date : Wednesday :3.00 p.m. to 6.00 p			Max. Marks : 70
	n o 2) A D	ninutes in Answe ne mark. nswer MCQ/Obj on't forget to me	r Book Page No. 3. I ective type questicention, Q.P. Set (P/	be solved in first 30 Each question carries ons on Page No. 3 only. Q/R/S) on Top of Page. out mention it clearly.
		MCQ/Objective	Type Questions	
Dura	tion : 30 Minutes			Marks : 14
1. (Choose the correct an	swer:		(14×1=14)
	 A 10 N force is acti components are a) H = 10 N V = 0 b) H = 0 N V = 10 	ng in horizontal d	irection towards rig b) H = 10 N V = d) H = 0 N V = 0	10
	2) Two forces F1 and these are known a a) Coplanar concu c) Like parallel for	s Irrent forces		r concurrent forces
	 The angle of inclin the plane is called a) Angle of friction c) Angle of project 		e at which the body b) Angle of repo d) None of these	se
	4) The redundant fran a) Perfect	ne is also called a b) Imperfect	as fra c) Deficient	ame. d) None of these
	 The moment of ine an axis through its a) bh³/36 	base is given by		and height h about d) bh ³ /12
	6) The horizontal rang with horizontal is	ge of a projectile i	s maximum when tl	he angle of projection

c) 60°

a) 50°

b) 45°

d) None of these

7)	Unit of impulse of f	orce is				
	a) N	b) Nm	c)	N/m	d)	Ns
8)	Product of mass ar	nd velocity is				
	a) Moment	b) Momentum	c)	Movement	d)	Power
9)	Angle made by moving particle at the center of the circle in case of angula motion is					
	a) Angular velocity	•	b)	Angular displac	em	ent
	c) Angular speed		d)	Angular acceler	atio	on
10)	The motion of a what a) Purely translation b) Purely rotationac) Combined trans d) None of these	on I	al			
11)	The rate of doing wa) Potential energy		b)	Kinetic energy		
	c) Power		•	None		
12)	1 kg force is equal	to				
,	a) 7.8 N	b) 8.91 N	c)	9.81 N	d)	9.18 N
13)	Which of the follow	ing is a vector qua	ntit	y ?		
	a) Area	b) Length	c)	Distance	d)	Displacement
14)	Slope of velocity tiral a) Displacement	•	c)	Acceleration	d)	Jerk
	'	,	,		,	



Seat	
No.	

F.E. (Part – I) (CBCS) Examination, 2017 APPLIED MECHANICS

Day and Date: Wednesday, 13-12-2017

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

Instructions: 1) Attempt all questions.

2) Assume suitable data if **necessary**, but mention it **clearly**.

SECTION - I

2. Solve any four:

 $(4 \times 3 = 12)$

Marks: 56

- a) State and prove Varignon's theorem.
- b) Discuss the concept of free body diagram with neat example.
- c) State assumptions in analysis of perfect frame.
- d) Two forces acting at and away from the point having magnitude of 10 kN and 20 kN respectively, having an angle 60° as shown in Fig. 1. Find the resultant.

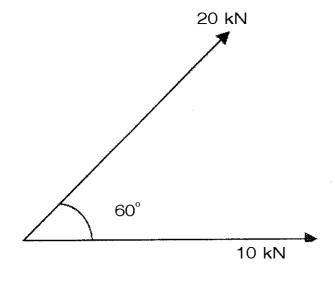
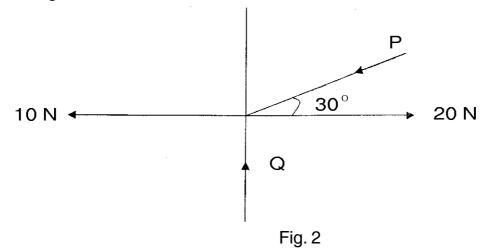


Fig. 1

e) Find the value of the forces P and Q if the system is in equilibrium as shown in Fig. 2.

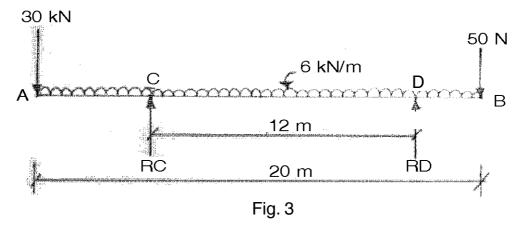


f) A simply supported beam 3 m span is loaded with uniformly distributed load of 2 kN/m and a point load of 6 kN at 1 m from left hand support. Determine reactions at supports. (Ref. Fig. (A))

3. Solve any two:

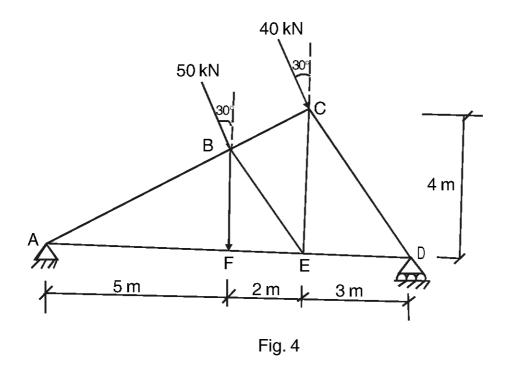
 $(8 \times 2 = 16)$

a) A beam AB 20 m long supported on two intermediate supports 12 m apart, carries a UDL of 6 kN/m and two concentrated load of 30 kN at left end A and 50 kN at the right end B as shown in Fig. 3. How far away should the first support 'C' be located from the end A so the reactions at both the supports are equal?



Set P

b) Determine the forces in all members of a truss shown in Fig. 4.



c) Calculate the moment of inertia of the section shown in Fig. 5 about the centroidal axis parallel to and perpendicular to top edge.

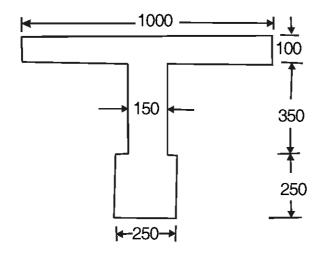


Fig. 5

SECTION - II

4. Solve any four: (4×3=12)

- a) Derive three equations of motion of a body moving with uniform acceleration.
- b) What is banking of roads? Why it is required?
- c) Define
 - i) Trajectory
- ii) Range
- iii) Projectile
- d) A particle starting from rest moves in a straight line whose equation of motion is given by $s = t^3 2t^2 + 3$. Find the velocity and acceleration of the particle at t = 5 sec.
- e) A horse pulling a cart exerts a steady horizontal pull of 300 N and walks at a rate of 4.5 kmph. How much work is done by the horse in 5 min. ?
- f) A car is moving at 72 kmph. If the wheels are of 75 cm diameter, find the angular velocity of the wheel about its axis.

5. Solve any two: (8×2=16)

- a) Two stations P and Q are 5.2 km apart. An automobile starts from rest from the station P and accelerates uniformly to attain a speed of 48 kmph in 30 seconds. This speed is maintained until the brakes are applied. The automobile comes to rest at the station Q with a uniform retardation of 1 m/s². Determine total time required to cover the distance between these two stations.
- b) Determine the tension in the string and acceleration of block A and B weighing 750 N and 250 N connected by an inextensible string as shown in Fig. 6. Assume pulleys as functionless and weight less.

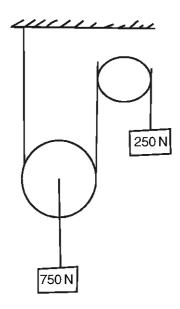


Fig. 6 Set P



c) A body weighing 300 N is pushed up a 30° plane by a 400 N force acting parallel to the plane as shown in Fig. 7. If the initial velocity of the body is 1.5 m/sec. and coefficient of kinetic friction is μ = 0.2, what velocity will the body have after moving 6 m?

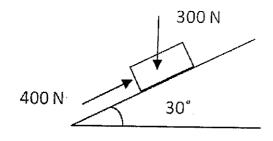


Fig. 7

SLR-TJ-2

Seat		
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F.E. (Part – I) (CBCS) Examination, 2017 **APPLIED MECHANICS**

Day and Date: Wednesday, 13-12-2017	Max. Marks : 70

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

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

2) Answer MCQ/Objective type questions on Page No. 3 only.

Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page. 3) Assume suitable data if **necessary**, but mention it **clearly**. MCQ/Objective Type Questions **Duration: 30 Minutes** Marks: 14 1. Choose the correct answer: $(14 \times 1 = 14)$ 1) Product of mass and velocity is b) Momentum a) Moment c) Movement d) Power 2) Angle made by moving particle at the center of the circle in case of angular motion is a) Angular velocity b) Angular displacement d) Angular acceleration c) Angular speed 3) The motion of a wheel of a car is a) Purely translation b) Purely rotational c) Combined translation and rotational d) None of these 4) The rate of doing work is known as a) Potential energy b) Kinetic energy c) Power d) None

5) 1 kg force is equal to

a) 7.8 N b) 8.91 N c) 9.81 N

d) 9.18 N

6) Which of the following is a vector quantity?

a) Area

b) Length

c) Distance

d) Displacement

7) Slope of velocity time curve gives

a) Displacement

b) Velocity

c) Acceleration

d) Jerk

8)	A 10 N force is acting in horizontal direction towards right. Then the resolved components are					
	a) H = 10 N V = 0 c) H = 0 N V = 10		,	H = 10 N V = 1 H = 0 N V = 0	0	
9)	Two forces F1 and these are known as	•	ea	ch other and ac	ting	towards down,
	a) Coplanar concuc) Like parallel for		,	Non coplanar c Unlike parallel		
10)	The angle of inclination the plane is called	ation of the plane a	at w	hich the body s	tart	s to move down
	a) Angle of frictionc) Angle of project		,	Angle of repose None of these	9	
11)	The redundant fran	ne is also called as		fram	ne.	
,	a) Perfect	b) Imperfect				None of these
12)	The moment of ine an axis through its	_	sec	tion of base b ar	nd h	eight h about
	a) bh ³ /36	b) bh ³ /16	c)	bh ³ /26	d)	bh ³ /12
13)	The horizontal rang with horizontal is	je of a projectile is i	max	ximum when the	an	gle of projection
	a) 50°	b) 45°	c)	60°	d)	None of these
14)	Unit of impulse of f	orce is				
	a) N	b) Nm	c)	N/m	d)	Ns



Seat	
No.	

F.E. (Part – I) (CBCS) Examination, 2017 APPLIED MECHANICS

Day and Date: Wednesday, 13-12-2017

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

Instructions: 1) Attempt all questions.

2) Assume suitable data if **necessary**, but mention it **clearly**.

SECTION-I

2. Solve any four:

 $(4 \times 3 = 12)$

Marks: 56

- a) State and prove Varignon's theorem.
- b) Discuss the concept of free body diagram with neat example.
- c) State assumptions in analysis of perfect frame.
- d) Two forces acting at and away from the point having magnitude of 10 kN and 20 kN respectively, having an angle 60° as shown in Fig. 1. Find the resultant.

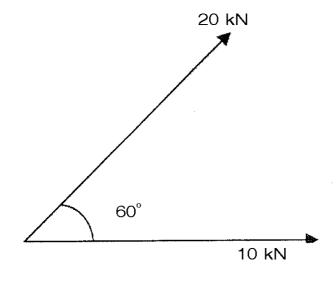
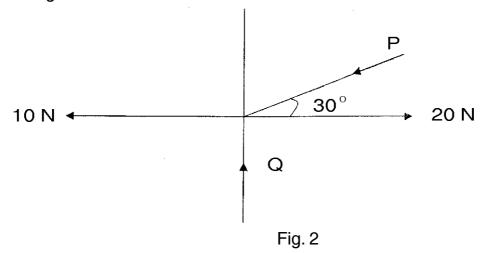


Fig. 1



e) Find the value of the forces P and Q if the system is in equilibrium as shown in Fig. 2.

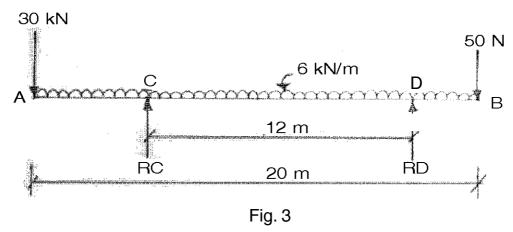


f) A simply supported beam 3 m span is loaded with uniformly distributed load of 2 kN/m and a point load of 6 kN at 1 m from left hand support. Determine reactions at supports. (Ref. Fig. (A))

3. Solve any two:

 $(8 \times 2 = 16)$

a) A beam AB 20 m long supported on two intermediate supports 12 m apart, carries a UDL of 6 kN/m and two concentrated load of 30 kN at left end A and 50 kN at the right end B as shown in Fig. 3. How far away should the first support 'C' be located from the end A so the reactions at both the supports are equal?



Set Q

b) Determine the forces in all members of a truss shown in Fig. 4.

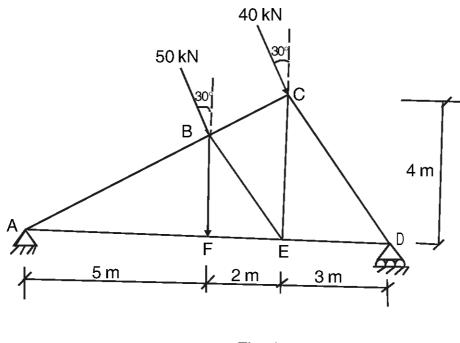


Fig. 4

c) Calculate the moment of inertia of the section shown in Fig. 5 about the centroidal axis parallel to and perpendicular to top edge.

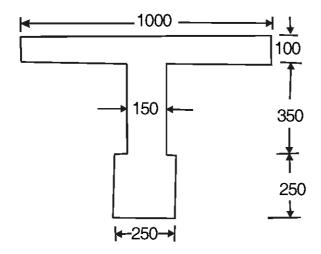


Fig. 5

SECTION - II

4. Solve any four: (4×3=12)

- a) Derive three equations of motion of a body moving with uniform acceleration.
- b) What is banking of roads? Why it is required?
- c) Define
 - i) Trajectory
- ii) Range
- iii) Projectile
- d) A particle starting from rest moves in a straight line whose equation of motion is given by $s = t^3 2t^2 + 3$. Find the velocity and acceleration of the particle at t = 5 sec.
- e) A horse pulling a cart exerts a steady horizontal pull of 300 N and walks at a rate of 4.5 kmph. How much work is done by the horse in 5 min. ?
- f) A car is moving at 72 kmph. If the wheels are of 75 cm diameter, find the angular velocity of the wheel about its axis.

5. Solve any two: (8×2=16)

- a) Two stations P and Q are 5.2 km apart. An automobile starts from rest from the station P and accelerates uniformly to attain a speed of 48 kmph in 30 seconds. This speed is maintained until the brakes are applied. The automobile comes to rest at the station Q with a uniform retardation of 1 m/s². Determine total time required to cover the distance between these two stations.
- b) Determine the tension in the string and acceleration of block A and B weighing 750 N and 250 N connected by an inextensible string as shown in Fig. 6. Assume pulleys as functionless and weight less.

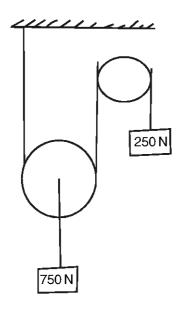


Fig. 6 Set Q



c) A body weighing 300 N is pushed up a 30° plane by a 400 N force acting parallel to the plane as shown in Fig. 7. If the initial velocity of the body is 1.5 m/sec. and coefficient of kinetic friction is μ = 0.2, what velocity will the body have after moving 6 m?

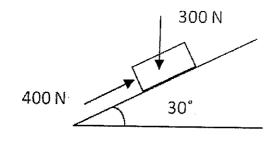


Fig. 7

Seat		
No.	Set	R
	-	I

F.E. (Part – I) (CBCS) Examination, 2017 APPLIED MECHANICS

Day and Date: Wednesday, 13-12-2017 Max. Marks: 70

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

b) Purely rotational

d) None of these

c) Combined translation and rotational

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

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Assume suitable data if **necessary**, but mention it **clearly**.

		MCQ/Objective T	ype Questions	
Duration	on : 30 Minutes	-		Marks : 14
1. Ch	noose the correct an	swer:		(14×1=14)
1)	The moment of ine an axis through its a) bh ³ /36			nd height h about d) bh ³ /12
2)	The horizontal rang with horizontal is	,	,	,
	a) 50°	b) 45°	c) 60°	d) None of these
3)	Unit of impulse of fa) N	orce is b) Nm	c) N/m	d) Ns
4)	Product of mass an a) Moment	nd velocity is b) Momentum	c) Movement	d) Power
5)	Angle made by mo motion is	oving particle at the	e center of the circl	e in case of angular
	a) Angular velocityc) Angular speed	<i>'</i>	b) Angular displadd) Angular accele	
6)	The motion of a what a) Purely translation			



7)	The rate of doing wat a) Potential energy c) Power		•	Kinetic energy None		
8)	1 kg force is equal		۵١	0.04 N	al\	0.10 N
	a) 7.8 N	•			a)	9.18 N
9)	Which of the follow	•		•		
	a) Area	b) Length	c)	Distance	d)	Displacement
10)	Slope of velocity tir	ne curve gives				
·	a) Displacement	b) Velocity	c)	Acceleration	d)	Jerk
11)	A 10 N force is actir components are	ng in horizontal dire	ectio	on towards right.	. Th	en the resolved
	a) H = 10 N V = 0		b)	H = 10 N V = 10)	
	c) $H = 0 \text{ N V} = 10$,	H = 0 N V = 0		
12\	Two forces F1 and	E2 are parallel to	,		ina	towarde down
12)	these are known as	•	Cai	on other and act	uiig	towards down,
	a) Coplanar concu		h)	Non conlanar o	onc	current forces
	c) Like parallel for		•	Unlike parallel f		
40\	, .		,	•		
13)	The angle of inclination the plane is called	ation of the plane a	II W	nich the body st	ans	s to move down
	a) Angle of friction		b)	Angle of repose)	
	c) Angle of projecti	on	d)	None of these		
14)	The redundant fram	ne is also called as		fram	e.	
,	a) Perfect					None of these

Set R



Seat	
No.	

F.E. (Part – I) (CBCS) Examination, 2017 APPLIED MECHANICS

Day and Date: Wednesday, 13-12-2017

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

Instructions: 1) Attempt all questions.

2) Assume suitable data if **necessary**, but mention it **clearly**.

SECTION-I

2. Solve any four:

 $(4 \times 3 = 12)$

Marks: 56

- a) State and prove Varignon's theorem.
- b) Discuss the concept of free body diagram with neat example.
- c) State assumptions in analysis of perfect frame.
- d) Two forces acting at and away from the point having magnitude of 10 kN and 20 kN respectively, having an angle 60° as shown in Fig. 1. Find the resultant.

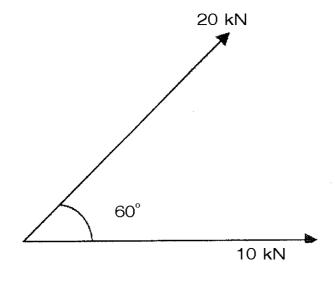
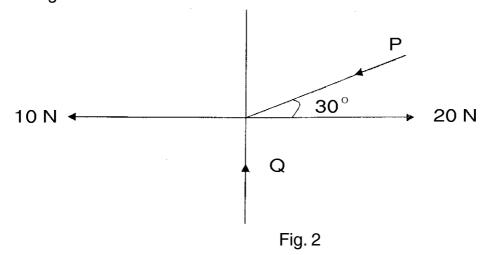


Fig. 1

e) Find the value of the forces P and Q if the system is in equilibrium as shown in Fig. 2.



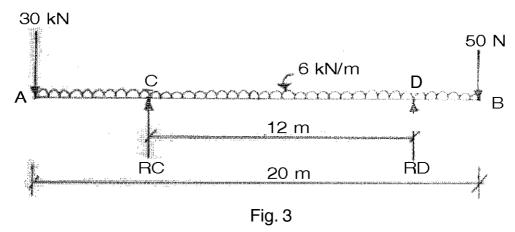
f) A simply supported beam 3 m span is loaded with uniformly distributed load of 2 kN/m and a point load of 6 kN at 1 m from left hand support. Determine reactions at supports. (Ref. Fig. (A))

3. Solve any two:

 $(8 \times 2 = 16)$

Set R

a) A beam AB 20 m long supported on two intermediate supports 12 m apart, carries a UDL of 6 kN/m and two concentrated load of 30 kN at left end A and 50 kN at the right end B as shown in Fig. 3. How far away should the first support 'C' be located from the end A so the reactions at both the supports are equal?



b) Determine the forces in all members of a truss shown in Fig. 4.

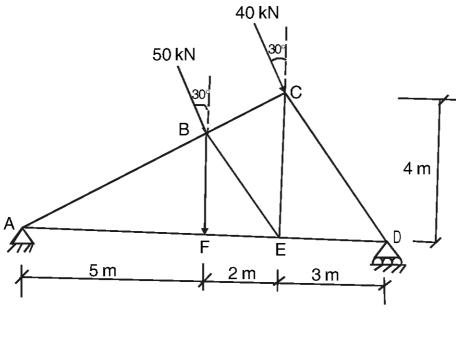


Fig. 4

c) Calculate the moment of inertia of the section shown in Fig. 5 about the centroidal axis parallel to and perpendicular to top edge.

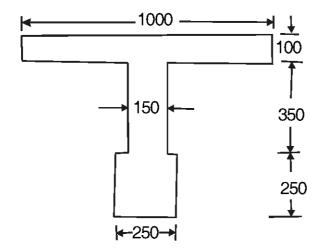


Fig. 5

SECTION - II

4. Solve any four: (4×3=12)

- a) Derive three equations of motion of a body moving with uniform acceleration.
- b) What is banking of roads? Why it is required?
- c) Define
 - i) Trajectory
- ii) Range
- iii) Projectile
- d) A particle starting from rest moves in a straight line whose equation of motion is given by $s = t^3 2t^2 + 3$. Find the velocity and acceleration of the particle at t = 5 sec.
- e) A horse pulling a cart exerts a steady horizontal pull of 300 N and walks at a rate of 4.5 kmph. How much work is done by the horse in 5 min. ?
- f) A car is moving at 72 kmph. If the wheels are of 75 cm diameter, find the angular velocity of the wheel about its axis.

5. Solve any two: (8×2=16)

- a) Two stations P and Q are 5.2 km apart. An automobile starts from rest from the station P and accelerates uniformly to attain a speed of 48 kmph in 30 seconds. This speed is maintained until the brakes are applied. The automobile comes to rest at the station Q with a uniform retardation of 1 m/s². Determine total time required to cover the distance between these two stations.
- b) Determine the tension in the string and acceleration of block A and B weighing 750 N and 250 N connected by an inextensible string as shown in Fig. 6. Assume pulleys as functionless and weight less.

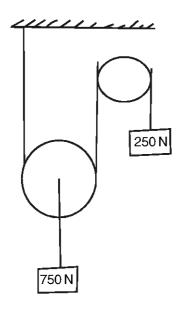


Fig. 6 Set R



c) A body weighing 300 N is pushed up a 30° plane by a 400 N force acting parallel to the plane as shown in Fig. 7. If the initial velocity of the body is 1.5 m/sec. and coefficient of kinetic friction is μ = 0.2, what velocity will the body have after moving 6 m?

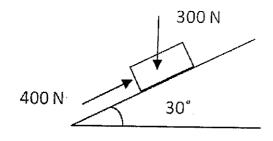


Fig. 7

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SLR-TJ-2

Seat	
No.	

Set S

F.E. (Part – I) (CBCS) Examination, 2017 APPLIED MECHANICS

Day and Date: Wednesday, 13-12-2017 Max. Marks: 70

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

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

- 1) The motion of a wheel of a car is
 - a) Purely translation
 - b) Purely rotational
 - c) Combined translation and rotational
 - d) None of these
- 2) The rate of doing work is known as
 - a) Potential energy

b) Kinetic energy

c) Power

d) None

- 3) 1 kg force is equal to
 - a) 7.8 N
- b) 8.91 N
- c) 9.81 N
- d) 9.18 N
- 4) Which of the following is a vector quantity?
 - a) Area
- b) Length
- c) Distance
- d) Displacement

- 5) Slope of velocity time curve gives
 - a) Displacement
- b) Velocity
- c) Acceleration
- d) Jerk
- 6) A 10 N force is acting in horizontal direction towards right. Then the resolved components are
 - a) H = 10 N V = 0

b) H = 10 N V = 10

c) H = 0 N V = 10

d) H = 0 N V = 0



7)	Two forces F1 and these are known as	•	ea	ch other and ac	ting	towards down,
	a) Coplanar concurc) Like parallel force		,	Non coplanar c Unlike parallel t		
8)	The angle of inclination the plane is called	ation of the plane a	at w	hich the body st	tarts	s to move down
	a) Angle of frictionc) Angle of projecti	on	•	Angle of repose None of these)	
9)	The redundant fram	ne is also called as		fram	ıe.	
,		b) Imperfect				None of these
10)	The moment of inertia of a triangular section of base b and height h about an axis through its base is given by					
	a) bh ³ /36	b) bh ³ /16	c)	bh ³ /26	d)	bh ³ /12
11)	The horizontal rang with horizontal is	e of a projectile is ı	ma	ximum when the	an	gle of projection
	a) 50°	b) 45°	c)	60°	d)	None of these
12)	Unit of impulse of fo	orce is				
	a) N	b) Nm	c)	N/m	d)	Ns
13)	Product of mass an	nd velocity is				
	a) Moment	b) Momentum	c)	Movement	d)	Power
14)	Angle made by mormotion is	ving particle at the	ce	nter of the circle	in :	case of angular
	a) Angular velocity		b)	Angular displac	em	ent
	c) Angular speed		d)	Angular acceler	ratio	on
						



Seat	
No.	

F.E. (Part – I) (CBCS) Examination, 2017 APPLIED MECHANICS

Day and Date: Wednesday, 13-12-2017

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

Instructions: 1) Attempt all questions.

2) Assume suitable data if **necessary**, but mention it **clearly**.

SECTION-I

2. Solve any four:

 $(4 \times 3 = 12)$

Marks: 56

- a) State and prove Varignon's theorem.
- b) Discuss the concept of free body diagram with neat example.
- c) State assumptions in analysis of perfect frame.
- d) Two forces acting at and away from the point having magnitude of 10 kN and 20 kN respectively, having an angle 60° as shown in Fig. 1. Find the resultant.

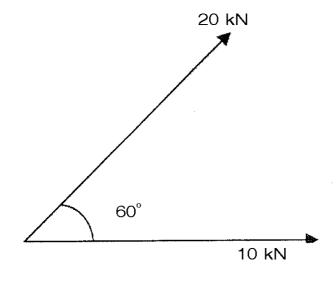
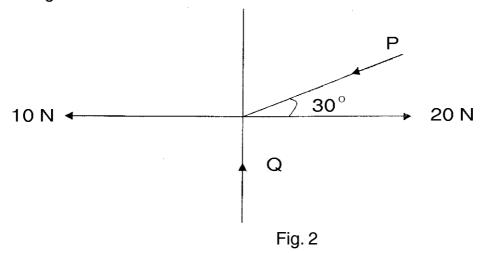


Fig. 1



e) Find the value of the forces P and Q if the system is in equilibrium as shown in Fig. 2.

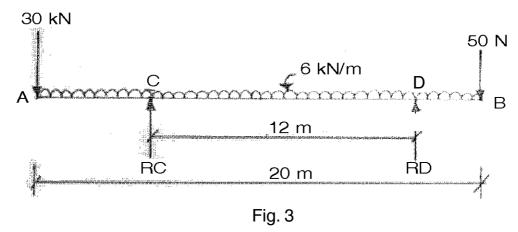


f) A simply supported beam 3 m span is loaded with uniformly distributed load of 2 kN/m and a point load of 6 kN at 1 m from left hand support. Determine reactions at supports. (Ref. Fig. (A))

3. Solve any two:

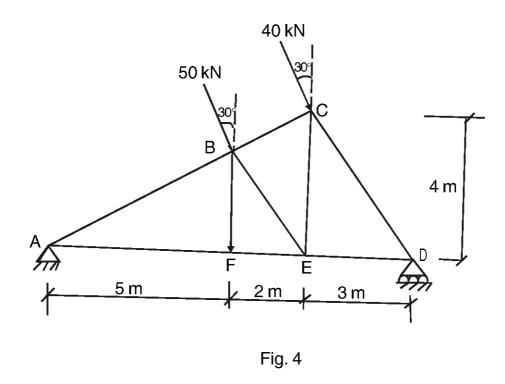
 $(8 \times 2 = 16)$

a) A beam AB 20 m long supported on two intermediate supports 12 m apart, carries a UDL of 6 kN/m and two concentrated load of 30 kN at left end A and 50 kN at the right end B as shown in Fig. 3. How far away should the first support 'C' be located from the end A so the reactions at both the supports are equal?



Set S

b) Determine the forces in all members of a truss shown in Fig. 4.



c) Calculate the moment of inertia of the section shown in Fig. 5 about the centroidal axis parallel to and perpendicular to top edge.

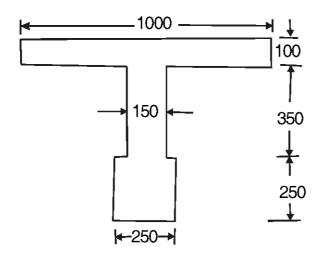


Fig. 5

SECTION - II

4. Solve any four: (4×3=12)

- a) Derive three equations of motion of a body moving with uniform acceleration.
- b) What is banking of roads? Why it is required?
- c) Define
 - i) Trajectory
- ii) Range
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- d) A particle starting from rest moves in a straight line whose equation of motion is given by $s = t^3 2t^2 + 3$. Find the velocity and acceleration of the particle at t = 5 sec.
- e) A horse pulling a cart exerts a steady horizontal pull of 300 N and walks at a rate of 4.5 kmph. How much work is done by the horse in 5 min. ?
- f) A car is moving at 72 kmph. If the wheels are of 75 cm diameter, find the angular velocity of the wheel about its axis.

5. Solve any two: (8×2=16)

- a) Two stations P and Q are 5.2 km apart. An automobile starts from rest from the station P and accelerates uniformly to attain a speed of 48 kmph in 30 seconds. This speed is maintained until the brakes are applied. The automobile comes to rest at the station Q with a uniform retardation of 1 m/s². Determine total time required to cover the distance between these two stations.
- b) Determine the tension in the string and acceleration of block A and B weighing 750 N and 250 N connected by an inextensible string as shown in Fig. 6. Assume pulleys as functionless and weight less.

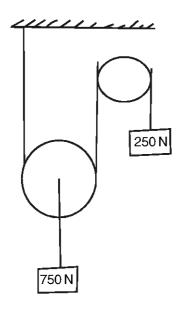


Fig. 6 Set S



c) A body weighing 300 N is pushed up a 30° plane by a 400 N force acting parallel to the plane as shown in Fig. 7. If the initial velocity of the body is 1.5 m/sec. and coefficient of kinetic friction is μ = 0.2, what velocity will the body have after moving 6 m?

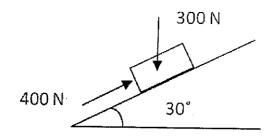


Fig. 7

Seat	Set	Р
No.		•

F.E. (Part – I) (CBCS) Examination, 2017 BASIC ELECTRICAL ENGINEERING

Day and Date: Friday, 15-12-2017 Max. Marks: 70

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

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

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

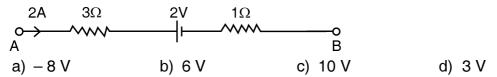
MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

 $(14 \times 1 = 14)$

- 1) While calculating R_{th} constant-current sources in the circuit are
 - a) Replaced by 'opens'
 - b) Replaced by 'shorts'
 - c) Treated in parallel with other voltage sources
 - d) Converted into equivalent voltage sources
- 2) If a 220 V heater is used on 110 V supply, consumption of energy will be
 - a) one half
- b) twice
- c) one fourth
- d) four times
- 3) Figure shows a part of closed electrical circuit. Then $V_A V_B$ is,



- 4) Magnetic reluctance is
 - a) Assistance to magnetic flux
- b) Permeance to magnetic flux
- c) Magnetic field strength
- d) Opposition to magnetic flux
- 5) Two parallel conductor carries the current in same direction, what kind of mutual force they will experience ?
 - a) Force of repulsion

- b) Force of attraction
- c) Force of attraction and attraction
- d) None of these
- 6) Frequency of an a.c. quantity is defined as
 - a) rev./sec.
- b) sec./rev.
- c) cycles/rev.
- d) cycles/sec.



7)	The RMS value of si	The RMS value of sinusoidal 200 V peak to peak wave is					
	a) 200 V	b) $\frac{100}{\sqrt{2}}$	c)	200/\sqrt{2}	d)	100 V	
8)	In a purely inductive	circuit power factor	is				
	a) zero lagging	b) unity	c)	zero leading	d)	none of these	
9)	Admittance is recipro	ocal of					
	a) Resistance	b) Impedance	c)	Reactance	d)	Voltage	
10)	If $Z_1 = 08 - j6\Omega$ and	$Y_2 = 08 - j6 \text{ mho, th}$	nen	the nature of the	two	circuits are	
	a) 1-capacitive, 2-capacitive	apacitive	b)	1-capacitive, 2-in	าdu	ctive	
	c) 1-inductive, 2-ca	pacitive	d)	1-inductive, 2-ind	duc	tive	
11)	Three identical resistances are connwill be						
	a) 4000 W	b) 6000 W	c)	8000 W	d)	12000 W	
12)	Transformer cores a	re laminated in orde	er to)			
	a) Simplify its const	ruction	b)	Minimize eddy c	urre	ent loss	
	c) Reduce cost		d)	Reduce hysteres	sis I	oss	
13)	A transformer having For a secondary volt						
	a) 1600	b) 250	c)	400	d)	1250	
14)	The back emf in d.c.	Motor					
	a) Opposes the app	olied voltage	b)	Aids the applied	vol	tage	
	c) Aids the armature	ecurrent	d)	None of these			
							



Seat	
No.	

F.E. (Part – I) (CBCS) Examination, 2017 BASIC ELECTRICAL ENGINEERING

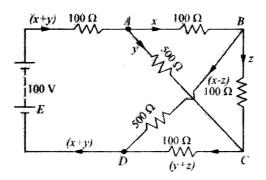
Day and Date: Friday, 15-12-2017 Marks: 56

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

SECTION - I

2. Attempt any four. (4×4=16)

- a) A coil has a resistance of 18 ohm when its mean temperature is 20°C & of 20 ohm when its temperature is 50°C. Find its mean temperature rise when its resistance is 21 ohm and surrounding temperature is 15°C.
- b) By using Kirchhoff's laws, calculate the branch current in the circuit shown below.



- c) State and prove the Maximum Power transfer theorem.
- d) A steel ring having cross-sectional area 12.56 cm² and mean diameter of 100 mm has a coil of 100 turns wound uniformly around it. A magnetic flux of 2 mWb is to be produced in the ring. Calculate
 - i) The current required
 - ii) The relative permeability of steel
 - iii) Inductance of the coil. From the magnetizing curve for steel where H = 5000AT/m for B = 1.6 tesla.
- e) An electric kettle is used to heat 0.5 litre of water from 20°C to the boiling point in 10 minutes, the supply voltage is 230 Volt. The efficiency of the kettle is 80%. Calculate i) the resistance of heating element and ii) The cost of electrical energy consumed at 75 paisa per unit. Assume the specific heat capacity of water is 4190 joule/Kg.K.



- f) Define the following term related with alternating quantity
 - i) Cycle
 - ii) Instantaneous value
 - iii) Frequency
 - iv) Time period.

3. Solve any two.

 $(2 \times 6 = 12)$

a) Determine the electrical energy required to raise the temperature of 80 litres of water by 80°C. If the efficiency of the heater = 89.5%, specific heat capacity of water = 4200 J/kg.K. and mass of one litre of water = 1 Kg.

To what height could a mass of 10 tons be raised with the same expenditure of energy if lifting equipment has an efficiency of 66.5%.

b) Explain the concept of self and mutual inductance.

A flux of 0.6 mWb is produced by a coil of 1000 turns wound on a ring with a current of 5A in it. Calculate,

- i) Self inductance of coil
- ii) Mutual inductance between the coil, if second coil of 600 turns is uniformly wound on first coil.
- c) An alternating current quantity varying sinusoidally with frequency of 50 Hz has RMS value of 20 amps. Write down the equation for the instantaneous value and find instantaneous values after passing through a positive maximum value at
 - i) 0.0025 sec.
 - ii) 0.0125 sec.
 - iii) At what time measured from a positive maximum value, the instantaneous current will be 14.14 A.

SECTION - II

4. Attempt any four.

 $(4 \times 4 = 16)$

- a) Derive the relation between voltage and current for a purely capacitive circuit when ac supply is applied across it.
- b) In series RLC circuit R = $10\,\Omega$, L = 0.25 H, C = $25\,\mu$ F and supply voltage is 230 V, 50 Hz. Calculate total impedance and power in the circuit.
- c) Explain principle of operation, working and construction of single phase transformer.
- d) Explain the working principle of DC motor.



- e) Derive the relation between line and phase voltages and currents in balanced delta connected 3-phase load.
- f) A coil takes a current of 2 A lagging 60 degree behind the applied voltage of 200 V at 50 Hz ac supply. Calculate,
 - i) resistance of coil
 - ii) inductance of coil
 - iii) impedance of coil.

5. Solve any two. (2×6=12)

- a) A 40 KVA single phase transformer has iron loss of 450 W. The full load copper loss is 850 watts. Calculate,
 - i) Efficiency at full load, 0.8 lagging p.f.
 - ii) KVA supplied at maximum efficiency.
 - iii) Maximum efficiency at 0.8 lagging p.f.
- b) Coil of resistance 15 Ω and inductance 0.05 H is connected in parallel with resistance of 20 Ω . If the circuit is connected to 200 V, 50 Hz supply. Determine,
 - i) current in each branch
 - ii) supply current
 - iii) circuit power factor.
- c) The load to a 3 phase supply consists of 3 similar coils connected in star. The line currents are 25 A and KVA and KW inputs are 20 and 11 respectively. Find,
 - i) Phase and line voltages
 - ii) KVAR input
 - iii) Resistance and reactance of each coil.

Set P

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No.		

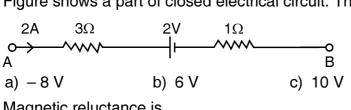
F.E. (Part – I) (CBCS) Examination, 2017 BASIC ELECTRICAL ENGINEERING

Day and Date : Friday, 15-12-2017	Max. Marks : 70
Time: 3.00 n m, to 6.00 n m	

Time: 3	.00 p.m. to 6.00 p.m.					
	in 2) A	. No. 1 is compulso Answer Book Page nswer MCQ/Objec on't forget to ment	No tive	o. 3 . Each questions type questions	on ca s on	nrries one mark. Page No. 3 only.
.		MCQ/Objective T	ype	Questions		
Duration	n : 30 Minutes					Marks : 14
1. Cho	oose the correct answ	ver:				(14×1=14)
1)	In a purely inductive	circuit power factor	is			
	a) zero lagging	b) unity	c)	zero leading	d) r	none of these
2)	Admittance is recipro	ocal of				
	a) Resistance	b) Impedance	c)	Reactance	d) \	Voltage
3)	If $Z_1 = 08 - j6\Omega$ and	$Y_2 = 08 - j6 \text{ mho, th}$	nen	the nature of the	two	circuits are
	a) 1-capacitive, 2-c	apacitive	b)	1-capacitive, 2-in	nduc	tive
	c) 1-inductive, 2-ca	pacitive	d)	1-inductive, 2-inductive	ducti	ve
4)	Three identical resistances are conr will be					
	a) 4000 W	b) 6000 W	c)	8000 W	d) '	12000 W
5)	Transformer cores a	re laminated in orde	er to)		
	a) Simplify its const	ruction	b)	Minimize eddy c	urrer	nt loss
	c) Reduce cost		d)	Reduce hysteres	sis lo	oss
6)	A transformer having For a secondary voltage of the contract o	= = =				
	a) 1600	b) 250	c)	400	d) ⁻	1250
7)	The back emf in d.c.	Motor				
	a) Opposes the app	olied voltage	b)	Aids the applied	volta	age
	c) Aids the armature	e current	d)	None of these		



- 8) While calculating R_{th} constant-current sources in the circuit are
 - a) Replaced by 'opens'
 - b) Replaced by 'shorts'
 - c) Treated in parallel with other voltage sources
 - d) Converted into equivalent voltage sources
- 9) If a 220 V heater is used on 110 V supply, consumption of energy will be
 - a) one half
- b) twice
- c) one fourth
- d) four times
- 10) Figure shows a part of closed electrical circuit. Then $V_A V_B$ is,



- a) -8 V

- d) 3 V

- 11) Magnetic reluctance is

 - a) Assistance to magnetic flux b) Permeance to magnetic flux
 - c) Magnetic field strength
- d) Opposition to magnetic flux
- 12) Two parallel conductor carries the current in same direction, what kind of mutual force they will experience?
 - a) Force of repulsion

- b) Force of attraction
- c) Force of attraction and attraction
- d) None of these
- 13) Frequency of an a.c. quantity is defined as
 - a) rev./sec.
- b) sec./rev.
- c) cycles/rev.
- d) cycles/sec.
- 14) The RMS value of sinusoidal 200 V peak to peak wave is
 - a) 200 V
- b) $\frac{100}{\sqrt{2}}$ c) $\frac{200}{\sqrt{2}}$
- d) 100 V



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F.E. (Part – I) (CBCS) Examination, 2017 BASIC ELECTRICAL ENGINEERING

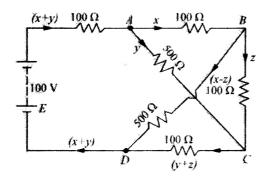
Day and Date: Friday, 15-12-2017 Marks: 56

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

SECTION - I

2. Attempt any four. (4×4=16)

- a) A coil has a resistance of 18 ohm when its mean temperature is 20°C & of 20 ohm when its temperature is 50°C. Find its mean temperature rise when its resistance is 21 ohm and surrounding temperature is 15°C.
- b) By using Kirchhoff's laws, calculate the branch current in the circuit shown below.



- c) State and prove the Maximum Power transfer theorem.
- d) A steel ring having cross-sectional area 12.56 cm² and mean diameter of 100 mm has a coil of 100 turns wound uniformly around it. A magnetic flux of 2 mWb is to be produced in the ring. Calculate
 - i) The current required
 - ii) The relative permeability of steel
 - iii) Inductance of the coil. From the magnetizing curve for steel where H = 5000AT/m for B = 1.6 tesla.
- e) An electric kettle is used to heat 0.5 litre of water from 20°C to the boiling point in 10 minutes, the supply voltage is 230 Volt. The efficiency of the kettle is 80%. Calculate i) the resistance of heating element and ii) The cost of electrical energy consumed at 75 paisa per unit. Assume the specific heat capacity of water is 4190 joule/Kg.K.



- f) Define the following term related with alternating quantity
 - i) Cycle
 - ii) Instantaneous value
 - iii) Frequency
 - iv) Time period.

3. Solve any two.

 $(2 \times 6 = 12)$

a) Determine the electrical energy required to raise the temperature of 80 litres of water by 80°C. If the efficiency of the heater = 89.5%, specific heat capacity of water = 4200 J/kg.K. and mass of one litre of water = 1 Kg.

To what height could a mass of 10 tons be raised with the same expenditure of energy if lifting equipment has an efficiency of 66.5%.

b) Explain the concept of self and mutual inductance.

A flux of 0.6 mWb is produced by a coil of 1000 turns wound on a ring with a current of 5A in it. Calculate,

- i) Self inductance of coil
- ii) Mutual inductance between the coil, if second coil of 600 turns is uniformly wound on first coil.
- c) An alternating current quantity varying sinusoidally with frequency of 50 Hz has RMS value of 20 amps. Write down the equation for the instantaneous value and find instantaneous values after passing through a positive maximum value at
 - i) 0.0025 sec.
 - ii) 0.0125 sec.
 - iii) At what time measured from a positive maximum value, the instantaneous current will be 14.14 A.

SECTION - II

4. Attempt any four.

 $(4 \times 4 = 16)$

- a) Derive the relation between voltage and current for a purely capacitive circuit when ac supply is applied across it.
- b) In series RLC circuit R = $10\,\Omega$, L = 0.25 H, C = $25\,\mu$ F and supply voltage is 230 V, 50 Hz. Calculate total impedance and power in the circuit.
- c) Explain principle of operation, working and construction of single phase transformer.
- d) Explain the working principle of DC motor.

SLR-TJ-3

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

-5-

- f) A coil takes a current of 2 A lagging 60 degree behind the applied voltage of 200 V at 50 Hz ac supply. Calculate,
 - i) resistance of coil
 - ii) inductance of coil
 - iii) impedance of coil.

5. Solve any two. (2×6=12)

- a) A 40 KVA single phase transformer has iron loss of 450 W. The full load copper loss is 850 watts. Calculate,
 - i) Efficiency at full load, 0.8 lagging p.f.
 - ii) KVA supplied at maximum efficiency.
 - iii) Maximum efficiency at 0.8 lagging p.f.
- b) Coil of resistance 15 Ω and inductance 0.05 H is connected in parallel with resistance of 20 Ω . If the circuit is connected to 200 V, 50 Hz supply. Determine,
 - i) current in each branch
 - ii) supply current
 - iii) circuit power factor.
- c) The load to a 3 phase supply consists of 3 similar coils connected in star. The line currents are 25 A and KVA and KW inputs are 20 and 11 respectively. Find,
 - i) Phase and line voltages
 - ii) KVAR input
 - iii) Resistance and reactance of each coil.

Set Q

SLR-TJ - 3

Sea No.				Set R
		F.E. (Part – I) (CBCS BASIC ELECTRIC	S) Examination, 20 CAL ENGINEERING	
•	and Date : Friday e : 3.00 p.m. to 6.0			Max. Marks : 70
	Instruction	2) Answer MCQ/Obje	ge No. 3. Each que ective type questio	lved in first 30 minutes stion carries one mark. ons on Page No. 3 only. Q/R/S) on Top of Page.
		MCQ/Objective	Type Questions	
Dura	ation : 30 Minutes			Marks : 14
1.	Choose the corre	ct answer :		(14×1=14)
		conductor carries the cur I experience ?	rrent in same direction	on, what kind of mutual
	a) Force of r	epulsion	b) Force of attra	ction
	c) Force of a	ttraction and attraction	d) None of these	Э
	2) Frequency of	an a.c. quantity is define	ed as	
	a) rev./sec.	b) sec./rev.	c) cycles/rev.	d) cycles/sec.
	3) The RMS val	ue of sinusoidal 200 V p	eak to peak wave is	3
	a) 200 V	b) $\frac{100}{\sqrt{2}}$	c) $\frac{200}{\sqrt{2}}$	d) 100 V
	4) In a nurely in	ductive circuit nower fact	tor is	

In a purely inductive circuit power factor is

- a) zero lagging
- b) unity
- c) zero leading
- d) none of these

- 5) Admittance is reciprocal of
 - a) Resistance
- b) Impedance c) Reactance
- d) Voltage

6) If $Z_1 = 08 - j6\Omega$ and $Y_2 = 08 - j6$ mho, then the nature of the two circuits are

- a) 1-capacitive, 2-capacitive
- b) 1-capacitive, 2-inductive
- c) 1-inductive, 2-capacitive
- d) 1-inductive, 2-inductive

7) Three identical resistances connected in star consume 4000W. If these three resistances are connected in delta across the same supply, the power consumed will be

- a) 4000 W
- b) 6000 W
- c) 8000 W
- d) 12000 W

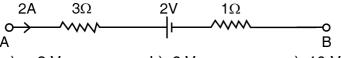


- 8) Transformer cores are laminated in order to
 - a) Simplify its construction
- b) Minimize eddy current loss

c) Reduce cost

- d) Reduce hysteresis loss
- 9) A transformer having 1000 primary turns is connected to a 250 V a.c. supply. For a secondary voltage of 400 V, the number of secondary turns should be
 - a) 1600
- b) 250
- c) 400
- d) 1250

- 10) The back emf in d.c. Motor
 - a) Opposes the applied voltage
- b) Aids the applied voltage
- c) Aids the armature current
- d) None of these
- 11) While calculating R_{th} constant-current sources in the circuit are
 - a) Replaced by 'opens'
 - b) Replaced by 'shorts'
 - c) Treated in parallel with other voltage sources
 - d) Converted into equivalent voltage sources
- 12) If a 220 V heater is used on 110 V supply, consumption of energy will be
 - a) one half
- b) twice
- c) one fourth
- d) four times
- 13) Figure shows a part of closed electrical circuit. Then $V_A V_B$ is,



- a) -8 V
- b) 6 V
- c) 10 V
- d) 3 V

- 14) Magnetic reluctance is
 - a) Assistance to magnetic flux
- b) Permeance to magnetic flux
- c) Magnetic field strength
- d) Opposition to magnetic flux



Seat	
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F.E. (Part – I) (CBCS) Examination, 2017 BASIC ELECTRICAL ENGINEERING

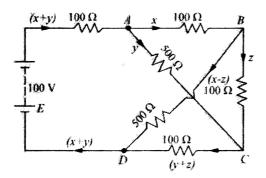
Day and Date: Friday, 15-12-2017 Marks: 56

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

SECTION - I

2. Attempt any four. (4×4=16)

- a) A coil has a resistance of 18 ohm when its mean temperature is 20°C & of 20 ohm when its temperature is 50°C. Find its mean temperature rise when its resistance is 21 ohm and surrounding temperature is 15°C.
- b) By using Kirchhoff's laws, calculate the branch current in the circuit shown below.



- c) State and prove the Maximum Power transfer theorem.
- d) A steel ring having cross-sectional area 12.56 cm² and mean diameter of 100 mm has a coil of 100 turns wound uniformly around it. A magnetic flux of 2 mWb is to be produced in the ring. Calculate
 - i) The current required
 - ii) The relative permeability of steel
 - iii) Inductance of the coil. From the magnetizing curve for steel where H = 5000AT/m for B = 1.6 tesla.
- e) An electric kettle is used to heat 0.5 litre of water from 20°C to the boiling point in 10 minutes, the supply voltage is 230 Volt. The efficiency of the kettle is 80%. Calculate i) the resistance of heating element and ii) The cost of electrical energy consumed at 75 paisa per unit. Assume the specific heat capacity of water is 4190 joule/Kg.K.



- f) Define the following term related with alternating quantity
 - i) Cycle
 - ii) Instantaneous value
 - iii) Frequency
 - iv) Time period.

3. Solve any two.

 $(2 \times 6 = 12)$

a) Determine the electrical energy required to raise the temperature of 80 litres of water by 80°C. If the efficiency of the heater = 89.5%, specific heat capacity of water = 4200 J/kg.K. and mass of one litre of water = 1 Kg.

To what height could a mass of 10 tons be raised with the same expenditure of energy if lifting equipment has an efficiency of 66.5%.

b) Explain the concept of self and mutual inductance.

A flux of 0.6 mWb is produced by a coil of 1000 turns wound on a ring with a current of 5A in it. Calculate,

- i) Self inductance of coil
- ii) Mutual inductance between the coil, if second coil of 600 turns is uniformly wound on first coil.
- c) An alternating current quantity varying sinusoidally with frequency of 50 Hz has RMS value of 20 amps. Write down the equation for the instantaneous value and find instantaneous values after passing through a positive maximum value at
 - i) 0.0025 sec.
 - ii) 0.0125 sec.
 - iii) At what time measured from a positive maximum value, the instantaneous current will be 14.14 A.

SECTION - II

4. Attempt any four.

 $(4 \times 4 = 16)$

- a) Derive the relation between voltage and current for a purely capacitive circuit when ac supply is applied across it.
- b) In series RLC circuit R = $10\,\Omega$, L = 0.25 H, C = $25\,\mu$ F and supply voltage is 230 V, 50 Hz. Calculate total impedance and power in the circuit.
- c) Explain principle of operation, working and construction of single phase transformer.
- d) Explain the working principle of DC motor.



- e) Derive the relation between line and phase voltages and currents in balanced delta connected 3-phase load.
- f) A coil takes a current of 2 A lagging 60 degree behind the applied voltage of 200 V at 50 Hz ac supply. Calculate,
 - i) resistance of coil
 - ii) inductance of coil
 - iii) impedance of coil.

5. Solve any two. (2×6=12)

- a) A 40 KVA single phase transformer has iron loss of 450 W. The full load copper loss is 850 watts. Calculate,
 - i) Efficiency at full load, 0.8 lagging p.f.
 - ii) KVA supplied at maximum efficiency.
 - iii) Maximum efficiency at 0.8 lagging p.f.
- b) Coil of resistance 15 Ω and inductance 0.05 H is connected in parallel with resistance of 20 Ω . If the circuit is connected to 200 V, 50 Hz supply. Determine,
 - i) current in each branch
 - ii) supply current
 - iii) circuit power factor.
- c) The load to a 3 phase supply consists of 3 similar coils connected in star. The line currents are 25 A and KVA and KW inputs are 20 and 11 respectively. Find,
 - i) Phase and line voltages
 - ii) KVAR input
 - iii) Resistance and reactance of each coil.

Set R

Seat	Set	S
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F.E. (Part – I) (CBCS) Examination, 2017 BASIC ELECTRICAL ENGINEERING

Day and Date: Friday, 15-12-2017 Max. Marks: 70

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

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

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

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- Choose the correct answer: (14×1=14)
 If Z₁ = 08 j6 Ω and Y₂ = 08 j6 mho, then the nature of the two circuits are
 - a) 1-capacitive, 2-capacitive
- b) 1-capacitive, 2-inductive
- c) 1-inductive, 2-capacitive
- d) 1-inductive, 2-inductive
- Three identical resistances connected in star consume 4000W. If these three
 resistances are connected in delta across the same supply, the power consumed
 will be
 - a) 4000 W
- b) 6000 W
- c) 8000 W
- d) 12000 W

- 3) Transformer cores are laminated in order to
 - a) Simplify its construction
- b) Minimize eddy current loss

c) Reduce cost

- d) Reduce hysteresis loss
- 4) A transformer having 1000 primary turns is connected to a 250 V a.c. supply. For a secondary voltage of 400 V, the number of secondary turns should be
 - a) 1600
- b) 250
- c) 400
- d) 1250

- 5) The back emf in d.c. Motor
 - a) Opposes the applied voltage
- b) Aids the applied voltage
- c) Aids the armature current
- d) None of these
- 6) While calculating R_{th} constant-current sources in the circuit are
 - a) Replaced by 'opens'
 - b) Replaced by 'shorts'
 - c) Treated in parallel with other voltage sources
 - d) Converted into equivalent voltage sources



7)) If a 220 V heater is used on 110 V supply, consumption of energy will be						
	a) one half	b) twice	c)	one fourth	d)	four times	
8)	Figure shows a part	of closed electrical	circ	cuit. Then $V_A - V_B$	s is,	,	
	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	2V 1Ω —	_	—о В			
	a) -8 V	b) 6 V	c)	10 V	d)	3 V	
9)	Magnetic reluctance	is					
	a) Assistance to ma	gnetic flux	b)	Permeance to m	nagr	netic flux	
	c) Magnetic field str	ength	d)	Opposition to ma	agn	etic flux	
10) Two parallel conductor carries the current in same direction, what k force they will experience?					at kind of mutua		
	a) Force of repulsio	n	b)	Force of attraction	on		
	c) Force of attractio	n and attraction	d)	None of these			
11)	Frequency of an a.c.	quantity is defined	as				
	a) rev./sec.	b) sec./rev.	c)	cycles/rev.	d)	cycles/sec.	
12)	The RMS value of si	nusoidal 200 V pea	ık to	o peak wave is			
	a) 200 V	b) $\frac{100}{\sqrt{2}}$	c)	$200\sqrt{2}$	d)	100 V	
13)	In a purely inductive	circuit power factor	is				
	a) zero lagging	b) unity	c)	zero leading	d)	none of these	
14)	Admittance is recipro	ocal of					
	a) Resistance	b) Impedance	c)	Reactance	d)	Voltage	



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F.E. (Part – I) (CBCS) Examination, 2017 BASIC ELECTRICAL ENGINEERING

Day and Date: Friday, 15-12-2017 Marks: 56

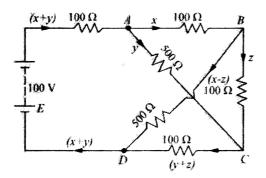
Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four.

 $(4 \times 4 = 16)$

- a) A coil has a resistance of 18 ohm when its mean temperature is 20°C & of 20 ohm when its temperature is 50°C. Find its mean temperature rise when its resistance is 21 ohm and surrounding temperature is 15°C.
- b) By using Kirchhoff's laws, calculate the branch current in the circuit shown below.



- c) State and prove the Maximum Power transfer theorem.
- d) A steel ring having cross-sectional area 12.56 cm² and mean diameter of 100 mm has a coil of 100 turns wound uniformly around it. A magnetic flux of 2 mWb is to be produced in the ring. Calculate
 - i) The current required
 - ii) The relative permeability of steel
 - iii) Inductance of the coil. From the magnetizing curve for steel where H = 5000AT/m for B = 1.6 tesla.
- e) An electric kettle is used to heat 0.5 litre of water from 20°C to the boiling point in 10 minutes, the supply voltage is 230 Volt. The efficiency of the kettle is 80%. Calculate i) the resistance of heating element and ii) The cost of electrical energy consumed at 75 paisa per unit. Assume the specific heat capacity of water is 4190 joule/Kg.K.



- f) Define the following term related with alternating quantity
 - i) Cycle
 - ii) Instantaneous value
 - iii) Frequency
 - iv) Time period.

3. Solve any two.

 $(2 \times 6 = 12)$

a) Determine the electrical energy required to raise the temperature of 80 litres of water by 80°C. If the efficiency of the heater = 89.5%, specific heat capacity of water = 4200 J/kg.K. and mass of one litre of water = 1 Kg.

To what height could a mass of 10 tons be raised with the same expenditure of energy if lifting equipment has an efficiency of 66.5%.

b) Explain the concept of self and mutual inductance.

A flux of 0.6 mWb is produced by a coil of 1000 turns wound on a ring with a current of 5A in it. Calculate,

- i) Self inductance of coil
- ii) Mutual inductance between the coil, if second coil of 600 turns is uniformly wound on first coil.
- c) An alternating current quantity varying sinusoidally with frequency of 50 Hz has RMS value of 20 amps. Write down the equation for the instantaneous value and find instantaneous values after passing through a positive maximum value at
 - i) 0.0025 sec.
 - ii) 0.0125 sec.
 - iii) At what time measured from a positive maximum value, the instantaneous current will be 14.14 A.

SECTION - II

4. Attempt any four.

 $(4 \times 4 = 16)$

- a) Derive the relation between voltage and current for a purely capacitive circuit when ac supply is applied across it.
- b) In series RLC circuit R = $10\,\Omega$, L = 0.25 H, C = $25\,\mu$ F and supply voltage is 230 V, 50 Hz. Calculate total impedance and power in the circuit.
- c) Explain principle of operation, working and construction of single phase transformer.
- d) Explain the working principle of DC motor.



- e) Derive the relation between line and phase voltages and currents in balanced delta connected 3-phase load.
- f) A coil takes a current of 2 A lagging 60 degree behind the applied voltage of 200 V at 50 Hz ac supply. Calculate,
 - i) resistance of coil
 - ii) inductance of coil
 - iii) impedance of coil.

5. Solve any two. (2×6=12)

- a) A 40 KVA single phase transformer has iron loss of 450 W. The full load copper loss is 850 watts. Calculate,
 - i) Efficiency at full load, 0.8 lagging p.f.
 - ii) KVA supplied at maximum efficiency.
 - iii) Maximum efficiency at 0.8 lagging p.f.
- b) Coil of resistance 15 Ω and inductance 0.05 H is connected in parallel with resistance of 20 Ω . If the circuit is connected to 200 V, 50 Hz supply. Determine,
 - i) current in each branch
 - ii) supply current
 - iii) circuit power factor.
- c) The load to a 3 phase supply consists of 3 similar coils connected in star. The line currents are 25 A and KVA and KW inputs are 20 and 11 respectively. Find,
 - i) Phase and line voltages
 - ii) KVAR input
 - iii) Resistance and reactance of each coil.

Set S

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F.E. (Part – I) (CBCS) Examination, 2017 BASIC MECHANICAL ENGINEERING

Day and Date: Monday, 18-12-2017 Total Marks: 70

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

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

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) **All** questions are **compulsory**.
- 4) Q. 2 and Q. 4 are short answer type questions.
- 5) Q. 3 and Q. 5 are long answer type questions.
- 6) Neat diagram must be drawn wherever necessary.
- 7) Figures to the **right** indicate **full** marks.
- 8) Make suitable assumption **if necessary** and mention them **clearly**.
- 9) **Use** of log tables and non-programmable **single** memory calculator is **allowed**.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct alternatives:
 - 1) It is impossible to construct a device which operating in a cycle will produce no effect other than the transfer of heat from a colder body to hotter body.
 - a) Kelvin plank law

b) Clausius law

c) Carnot theorem

- d) None
- 2) A centrifugal fan forms
 - a) Closed system

b) Open system

c) Isolated system

d) None of above

- 3) A perfect gas obeys
 - a) Charles law

b) Boyle's law

c) Both a) and b)

d) None

SLR-TJ-4



4)	-	of a substance	equired to raise the temperature b) By unit degree of a unit mass d) None of the above				
5)	The devices, pumps, compressor, refrigerators, air conditioners which require input energy for their operation are called						
	a) Power absorbingc) Power transferring	=			ng d	evices	
6)	a) 5 kg/cm ² to 10 kg/cm ²	kg/cm ²	rmal power plants are b) 50 kg/cm² to 100 kg/cm² d) 200 kg/cm² to 215 kg/cm²				
7)	In a thermal power a) Chimney c) Economizer	plant, heat from th	b)	ue gases is reco De-super heate Condenser		red in	
8)	Theoretically, for sar power as compared a) Half	•	le e	•		should develop Four times	
9)	Flywheel used in twengine is	•	,		•		
	a) Heavierc) Same in weight		-	Lighter None of the abo	ove		
10)	Idler pulley is used a) Maintaining belt		h)	Changing direc	tion	of rotation	
	c) Stopping motion			Changing direction of rotation All of the above			
11)	When a material is	heated, its toughn	ess	3			
	a) Increases		,	Decreases			
	c) Remains same		•	None of the abo			
12)	Property of a mater loads, is known as				du	e to high impact	
	a) Elasticity	b) Plasticity	c)	Ductility	d)	Toughness	
13)	Which of the follow a) Head stock	ing is a sliding par b) Tail stock		the lathe ? Both a) and b)	d)	None of these	
14)	Material used for co a) Protective layer	-		is called Slag	d)	Flux	



Seat	
No.	

F.E. (Part – I) (CBCS) Examination, 2017 BASIC MECHANICAL ENGINEERING

Day and Date: Monday, 18-12-2017 Marks: 56

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

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

- 2) Q. 2 and Q. 4 are short answer type questions.
- 3) Q. 3 and Q. 5 are long answer type questions.
- 4) Neat diagram must be drawn whenever necessary.
- 5) Figures to the **right** indicate **full** marks.
- 6) Make suitable assumption **if necessary** and mention them **clearly**.
- 7) **Use** of log tables and non-programmable **single** memory calculator is **allowed**.

SECTION-I

2. Answer any five of the following:

 $(5 \times 3 = 15)$

- a) State and explain "Kelvin-Plank" and "Clausius" statements.
- b) Prove that internal energy is a property of system.
- c) Explain in brief open system. State the type of system for following:
 - 1) Car Engine
 - 2) Domestic refrigerator.
- d) Obtain relation between them C_p , C_v , R and C_p , R, γ .
- e) Distinguish between centrifugal and reciprocating pump.
- f) Explain working of Root blower with neat sketch.
- g) Draw a neat sketch of Nuclear power plant.



- 3. Solve any one out of (a) and (b) and solve any two out of (c) to (f):
 - a) The working fluid, in a steady flow process flows at a rate of 220 Kg/min. The fluid rejects 100 KJ/Sec passing through the system. The condition of the fluid at inlet and outlet are as shown in table below:

Velocity(m/s)		Pressure (bar)	Sp. l.E. (KJ/Kg)	Sp. Vol. (m³/kg)	
Inlet	320	6	2000	0.36	
Outlet	140	1.2	1400	1.3	

Determine the power capacity of the system in KW. The change in potential energy can be neglected.

- b) Explain the working of hydro electric power plant with block diagram. 5
- c) 0.5 kg of air is compressed adiabatically from 160 kpa pressure and 60°C temperature to 0.8 MPa pressure. It is then expanded at constant pressure to reach its original volume. Find gross heat transfer and work transfer. Take $C_v = 0.714 \text{ KJ/kg-K}.C_p = 1.005 \text{ KJ/Kg-K}.$
- d) Explain working of impulse type water turbine.
- e) What are the functions of following unit in thermal power plant?
 - i) Condenser
 - ii) Economizer
 - iii) Cooling toweriv
 - iv) Air preheater.
 - f) In a non-flow reversible process the pressure and volume are related by $P = V^2 + (10/V)$ (Where P is in KN/m² and V is in m³). During the process volume changes from 1.2 m³ to 4.5 m³. The heat added during the process is 10 MJ. Find change in internal energy during process.

4

5

4



SECTION - II

4. Answer **any five** of the following:

 $(5 \times 3 = 15)$

- a) Compare diesel engine and Petrol Engine.
- b) State the advantages and disadvantages of chain drive over belt drive.
- c) Enlist different types of gear and explain worm and worm wheel gear.
- d) What are the different types of design? What are common source of design failure?
- e) Write note on 'aesthetic considerations' in design.
- f) Derive an expression for air standard efficiency of Otto cycle.
- g) Explain with neat sketch brazing process. State its advantages and applications.

	applications.	
5.	Solve any one out of (a) and (b) and solve any two out of (c) to (f):	13
	a) The following data relates to an open belt drive:	
	i) Distance between the two parallel shaft = 4.8 m	
	ii) Diameter of larger pulley = 1.5 m	
	iii) Diameter of smaller pulley = 1.05 m	
	iv) Initial tension in the belt = 3.0 KN	
	v) Mass of belt material = 1.5 kg/m	
	vi) Coefficient of friction between the belt and pulley = 0.3	
	vii) Speed of smaller pulley = 400 rpm	
	Calculate power transmitted.	5
	b) Sketch and describe in brief pillar drilling machine.	5
	c) In an SI engine working on the ideal Otto cycle, the compression rate. The pressure and temperature at the beginning of compression are 127°C respectively. The maximum pressure in cycle is 30 bar. Deter pressure, temperature at the salient points and air standard efficier.	l bar and rmine
	d) Explain the different modes of failure of mechanical components.	4
	e) Differentiate between soldering and brazing.	4
	 f) List various types of operations performed on lathe machine and ex turning and facing operation in detail. 	xplain 4

Seat No.		Set	Q
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F.E. (Part – I) (CBCS) Examination, 2017 BASIC MECHANICAL ENGINEERING

Day and Date: Monday, 18-12-2017 Total Marks: 70

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

- Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
 - 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
 - 3) **All** questions are **compulsory**.
 - 4) Q. 2 and Q. 4 are short answer type questions.
 - 5) Q. 3 and Q. 5 are long answer type questions.
 - 6) Neat diagram must be drawn wherever necessary.
 - 7) Figures to the **right** indicate **full** marks.
 - 8) Make suitable assumption **if necessary** and mention them **clearly**.
 - 9) **Use** of log tables and non-programmable **single** memory calculator is **allowed**.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct alternatives:
 - Theoretically, for same swept volume a four stroke cycle engine should develop power as compared to two stroke cycle engine is
 - a) Half
- b) Double
- c) Same
- d) Four times
- 2) Flywheel used in two stroke cycle engine as compared to four stroke cycle engine is
 - a) Heavier

b) Lighter

c) Same in weight

d) None of the above

- 3) Idler pulley is used for
 - a) Maintaining belt tension
- b) Changing direction of rotation
- c) Stopping motion completely
- d) All of the above



4)	When a material is heated, its toughness						
	a) Increases		b)	Decreases			
	c) Remains same		d)	None of the abo	ove		
5)	Property of a mate loads, is known as	rial, which enables	it t	o resist fracture	du	e to high impact	
	a) Elasticity	b) Plasticity	c)	Ductility	d)	Toughness	
6)	Which of the follow	ring is a sliding par	t of	the lathe?			
	a) Head stock	b) Tail stock	c)	Both a) and b)	d)	None of these	
7)	Material used for co	oating the electrod	les	is called			
	a) Protective layer	b) Binder	c)	Slag	d)	Flux	
8)	It is impossible to cono effect other than				•	-	
	a) Kelvin plank law	I	b)	Clausius law			
	c) Carnot theorem		d)	None			
9)	A centrifugal fan fo	rms					
	a) Closed system		b)	Open system			
	c) Isolated system	1	d)	None of above			
10)	A perfect gas obey	s					
	a) Charles law		b)	Boyle's law			
	c) Both a) and b)		d)	None			
11)	Specific heat is the	amount of heat re	qui	red to raise the t	em	perature	
	a) By unit degree of		-	By unit degree		a unit mass	
	c) Of a unit mass t	oy 10°	d)	None of the abo	ove		
12)	The devices, pumps input energy for the				one	ers which require	
	a) Power absorbin	g devices	b)	Power producir	ng d	levices	
	c) Power transferr	ing devices	d)	None			
13)) Steam pressures usually used in thermal power plants are						
	a) 5 kg/cm ² to 10 l	•	,	50 kg/cm ² to 10		•	
	c) 110 kg/cm ² to 1	70 kg/cm ²	d)	200 kg/cm ² to 2	215	kg/cm ²	
14)	In a thermal power	plant, heat from th	ne fl	ue gases is rec	ove	red in	
	a) Chimney		•	De-super heate	er		
	c) Economizer		d)	Condenser			



Seat	
No.	

F.E. (Part – I) (CBCS) Examination, 2017 BASIC MECHANICAL ENGINEERING

Day and Date: Monday, 18-12-2017 Marks: 56

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

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

- 2) Q. 2 and Q. 4 are short answer type questions.
- 3) Q. 3 and Q. 5 are long answer type questions.
- 4) Neat diagram must be drawn whenever necessary.
- 5) Figures to the **right** indicate **full** marks.
- 6) Make suitable assumption **if necessary** and mention them **clearly**.
- 7) **Use** of log tables and non-programmable **single** memory calculator is **allowed**.

SECTION-I

2. Answer any five of the following:

 $(5 \times 3 = 15)$

- a) State and explain "Kelvin-Plank" and "Clausius" statements.
- b) Prove that internal energy is a property of system.
- c) Explain in brief open system. State the type of system for following:
 - 1) Car Engine
 - 2) Domestic refrigerator.
- d) Obtain relation between them C_p , C_v , R and C_p , R, γ .
- e) Distinguish between centrifugal and reciprocating pump.
- f) Explain working of Root blower with neat sketch.
- g) Draw a neat sketch of Nuclear power plant.



5

4

4

- 3. Solve any one out of (a) and (b) and solve any two out of (c) to (f):
 - a) The working fluid, in a steady flow process flows at a rate of 220 Kg/min. The fluid rejects 100 KJ/Sec passing through the system. The condition of the fluid at inlet and outlet are as shown in table below:

	Velocity(m/s)	Pressure (bar)	Sp. I.E. (KJ/Kg)	Sp. Vol. (m³/kg)
Inlet	320	6	2000	0.36
Outlet	140	1.2	1400	1.3

Determine the power capacity of the system in KW. The change in potential energy can be neglected.

- b) Explain the working of hydro electric power plant with block diagram. 5
- c) 0.5 kg of air is compressed adiabatically from 160 kpa pressure and 60°C temperature to 0.8 MPa pressure. It is then expanded at constant pressure to reach its original volume. Find gross heat transfer and work transfer. Take $C_v = 0.714 \text{ KJ/kg-K.C}_p = 1.005 \text{ KJ/Kg-K}$.
- d) Explain working of impulse type water turbine.
- e) What are the functions of following unit in thermal power plant?
 - i) Condenser
 - ii) Economizer
 - iii) Cooling toweriv
 - iv) Air preheater.
 - f) In a non-flow reversible process the pressure and volume are related by $P = V^2 + (10/V)$ (Where P is in KN/m² and V is in m³). During the process volume changes from 1.2 m³ to 4.5 m³. The heat added during the process is 10 MJ. Find change in internal energy during process.



SECTION - II

4. Answer **any five** of the following:

 $(5 \times 3 = 15)$

a) Compare diesel engine and Petrol Engine.

turning and facing operation in detail.

- b) State the advantages and disadvantages of chain drive over belt drive.
- c) Enlist different types of gear and explain worm and worm wheel gear.
- d) What are the different types of design? What are common source of design failure?
- e) Write note on 'aesthetic considerations' in design.
- f) Derive an expression for air standard efficiency of Otto cycle.
- g) Explain with neat sketch brazing process. State its advantages and applications.

applications.	
5. Solve any one out of (a) and (b) and solve any two out of (c) to (f):	13
a) The following data relates to an open belt drive :	
i) Distance between the two parallel shaft = 4.8 m	
ii) Diameter of larger pulley = 1.5 m	
iii) Diameter of smaller pulley = 1.05 m	
iv) Initial tension in the belt = 3.0 KN	
v) Mass of belt material = 1.5 kg/m	
vi) Coefficient of friction between the belt and pulley = 0.3	
vii) Speed of smaller pulley = 400 rpm	
Calculate power transmitted.	5
b) Sketch and describe in brief pillar drilling machine.	5
c) In an SI engine working on the ideal Otto cycle, the compression ratio is 5.5. The pressure and temperature at the beginning of compression are 1 bar and 27°C respectively. The maximum pressure in cycle is 30 bar. Determine pressure, temperature at the salient points and air standard efficiency.	4
d) Explain the different modes of failure of mechanical components.	4
e) Differentiate between soldering and brazing.	4
f) List various types of operations performed on lathe machine and explain	

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F.E. (Part – I) (CBCS) Examination, 2017 BASIC MECHANICAL ENGINEERING

Day and Date: Monday, 18-12-2017 Total Marks: 70

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

- Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
 - 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
 - 3) All questions are compulsory.
 - 4) Q. 2 and Q. 4 are short answer type questions.
 - 5) Q. 3 and Q. 5 are long answer type questions.
 - 6) Neat diagram must be drawn wherever necessary.
 - 7) Figures to the **right** indicate **full** marks.
 - 8) Make suitable assumption if necessary and mention them clearly.
 - 9) **Use** of log tables and non-programmable **single** memory calculator is allowed.

MCO/Objective Type Overticas

IVICQ/ODJectiv	ve Type Questions	
Ouration: 30 Minutes	Marks:	14
1. Choose the correct alternatives :		
 The devices, pumps, compressor, input energy for their operation are 	refrigerators, air conditioners which require e called	
a) Power absorbing devicesc) Power transferring devices	b) Power producing devicesd) None	
 Steam pressures usually used in tale a) 5 kg/cm² to 10 kg/cm² c) 110 kg/cm² to 170 kg/cm² 	thermal power plants are b) 50 kg/cm ² to 100 kg/cm ² d) 200 kg/cm ² to 215 kg/cm ²	

- 3) In a thermal power plant, heat from the flue gases is recovered in
- a) Chimney b) De-super heater
 - c) Economizer d) Condenser



4)	Theoretically, for same swept volume a four stroke cycle engine should develop power as compared to two stroke cycle engine is					
	a) Half	b) Double	c)	Same	d)	Four times
5)	Flywheel used in twengine is	vo stroke cycle en	gin	e as compared	to fo	our stroke cycle
	a) Heavier			Lighter		
	c) Same in weight		d)	None of the abo	ove	
6)	Idler pulley is used				_	
	a) Maintaining beltc) Stopping motion		-	Changing direct All of the above		of rotation
7)	When a material is	heated, its toughn	ess	;		
,	a) Increases		b)	Decreases		
	c) Remains same		d)	None of the abo	ove	
8)	Property of a mater loads, is known as	rial, which enables	it t	o resist fracture	du	e to high impact
	a) Elasticity	b) Plasticity	c)	Ductility	d)	Toughness
9)	Which of the follow	ing is a sliding par	t of	the lathe?		
	a) Head stock	b) Tail stock	c)	Both a) and b)	d)	None of these
10)	Material used for co	=				
	a) Protective layer	b) Binder	c)	Slag	d)	Flux
11)	It is impossible to c no effect other than	n the transfer of he	at f	rom a colder bo	•	•
	a) Kelvin plank law	1	,	Clausius law		
\	c) Carnot theorem		a)	None		
12)	A centrifugal fan fo	rms	L۱	On on overteen		
	a) Closed systemc) Isolated system		-	Open system None of above		
12\			u)	None of above		
13)	A perfect gas obey a) Charles law	5	h)	Boyle's law		
	c) Both a) and b)		•	None		
14)	Specific heat is the	amount of heat re	•		em	perature
- ',	a) By unit degree of			By unit degree		
	c) Of a unit mass k		-	None of the abo		



Seat	
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F.E. (Part – I) (CBCS) Examination, 2017 BASIC MECHANICAL ENGINEERING

Day and Date: Monday, 18-12-2017 Marks: 56

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

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

- 2) Q. 2 and Q. 4 are short answer type questions.
- 3) Q. 3 and Q. 5 are long answer type questions.
- 4) Neat diagram must be drawn whenever necessary.
- 5) Figures to the **right** indicate **full** marks.
- 6) Make suitable assumption **if necessary** and mention them **clearly**.
- 7) **Use** of log tables and non-programmable **single** memory calculator is **allowed**.

SECTION-I

2. Answer any five of the following:

 $(5 \times 3 = 15)$

- a) State and explain "Kelvin-Plank" and "Clausius" statements.
- b) Prove that internal energy is a property of system.
- c) Explain in brief open system. State the type of system for following:
 - 1) Car Engine
 - 2) Domestic refrigerator.
- d) Obtain relation between them C_p , C_v , R and C_p , R, γ .
- e) Distinguish between centrifugal and reciprocating pump.
- f) Explain working of Root blower with neat sketch.
- g) Draw a neat sketch of Nuclear power plant.



5

4

4

- 3. Solve **any one** out of **(a)** and **(b)** and solve **any two** out of **(c)** to **(f)**:
 - a) The working fluid, in a steady flow process flows at a rate of 220 Kg/min. The fluid rejects 100 KJ/Sec passing through the system. The condition of the fluid at inlet and outlet are as shown in table below:

	Velocity(m/s)	Pressure (bar)	Sp. I.E. (KJ/Kg)	Sp. Vol. (m³/kg)
Inlet	320	6	2000	0.36
Outlet	140	1.2	1400	1.3

Determine the power capacity of the system in KW. The change in potential energy can be neglected.

- b) Explain the working of hydro electric power plant with block diagram. 5
- c) 0.5 kg of air is compressed adiabatically from 160 kpa pressure and 60°C temperature to 0.8 MPa pressure. It is then expanded at constant pressure to reach its original volume. Find gross heat transfer and work transfer. Take $C_v = 0.714 \text{ KJ/kg-K.C}_p = 1.005 \text{ KJ/Kg-K}$.
- d) Explain working of impulse type water turbine.
- e) What are the functions of following unit in thermal power plant?
 - i) Condenser
 - ii) Economizer
 - iii) Cooling toweriv
 - iv) Air preheater.
 - f) In a non-flow reversible process the pressure and volume are related by $P = V^2 + (10/V)$ (Where P is in KN/m² and V is in m³). During the process volume changes from 1.2 m³ to 4.5 m³. The heat added during the process is 10 MJ. Find change in internal energy during process.



SECTION - II

4. Answer any five of the following:

 $(5 \times 3 = 15)$

- a) Compare diesel engine and Petrol Engine.
- b) State the advantages and disadvantages of chain drive over belt drive.
- c) Enlist different types of gear and explain worm and worm wheel gear.
- d) What are the different types of design? What are common source of design failure?
- e) Write note on 'aesthetic considerations' in design.
- f) Derive an expression for air standard efficiency of Otto cycle.
- g) Explain with neat sketch brazing process. State its advantages and

	applications.		
5.	Solve any one out of (a) and (b) and solve any two out of	of (c) to (f):	13
	a) The following data relates to an open belt drive:		
	i) Distance between the two parallel shaft	= 4.8 m	
	ii) Diameter of larger pulley	= 1.5 m	
	iii) Diameter of smaller pulley	= 1.05 m	
	iv) Initial tension in the belt	= 3.0 KN	
	v) Mass of belt material	= 1.5 kg/m	
	vi) Coefficient of friction between the belt and pulley	= 0.3	
	vii) Speed of smaller pulley	= 400 rpm	
	Calculate power transmitted.		5
	b) Sketch and describe in brief pillar drilling machine.		5
	c) In an SI engine working on the ideal Otto cycle, the co The pressure and temperature at the beginning of com 27°C respectively. The maximum pressure in cycle is pressure, temperature at the salient points and air sta	oression are 1 bar and 30 bar. Determine	4
	d) Explain the different modes of failure of mechanical co	mponents.	4
	e) Differentiate between soldering and brazing.		4
	f) List various types of operations performed on lathe maturning and facing operation in detail.	achine and explain	4

F.E. (Part – I) (CBCS) Examination, 2017 BASIC MECHANICAL ENGINEERING

Day and Date: Monday, 18-12-2017 Total Marks: 70

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

- Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
 - 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
 - 3) **All** questions are **compulsory**.
 - 4) Q. 2 and Q. 4 are short answer type questions.
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 - 6) Neat diagram must be drawn wherever necessary.
 - 7) Figures to the **right** indicate **full** marks.
 - 8) Make suitable assumption **if necessary** and mention them **clearly**.
 - 9) **Use** of log tables and non-programmable **single** memory calculator is **allowed**.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct alternatives:
 - 1) Idler pulley is used for
 - a) Maintaining belt tension
- b) Changing direction of rotation
- c) Stopping motion completely
- d) All of the above
- 2) When a material is heated, its toughness
 - a) Increases

b) Decreases

c) Remains same

- d) None of the above
- 3) Property of a material, which enables it to resist fracture due to high impact loads, is known as
 - a) Elasticity
- b) Plasticity
- c) Ductility
- d) Toughness



4)	Which of the following is a sliding parta) Head stock b) Tail stock		the lathe? Both a) and b)	d)	None of these	
5)	Material used for coating the electrod a) Protective layer b) Binder		is called Slag	d)	Flux	
6)	It is impossible to construct a device of no effect other than the transfer of heat a) Kelvin plank law c) Carnot theorem	at f b)	•	•	•	
·	A centrifugal fan forms a) Closed system c) Isolated system		Open system None of above			
8)	A perfect gas obeysa) Charles lawc) Both a) and b)	,	Boyle's law None			
9)	Specific heat is the amount of heat red a) By unit degree of a substance c) Of a unit mass by 10°	b)	red to raise the to By unit degree None of the abo	of a		
10)	The devices, pumps, compressor, refri input energy for their operation are cal a) Power absorbing devices c) Power transferring devices	led b)			•	
11)	Steam pressures usually used in there a) 5 kg/cm ² to 10 kg/cm ² c) 110 kg/cm ² to 170 kg/cm ²	b)	l power plants ar 50 kg/cm ² to 10 200 kg/cm ² to 2)O k	•	
12)	In a thermal power plant, heat from tha) Chimney c) Economizer	b)	ue gases is reco De-super heate Condenser		red in	
13)	Theoretically, for same swept volume a power as compared to two stroke cyca) Half b) Double	le e			e should develop Four times	
14)	Flywheel used in two stroke cycle energine is		·	o fo	our stroke cycle	
	a) Heavierc) Same in weight		Lighter None of the abo	ve	Se	t S



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F.E. (Part – I) (CBCS) Examination, 2017 BASIC MECHANICAL ENGINEERING

Day and Date: Monday, 18-12-2017 Marks: 56

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

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

- 2) Q. 2 and Q. 4 are short answer type questions.
- 3) Q. 3 and Q. 5 are long answer type questions.
- 4) Neat diagram must be drawn whenever necessary.
- 5) Figures to the **right** indicate **full** marks.
- 6) Make suitable assumption **if necessary** and mention them **clearly**.
- 7) **Use** of log tables and non-programmable **single** memory calculator is **allowed**.

SECTION-I

2. Answer any five of the following:

 $(5 \times 3 = 15)$

- a) State and explain "Kelvin-Plank" and "Clausius" statements.
- b) Prove that internal energy is a property of system.
- c) Explain in brief open system. State the type of system for following:
 - 1) Car Engine
 - 2) Domestic refrigerator.
- d) Obtain relation between them C_p , C_v , R and C_p , R, γ .
- e) Distinguish between centrifugal and reciprocating pump.
- f) Explain working of Root blower with neat sketch.
- g) Draw a neat sketch of Nuclear power plant.



5

4

- 3. Solve **any one** out of **(a)** and **(b)** and solve **any two** out of **(c)** to **(f)**:
 - a) The working fluid, in a steady flow process flows at a rate of 220 Kg/min. The fluid rejects 100 KJ/Sec passing through the system. The condition of the fluid at inlet and outlet are as shown in table below:

	Velocity(m/s)	Pressure (bar)	Sp. I.E. (KJ/Kg)	Sp. Vol. (m³/kg)
Inlet	320	6	2000	0.36
Outlet	140	1.2	1400	1.3

Determine the power capacity of the system in KW. The change in potential energy can be neglected.

- b) Explain the working of hydro electric power plant with block diagram. 5
- c) 0.5 kg of air is compressed adiabatically from 160 kpa pressure and 60°C temperature to 0.8 MPa pressure. It is then expanded at constant pressure to reach its original volume. Find gross heat transfer and work transfer. Take $C_v = 0.714 \text{ KJ/kg-K.C}_p = 1.005 \text{ KJ/Kg-K}$.
- d) Explain working of impulse type water turbine.
- e) What are the functions of following unit in thermal power plant?
 - i) Condenser
 - ii) Economizer
 - iii) Cooling toweriv
 - iv) Air preheater.
 - f) In a non-flow reversible process the pressure and volume are related by $P = V^2 + (10/V)$ (Where P is in KN/m² and V is in m³). During the process volume changes from 1.2 m³ to 4.5 m³. The heat added during the process is 10 MJ. Find change in internal energy during process.



SECTION - II

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

- a) Compare diesel engine and Petrol Engine.
- b) State the advantages and disadvantages of chain drive over belt drive.
- c) Enlist different types of gear and explain worm and worm wheel gear.
- d) What are the different types of design? What are common source of design failure?
- e) Write note on 'aesthetic considerations' in design.
- f) Derive an expression for air standard efficiency of Otto cycle.
- g) Explain with neat sketch brazing process. State its advantages and applications.

	applications.		
5.	Solve any one out of (a) and (b) and solve any two out or	f (c) to (f):	13
	a) The following data relates to an open belt drive:		
	i) Distance between the two parallel shaft	= 4.8 m	
	ii) Diameter of larger pulley	= 1.5 m	
	iii) Diameter of smaller pulley	= 1.05 m	
	iv) Initial tension in the belt	= 3.0 KN	
	v) Mass of belt material	= 1.5 kg/m	
	vi) Coefficient of friction between the belt and pulley	= 0.3	
	vii) Speed of smaller pulley	= 400 rpm	
	Calculate power transmitted.		5
	b) Sketch and describe in brief pillar drilling machine.		5
	c) In an SI engine working on the ideal Otto cycle, the cor The pressure and temperature at the beginning of comp 27°C respectively. The maximum pressure in cycle is pressure, temperature at the salient points and air star	oression are 1 bar and 30 bar. Determine	4
	d) Explain the different modes of failure of mechanical co	mponents.	4
	e) Differentiate between soldering and brazing.		4
	f) List various types of operations performed on lathe maturning and facing operation in detail.	chine and explain	4

Seat No.		Set	Р
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F.E. (Part – I) (CBCS) Examination, 2017 ENGINEERING PHYSICS

Day and Date: Wednesday, 20-12-2017 Max. Marks: 70

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

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

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Make suitable assumptions, **if** necessary.
- 4) Figures to the **right** indicate **full** marks.

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	t answer :		
	1) Donor type sen	niconductor is form	ed by adding impu	rity of valency
	a) 3	b) 4	c) 5	d) 6
	2) The co-ordinati	on number in case	of BCC structure i	S
	a) 12	b) 6	c) 4	d) 8
	3) The Miller indic	es of the plane par	allel to x and y axe	es are
	a) (1 0 0)	b) (0 1 0)	c) (0 0 1)	d) (1 1 1)
	4) The audible rar	nge of frequency is		
	a) 20 Hz to 20	KHz	b) 200 KHz to	200 MHz

- 5) Optimum reverberation time for music is
 - a) 0.5 to 1 second
 - b) 0 to 1 second

c) 1 to 2 second

c) 20 KHz to 20 MHz

d) Above 5 second

d) 200 Hz to 200 MHz

 $(14 \times 1 = 14)$



6)	At velocities which are com	parable to velocity of light,	ity of light, the mass of the moving	
	object appears to be	_ than at rest.		

a) Less

b) Greater

c) Remains same

- d) None of these
- 7) Time dilation equation is given by
 - a) $t = to/\sqrt{1 v^2/c^2}$

b) $t = to/\sqrt{1 + v^2/c^2}$

c) $t = to/(1 - v^2/c^2)$

d) $t = to/\sqrt{1 - c^2/v^2}$

SECTION - II

- 8) In Fraunhoffer diffraction, the source and screen are
 - a) at an infinite distance from the obstacle
 - b) at finite distances from the obstacle
 - c) source at a finite distance and screen at an infinite distance from the obstacle
 - d) source at an infinite distance and screen at a finite distance from the obstacle
- 9) The velocities of E-ray and O-ray are same in a direction
 - a) parallel to optic axis
 - b) perpendicular to optic axis
 - c) making an angle 45° with optic axis
 - d) making any angle with optic axis
- 10) Spontaneous Emission 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) LASER beam is
 - a) highly directional

b) highly intense

c) monochromatic

- d) all of these
- 12) The diameter of cladding is nearly
 - a) 5 μ m to 100 μ m

b) 125 μm

c) 250 µm

- d) $500 \mu m$
- 13) The chain reaction becomes supercritical when the effective multiplication factors K
 - a) K = 1
- b) K > 1
- c) K < 1
- d) K = 0

- 14) The chirality of Zigzag CNT is
 - a) (a, 0)
- b) (a, a)
- c) (a, b)
- d) (0, b)

Marks: 56



Seat	
No.	

F.E. (Part – I) (CBCS) Examination, 2017 ENGINEERING PHYSICS

Day and Date: Wednesday, 20-12-2017

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

Instructions: 1) Make suitable assumptions, *if* necessary.

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

Constants: 1) Avogadro's no. $N = 6.02 \times 10^{26}$ /kmmol.

2) Velocity of light, $c = 3 \times 10^8$ m/sec.

3) Charge of electron, $e = 1.6 \times 10^{-19}$ C.

SECTION - I

2. Attempt any five of the following:

15

- a) With energy band diagram, explain classification of solids.
- b) Define
 - i) Unit cell,
 - ii) Co-ordination number and
 - iii) Atomic packing fraction.
- c) What are miller indices? How they are determined?
- d) State applications of ultrasonic waves.
- e) Explain Bragg's law in X-ray diffraction.
- f) The volume of a hall is 475 m³. The area of wall is 200 m², area of floor and ceiling each is 100 m². If absorption coefficient of the wall, ceiling and floor are 0.025, 0.02 and 0.55 respectively. Calculate the reverberation time for the hall.
- g) At what speed the mass of an object will be double of its value at rest.
- 3. State Hall effect. Derive an expression for Hall voltage and Hall coefficient.

5

OR

Deduce an expression for Lorentz transformations for space and time co-ordinates.

- 4. Attempt **any two** of the following:
 - a) Explain effect of increase of impurity concentration on fermi level of N type semiconductor.
 - b) Explain any four factors affecting architectural acoustics and their remedies.
 - c) Define axis of symmetry. Explain it for cubic crystals.
 - d) Derive an expression for Length Contraction in special theory of relativity. Hence explain special cases.

SECTION - II

5. Attempt any five of the following:

15

8

- a) Distinguish between Fresnel and Fraunhoffer class of diffraction.
- b) Explain: Positive and Negative crystals.
- c) Explain with neat diagram
 - i) Spontaneous emission
 - ii) Stimulated emission.
- d) Write in brief applications of nano materials in electronics, energy and cosmetics.
- e) Explain: Carbon Nitrogen cycle.
- f) In an optical fiber the core material has refractive index 1.6 and clad material is 1.3. What is the value of critical angle and acceptance angle?
- g) A parallel beam of sodium light ($\chi = 5890 \, \text{A}^\circ$) is allowed to incident normally on transmission grating. Second order spectral lines are found to be deviated through 30°. Calculate the number of lines/cm on the grating.
- 6. Describe construction and working of He-Ne laser with neat diagrams.

5

OR

Obtain the expression for acceptance angle, NA and fractional refractive index change of an optical fiber.

7. Attempt any two of the following:

8

- a) With neat diagram explain construction and working of Laurent's half shade polarimeter.
- b) Explain the construction and working of semiconductor diode laser with neat diagram.
- c) Explain the main features of the design and working of a nuclear fission reactor.
- d) Write a note on : Classification of optical fibers.

Set P

SLR-TJ – 5

No.	Seat No.		Set (Q
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F.E. (Part – I) (CBCS) Examination, 2017 **ENGINEERING PHYSICS**

Day and Date: Wednesday, 20-12-2017 Max. Marks: 70

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

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

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Make suitable assumptions, if necessary.
- 4) Figures to the **right** indicate **full** marks.

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	The Miller indices of the	plane paralle	I to x and	y axes are

 $(14 \times 1 = 14)$

- - a) (100)
- b) (0 1 0)
- c) (0 0 1)
- d) (1 1 1)

- 2) The audible range of frequency is
 - a) 20 Hz to 20 KHz

1. Choose the correct answer:

b) 200 KHz to 200 MHz

c) 20 KHz to 20 MHz

- d) 200 Hz to 200 MHz
- 3) 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
- 4) At velocities which are comparable to velocity of light, the mass of the moving object appears to be _____ than at rest.
 - a) Less

b) Greater

c) Remains same

- d) None of these
- 5) Time dilation equation is given by
 - a) $t = to/\sqrt{1 v^2/c^2}$

b) $t = to/\sqrt{1 + v^2/c^2}$

c) $t = to/(1 - v^2/c^2)$

d) $t = to/\sqrt{1 - c^2/v^2}$

6) Donor type semiconductor is formed by adding impurity of valency



	a) 3	b) 4	c) 5	d) 6
7)	The co-ordination r	number in case of E	BCC structure is	
·	a) 12	b) 6	c) 4	d) 8
		SECTIO	N – II	
8)	Spontaneous Emis	sion process is ma	thematically repres	sented by equation
	a) $A + h\gamma \rightarrow A^*$		b) $A^* + h \gamma \rightarrow 2h$	γ + A
	c) $A^* \rightarrow A + h \gamma$		d) $A^* + h\gamma \rightarrow A +$	- h γ
9)	LASER beam is			
	a) highly directiona	al	b) highly intense	
	c) monochromatic		d) all of these	
10)	The diameter of cla	dding is nearly		
	a) 5 μm to 100 μn	n	b) 125 μm	
	c) 250 μm		d) 500 μm	
11)	The chain reaction factors K	becomes supercri	tical when the effec	tive multiplication
	a) K = 1	b) K > 1	c) K < 1	d) $K = 0$
12)	The chirality of Zigz	zag CNT is		
	a) (a, 0)	b) (a, a)	c) (a, b)	d) (0, b)
13)	In Fraunhoffer diffra	action, the source	and screen are	
	a) at an infinite dis	tance from the obs	stacle	
	b) at finite distance	es from the obstac	le	
	c) source at a fini- obstacle	te distance and so	creen at an infinite	distance from the
	d) source at an in obstacle	finite distance and	d screen at a finite	distance from the
14)	The velocities of E-	ray and O-ray are	same in a direction	ı
	a) parallel to optic	axis		
	b) perpendicular to	•		
	c) making an angle	•	S	
	d) making any ang	le with optic axis		
				

Marks: 56



Seat	
No.	

F.E. (Part – I) (CBCS) Examination, 2017 ENGINEERING PHYSICS

Day and Date: Wednesday, 20-12-2017

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

Instructions: 1) Make suitable assumptions, **if** necessary.

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

Constants: 1) Avogadro's no. $N = 6.02 \times 10^{26}$ /kmmol.

2) Velocity of light, $c = 3 \times 10^8$ m/sec.

3) Charge of electron, $e = 1.6 \times 10^{-19}$ C.

SECTION - I

2. Attempt any five of the following:

15

- a) With energy band diagram, explain classification of solids.
- b) Define
 - i) Unit cell,
 - ii) Co-ordination number and
 - iii) Atomic packing fraction.
- c) What are miller indices? How they are determined?
- d) State applications of ultrasonic waves.
- e) Explain Bragg's law in X-ray diffraction.
- f) The volume of a hall is 475 m³. The area of wall is 200 m², area of floor and ceiling each is 100 m². If absorption coefficient of the wall, ceiling and floor are 0.025, 0.02 and 0.55 respectively. Calculate the reverberation time for the hall.
- g) At what speed the mass of an object will be double of its value at rest.
- 3. State Hall effect. Derive an expression for Hall voltage and Hall coefficient.

5

OR

Deduce an expression for Lorentz transformations for space and time co-ordinates.

Set Q

- 4. Attempt **any two** of the following:
 - a) Explain effect of increase of impurity concentration on fermi level of N type semiconductor.
 - b) Explain any four factors affecting architectural acoustics and their remedies.
 - c) Define axis of symmetry. Explain it for cubic crystals.
 - d) Derive an expression for Length Contraction in special theory of relativity. Hence explain special cases.

SECTION - II

5. Attempt any five of the following:

15

8

- a) Distinguish between Fresnel and Fraunhoffer class of diffraction.
- b) Explain: Positive and Negative crystals.
- c) Explain with neat diagram
 - i) Spontaneous emission
 - ii) Stimulated emission.
- d) Write in brief applications of nano materials in electronics, energy and cosmetics.
- e) Explain: Carbon Nitrogen cycle.
- f) In an optical fiber the core material has refractive index 1.6 and clad material is 1.3. What is the value of critical angle and acceptance angle?
- g) A parallel beam of sodium light ($\chi = 5890 \ A^\circ$) is allowed to incident normally on transmission grating. Second order spectral lines are found to be deviated through 30°. Calculate the number of lines/cm on the grating.
- 6. Describe construction and working of He-Ne laser with neat diagrams.

5

OR

Obtain the expression for acceptance angle, NA and fractional refractive index change of an optical fiber.

7. Attempt any two of the following:

8

- a) With neat diagram explain construction and working of Laurent's half shade polarimeter.
- b) Explain the construction and working of semiconductor diode laser with neat diagram.
- c) Explain the main features of the design and working of a nuclear fission reactor.
- d) Write a note on : Classification of optical fibers.

Set Q

SLR-TJ - 5

Seat No.		Set [R
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F.E. (Part – I) (CBCS) Examination, 2017 ENGINEERING PHYSICS

Day and Date: Wednesday, 20-12-2017 Max. Marks: 70

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

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

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Make suitable assumptions, **if** necessary.
- 4) Figures to the right indicate full marks.

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

Choose the correct answer:	(14×1=14)
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- 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) At velocities which are comparable to velocity of light, the mass of the moving object appears to be _____ than at rest.
 - a) Less

b) Greater

c) Remains same

- d) None of these
- 3) Time dilation equation is given by

a)
$$t = to/\sqrt{1 - v^2/c^2}$$

b) $t = to/\sqrt{1 + v^2/c^2}$

c) $t = to/(1 - v^2/c^2)$

- d) $t = to/\sqrt{1 c^2/v^2}$
- 4) The Miller indices of the plane parallel to x and y axes are
 - a) (1 0 0)
- b) (0 1 0)
- c) (001)
- d) (1 1 1)
- 5) Donor type semiconductor is formed by adding impurity of valency
 - a) 3
- b) 4
- c) 5
- d) 6



6)	The co-ordination i	number in case of	BC	C structure is	
	a) 12	b) 6	c)	4	d) 8
7)	The audible range	of frequency is			
	a) 20 Hz to 20 KHz	Z	b)	200 KHz to 200) MHz
	c) 20 KHz to 20 M	Hz	d)	200 Hz to 200 I	MHz
		SECTIO	N -	- II	
8)	The chain reaction factors K	becomes supercri	tica	ll when the effec	tive multiplication
	a) K = 1	b) K > 1	c)	K < 1	d) $K = 0$
9)	The chirality of Zig.	zag CNT is			
	a) (a, 0)	b) (a, a)	c)	(a, b)	d) (0, b)
,	 0) In Fraunhoffer diffraction, the source and screen are a) at an infinite distance from the obstacle b) at finite distances from the obstacle c) source at a finite distance and screen at an infinite distance from the obstacle d) source at an infinite distance and screen at a finite distance from the obstacle 1) The velocities of E-ray and O-ray are same in a direction a) parallel to optic axis b) perpendicular to optic axis 			distance from the	
	c) making an angl	•	is		
10\	d) making any ang		م ملا		
12)	Spontaneous Emis	ssion process is ma		• •	• •
	a) $A + h\gamma \rightarrow A^*$ c) $A^* \rightarrow A + h\gamma$		-	$A^* + h\gamma \rightarrow 2h$	
40\	,		u)	$A^* + h\gamma \rightarrow A +$	- 11 ү
13)	LASER beam is	al.	h)	highly intense	
	a) highly directionac) monochromatic	גו	,	all of these	
14)	The diameter of cla	adding is nearly	u,		
17)	a) 5 μm to 100 μr	•	b)	125 μ m	
	c) 250 μm		,	500 μm	
	•				

Marks: 56



Seat	
No.	

F.E. (Part – I) (CBCS) Examination, 2017 ENGINEERING PHYSICS

Day and Date: Wednesday, 20-12-2017

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

Instructions: 1) Make suitable assumptions, *if* necessary.

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

Constants: 1) Avogadro's no. $N = 6.02 \times 10^{26}$ /kmmol.

2) Velocity of light, $c = 3 \times 10^8$ m/sec.

3) Charge of electron, $e = 1.6 \times 10^{-19}$ C.

SECTION - I

2. Attempt any five of the following:

15

- a) With energy band diagram, explain classification of solids.
- b) Define
 - i) Unit cell,
 - ii) Co-ordination number and
 - iii) Atomic packing fraction.
- c) What are miller indices? How they are determined?
- d) State applications of ultrasonic waves.
- e) Explain Bragg's law in X-ray diffraction.
- f) The volume of a hall is 475 m³. The area of wall is 200 m², area of floor and ceiling each is 100 m². If absorption coefficient of the wall, ceiling and floor are 0.025, 0.02 and 0.55 respectively. Calculate the reverberation time for the hall.
- g) At what speed the mass of an object will be double of its value at rest.
- 3. State Hall effect. Derive an expression for Hall voltage and Hall coefficient.

OR

Deduce an expression for Lorentz transformations for space and time co-ordinates.

Set R

5

- 4. Attempt **any two** of the following:
 - a) Explain effect of increase of impurity concentration on fermi level of N type semiconductor.
 - b) Explain any four factors affecting architectural acoustics and their remedies.
 - c) Define axis of symmetry. Explain it for cubic crystals.
 - d) Derive an expression for Length Contraction in special theory of relativity. Hence explain special cases.

SECTION - II

5. Attempt any five of the following:

15

8

- a) Distinguish between Fresnel and Fraunhoffer class of diffraction.
- b) Explain: Positive and Negative crystals.
- c) Explain with neat diagram
 - i) Spontaneous emission
 - ii) Stimulated emission.
- d) Write in brief applications of nano materials in electronics, energy and cosmetics.
- e) Explain: Carbon Nitrogen cycle.
- f) In an optical fiber the core material has refractive index 1.6 and clad material is 1.3. What is the value of critical angle and acceptance angle?
- g) A parallel beam of sodium light ($\chi = 5890 \ A^\circ$) is allowed to incident normally on transmission grating. Second order spectral lines are found to be deviated through 30°. Calculate the number of lines/cm on the grating.
- 6. Describe construction and working of He-Ne laser with neat diagrams.

5

OR

Obtain the expression for acceptance angle, NA and fractional refractive index change of an optical fiber.

7. Attempt any two of the following:

8

- a) With neat diagram explain construction and working of Laurent's half shade polarimeter.
- b) Explain the construction and working of semiconductor diode laser with neat diagram.
- c) Explain the main features of the design and working of a nuclear fission reactor.
- d) Write a note on : Classification of optical fibers.

Set R

SLR-TJ – 5

Seat	
No.	

Set S

F	- F.E. (Part – I) (CB ENGINEEF	CS) Examination	-	
Day and Date : Wedr Time : 3.00 p.m. to 6	•		Max. Marks :	70
Instructions	in Answer Book 2) Answer MCQ/O	Page No. 3. Each bjective type que mention, Q.P. Se ssumptions, if ne		ζ. /.
Constants:	 Avogadro's no. Velocity of light, Charge of election 	$c = 3 \times 10^8 \text{ m/sec}$		
Duration : 30 Minutes		ve Type Question	ns Marks :	14
Daration . 00 Minutes		STION I	wano.	'-
	SEC	CTION – I		
1. Choose the corre	ect answer :		(14×1=	14)
•	ation number in case			
a) 12	b) 6	c) 4	d) 8	
	dices of the plane pa			
a) (1 0 0)	, , ,	c) (0 0 1)	d) (1 1 1)	
3) The audible and a) 20 Hz to 2 c) 20 KHz to		b) 200 KHz d) 200 Hz to		
4) Optimum rev	verberation time for n	nusic is		
a) 0.5 to 1 se	econd	b) 0 to 1 sec	cond	
c) 1 to 2 sec	ond	d) Above 5	second	
•	which are comparabl ars to be thar		nt, the mass of the moving	
a) Less		b) Greater		
c) Remains	same	d) None of t	nese	



6)	Time dilation equat	ion is given by			
a) $t = to/\sqrt{1 - v^2/4}$			b) t =	$to/\sqrt{1 + v^2/c^2}$	2
	c) $t = to/(1 - v^2/c^2)$		d) t =	$to/\sqrt{1 - c^2/v^2}$	
7)	Donor type semico	nductor is formed	by addi	ng impurity o	of valency
	a) 3	b) 4	c) 5		d) 6
		SECTIO	N – II		
8)	The diameter of cla	dding is nearly			
•,	a) 5 μm to 100 μn	•	b) 12	5 μ m	
	c) 250 μm		d) 500	•	
9)	The chain reaction factors K	becomes supercri	tical wh	en the effect	tive multiplication
		b) K > 1	c) K <	:1	d) $K = 0$
10)	The chirality of Zigz	•	•		,
,	•	b) (a, a)	c) (a,	b)	d) (0, b)
11)	In Fraunhoffer diffra	action. the source	and scr	,	, , ,
,	a) at an infinite dis	•			
	b) at finite distance				
	c) source at a finition			at an infinite	distance from the
	d) source at an in obstacle	finite distance and	d scree	en at a finite	distance from the
12)	The velocities of E-	ray and O-ray are	same i	n a direction	
	a) parallel to optic	axis			
	b) perpendicular to	optic axis			
	c) making an angle	e 45° with optic ax	is		
	d) making any ang	le with optic axis			
13)	Spontaneous Emis	sion process is ma	athemat	tically repres	ented by equation
	a) $A + h\gamma \rightarrow A^*$		b) A*	$+ h\gamma \rightarrow 2h\gamma$	′ + A
	c) $A^* \rightarrow A + h \gamma$		d) A*	$+ h\gamma \rightarrow A +$	hγ
14)	LASER beam is				
	a) highly directiona	al	b) hig	hly intense	
	c) monochromatic		d) all	of these	

Marks: 56



Seat	
No.	

F.E. (Part – I) (CBCS) Examination, 2017 ENGINEERING PHYSICS

Day and Date: Wednesday, 20-12-2017

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

Instructions: 1) Make suitable assumptions, *if* necessary.

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

Constants: 1) Avogadro's no. $N = 6.02 \times 10^{26}$ /kmmol.

2) Velocity of light, $c = 3 \times 10^8$ m/sec.

3) Charge of electron, $e = 1.6 \times 10^{-19}$ C.

SECTION - I

2. Attempt any five of the following:

15

- a) With energy band diagram, explain classification of solids.
- b) Define
 - i) Unit cell,
 - ii) Co-ordination number and
 - iii) Atomic packing fraction.
- c) What are miller indices? How they are determined?
- d) State applications of ultrasonic waves.
- e) Explain Bragg's law in X-ray diffraction.
- f) The volume of a hall is 475 m³. The area of wall is 200 m², area of floor and ceiling each is 100 m². If absorption coefficient of the wall, ceiling and floor are 0.025, 0.02 and 0.55 respectively. Calculate the reverberation time for the hall.
- g) At what speed the mass of an object will be double of its value at rest.
- 3. State Hall effect. Derive an expression for Hall voltage and Hall coefficient.

5

OR

Deduce an expression for Lorentz transformations for space and time co-ordinates.

- 4. Attempt **any two** of the following:
 - a) Explain effect of increase of impurity concentration on fermi level of N type semiconductor.
 - b) Explain any four factors affecting architectural acoustics and their remedies.
 - c) Define axis of symmetry. Explain it for cubic crystals.
 - d) Derive an expression for Length Contraction in special theory of relativity. Hence explain special cases.

SECTION - II

5. Attempt any five of the following:

15

8

- a) Distinguish between Fresnel and Fraunhoffer class of diffraction.
- b) Explain: Positive and Negative crystals.
- c) Explain with neat diagram
 - i) Spontaneous emission
 - ii) Stimulated emission.
- d) Write in brief applications of nano materials in electronics, energy and cosmetics.
- e) Explain: Carbon Nitrogen cycle.
- f) In an optical fiber the core material has refractive index 1.6 and clad material is 1.3. What is the value of critical angle and acceptance angle?
- g) A parallel beam of sodium light ($\chi = 5890 \ A^\circ$) is allowed to incident normally on transmission grating. Second order spectral lines are found to be deviated through 30°. Calculate the number of lines/cm on the grating.
- 6. Describe construction and working of He-Ne laser with neat diagrams.

5

OR

Obtain the expression for acceptance angle, NA and fractional refractive index change of an optical fiber.

7. Attempt any two of the following:

8

- a) With neat diagram explain construction and working of Laurent's half shade polarimeter.
- b) Explain the construction and working of semiconductor diode laser with neat diagram.
- c) Explain the main features of the design and working of a nuclear fission reactor.
- d) Write a note on : Classification of optical fibers.

Set S

	7	
Seat	Set	D
No.	Set	

F.E. (Part – I) (CBCS) Examination, 2017 ENGINEERING CHEMISTRY

Day and Date: Friday, 22-12-2017 Max. Marks: 70

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

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

- 2) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 3) Figures to the **right** indicates **full** marks.
- 4) Draw neat and labelled diagram wherever necessary.
- 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct answer:
 - 1) Permanent hardness of water cannot be removed by
 - a) Adding lime soda

b) Zeolite

c) Boiling

- d) Ion exchange resine
- 2) Machine operating under high temperature and loads are best lubricated by
 - a) Mineral oils

b) Solid lubricants

c) Greases

- d) Animal oils
- 3) A lubricant is used with an object of
 - a) Increasing resistance
 - b) Increasing frictional heat
 - c) Decreasing frictional resistance
 - d) Providing direct contact between rubbing surfaces
- 4) Metal at the top of electrochemical series is
 - a) Most stable
- b) Least active
- c) Most noble
- d) Most active
- 5) Hard water is unfit for use in boilers for steam raising because
 - a) The boiling point is high
 - b) Steam is generated at high pressure
 - c) It leads to scale formation inside the boilers
 - d) Water undergoes decomposition into oxygen and hydrogen

aldehydes and ketones?

b) TGA

14) Highest percentage of carbon is present in

a) GLC

a) Steel

c) Cast iron

c) DTA

b) Wrought iron

d) Both a) and b)

d) None of these



Seat	
No.	

F.E. (Part – I) (CBCS) Examination, 2017 ENGINEERING CHEMISTRY

Day and Date: Friday, 22-12-2017 Marks: 56

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

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

- 2) Figures to the **right** indicates **full** marks.
- 3) Draw neat and labelled diagram wherever necessary.

SECTION-I

2. A) Solve any two:

8

- a) Define corrosion. Explain the mechanism of oxidation corrosion.
- b) Explain the traditional and green pathways for synthesis of Indigo dye.
- c) A sample of water on analysis was found to contain the following impurities in mg/lit. Calculate temporary, permanent and total hardness of water.

Impurities	7 / 1	Amount	Mole Wt
Ca(HCO ₃) ₂		30	162
$Mg(HCO_3)_2^2$		15	146
CaSO ₄ 3 ⁷²		09	136
MgCl ₂		08	95

B) Solve any two:

6

- a) Define Green Chemistry. State any 4 principles of green chemistry.
- b) Explain the EDTA method for estimation of hardness of water.
- c) Explain the weightless method for the measurement of rate of corrosion.

3. A) Solve any two:

8

- a) With the help of suitable diagram explain the zeolite method for softening hard water.
- b) Define lubricant. Write the functions of lubricants.
- c) Explain the Galvanization process for prevention of corrosion.

B) Solve:

6

- a) How will you select the lubricant for
 - i) IC Engine

ii) Gears.

b) 6 gm of an oil after saponification with 40 ml of N/2 alcoholic KOH solution and on subsequent titration with N/2 HCl gave a titre value of 9 ml to phenolphthalein end point. A blank experiment was conducted without taking the oil and on repeating the same procedure gave a titre value of 40 ml. Calculate the saponification value of the oil sample.

Set P

weights.



SECTION - II

		SLOTION-II	
4.	A)	 Solve any two: a) Explain Refining of crude petroleum. b) Explain with block diagram the gas liquid chromatography. c) A sample of coal has following analysis; C = 85%, S = 1.0%, N = 0.3%, H = 8%, O = 5.7%. Find the gross and net calorific value. (Latent heat of steam = 587 cal/gm.) 	8
	B)	 Solve any two: a) Explain properties and applications of FRP. b) Define: i) Degree of polymerization ii) Melting temperature iii) Glass transition temperature. c) What is the weight of MgSO₄ required to prepare 750 ml of 0.5 M and 0.1 N solutions? (Molecular wt of MgSO₄ = 120) 	6
5.	A)	Solve any two : a) Compare between solid, liquid and gaseous fuel. b) Define ceramics. Write the general properties of glass. c) Define plastic. Explain different types of plastics.	8
	B)	 Solve: a) Compare between cast iron and wrought iron. b) Calculate the degree of polymerization of vinyl chloride, if the molecular weight of polymer is 1.31 × 10⁵. (Molecular weight of vinyl chloride = 62.5) OR a) What are conductive polymers? Write its applications. b) A polymer has the following composition 100 molecules of molecular mass 1000; 200 molecules of molecular mass 2000; 500 molecules of molecular mass 5000; Calculate the number average and weight average molecular 	6

Seat No.		Set	Q
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F.E. (Part – I) (CBCS) Examination, 2017 ENGINEERING CHEMISTRY

Day and Date: Friday, 22-12-2017 Max. Marks: 70

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

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

- 2) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 3) Figures to the **right** indicates **full** marks.
- 4) Draw neat and labelled diagram wherever necessary.
- 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct answer:
 - 1) Following is a non-petroleum fuel obtained from transesterification of vegetable/animal oil with alcohol.
 - a) Kerosene
- b) Petrol
- c) Biodiesel
- d) LPG
- 2) Number of moles of solute present in 1 kg of solvent is called
 - a) Normality
- b) Molarity
- c) Molality
- d) Mole fraction

- 3) A good fuel should have
 - a) High moisture content
 - b) Low calorific value
 - c) Moderate ignition temperature
 - d) High velocity of combustion
- 4) Ebonite is
 - a) Polyethylene

b) Highly vulcanized rubber

c) Natural rubber

- d) Synthetic rubber
- 5) Bomb calorimeter is an apparatus which is used to find the gross calorific value of
 - a) Non volatile liquid fuel
- b) Solid fuel

c) Volatile liquid fuel

d) Both a) and b)



6)	Which of the following to aldehydes and ketones		I to analyse the d	lairy products for
			DTA	d) None of these
7)	Highest percentage of c a) Steel c) Cast iron	b)	in Wrought iron Both a) and b)	
8)	Permanent hardness of a) Adding lime soda c) Boiling	b)	removed by Zeolite Ion exchange re	esine
9)	Machine operating under a) Mineral oils c) Greases	b)	ire and loads are Solid lubricants Animal oils	
10)	A lubricant is used with a) Increasing resistance b) Increasing frictional hc) Decreasing frictional d) Providing direct contacts	e neat resistance	bing surfaces	
11)	Metal at the top of electral Most stable b) L			d) Most active
12)	Hard water is unfit for us a) The boiling point is hi b) Steam is generated a c) It leads to scale form d) Water undergoes dec	igh at high pressure lation inside the	boilers	
13)	Tinning is the process of a) Zn b) S	•	th Cu	d) Na
14)	In green synthesis of ad a) Cyclohexane and hyd b) Aniline and hydrogen c) Cyclohexane and nit d) None of these	drogen peroxide peroxide	ctants are	



Seat	
No.	

F.E. (Part – I) (CBCS) Examination, 2017 ENGINEERING CHEMISTRY

Day and Date: Friday, 22-12-2017 Marks: 56

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

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

- 2) Figures to the **right** indicates **full** marks.
- 3) Draw neat and labelled diagram wherever necessary.

SECTION-I

2. A) Solve any two:

8

- a) Define corrosion. Explain the mechanism of oxidation corrosion.
- b) Explain the traditional and green pathways for synthesis of Indigo dye.
- c) A sample of water on analysis was found to contain the following impurities in mg/lit. Calculate temporary, permanent and total hardness of water.

Impurities	Amount	Mole Wi
Ca(HCO ₃) ₂	30	162
$Mg(HCO_3)_2^2$	15	146
CaSO ₄ 3 ⁷²	09	136
MgCl ₂	80	95

B) Solve any two:

6

- a) Define Green Chemistry. State any 4 principles of green chemistry.
- b) Explain the EDTA method for estimation of hardness of water.
- c) Explain the weightless method for the measurement of rate of corrosion.

3. A) Solve any two:

8

- a) With the help of suitable diagram explain the zeolite method for softening hard water.
- b) Define lubricant. Write the functions of lubricants.
- c) Explain the Galvanization process for prevention of corrosion.

B) Solve:

6

- a) How will you select the lubricant for
 - i) IC Engine

ii) Gears.

b) 6 gm of an oil after saponification with 40 ml of N/2 alcoholic KOH solution and on subsequent titration with N/2 HCl gave a titre value of 9 ml to phenolphthalein end point. A blank experiment was conducted without taking the oil and on repeating the same procedure gave a titre value of 40 ml. Calculate the saponification value of the oil sample.

Set Q



SECTION - II

		SECTION - II	
4.	A)	 Solve any two: a) Explain Refining of crude petroleum. b) Explain with block diagram the gas liquid chromatography. c) A sample of coal has following analysis; C = 85%, S = 1.0%, N = 0.3%, H = 8%, O = 5.7%. Find the gross and net calorific value. (Latent heat of steam = 587 cal/gm.) 	8
	B)	Solve any two: a) Explain properties and applications of FRP. b) Define: i) Degree of polymerization ii) Melting temperature iii) Glass transition temperature. c) What is the weight of MgSO ₄ required to prepare 750 ml of 0.5 M and 0.1 N solutions? (Molecular wt of MgSO ₄ = 120)	6
5.	A)	Solve any two:a) Compare between solid, liquid and gaseous fuel.b) Define ceramics. Write the general properties of glass.c) Define plastic. Explain different types of plastics.	8
	B)	 Solve: a) Compare between cast iron and wrought iron. b) Calculate the degree of polymerization of vinyl chloride, if the molecular weight of polymer is 1.31 × 10⁵. (Molecular weight of vinyl chloride = 62.5) OR	6
		 a) What are conductive polymers? Write its applications. b) A polymer has the following composition 100 molecules of molecular mass 1000; 200 molecules of molecular mass 2000; 500 molecules of molecular mass 5000; Calculate the number average and weight average molecular weights. 	

No. Set F	Seat No.
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F.E. (Part – I) (CBCS) Examination, 2017 ENGINEERING CHEMISTRY

Day and Date: Friday, 22-12-2017 Max. Marks: 70

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

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

- 2) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 3) Figures to the **right** indicates **full** marks.
- 4) Draw neat and labelled diagram wherever necessary.
- 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct answer:
 - 1) Hard water is unfit for use in boilers for steam raising because
 - a) The boiling point is high
 - b) Steam is generated at high pressure
 - c) It leads to scale formation inside the boilers
 - d) Water undergoes decomposition into oxygen and hydrogen
 - 2) Tinning is the process of coating iron with
 - a) Zn b) Sn c) Cu d) Na
 - 3) In green synthesis of adipic acid the reactants are
 - a) Cyclohexane and hydrogen peroxide
 - b) Aniline and hydrogen peroxide
 - c) Cyclohexane and nitric acid
 - d) None of these
 - 4) Following is a non-petroleum fuel obtained from transesterification of vegetable/animal oil with alcohol.
 - a) Kerosene
- b) Petrol
- c) Biodiesel
- d) LPG
- 5) Number of moles of solute present in 1 kg of solvent is called
 - a) Normality
- b) Molarity
- c) Molality
- d) Mole fraction

6)	A good fuel shoulda) High moisture ofb) Low calorific vancec) Moderate ignitiond) High velocity of	content llue on temperature				
7)	Ebonite is a) Polyethylene c) Natural rubber		-	Highly vulcaniz Synthetic rubbe		ubber
8)	Bomb calorimeter value of a) Non volatile liquid fu	uid fuel	b)	n is used to find Solid fuel Both a) and b)	l the	e gross calorific
9)	Which of the follow aldehydes and keto a) GLC	•		to analyse the o		y products for None of these
10)	Highest percentag a) Steel c) Cast iron	e of carbon is pres	b)	in Wrought iron Both a) and b)		
11)	Permanent hardne a) Adding lime soo c) Boiling		b)	removed by Zeolite Ion exchange re	esin	e
12)	Machine operating a) Mineral oils c) Greases	under high tempe	b)	re and loads are Solid lubricants Animal oils		st lubricated by
13)	A lubricant is used a) Increasing resis b) Increasing fricti c) Decreasing fric d) Providing direct	stance onal heat tional resistance	ubk	oing surfaces		
14)	Metal at the top of a) Most stable				d)	Most active



Seat	
No.	

F.E. (Part – I) (CBCS) Examination, 2017 ENGINEERING CHEMISTRY

Day and Date: Friday, 22-12-2017 Marks: 56

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

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

- 2) Figures to the **right** indicates **full** marks.
- 3) Draw neat and labelled diagram wherever necessary.

SECTION-I

2. A) Solve any two:

8

- a) Define corrosion. Explain the mechanism of oxidation corrosion.
- b) Explain the traditional and green pathways for synthesis of Indigo dye.
- c) A sample of water on analysis was found to contain the following impurities in mg/lit. Calculate temporary, permanent and total hardness of water.

Impurities	Amount	t Mole Wt
Ca(HCO ₂) ₂	30	162
$Mg(HCO_3)_2^2$	15	146
CaSO ₄ 3 ⁷²	09	136
MgCl ₂	08	95

B) Solve any two:

6

- a) Define Green Chemistry. State any 4 principles of green chemistry.
- b) Explain the EDTA method for estimation of hardness of water.
- c) Explain the weightless method for the measurement of rate of corrosion.

3. A) Solve any two:

8

- a) With the help of suitable diagram explain the zeolite method for softening hard water.
- b) Define lubricant. Write the functions of lubricants.
- c) Explain the Galvanization process for prevention of corrosion.

B) Solve:

6

- a) How will you select the lubricant for
 - i) IC Engine

ii) Gears.

b) 6 gm of an oil after saponification with 40 ml of N/2 alcoholic KOH solution and on subsequent titration with N/2 HCl gave a titre value of 9 ml to phenolphthalein end point. A blank experiment was conducted without taking the oil and on repeating the same procedure gave a titre value of 40 ml. Calculate the saponification value of the oil sample.

Set R



SECTION - II

		SECTION - II	
4.	A)	 Solve any two: a) Explain Refining of crude petroleum. b) Explain with block diagram the gas liquid chromatography. c) A sample of coal has following analysis; C = 85%, S = 1.0%, N = 0.3%, H = 8%, O = 5.7%. Find the gross and net calorific value. (Latent heat of steam = 587 cal/gm.) 	8
	B)	Solve any two: a) Explain properties and applications of FRP. b) Define: i) Degree of polymerization ii) Melting temperature iii) Glass transition temperature. c) What is the weight of MgSO ₄ required to prepare 750 ml of 0.5 M and 0.1 N solutions? (Molecular wt of MgSO ₄ = 120)	6
5.	A)	Solve any two:a) Compare between solid, liquid and gaseous fuel.b) Define ceramics. Write the general properties of glass.c) Define plastic. Explain different types of plastics.	8
	B)	 Solve: a) Compare between cast iron and wrought iron. b) Calculate the degree of polymerization of vinyl chloride, if the molecular weight of polymer is 1.31 × 10⁵. (Molecular weight of vinyl chloride = 62.5) OR	6
		 a) What are conductive polymers? Write its applications. b) A polymer has the following composition 100 molecules of molecular mass 1000; 200 molecules of molecular mass 2000; 500 molecules of molecular mass 5000; Calculate the number average and weight average molecular weights. 	

Seat No.		Set	S
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F.E. (Part – I) (CBCS) Examination, 2017 ENGINEERING CHEMISTRY

Day and Date: Friday, 22-12-2017 Max. Marks: 70

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

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

- 2) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 3) Figures to the **right** indicates **full** marks.
- 4) Draw neat and labelled diagram wherever necessary.
- 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct answer:
 - 1) A good fuel should have
 - a) High moisture content
 - b) Low calorific value
 - c) Moderate ignition temperature
 - d) High velocity of combustion
 - 2) Ebonite is
 - a) Polyethylene

b) Highly vulcanized rubber

c) Natural rubber

- d) Synthetic rubber
- 3) Bomb calorimeter is an apparatus which is used to find the gross calorific value of
 - a) Non volatile liquid fuel

b) Solid fuel

c) Volatile liquid fuel

- d) Both a) and b)
- 4) Which of the following technique is used to analyse the dairy products for aldehydes and ketones?
 - a) GLC
- b) TGA
- c) DTA
- d) None of these
- 5) Highest percentage of carbon is present in
 - a) Steel

b) Wrought iron

c) Cast iron

d) Both a) and b)



6)	Permanent hardness of water cannot a) Adding lime soda c) Boiling	be removed by b) Zeolite d) Ion exchange re	esine
7)	Machine operating under high temper a) Mineral oils c) Greases	rature and loads are b) Solid lubricants d) Animal oils	
8)	 A lubricant is used with an object of a) Increasing resistance b) Increasing frictional heat c) Decreasing frictional resistance d) Providing direct contact between resistance 	ubbing surfaces	
9)	Metal at the top of electrochemical sea) Most stable b) Least active	eries is c) Most noble	d) Most active
10)	 Hard water is unfit for use in boilers for a) The boiling point is high b) Steam is generated at high pressure. c) It leads to scale formation inside the d) Water undergoes decomposition in 	re ne boilers	
11)	Tinning is the process of coating iron a) Zn b) Sn	with c) Cu	d) Na
12)	In green synthesis of adipic acid the ra) Cyclohexane and hydrogen peroxide b) Aniline and hydrogen peroxide c) Cyclohexane and nitric acid d) None of these		
13)	Following is a non-petroleum fuel obtair animal oil with alcohol. a) Kerosene b) Petrol	ned from transesterif c) Biodiesel	ication of vegetable/
14)	Number of moles of solute present in a) Normality b) Molarity	1 kg of solvent is c c) Molality	alled d) Mole fraction



Seat	
No.	

F.E. (Part – I) (CBCS) Examination, 2017 ENGINEERING CHEMISTRY

Day and Date: Friday, 22-12-2017 Marks: 56

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

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

- 2) Figures to the **right** indicates **full** marks.
- 3) Draw neat and labelled diagram wherever necessary.

SECTION-I

2. A) Solve any two:

8

- a) Define corrosion. Explain the mechanism of oxidation corrosion.
- b) Explain the traditional and green pathways for synthesis of Indigo dye.
- c) A sample of water on analysis was found to contain the following impurities in mg/lit. Calculate temporary, permanent and total hardness of water.

Impurities	7 / 1	Amount	Mole Wt
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$Mg(HCO_3)_2^2$		15	146
CaSO ₄ 3 ⁷²		09	136
MgCl ₂		08	95

B) Solve any two:

6

- a) Define Green Chemistry. State any 4 principles of green chemistry.
- b) Explain the EDTA method for estimation of hardness of water.
- c) Explain the weightless method for the measurement of rate of corrosion.

3. A) Solve any two:

8

- a) With the help of suitable diagram explain the zeolite method for softening hard water.
- b) Define lubricant. Write the functions of lubricants.
- c) Explain the Galvanization process for prevention of corrosion.

B) Solve:

6

- a) How will you select the lubricant for
 - i) IC Engine

ii) Gears.

b) 6 gm of an oil after saponification with 40 ml of N/2 alcoholic KOH solution and on subsequent titration with N/2 HCl gave a titre value of 9 ml to phenolphthalein end point. A blank experiment was conducted without taking the oil and on repeating the same procedure gave a titre value of 40 ml. Calculate the saponification value of the oil sample.

Set S

weights.



SECTION - II

		SECTION - II	
4.	A)	 Solve any two: a) Explain Refining of crude petroleum. b) Explain with block diagram the gas liquid chromatography. c) A sample of coal has following analysis; C = 85%, S = 1.0%, N = 0.3%, H = 8%, O = 5.7%. Find the gross and net calorific value. (Latent heat of steam = 587 cal/gm.) 	8
	B)	 Solve any two: a) Explain properties and applications of FRP. b) Define: i) Degree of polymerization ii) Melting temperature iii) Glass transition temperature. c) What is the weight of MgSO₄ required to prepare 750 ml of 0.5 M and 0.1 N solutions? (Molecular wt of MgSO₄ = 120) 	6
5.	A)	Solve any two : a) Compare between solid, liquid and gaseous fuel. b) Define ceramics. Write the general properties of glass. c) Define plastic. Explain different types of plastics.	8
	B)	 Solve: a) Compare between cast iron and wrought iron. b) Calculate the degree of polymerization of vinyl chloride, if the molecular weight of polymer is 1.31 × 10⁵. (Molecular weight of vinyl chloride = 62.5) OR a) What are conductive polymers? Write its applications. b) A polymer has the following composition 100 molecules of molecular mass 1000; 200 molecules of molecular mass 2000; 500 molecules of molecular mass 5000; Calculate the number average and weight average molecular 	6

Seat	
No.	

Set

F.E. (Part – II) (CGPA) Examination, 2017 **ENGINEERING MATHEMATICS – II (Old)**

Day and Date: Tuesday, 21-11-2017 Max. Marks: 70

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

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

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Figures to the **right** indicate **full** marks.
- 4) Use of calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

 $(1 \times 14 = 14)$

- 1) For what value of b the differential equation $(y + x^3)dx + (bx + 2y^3) dy = 0$ is
 - a) 0
- b) 2
- d) 3
- 2) The integrating factor of $x \frac{dy}{dx} + (1+x)y = e^x$ is
 - a) xe^x
- b) $x + e^x$
- c) xe^{-x}
- d) xlogx
- 3) The length of normal to a curve y = f(x) is given by
 - a) $y \cdot \frac{dx}{dy}$
- b) $y \cdot \frac{dy}{dx}$
- c) $y\sqrt{1+\left(\frac{dx}{dy}\right)^2}$ d) $y\sqrt{1+\left(\frac{dy}{dx}\right)^2}$
- 4) The orthogonal trajectories of the family of curve $x^2 + y^2 = a^2$, where 'a' is a parameter is
 - a) $v^2 = mx$
- b) y = mx
- c) $v = mx^2$ d) $v^2 = x^2$
- 5) If $\frac{dy}{dx} = 1 + xy$ with y(0) = 0, then the Picards first approximation y_1 is
 - a) x
- c) 1 + x
- d) $1 + x^2$
- 6) For the fourth order Runge-Kutta method, which of the following is correct?
 - a) $K_1 = \frac{h}{2} f(x_0, y_0)$

- b) $K_2 = h f(x_0 + h, y_0 + K_1)$
- c) $K_3 = hf(x_0 + \frac{h}{2}, y_0 + \frac{K_2}{2})$
- d) $K_4 = \frac{h}{2} f(x_0 + h, y_0 + K_3)$



- 7) Divided difference formula is used to find numerical differentiation, when the values of arguments x are
 - a) Equally spaced

- b) Unequally spaced d) None of these
- c) Equally or unequally spaced
- 8) The asymptotes to the curve $y^2 = ax^3$ is
 - a) x = a
- c) x = 0
- d) not exists

- 9) Rectification is the process of finding
 - a) double integrals

 - c) length of arc of plane curve
- 10) Which of the following is not true?
 - a) $\boxed{0} = \infty$

b) multiple integrals

d) area under plane curve

- b) $\frac{1}{2} = \sqrt{\pi}$ c) $\ln = (n-1)!$ d) $\frac{1}{4} = \frac{3}{4} = \pi$
- 11) $\beta(3, 1) =$
 - a) 3
- b) $\frac{1}{3}$ c) $\frac{1}{3!}$
- d) 3!
- 12) By changing the order $\int_{0}^{a} \int_{0}^{y} f(x,y) dxdy$ is equal to
 - a) $\iint_{a}^{y} f(x,y) dxdy$

b) $\iint_{\Omega} f(x,y) dxdy$

c) $\int_{0}^{a} \int_{0}^{x} f(x,y) dxdy$

d) $\int_{1}^{a} \int_{1}^{y} f(x,y) dxdy$

- 13) $\iint_{2}^{1} \int_{2}^{x} dx dy dz =$
 - a) $\frac{1}{10}$
- b) $\frac{1}{6}$ c) $\frac{1}{7}$
- 14) Area by curves $r = f(\theta)$, $r = g(\theta)$ intersecting at points (r_1, α) and (r_2, β) is
 - a) $\int_{0}^{\beta} \int_{0}^{f(\theta)} rd\theta dr$

b) $\int_{\alpha}^{\beta} \int_{f(\theta)}^{g(\theta)} rd\theta dr$

c) $\int_{0}^{\alpha} \int_{0}^{g(\theta)} rd\theta dr$

d) none of these



Seat	
No.	

F.E. (Part – II) (CGPA) Examination, 2017 ENGINEERING MATHEMATICS – II (Old)

Day and Date: Tuesday, 21-11-2017 Marks: 56

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

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

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

SECTION - I

2. Attempt the following.

a) Solve:
$$(2x + 2y - 1) dx = (x + y + 3) dx$$
.

b) Solve:
$$\frac{dy}{dx} + \frac{y\cos x + \sin y + y}{\sin x + x\cos y + x} = 0.$$

c) Solve:
$$(1+x^2)\frac{dy}{dx} - 2xy = 2x(1+x^2)$$
 where $y(0) = 1$.

OR

c) Solve
$$\frac{dr}{d\theta} = r \tan \theta - \frac{r^2}{\cos \theta}$$
.

- Attempt the following.
 - a) Find the orthogonal trajectories of the family of the curve $r = a(\sec \theta + \tan \theta)$ where 'a' is a parameter.
 - b) If the intercept made by the tangent to the curve at (x, y) on the X-axis is proportional to the ordinate of the point, then find the equation of the curve.
 - c) The current in a circuit containing an inductance L, resistance R and voltage of 20 cos(5t) is given by $L \frac{di}{dt} + Ri = 20 \cos(5t)$

if R = 10 ohms, L = 2 henrys and initially there is no current in the circuit, then find current i at any time t.

3

3

3



4. a) Using Taylor's series method, find y(0.1) correct to three decimal places from

$$\frac{dy}{dx} = 1 - 2xy \text{ with } y(0) = 1.$$

3

b) Using Euler's method, find an approximate value of y at x = 0.1 from $\frac{dy}{dx} = x + y(x + 1)$ with y(0) = 1, taking h = 0.025.

3

c) Use Runge-Kutta method of the fourth order to find y(0.1), given that $\frac{dy}{dx} = \frac{1}{x + v}$ with y(0) = 1 in one step.

3

5. a) Find $\frac{dy}{dx}$, $\frac{d^2y}{dx^2}$ at x = 0.5 and at x = 4 from the following data.

5

45

103

4

- 17
- 203

b) Using divided difference formula, find the value of f'(2) and f"(2) from the following data.

4

- y = f(x) : 18 10 -18

3

90

6

SECTION - II

6. a) Evaluate $\int_{0}^{\infty} x^7 e^{-2x^2} dx$.

3

b) Evaluate $\int_{2}^{7} \sqrt[4]{(x-3)(7-x)} dx.$

3

c) Prove that $\int_{0}^{\infty} \frac{1 - \cos(mx)}{x} e^{-x} dx = \frac{1}{2} \log(m^2 + 1)$.

3

7. a) Trace the curve $a^2y^2 = x^3(2a - x)$.

3

b) Trace the curve $x = a(\theta - \sin \theta)$, $y = a(1 + \cos \theta)$.

3

c) Find the perimeter of the cardioid $r = a(1 - \cos \theta)$

3

8. a) Evaluate $\int_{0}^{a} \int_{0}^{\sqrt{a^2-x^2}} x^2 y dy dx$.

3

- b) Evaluate $\int_{0}^{\pi/2} \int_{0}^{a \cos \theta} \int_{0}^{\sqrt{a^2 r^2}} r \, dz dr d\theta.$
- c) Change the order of integration and evaluate

4

3

$$\int_{0}^{1} \int_{0}^{\sqrt{1-x^{2}}} \frac{e^{y}}{(1+e^{y}) \cdot \sqrt{1-x^{2}-y^{2}}} dxdy.$$

OR

- c) Evaluate $\iint (x^2 + y^2) dxdy$ over the area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.
- 4

3

3

- 9. a) Find the area enclosed between the parabola $y = 4x x^2$ and the line y = x.
 - b) Find the mass of the lamina bounded by the curves x = 0, y = 0, x = 1 and $y = e^x$ if density at any point of the lamina varies as square of its distance from origin.
 - c) Find the volume of the solid generated when the area bounded by $y = x^2$ and y = 2x in the first quadrant is rotated about y axis.

Seat	
No.	

F.E. (Part – II) (CGPA) Examination, 2017 **ENGINEERING MATHEMATICS – II (Old)**

Day and Date: Tuesday, 21-11-2017 Max. Marks: 70

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

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

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Figures to the **right** indicate **full** marks.
- 4) Use of calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

 $(1 \times 14 = 14)$

- 1) The asymptotes to the curve $y^2 = ax^3$ is
- b) v = a
- c) x = 0
- d) not exists

- 2) Rectification is the process of finding
 - a) double integrals
 - c) length of arc of plane curve
- b) multiple integrals
- d) area under plane curve
- 3) Which of the following is not true?

a)
$$\boxed{0} = \infty$$

b)
$$\sqrt{\frac{1}{2}} = \sqrt{\pi}$$

c)
$$\overline{n} = (n-1)$$

b)
$$\sqrt{\frac{1}{2}} = \sqrt{\pi}$$
 c) $\sqrt{n} = (n-1)!$ d) $\sqrt{\frac{1}{4}} \sqrt{\frac{3}{4}} = \pi$

4)
$$\beta(3, 1) =$$

- a) 3
- b) $\frac{1}{3}$ c) $\frac{1}{3!}$
- d) 3!
- 5) By changing the order $\int_{0}^{a} \int_{0}^{y} f(x, y) dxdy$ is equal to

a)
$$\iint_{0}^{y} f(x,y) dxdy$$

b)
$$\int_{0}^{a} \int_{x}^{a} f(x, y) dxdy$$

c)
$$\int_{0}^{a} \int_{0}^{x} f(x, y) dxdy$$

d)
$$\int_{0}^{a} \int_{a}^{y} f(x,y) dxdy$$



- 6) $\int_{1}^{1} \int_{1}^{x} \int_{1}^{xy} dx dy dz =$
 - a) $\frac{1}{10}$
- b) $\frac{1}{6}$ c) $\frac{1}{7}$

- 7) Area by curves $r = f(\theta)$, $r = g(\theta)$ intersecting at points (r_1, α) and (r_2, β) is
 - a) $\int_{0}^{\beta} \int_{0}^{\tau(\theta)} rd\theta dr$

b) $\int_{\alpha}^{\beta} \int_{f(\theta)}^{g(\theta)} rd\theta dr$

c) $\int_{0}^{\alpha} \int_{0}^{g(\theta)} rd\theta dr$

- d) none of these
- 8) For what value of b the differential equation $(y + x^3)dx + (bx + 2y^3) dy = 0$ is exact?
 - a) 0
- b) 2

- d) 3
- 9) The integrating factor of $x \frac{dy}{dx} + (1+x)y = e^x$ is
- b) $x + e^x$
- d) xloax
- 10) The length of normal to a curve y = f(x) is given by
 - a) $y \cdot \frac{dx}{dy}$

- b) $y \cdot \frac{dy}{dx}$ c) $y \sqrt{1 + \left(\frac{dx}{dy}\right)^2}$ d) $y \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$
- 11) The orthogonal trajectories of the family of curve $x^2 + y^2 = a^2$, where 'a' is a parameter is
 - a) $y^2 = mx$
- b) y = mx
- c) $y = mx^2$ d) $y^2 = x^2$
- 12) If $\frac{dy}{dx} = 1 + xy$ with y(0) = 0, then the Picards first approximation y_1 is

- d) $1 + x^2$
- 13) For the fourth order Runge-Kutta method, which of the following is correct?
 - a) $K_1 = \frac{h}{2} f(x_0, y_0)$

- b) $K_2 = h f(x_0 + h, y_0 + K_1)$
- c) $K_3 = hf(x_0 + \frac{h}{2}, y_0 + \frac{K_2}{2})$
- d) $K_4 = \frac{h}{2} f(x_0 + h, y_0 + K_3)$
- 14) Divided difference formula is used to find numerical differentiation, when the values of arguments x are
 - a) Equally spaced

- b) Unequally spaced
- c) Equally or unequally spaced
- d) None of these



Seat No.

F.E. (Part – II) (CGPA) Examination, 2017 ENGINEERING MATHEMATICS – II (Old)

Day and Date: Tuesday, 21-11-2017 Marks: 56

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

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

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

SECTION - I

2. Attempt the following.

a) Solve:
$$(2x + 2y - 1) dx = (x + y + 3) dx$$
.

b) Solve:
$$\frac{dy}{dx} + \frac{y\cos x + \sin y + y}{\sin x + x\cos y + x} = 0.$$

c) Solve:
$$(1+x^2)\frac{dy}{dx} - 2xy = 2x(1+x^2)$$
 where $y(0) = 1$.

OR

c) Solve
$$\frac{dr}{d\theta} = r \tan \theta - \frac{r^2}{\cos \theta}$$
.

- Attempt the following.
 - a) Find the orthogonal trajectories of the family of the curve $r = a(\sec \theta + \tan \theta)$ where 'a' is a parameter.
 - b) If the intercept made by the tangent to the curve at (x, y) on the X-axis is proportional to the ordinate of the point, then find the equation of the curve.
 - c) The current in a circuit containing an inductance L, resistance R and voltage of

20 cos(5t) is given by
$$L \frac{di}{dt} + Ri = 20 \cos(5t)$$

if R = 10 ohms, L = 2 henrys and initially there is no current in the circuit, then find current i at any time t.

3



4. a) Using Taylor's series method, find y(0.1) correct to three decimal places from

$$\frac{dy}{dx} = 1 - 2xy \text{ with } y(0) = 1.$$

3

b) Using Euler's method, find an approximate value of y at x = 0.1 from $\frac{dy}{dx} = x + y(x + 1)$ with y(0) = 1, taking h = 0.025.

3

c) Use Runge-Kutta method of the fourth order to find y(0.1), given that $\frac{dy}{dx} = \frac{1}{x+v}$ with y(0) = 1 in one step.

3

5. a) Find $\frac{dy}{dx}$, $\frac{d^2y}{dx^2}$ at x = 0.5 and at x = 4 from the following data.

5

45

4

- 17
- 103
- 203

b) Using divided difference formula, find the value of f'(2) and f"(2) from the following data.

4

- 3
- y = f(x) : 18 10 -18
- 90

6

SECTION - II

6. a) Evaluate $\int_{0}^{\infty} x^7 e^{-2x^2} dx$.

3

b) Evaluate $\int_{2}^{7} \sqrt[4]{(x-3)(7-x)} dx.$

3

c) Prove that $\int_{0}^{\infty} \frac{1 - \cos(mx)}{x} e^{-x} dx = \frac{1}{2} \log(m^2 + 1)$.

7. a) Trace the curve $a^2y^2 = x^3(2a - x)$.

3

b) Trace the curve $x = a(\theta - \sin \theta)$, $y = a(1 + \cos \theta)$.

3

c) Find the perimeter of the cardioid $r = a(1 - \cos \theta)$

3

8. a) Evaluate $\int_{0}^{a} \int_{0}^{\sqrt{a^2-x^2}} x^2 y dy dx$.

3

3

4

- b) Evaluate $\int_{0}^{\pi/2} \int_{0}^{a\cos\theta} \int_{0}^{\sqrt{a^2-r^2}} r \, dz dr d\theta.$
- c) Change the order of integration and evaluate
 - $\int_{0}^{1} \int_{0}^{\sqrt{1-x^{2}}} \frac{e^{y}}{(1+e^{y}) \cdot \sqrt{1-x^{2}-y^{2}}} \, dx dy.$
 - OR
- c) Evaluate $\iint (x^2 + y^2) dxdy$ over the area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.
- 9. a) Find the area enclosed between the parabola $y = 4x x^2$ and the line y = x.
 - b) Find the mass of the lamina bounded by the curves x = 0, y = 0, x = 1 and $y = e^x$ if density at any point of the lamina varies as square of its distance from origin.
 - c) Find the volume of the solid generated when the area bounded by $y = x^2$ and y = 2x in the first quadrant is rotated about y axis.

|--|--|

SLR-TJ - 7

Seat	
No.	

Max. Marks: 70

F.E. (Part – II) (CGPA) Examination, 2017 **ENGINEERING MATHEMATICS – II (Old)**

Day and Date: Tuesday, 21-11-2017

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

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

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Figures to the **right** indicate **full** marks.
- 4) Use of calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

 $(1 \times 14 = 14)$

1) If
$$\frac{dy}{dx} = 1 + xy$$
 with $y(0) = 0$, then the Picards first approximation y_1 is

- d) $1 + x^2$
- 2) For the fourth order Runge-Kutta method, which of the following is correct?

a)
$$K_1 = \frac{h}{2} f(x_0, y_0)$$

b)
$$K_2 = h f(x_0 + h, y_0 + K_1)$$

c)
$$K_3 = hf(x_0 + \frac{h}{2}, y_0 + \frac{K_2}{2})$$
 d) $K_4 = \frac{h}{2}f(x_0 + h, y_0 + K_3)$

d)
$$K_4 = \frac{h}{2} f(x_0 + h, y_0 + K_3)$$

- 3) Divided difference formula is used to find numerical differentiation, when the values of arguments x are
 - a) Equally spaced

- b) Unequally spaced
- c) Equally or unequally spaced
- d) None of these
- 4) The asymptotes to the curve $y^2 = ax^3$ is
- b) y = a
- c) x = 0
- d) not exists

- 5) Rectification is the process of finding
 - a) double integrals
 - c) length of arc of plane curve
- b) multiple integrals
- d) area under plane curve
- 6) Which of the following is not true?

- a) $\boxed{0} = \infty$ b) $\boxed{\frac{1}{2}} = \sqrt{\pi}$ c) $\boxed{n} = (n-1)!$ d) $\boxed{\frac{1}{4}} = \frac{3}{4} = \pi$



7) $\beta(3, 1) =$

- a) 3
- b) $\frac{1}{3}$
- c) $\frac{1}{3!}$
- d) 3!

8) By changing the order $\int_{0}^{a} \int_{0}^{y} f(x,y) dxdy$ is equal to

a) $\iint_{a}^{y} f(x,y) dxdy$

b) $\int_{a}^{a} \int_{a}^{a} f(x,y) dxdy$

c) $\int_{0}^{a} \int_{0}^{x} f(x,y) dxdy$

d) $\int_{0}^{a} \int_{0}^{y} f(x,y) dxdy$

9) $\int_{1}^{1} \int_{1}^{x} dx dy dz =$

- a) $\frac{1}{10}$
- b) $\frac{1}{6}$ c) $\frac{1}{7}$

10) Area by curves $r = f(\theta)$, $r = g(\theta)$ intersecting at points (r_1, α) and (r_2, β) is

a) $\int_{0}^{\beta} \int_{0}^{f(\theta)} rd\theta dr$

b) $\int_{0}^{\beta} \int_{0}^{g(\theta)} rd\theta dr$

c) $\int_{0}^{\alpha} \int_{1}^{g(\theta)} rd\theta dr$

d) none of these

11) For what value of b the differential equation $(y + x^3)dx + (bx + 2y^3) dy = 0$ is exact?

- a) 0
- b) 2
- d) 3

12) The integrating factor of $x \frac{dy}{dx} + (1+x)y = e^x$ is

- a) xex
- b) $x + e^x$
- d) xlogx

13) The length of normal to a curve y = f(x) is given by

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

14) The orthogonal trajectories of the family of curve $x^2 + y^2 = a^2$, where 'a' is a parameter is

- a) $y^2 = mx$
- b) y = mx
- c) $y = mx^2$
- d) $v^2 = x^2$



Seat No.

F.E. (Part – II) (CGPA) Examination, 2017 ENGINEERING MATHEMATICS – II (Old)

Day and Date: Tuesday, 21-11-2017 Marks: 56

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

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

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

SECTION - I

2. Attempt the following.

a) Solve:
$$(2x + 2y - 1) dx = (x + y + 3) dx$$
.

b) Solve:
$$\frac{dy}{dx} + \frac{y\cos x + \sin y + y}{\sin x + x\cos y + x} = 0.$$

c) Solve:
$$(1+x^2)\frac{dy}{dx} - 2xy = 2x(1+x^2)$$
 where $y(0) = 1$.

OR

c) Solve
$$\frac{dr}{d\theta} = r \tan \theta - \frac{r^2}{\cos \theta}$$
.

- Attempt the following.
 - a) Find the orthogonal trajectories of the family of the curve $r = a(\sec \theta + \tan \theta)$ where 'a' is a parameter.
 - b) If the intercept made by the tangent to the curve at (x, y) on the X-axis is proportional to the ordinate of the point, then find the equation of the curve.
 - c) The current in a circuit containing an inductance L, resistance R and voltage of

20 cos(5t) is given by
$$L \frac{di}{dt} + Ri = 20 \cos(5t)$$

if R = 10 ohms, L = 2 henrys and initially there is no current in the circuit, then find current i at any time t.

3



4. a) Using Taylor's series method, find y(0.1) correct to three decimal places from

$$\frac{dy}{dx} = 1 - 2xy \text{ with } y(0) = 1.$$

3

b) Using Euler's method, find an approximate value of y at x = 0.1 from $\frac{dy}{dx} = x + y(x + 1)$ with y(0) = 1, taking h = 0.025.

3

c) Use Runge-Kutta method of the fourth order to find y(0.1), given that $\frac{dy}{dx} = \frac{1}{x+v}$ with y(0) = 1 in one step.

3

5. a) Find $\frac{dy}{dx}$, $\frac{d^2y}{dx^2}$ at x = 0.5 and at x = 4 from the following data.

5

4

17

45

103

203

b) Using divided difference formula, find the value of f'(2) and f"(2) from the following data.

4

3

6

y = f(x) : 18 10 -18

90

SECTION - II

6. a) Evaluate $\int_{0}^{\infty} x^7 e^{-2x^2} dx$.

3

b) Evaluate $\int_{2}^{7} \sqrt[4]{(x-3)(7-x)} dx.$

3

c) Prove that $\int_{0}^{\infty} \frac{1 - \cos(mx)}{x} e^{-x} dx = \frac{1}{2} \log(m^2 + 1)$.

7. a) Trace the curve $a^2y^2 = x^3(2a - x)$.

3

b) Trace the curve $x = a(\theta - \sin \theta)$, $y = a(1 + \cos \theta)$.

3

c) Find the perimeter of the cardioid $r = a(1 - \cos \theta)$

3

8. a) Evaluate $\int_{0}^{a} \int_{0}^{\sqrt{a^2-x^2}} x^2 y dy dx$.

3

3

4

4

- b) Evaluate $\int_{0}^{\pi/2} \int_{0}^{a\cos\theta} \int_{0}^{\sqrt{a^2-r^2}} r \, dz dr d\theta.$
- c) Change the order of integration and evaluate
 - $\int_{0}^{1} \int_{0}^{\sqrt{1-x^{2}}} \frac{e^{y}}{(1+e^{y}) \cdot \sqrt{1-x^{2}-y^{2}}} dxdy.$

OR

- c) Evaluate $\iint (x^2 + y^2) dxdy$ over the area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.
- 9. a) Find the area enclosed between the parabola $y = 4x x^2$ and the line y = x.
 - b) Find the mass of the lamina bounded by the curves x = 0, y = 0, x = 1 and $y = e^x$ if density at any point of the lamina varies as square of its distance from origin.
 - c) Find the volume of the solid generated when the area bounded by $y = x^2$ and y = 2x in the first quadrant is rotated about y axis.

SLR-TJ - 7

Seat	
No.	

Set

Max. Marks: 70

F.E. (Part – II) (CGPA) Examination, 2017 **ENGINEERING MATHEMATICS – II (Old)**

Day and Date: Tuesday, 21-11-2017

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

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

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Figures to the **right** indicate **full** marks.
- 4) Use of calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

 $(1 \times 14 = 14)$

1) Which of the following is not true?

a)
$$\overline{0} = \infty$$

b)
$$\frac{1}{2} = \sqrt{\pi}$$

b)
$$\sqrt{\frac{1}{2}} = \sqrt{\pi}$$
 c) $\sqrt{n} = (n-1)!$ d) $\sqrt{\frac{1}{4}} \sqrt{\frac{3}{4}} = \pi$

2)
$$\beta(3, 1) =$$

b)
$$\frac{1}{3}$$

b)
$$\frac{1}{3}$$
 c) $\frac{1}{3!}$

3) By changing the order $\int_{a}^{a} \int_{a}^{y} f(x,y) dxdy$ is equal to

a)
$$\iint_{0.0}^{y} f(x,y) dxdy$$

b)
$$\int_{0}^{a} \int_{x}^{a} f(x, y) dxdy$$

c)
$$\int_{0}^{a} \int_{0}^{x} f(x,y) dxdy$$

d)
$$\int_{0}^{a} \int_{0}^{y} f(x,y) dxdy$$

4)
$$\int_{0}^{1} \int_{0}^{x} \int_{0}^{xy} dxdydz =$$

a)
$$\frac{1}{10}$$

b)
$$\frac{1}{6}$$

c)
$$\frac{1}{7}$$

d)
$$\frac{1}{8}$$



- 5) Area by curves $r = f(\theta)$, $r = g(\theta)$ intersecting at points (r_1, α) and (r_2, β) is
 - a) $\int_{0}^{\beta} \int_{0}^{\tau(\theta)} rd\theta dr$

b) $\int_{0}^{\beta} \int_{0}^{g(\theta)} rd\theta dr$

c) $\int_{\beta}^{\alpha} \int_{f(\theta)}^{g(\theta)} rd\theta dr$

- d) none of these
- 6) For what value of b the differential equation $(y + x^3)dx + (bx + 2y^3) dy = 0$ is
 - a) 0
- b) 2

- d) 3
- 7) The integrating factor of $x \frac{dy}{dx} + (1+x)y = e^x$ is
 - a) xex
- b) $x + e^x$
- d) xlogx
- 8) The length of normal to a curve y = f(x) is given by
 - a) $y \cdot \frac{dx}{dy}$
- b) $y \cdot \frac{dy}{dx}$ c) $y \sqrt{1 + \left(\frac{dx}{dy}\right)^2}$ d) $y \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$
- 9) The orthogonal trajectories of the family of curve $x^2 + y^2 = a^2$, where 'a' is a parameter is
 - a) $v^2 = mx$
- b) y = mx
- c) $y = mx^2$
 - d) $v^2 = x^2$
- 10) If $\frac{dy}{dx} = 1 + xy$ with y(0) = 0, then the Picards first approximation y_1 is
 - a) x

- d) $1 + x^2$
- 11) For the fourth order Runge-Kutta method, which of the following is correct?
 - a) $K_1 = \frac{h}{2} f(x_0, y_0)$

- b) $K_2 = h f(x_0 + h, y_0 + K_1)$
- c) $K_3 = hf(x_0 + \frac{h}{2}, y_0 + \frac{K_2}{2})$ d) $K_4 = \frac{h}{2}f(x_0 + h, y_0 + K_3)$
- 12) Divided difference formula is used to find numerical differentiation, when the values of arguments x are
 - a) Equally spaced

- b) Unequally spaced
- c) Equally or unequally spaced
- d) None of these
- 13) The asymptotes to the curve $y^2 = ax^3$ is
 - a) x = a
- c) x = 0
- d) not exists

- 14) Rectification is the process of finding
 - a) double integrals

- b) multiple integrals
- c) length of arc of plane curve
- d) area under plane curve



Seat No.

F.E. (Part – II) (CGPA) Examination, 2017 ENGINEERING MATHEMATICS – II (Old)

Day and Date: Tuesday, 21-11-2017 Marks: 56

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

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

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

SECTION - I

2. Attempt the following.

a) Solve:
$$(2x + 2y - 1) dx = (x + y + 3) dx$$
.

b) Solve:
$$\frac{dy}{dx} + \frac{y\cos x + \sin y + y}{\sin x + x\cos y + x} = 0.$$

c) Solve:
$$(1+x^2)\frac{dy}{dx} - 2xy = 2x(1+x^2)$$
 where $y(0) = 1$.

OR

c) Solve
$$\frac{dr}{d\theta} = r \tan \theta - \frac{r^2}{\cos \theta}$$
.

- Attempt the following.
 - a) Find the orthogonal trajectories of the family of the curve $r = a(\sec \theta + \tan \theta)$ where 'a' is a parameter.
 - b) If the intercept made by the tangent to the curve at (x, y) on the X-axis is proportional to the ordinate of the point, then find the equation of the curve.
 - c) The current in a circuit containing an inductance L, resistance R and voltage of

20 cos(5t) is given by
$$L\frac{di}{dt} + Ri = 20 \cos(5t)$$

if R = 10 ohms, L = 2 henrys and initially there is no current in the circuit, then find current i at any time t.

3

3



4. a) Using Taylor's series method, find y(0.1) correct to three decimal places from

$$\frac{dy}{dx} = 1 - 2xy \text{ with } y(0) = 1.$$

3

b) Using Euler's method, find an approximate value of y at x = 0.1 from $\frac{dy}{dx} = x + y(x + 1)$ with y(0) = 1, taking h = 0.025.

3

c) Use Runge-Kutta method of the fourth order to find y(0.1), given that $\frac{dy}{dx} = \frac{1}{x + v}$ with y(0) = 1 in one step.

3

5. a) Find $\frac{dy}{dx}$, $\frac{d^2y}{dx^2}$ at x = 0.5 and at x = 4 from the following data.

5

45

103

4

- 17
- 203

b) Using divided difference formula, find the value of f'(2) and f"(2) from the following data.

4

- 3
- y = f(x) : 18 10 -18
- 90

6

SECTION - II

6. a) Evaluate $\int_{0}^{\infty} x^7 e^{-2x^2} dx$.

3

b) Evaluate $\int_{2}^{7} \sqrt[4]{(x-3)(7-x)} dx.$

3

c) Prove that $\int_{0}^{\infty} \frac{1 - \cos(mx)}{x} e^{-x} dx = \frac{1}{2} \log(m^2 + 1)$.

7. a) Trace the curve $a^2y^2 = x^3(2a - x)$.

3

b) Trace the curve $x = a(\theta - \sin \theta)$, $y = a(1 + \cos \theta)$.

3

c) Find the perimeter of the cardioid $r = a(1 - \cos \theta)$

3

8. a) Evaluate $\int_{0}^{a} \int_{0}^{\sqrt{a^2-x^2}} x^2 y dy dx$.

3

3

4

- b) Evaluate $\int_{0}^{\pi/2} \int_{0}^{a\cos\theta} \int_{0}^{\sqrt{a^2-r^2}} r \, dz dr d\theta.$
- c) Change the order of integration and evaluate
 - $\int_{0}^{1} \int_{0}^{\sqrt{1-x^{2}}} \frac{e^{y}}{(1+e^{y}) \cdot \sqrt{1-x^{2}-y^{2}}} dxdy.$
 - OR
- c) Evaluate $\iint (x^2 + y^2) dxdy$ over the area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.
- 9. a) Find the area enclosed between the parabola $y = 4x x^2$ and the line y = x.
 - b) Find the mass of the lamina bounded by the curves x = 0, y = 0, x = 1 and $y = e^x$ if density at any point of the lamina varies as square of its distance from origin.
 - c) Find the volume of the solid generated when the area bounded by $y = x^2$ and y = 2x in the first quadrant is rotated about y axis.

NO.	Seat No.		Set	P
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F.E. (Part – II) (Old CGPA) Examination, 2017 BASIC CIVIL ENGINEERING

Day and Date: Wednesday, 22-11-2017 Max. Marks: 70

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

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

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

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

SECTION - I

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

- 1) The method of surveying used for determining the relative heights of points on the surface of the earth is called
 - a) Levelling

b) Simple levelling

c) Longitudinal levelling

- d) Differential levelling
- 2) The portion of a road surface, which is used by vehicular traffic, is known as
 - a) carriage-way

b) shoulder

c) express way

- d) all of the above
- 3) The graduations in a prismatic compass
 - a) are inverted

b) have zero at south

c) are from 0° to 360°

- d) all the above
- 4) Principle of surveying 'working from whole to part' prevents
 - a) Linear error

b) Angular error

c) Accumulation of errors

- d) Chaining
- 5) 'One link' means distance from
 - a) Center to centre of middle rings
- b) Center to centre of inner rings
- c) Center to centre of outer rings
- d) All of these

6)	Earth dams, Rock fill dams and solid types of dams.	masonry gravity dams are
	a) Old types	b) Modern types
	c) Cultural types	d) All the above
7)	The contour interval is inversely proper	ortional to
	a) Scale of map	b) Steepness of area
	c) Extent of area	d) Flatter slope
	SECTIO	N – II
8)	The water cement ratio for good strengt	th and workability should range between
	a) 0.1 to 0.2	b) 0.2 to 0.4
	c) 0.4 to 0.6	d) 0.6 to 0.8
9)	Green building are recommended to	
	a) Use green color	b) Use farm house
	c) Reduce global warming	d) Achieve economy
10)	The weight of occupants with their be materials constitute in a	elongings, furniture and other movable building.
	a) Doodlood	1-1 1 - 1 1
	a) Dead load	b) Live load
	c) Static load	d) Dynamic load
11)	c) Static load	•
11)	c) Static load Ordinary Portland cement contains	d) Dynamic load
11)	c) Static load Ordinary Portland cement contains the rate of hydration.	d) Dynamic load Percent of gypsum, to retard
	c) Static load Ordinary Portland cement contains the rate of hydration. a) 3 c) 7	d) Dynamic load Percent of gypsum, to retard b) 5
	 c) Static load Ordinary Portland cement contains the rate of hydration. a) 3 c) 7 M - 15 grade of concrete is equivalent 	d) Dynamic load Percent of gypsum, to retard b) 5 d) 10
	c) Static load Ordinary Portland cement contains the rate of hydration. a) 3 c) 7 M - 15 grade of concrete is equivalent: sand: coarse aggregates as	d) Dynamic load Percent of gypsum, to retard b) 5 d) 10 alent to nominal mix of proportion of
12)	c) Static load Ordinary Portland cement contains the rate of hydration. a) 3 c) 7 M - 15 grade of concrete is equival cement: sand: coarse aggregates as a) 1:1:2	d) Dynamic load Percent of gypsum, to retard b) 5 d) 10 alent to nominal mix of proportion of b) 1:1.5:3 d) 1:3:6 heat) the method of irrigation used is
12)	c) Static load Ordinary Portland cement contains the rate of hydration. a) 3 c) 7 M - 15 grade of concrete is equival cement: sand: coarse aggregates as a) 1:1:2 c) 1:2:4	d) Dynamic load Percent of gypsum, to retard b) 5 d) 10 alent to nominal mix of proportion of b) 1:1.5:3 d) 1:3:6
12)	c) Static load Ordinary Portland cement contains the rate of hydration. a) 3 c) 7 M - 15 grade of concrete is equival cement: sand: coarse aggregates as a) 1:1:2 c) 1:2:4 For closed growing crops (such as where the same contains	d) Dynamic load Percent of gypsum, to retard b) 5 d) 10 alent to nominal mix of proportion of b) 1:1.5:3 d) 1:3:6 heat) the method of irrigation used is
12) 13)	c) Static load Ordinary Portland cement contains the rate of hydration. a) 3 c) 7 M - 15 grade of concrete is equivacement: sand: coarse aggregates as a) 1:1:2 c) 1:2:4 For closed growing crops (such as wha) Free flooding c) Check flooding	d) Dynamic load Percent of gypsum, to retard b) 5 d) 10 alent to nominal mix of proportion of b) 1:1.5:3 d) 1:3:6 heat) the method of irrigation used is b) Border flooding
12) 13)	C) Static load Ordinary Portland cement contains the rate of hydration. a) 3 c) 7 M - 15 grade of concrete is equival cement: sand: coarse aggregates as a) 1:1:2 c) 1:2:4 For closed growing crops (such as wha) Free flooding c) Check flooding The load is transferred to the foundat	d) Dynamic load Percent of gypsum, to retard b) 5 d) 10 alent to nominal mix of proportion of b) 1:1.5:3 d) 1:3:6 heat) the method of irrigation used is b) Border flooding d) Basin flooding
12) 13)	c) Static load Ordinary Portland cement contains the rate of hydration. a) 3 c) 7 M - 15 grade of concrete is equivacement: sand: coarse aggregates as a) 1:1:2 c) 1:2:4 For closed growing crops (such as wha) Free flooding c) Check flooding The load is transferred to the foundat sequence	d) Dynamic load Percent of gypsum, to retard b) 5 d) 10 alent to nominal mix of proportion of b) 1:1.5:3 d) 1:3:6 heat) the method of irrigation used is b) Border flooding d) Basin flooding ion in framed structure in the following



Seat	
No.	

F.E. (Part – II) (Old CGPA) Examination, 2017 BASIC CIVIL ENGINEERING

Day and Date: Wednesday, 22-11-2017 Marks: 56

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

Instructions: 1) Question No.2 and Question No. 6 are compulsory and attempt any two questions from remaining. (Each Section)

SECTION-I

2. a) What are the sub branches of civil engineering?

2

b) The magnetic bearing observed with a prismatic compass for a closed traverse PQRSP are given below:

8

Line	PQ	QR	RS	SP
F.B.	198°30′	107°30′	15°00′	219°00′
B. B.	18°30′	288°30′	192°30′	112°30′

Draw a rough traverse. Calculate included angles and check for angular error. Calculate corrected bearings. Indicate stations free from local attraction and corrections at other stations.

3. a) Draw a sketch Prismatic compass and label it properly.

2

b) The following consecutive readings were taken with a dumpy level on a 4 m levelling staff on a continuously sloping ground: 0.285, 1.380, 2.345,3.995 0.750, 3.220, 3.785, 0.900, 1.890, 2.300 and 3.330. The distance between every two consecutive ground points was 30 m. The first reading was taken on a point having R.L. 500.000 m. Enter the data in a standard levelling table. Apply Arithmetic checks (Use Rise and Fall method).

7

4. a) Write a short note on sources of water.

4

b) The area of a plan of an old map plotted to a scale of 1 cm = 10 m. Measures 100 cm². The plan is found to have shrunk so that the line originally 10 cm long now measures 9.5 cm, further the 20 m chain used was 8 cm too short. Find the true area of the survey.

Set P

SLR-TJ - 8

No.	Seat No.		Set	Q
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F.E. (Part - II) (Old CGPA) Examination, 2017 **BASIC CIVIL ENGINEERING**

Day and Date : Wednesday, 22-11-2017	Max. Marks : 70
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Time: 10.00 a.m. to 1.00.p.m.

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

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

MCQ/Objective Type Questions

Dur	ration : 30 Minutes	Marks : 14
	SEC	TION – I
1.	Choose the correct answer:	(14×1=14)
	1) The graduations in a prismatic cora) are invertedc) are from 0° to 360°	npass b) have zero at south d) all the above
	2) Principle of surveying 'working froa) Linear errorc) Accumulation of errors	m whole to part' prevents b) Angular error d) Chaining
	3) 'One link' means distance froma) Center to centre of middle ringsc) Center to centre of outer rings	s b) Center to centre of inner rings d) All of these
	4) Earth dams, Rock fill dams and stypes of dams.a) Old typesc) Cultural types	b) Modern types d) All the above
	5) The contour interval is inversely pa) Scale of mapc) Extent of area	roportional to b) Steepness of area d) Flatter slope



6)	The method of surveying used for det on the surface of the earth is called	err	nining the relative heights of points
	a) Levelling	b)	Simple levelling
	c) Longitudinal levelling	d)	Differential levelling
7)	The portion of a road surface, which is	s us	sed by vehicular traffic, is known as
	a) carriage-way	b)	shoulder
	c) express way	d)	all of the above
	SECTIO	N -	- II
8)	The weight of occupants with their be materials constitute in a l		
	a) Dead load	b)	Live load
	c) Static load	d)	Dynamic load
9)	Ordinary Portland cement contains the rate of hydration.		Percent of gypsum, to retard
	a) 3	b)	5
	c) 7	d)	10
10)	M - 15 grade of concrete is equivacement: sand: coarse aggregates as	ler	nt to nominal mix of proportion of
	a) 1:1:2	b)	1:1.5:3
	c) 1:2:4	d)	1:3:6
11)	For closed growing crops (such as wh	nea	t) the method of irrigation used is
	a) Free flooding	b)	Border flooding
	c) Check flooding	d)	Basin flooding
12)	The load is transferred to the foundation sequence	ion	in framed structure in the following
	a) Beam-column-foundation-slab	•	Slab-beam-column-foundation
	c) Slab-column-beam-foundation	d)	Column-slab-beam-foundation
13)	The water cement ratio for good strengt	ha	nd workability should range between
	a) 0.1 to 0.2	•	0.2 to 0.4
	c) 0.4 to 0.6	d)	0.6 to 0.8
14)	Green building are recommended to		
	a) Use green color	b)	Use farm house
	c) Reduce global warming	d)	Achieve economy
	- , , , , , , , , , , , , , , , , , , ,		



Seat	
No.	

F.E. (Part – II) (Old CGPA) Examination, 2017 BASIC CIVIL ENGINEERING

Day and Date: Wednesday, 22-11-2017 Marks: 56

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

Instructions: 1) Question No.2 and Question No. 6 are compulsory and attempt any two questions from remaining. (Each Section)

SECTION - I

2. a) What are the sub branches of civil engineering?

2

b) The magnetic bearing observed with a prismatic compass for a closed traverse PQRSP are given below:

8

Line	PQ	QR	RS	SP	
F.B.	198°30′	107°30′	15°00′	219°00′	
B. B.	18°30′	288°30′	192°30′	112°30′	

Draw a rough traverse. Calculate included angles and check for angular error. Calculate corrected bearings. Indicate stations free from local attraction and corrections at other stations.

3. a) Draw a sketch Prismatic compass and label it properly.

2

b) The following consecutive readings were taken with a dumpy level on a 4 m levelling staff on a continuously sloping ground: 0.285, 1.380, 2.345,3.995 0.750, 3.220, 3.785, 0.900, 1.890, 2.300 and 3.330. The distance between every two consecutive ground points was 30 m. The first reading was taken on a point having R.L. 500.000 m. Enter the data in a standard levelling table. Apply Arithmetic checks (Use Rise and Fall method).

7

4. a) Write a short note on sources of water.

4

b) The area of a plan of an old map plotted to a scale of 1 cm = 10 m. Measures 100 cm². The plan is found to have shrunk so that the line originally 10 cm long now measures 9.5 cm, further the 20 m chain used was 8 cm too short. Find the true area of the survey.

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SLR-TJ - 8

Seat	
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F.E. (Part – II) (Old CGPA) Examination, 2017 BASIC CIVIL ENGINEERING

Day and Date: Wednesday, 22-11-2017 Max. Marks: 70

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

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

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

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

SECTION-I

Choose the correct answer: (14x1=14)
 'One link' means distance from

 Center to centre of middle rings
 Center to centre of outer rings
 All of these

 Earth dams, Rock fill dams and solid masonry gravity dams are ______
types of dams.

 Old types
 Cultural types
 All the above

3) The contour interval is inversely proportional to

a) Scale of map

b) Steepness of area

c) Extent of area

d) Flatter slope

4) The method of surveying used for determining the relative heights of points on the surface of the earth is called

a) Levelling

b) Simple levelling

c) Longitudinal levelling

d) Differential levelling

5) The portion of a road surface, which is used by vehicular traffic, is known as

a) carriage-way

b) shoulder

c) express way

d) all of the above

P.T.O.



6)	The graduations in a prismatic compa	ass
	a) are inverted	b) have zero at south
	c) are from 0° to 360°	d) all the above
7)	Principle of surveying 'working from v	vhole to part' prevents
,	a) Linear error	b) Angular error
	c) Accumulation of errors	d) Chaining
	,	,
	SECTIO	DN – II
8)	M – 15 grade of concrete is equivacement: sand: coarse aggregates as	alent to nominal mix of proportion of
	a) 1:1:2	b) 1:1.5:3
	c) 1:2:4	d) 1:3:6
9)	For closed growing crops (such as w	heat) the method of irrigation used is
	a) Free flooding	b) Border flooding
	c) Check flooding	d) Basin flooding
10)	The load is transferred to the foundat sequence	ion in framed structure in the following
	a) Beam-column-foundation-slab	b) Slab-beam-column-foundation
	c) Slab-column-beam-foundation	d) Column-slab-beam-foundation
11)	The water cement ratio for good streng	th and workability should range between
	a) 0.1 to 0.2	b) 0.2 to 0.4
	c) 0.4 to 0.6	d) 0.6 to 0.8
12)	Green building are recommended to	
	a) Use green color	b) Use farm house
	c) Reduce global warming	d) Achieve economy
13)	The weight of occupants with their be materials constitute in a	elongings, furniture and other movable building.
	a) Dead load	b) Live load
	c) Static load	d) Dynamic load
14)	Ordinary Portland cement contains the rate of hydration.	Percent of gypsum, to retard
	a) 3	b) 5
	c) 7	d) 10
		



Seat	
No.	

F.E. (Part – II) (Old CGPA) Examination, 2017 BASIC CIVIL ENGINEERING

Day and Date: Wednesday, 22-11-2017 Marks: 56

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

Instructions: 1) Question No.2 and Question No. 6 are compulsory and attempt any two questions from remaining. (Each Section)

SECTION - I

2. a) What are the sub branches of civil engineering?

2

b) The magnetic bearing observed with a prismatic compass for a closed traverse PQRSP are given below:

8

Line	ine PQ QR		RS	SP	
F.B.	198°30′	107°30′	15°00′	219°00′	
B. B.	18°30′	288°30′	192°30′	112°30′	

Draw a rough traverse. Calculate included angles and check for angular error. Calculate corrected bearings. Indicate stations free from local attraction and corrections at other stations.

3. a) Draw a sketch Prismatic compass and label it properly.

2

b) The following consecutive readings were taken with a dumpy level on a 4 m levelling staff on a continuously sloping ground: 0.285, 1.380, 2.345,3.995 0.750, 3.220, 3.785, 0.900, 1.890, 2.300 and 3.330. The distance between every two consecutive ground points was 30 m. The first reading was taken on a point having R.L. 500.000 m. Enter the data in a standard levelling table. Apply Arithmetic checks (Use Rise and Fall method).

7

4. a) Write a short note on sources of water.

4

b) The area of a plan of an old map plotted to a scale of 1 cm = 10 m. Measures 100 cm². The plan is found to have shrunk so that the line originally 10 cm long now measures 9.5 cm, further the 20 m chain used was 8 cm too short. Find the true area of the survey.

Set R

functions.

B) Write short note on Green building.

5

SLR-TJ - 8

Seat	
No.	

F.E. (Part – II) (Old CGPA) Examination, 2017 **BASIC CIVIL ENGINEERING**

Day and Date: Wednesday, 22-11-2017 Max. Marks: 70

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

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

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

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

SECTION-I $(14 \times 1 = 14)$ 1. Choose the correct answer: 1) Principle of surveying 'working from whole to part' prevents a) Linear error b) Angular error c) Accumulation of errors d) Chaining 2) 'One link' means distance from a) Center to centre of middle rings b) Center to centre of inner rings c) Center to centre of outer rings d) All of these 3) Earth dams, Rock fill dams and solid masonry gravity dams are _____ types of dams. a) Old types b) Modern types d) All the above c) Cultural types 4) The contour interval is inversely proportional to a) Scale of map b) Steepness of area c) Extent of area d) Flatter slope

5) The method of surveying used for determining the relative heights of points on the surface of the earth is called

a) Levelling b) Simple levelling

c) Longitudinal levelling d) Differential levelling P.T.O.



6)	The portion of a road surface, which is		•
	a) carriage-way	b)	shoulder
	c) express way	d)	all of the above
7)	The graduations in a prismatic compa	ass	
	a) are inverted	b)	have zero at south
	c) are from 0° to 360°	d)	all the above
	SECTIO)N –	II
8)	Ordinary Portland cement contains the rate of hydration.		Percent of gypsum, to retard
	a) 3	b)	5
	c) 7	d)	10
9)	M – 15 grade of concrete is equivacement: sand: coarse aggregates as		
	a) 1:1:2	-	1:1.5:3
	c) 1:2:4	d)	1:3:6
10)	For closed growing crops (such as wheel)		
	a) Free flooding	•	Border flooding
	c) Check flooding	d)	Basin flooding
11)	The load is transferred to the foundat sequence	ion	in framed structure in the following
	a) Beam-column-foundation-slab	b)	Slab-beam-column-foundation
	c) Slab-column-beam-foundation	d)	Column-slab-beam-foundation
12)	The water cement ratio for good strengt	th ar	nd workability should range between
	a) 0.1 to 0.2	b)	0.2 to 0.4
	c) 0.4 to 0.6	d)	0.6 to 0.8
13)	Green building are recommended to		
	a) Use green color	b)	Use farm house
	c) Reduce global warming	d)	Achieve economy
14)	The weight of occupants with their be materials constitute in a		
	a) Dead load	b)	Live load
	c) Static load	d)	Dynamic load
			Set



Seat	
No.	

F.E. (Part – II) (Old CGPA) Examination, 2017 BASIC CIVIL ENGINEERING

Day and Date: Wednesday, 22-11-2017 Marks: 56

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

Instructions: 1) Question No.2 and Question No. 6 are compulsory and attempt any two questions from remaining. (Each Section)

SECTION - I

2. a) What are the sub branches of civil engineering?

2

b) The magnetic bearing observed with a prismatic compass for a closed traverse PQRSP are given below:

8

Line	PQ	QR	RS	SP	
F.B.	198°30′	107°30′	15°00′	219°00′	
B. B.	18°30′	288°30′	192°30′	112°30′	

Draw a rough traverse. Calculate included angles and check for angular error. Calculate corrected bearings. Indicate stations free from local attraction and corrections at other stations.

3. a) Draw a sketch Prismatic compass and label it properly.

2

b) The following consecutive readings were taken with a dumpy level on a 4 m levelling staff on a continuously sloping ground: 0.285, 1.380, 2.345,3.995 0.750, 3.220, 3.785, 0.900, 1.890, 2.300 and 3.330. The distance between every two consecutive ground points was 30 m. The first reading was taken on a point having R.L. 500.000 m. Enter the data in a standard levelling table. Apply Arithmetic checks (Use Rise and Fall method).

7

4. a) Write a short note on sources of water.

4

b) The area of a plan of an old map plotted to a scale of 1 cm = 10 m. Measures 100 cm². The plan is found to have shrunk so that the line originally 10 cm long now measures 9.5 cm, further the 20 m chain used was 8 cm too short. Find the true area of the survey.

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SLR-TJ - 9

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No.	Set

F.E. (Part – II) (Old – CGPA) Examination, 2017 BASIC ELECTRONICS AND COMPUTER PROGRAMMING

Day and Date: Thursday, 23-11-2017 Max. Marks: 70

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

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

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

1. Choose the correct answer:

- 1) To display the digit 9 in seven segment display,
- a) segments e should be off and all other segments should be turned on
 - b) segments e should be on and all other segments should be turned off
 - c) segments c should be off and all other segments should be turned on
 - d) segments c should be on and all other segments should be turned off
- 2) A photo diode is an example of light
 - a) Source
- b) Detector
- c) Coupler
- d) Isolator

- 3) Ripple factor of full wave rectifier is
 - a) 0.048
- b) 0.24
- c) 0.48
- d) 1.21

- 4) The 2's complement of 101001 is
 - a) 010101
- b) 010111
- c) 101001
- d) 010110

- 5) β is the current amplification factor for
 - a) CC configuration

b) CE configuration

c) CB configuration

d) Both a) and c)

6)	The	gauge operates o	n the principle of	photo resistivity.		
	a) Bonded	b)	Unbonded			
	c) Semiconductor	d)	Both a) and b)			
7)	LVDT consists of	seconda	ary and	primary winding.		
	a) one, one	b)	two, two			
	c) two, one	d)	one, two			
		SECTION	– II			
		(Computer Progr	amming)		7	
8)	Diagrammatic or sym	bolic representation	on of a an algorith	m is called	•	
,	a) Data Flow Diagram	•	E-R Diagram			
	c) Flowchart	•	None of these			
9)	9) Printf() belongs to which library of c					
-,	a) stdlib.h	•	stdio.h.			
	c) stdout.h	•	stdoutput.h			
10)	& operator returns of a variable.					
,	a) Name		Memory addres	S		
	c) Value	•	None of the abo			
11)	1) #include is called					
,	a) Preprocessor direct	ctive b	Inclusion directi	ve		
	c) File inclusion direc	·	None of the mer			
12)	I2) What is the size of a char data type in C?					
,				d) 4 bytes		
13)	"%d" access specifier	is used for				
	a) Integer type	b)	Character type			
	c) Floating type	d)	None of the abo	ve		
14)	Break statement is us	ed to				
-	a) Quit a program	b)	Quit the current	iteration		
	c) Both of above	d)	None of above			



Seat	
No.	

F.E. (Part – II) (Old – CGPA) Examination, 2017 BASIC ELECTRONICS AND COMPUTER PROGRAMMING

Day and Date: Thursday, 23-11-2017

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)

2. Solve any four questions.

 $(4 \times 4 = 16)$

Marks: 56

- 1) Perform subtraction using 2' complement
 - i) $(673)_8 (572)_8$
 - ii) $(84)_{16} (2A)_{16}$
- 2) Explain speed measurement technique using photoelectric pick up transducer.
- 3) Explain construction and operation of photo transistor.
- 4) Explain working of transistor as an amplifier.
- 5) Describe the operation of general purpose relay with suitable diagram.
- 3. Solve **any two** questions.

 $(2 \times 6 = 12)$

- Explain working of full wave rectifier with associated waveforms. Compare half wave rectifier, full wave rectifier and bridge rectifier.
- 2) Explain unbonded and bonded strain gauge with neat diagrams.
- 3) Explain with symbol, equation and truth table of following gates:
 - a) NAND
 - b) NOR
 - c) EX-OR
 - d) EX-NOR

SECTION - II

(Computer Programming)

4. Attempt any four:

 $(4 \times 4 = 16)$

- a) What is algorithm? Explain with example.
- b) What are the logical operators used in C? Explain with example.
- c) Explain increment operator (prefix and postfix) with example.
- d) Write a C program to find largest number among user entered three numbers.
- e) What is string? Explain ways to initialize the string.

5. Attempt any two:

 $(2 \times 6 = 12)$

- a) Explain structure concept with sample program to read and display.
- b) What is function? Compare function call by value and call by reference methods.
- c) Write a program for finding a factorial of a given number.

|--|--|--|--|--|--|

Seat	S-4	
No.	Set	Q

I	F.E. (Part BASIC ELECTF	– II) (OId – CG RONICS AND C					
•	Date : Thursday, 2 0.00 a.m. to 1.00 p					Max. Mark	s:70
<i>In</i> :	oi 2) A i D o 3) Fi	No. 1 is computinutes in Answer In Answer In Answer In Answer In Answer In	Boo ctive ntion ind	k Page No. 3. Ea e type questions n, Q.P. Set (P/Q/ icates maximur	s oi R/S	question carrie n Page No. 3 oi 6) on Top of Pa	es nly.
Duration	: 30 Minutes	MCQ/Objective T	уре	Questions		Mark	s:14
		SECTIO	ואר	I		a.r.	• • • •
		(Basic Elec					
4 Observ		•) (i O	11103)			_
1. Choc	ose the correct ans	swer:					7
•	Ripple factor of full i) 0.048	wave rectifier is b) 0.24	c)	0.48	d)	1.21	
•	he 2's complemer a) 010101	nt of 101001 is b) 010111	c)	101001	d)	010110	
3) β	is the current am	plification factor fo	or				
a) CC configuration	า	b)	CE configuratio	n		
С	c) CB configuration	1	d)	Both a) and c)			
4) T	he	gauge operate	S OI	n the principle of	pho	oto resistivity.	
a) Bonded		,	Unbonded			
С) Semiconductor		d)	Both a) and b)			
5) L	VDT consists of	secoi	nda	ry and		primary winding	j .
a	ı) one, one		b)	two, two			
С	two, one		d)	one, two			

- 6) To display the digit 9 in seven segment display,
 - a) segments e should be off and all other segments should be turned on
 - b) segments e should be on and all other segments should be turned off
 - c) segments c should be off and all other segments should be turned on
 - d) segments c should be on and all other segments should be turned off
- 7) A photo diode is an example of light
 - a) Source
- b) Detector
- c) Coupler
- d) Isolator

SECTION - II

(Computer Programming)

8)	& operator returns		of a varia	able.		
	a) Name		b)	Memory add	dress	
	c) Value		d)	None of the	above	
9)	#include is called					
	a) Preprocessor di		,	Inclusion dir		
	c) File inclusion di	rective	d)	None of the	mentio	ned
10)	What is the size of	a char data	type in C	?		
	a) 1 byte	b) 2 bytes	c)	3 bytes	d)	4 bytes
11)	"%d" access speci	fier is used f	or			
,	a) Integer type		b)	Character ty	/pe	
	c) Floating type		•	None of the	•	
12)	Break statement is	used to				
. — ,	a) Quit a program		b)	Quit the cur	rent ite	ration
	c) Both of above		•	None of abo		
13)	Diagrammatic or sy	mbolic repr	esentatio	n of a an algo	orithm	is called
.0,	a) Data Flow Diagr	·		E-R Diagran		io danoa
	c) Flowchart		•	None of the		
	,		•			
14)	Printf() belongs to	which librar				
	a) stdlib.h		,	stdio.h.		
	c) stdout.h		d)	stdoutput.h		



Seat	
No.	

F.E. (Part – II) (Old – CGPA) Examination, 2017 BASIC ELECTRONICS AND COMPUTER PROGRAMMING

Day and Date: Thursday, 23-11-2017

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)

2. Solve any four questions.

 $(4 \times 4 = 16)$

Marks: 56

- 1) Perform subtraction using 2' complement
 - i) $(673)_8 (572)_8$
 - ii) $(84)_{16} (2A)_{16}$
- 2) Explain speed measurement technique using photoelectric pick up transducer.
- 3) Explain construction and operation of photo transistor.
- 4) Explain working of transistor as an amplifier.
- 5) Describe the operation of general purpose relay with suitable diagram.
- 3. Solve **any two** questions.

 $(2 \times 6 = 12)$

- Explain working of full wave rectifier with associated waveforms. Compare half wave rectifier, full wave rectifier and bridge rectifier.
- 2) Explain unbonded and bonded strain gauge with neat diagrams.
- 3) Explain with symbol, equation and truth table of following gates:
 - a) NAND
 - b) NOR
 - c) EX-OR
 - d) EX-NOR

SECTION - II

(Computer Programming)

4. Attempt any four:

 $(4 \times 4 = 16)$

- a) What is algorithm? Explain with example.
- b) What are the logical operators used in C? Explain with example.
- c) Explain increment operator (prefix and postfix) with example.
- d) Write a C program to find largest number among user entered three numbers.
- e) What is string? Explain ways to initialize the string.

5. Attempt any two:

 $(2 \times 6 = 12)$

- a) Explain structure concept with sample program to read and display.
- b) What is function? Compare function call by value and call by reference methods.
- c) Write a program for finding a factorial of a given number.

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F.E. (Part – II) (Old – CGPA) Examination, 2017 BASIC ELECTRONICS AND COMPUTER PROGRAMMING

Day and Date: Thursday, 23-11-2017 Max. Marks: 70

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

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

1.	Choos	e the correct answe	er:	
	a)	s the current amplit CC configuration CB configuration	fication factor for b) CE configuratio d) Both a) and c)	n
	a)	e Bonded Semiconductor	gauge operates on the principle of b) Unbonded d) Both a) and b)	photo resistivity.
	a)	DT consists of one, one two, one	b) two, two d) one, two	primary winding.
	,	. ,	n seven segment display, I be off and all other segments shou	ıld be turned on

b) segments e should be on and all other segments should be turned off
c) segments c should be off and all other segments should be turned on
d) segments c should be on and all other segments should be turned off

SLR-T	J-9	-2-				
5)	A photo diode is an a) Source	example of light b) Detector	c)	Coupler	d)	Isolator
6)	Ripple factor of full a) 0.048	wave rectifier is b) 0.24	c)	0.48	d)	1.21
7)	The 2's complement a) 010101	nt of 101001 is b) 010111	c)	101001	d)	010110
		SECTIO	N -	-		
		(Computer Pro	gra	amming)		-
0)			_	0		7
8)	What is the size of a) 1 byte	a char data type ii b) 2 bytes		? 3 bytes	d)	4 bytes
9)	"%d" access specif a) Integer type c) Floating type	ier is used for		Character type None of the abo	ve	
10)	Break statement is a) Quit a program c) Both of above	used to	,	Quit the current	ite	ration
11)	Diagrammatic or symbolic representation of a an algorithm is calle a) Data Flow Diagram b) E-R Diagram c) Flowchart d) None of these				s called	
12)	Printf() belongs to a) stdlib.h c) stdout.h	which library of c		stdio.h. stdoutput.h		
13)	& operator returns _ a) Name c) Value	of a v	b)	ble. Memory addres None of the abo		
14)	#include is called a) Preprocessor di c) File inclusion dii		,	Inclusion direct None of the me		ned



Seat	
No.	

F.E. (Part – II) (Old – CGPA) Examination, 2017 BASIC ELECTRONICS AND COMPUTER PROGRAMMING

Day and Date: Thursday, 23-11-2017 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)

2. Solve any four questions.

 $(4 \times 4 = 16)$

- 1) Perform subtraction using 2' complement
 - i) $(673)_8 (572)_8$
 - ii) $(84)_{16} (2A)_{16}$
- 2) Explain speed measurement technique using photoelectric pick up transducer.
- 3) Explain construction and operation of photo transistor.
- 4) Explain working of transistor as an amplifier.
- 5) Describe the operation of general purpose relay with suitable diagram.
- 3. Solve **any two** questions.

 $(2 \times 6 = 12)$

- Explain working of full wave rectifier with associated waveforms. Compare half wave rectifier, full wave rectifier and bridge rectifier.
- 2) Explain unbonded and bonded strain gauge with neat diagrams.
- 3) Explain with symbol, equation and truth table of following gates:
 - a) NAND
 - b) NOR
 - c) EX-OR
 - d) EX-NOR

SECTION - II

(Computer Programming)

4. Attempt any four:

 $(4 \times 4 = 16)$

- a) What is algorithm? Explain with example.
- b) What are the logical operators used in C? Explain with example.
- c) Explain increment operator (prefix and postfix) with example.
- d) Write a C program to find largest number among user entered three numbers.
- e) What is string? Explain ways to initialize the string.

5. Attempt any two:

 $(2 \times 6 = 12)$

- a) Explain structure concept with sample program to read and display.
- b) What is function? Compare function call by value and call by reference methods.
- c) Write a program for finding a factorial of a given number.

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F.E. (Part - II) (Old - CGPA) Examination, 2017

•	NICS AND COMPUTER PROGI	RAMMING
Day and Date: Thursday, 23-17 Time: 10.00 a.m. to 1.00 p.m.		Max. Marks: 70
•	o. 1 is compulsory . It should be so tes in Answer Book Page No. 3 . Each nark.	
Don't 3) Figure	ver MCQ/Objective type questions of forget to mention, Q.P. Set (P/Q/R/Ses to the right indicates maximum names suitable data if necessary.	S) on Top of Page.
Duration : 30 Minutes	Q/Objective Type Questions	Marks : 14
	SECTION-I	
	(Basic Electronics)	
1. Choose the correct answer	r:	7
1) The 2's complement of	101001 is	
a) 010101 c) 101001	b) 010111 d) 010110	
2) β is the current amplific	cation factor for	
a) CC configuration	b) CE configuration	
c) CB configuration	d) Both a) and c)	
3) The	gauge operates on the principle of ph	oto resistivity.
a) Bonded	b) Unbonded	
c) Semiconductor	d) Both a) and b)	
4) LVDT consists of	secondary and	primary winding.
a) one, one	b) two, two	
c) two, one	d) one, two	

₹-T	J-9	-2-				
5)	To display the digit a) segments e sho b) segments e sho c) segments c sho d) segments c sho	uld be off and all o uld be on and all o uld be off and all o	the the the	r segments shour segments shour segments shou	uld	be turned off be turned on
6)	A photo diode is an a) Source	example of light b) Detector	c)	Coupler	d)	Isolator
7)	Ripple factor of full a) 0.048	wave rectifier is b) 0.24	c)	0.48	d)	1.21
		SECTIO	N -	- II		
		(Computer Pro	gr	amming)		
8)	#include is calleda) Preprocessor dic) File inclusion dir		,	Inclusion direct		
9)	What is the size of a) 1 byte	a char data type ir b) 2 bytes		? 3 bytes	d)	4 bytes
10)	"%d" access specif a) Integer type c) Floating type	ier is used for	-	Character type None of the abo	ove	
11)	Break statement is a) Quit a program c) Both of above	used to	-	Quit the current	t ite	ration
12)	Diagrammatic or sy a) Data Flow Diagra c) Flowchart	· · · · · · · · · · · · · · · · · · ·	b)	n of a an algorith E-R Diagram None of these	ım i	is called
13)	Printf() belongs to a) stdlib.h	which library of c b) stdio.h.	c)	stdout.h	d)	stdoutput.h

b) Memory address

d) None of the above

14) & operator returns _____ of a variable.

a) Name c) Value



Seat	
No.	

F.E. (Part – II) (Old – CGPA) Examination, 2017 BASIC ELECTRONICS AND COMPUTER PROGRAMMING

-3-

Day and Date: Thursday, 23-11-2017 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)

2. Solve any four questions.

 $(4 \times 4 = 16)$

- 1) Perform subtraction using 2' complement
 - i) $(673)_8 (572)_8$
 - ii) $(84)_{16} (2A)_{16}$
- 2) Explain speed measurement technique using photoelectric pick up transducer.
- 3) Explain construction and operation of photo transistor.
- 4) Explain working of transistor as an amplifier.
- 5) Describe the operation of general purpose relay with suitable diagram.
- 3. Solve **any two** questions.

 $(2 \times 6 = 12)$

- Explain working of full wave rectifier with associated waveforms. Compare half wave rectifier, full wave rectifier and bridge rectifier.
- 2) Explain unbonded and bonded strain gauge with neat diagrams.
- 3) Explain with symbol, equation and truth table of following gates:
 - a) NAND
 - b) NOR
 - c) EX-OR
 - d) EX-NOR

SECTION - II

(Computer Programming)

4. Attempt any four:

 $(4 \times 4 = 16)$

- a) What is algorithm? Explain with example.
- b) What are the logical operators used in C? Explain with example.
- c) Explain increment operator (prefix and postfix) with example.
- d) Write a C program to find largest number among user entered three numbers.
- e) What is string? Explain ways to initialize the string.

5. Attempt any two:

 $(2 \times 6 = 12)$

- a) Explain structure concept with sample program to read and display.
- b) What is function? Compare function call by value and call by reference methods.
- c) Write a program for finding a factorial of a given number.

b) $T = (K \times V)/\Sigma a.s$

d) All of these

c) $T = (K \times V)/(a1.s1 + a1.s2 + ... + a_n.s_n)$

SLR-TJ - 11

Seat	Set	D
No.	Set	

F.E. (Part	- II) (OID CGP ENGINEERING	A) Examination, G PHYSICS	2017			
Day and Date : Saturday, 25-1	1-2017			Max. Marks: 70		
Time: 10.00 a.m. to 1.00 p.m.						
Instructions:1) Ma	ke suitable assum	ptions, if necessary .				
2) Fig.	ures to the right in	dicate full marks.				
•	•	ry . It should be solve				
	•	No. 3 . Each questio				
,	•	tive type questions	_	•		
	_	ion, Q.P. Set (P/Q/R	(/S) on 1	op of Page.		
Constants: 1) Avo						
•	locity of light, c = 3. arge of electron, e					
,						
	MCQ/Objective T	ype Questions		Marks : 14		
Duration : 30 Minutes				Marks: 14		
Choose the correct answer						
Accepter type semico						
a) 3	b) 4	c) 5	d) 6			
2) The Hall coefficient (F	R _H) is for	N-type semiconductor	or.			
a) positive		b) negaive				
c) no sign		d) both a and b				
3) The Miller indices of the	he plane parallel to	o x and y axes are				
a) (1 0 0)	b) (0 1 0)	c) (0 0 1)	d) (1 1	1)		
4) The number of atoms	4) The number of atoms per unit cell for FCC structure is					
a) 01	b) 02	c) 03	d) 04			
5) Sabine's formula is	(symbols	have their usual me	aning).			
a) $T = (K \times V)/A$						



6)	Ultrasonic waves produced in a medium can be detected by					
	a) A telephone		b)	Kundt's tube		
	c) Quinck's tube		d)	Spectrometer		
7)	Einstein's mass ene	rgy relation (E = mc	²) s	hows that		
	a) mass disappears	s to reappear as ene	ergy	,		
	b) energy disappea	rs to reappear as m	ass	3		
	c) mass and energy		rms	s of the same entit	ty	
	d) all the above stat					
8)	The resolving power	r of a grating is				
	a) $\lambda/d\lambda$	b) dλ/λ	c)	$nNd \lambda$	d)	n(n+1)
9)	The wave front corre					
	a) plane	b) spherical	c)	cylindrical	d)	elliptical
10)	Stimulated absorption	on process is mathe	ma	tically represented	d b	y equation
	a) $A + h\gamma \rightarrow A^*$,	$A^* + h\gamma \rightarrow A + 2$	•	
	c) $A^* \rightarrow A + h\gamma$		d)	$A^* + h\gamma \rightarrow A + h$	η γ	
11)	The hologram record	ds of the	obj	ect.		
	a) Only intensity va	riation				
	b) Only phase distri	ibution				
	c) Both intensity va	riation and phase d	istri	bution		
	d) None of these					
12)	Control rods used in	nuclear reactors ar	e m	ade up of		
	a) graphite	b) plutonium	c)	boron	d)	iron
13)	In optical fibre the re	fractive index of clac	ddir	ıg is than th	ne r	efractive index of
	core.					
	a) less	b) greater	c)	equal	d)	none of these
14)	The chirality of armo	chair CNT is				
	a) (a, 0)	b) (a, b)	c)	(a, a)	d)	(0, b)



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No.	

F.E. (Part – II) (Old CGPA) Examination, 2017 ENGINEERING PHYSICS

Day and Date: Saturday, 25-11-2017 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) Explain formation of energy bands in solids.
- b) Calculate no. of atoms per unit cell for SC, BCC and FCC crystal.
- c) State properties of ultrasonic waves.
- d) Derive the expression of time dilation.
- e) Define the term miller indices. How they are determined?
- f) A classroom has dimensions $25 \times 20 \times 15$ m³. The reverberation time is 2.5 sec, calculate the total absorption of its surfaces and the average absorption coefficient.
- g) What is speed of clock to keep correct time with respect to an observer, so that it may seem to lose 1 min per day?
- 3. What is Hall effect? Derive the relation for Hall voltage and Hall coefficient.

5 8

- 4. Attempt any two of the following:
 - a) Define atomic packing factor and obtain its values for SC, BCC and FCC crystals.
 - b) Derive Einstein's expression for mass-energy equivalence.
 - c) Explain the factors affecting the architectural acoustics and their remedies.

SECTION - II

5. Attempt any five of the following:

15

- a) Explain with diagram
 - i) Stimulated emission
 - ii) Spontaneous emission.

Set P



- b) Distinguish between Fresnel and Fraunhoffer diffraction.
- c) State application of LASER beam.
- d) Explain nuclear chain reaction with neat diagram.
- e) State the applications of nanotechnology.
- f) Determine the acceptance angle and numerical aperture of a step index fiber when the core refractive index $n_1 = 1.4$ and the cladding refractive index $n_2 = 1.38$.
- g) Monochromatic light of wavelength 6560A° falls normally on a grating. The spectral line is diffracted at an angle of 19.15° from the normal in first order. Find the grating element.
- 6. Obtain the expression for acceptance angle, numerical aperture and fractional refractive index change of an optical fiber.

OR

Describe He-Ne laser with its construction and working.

7. Attempt any two of the following:

- a) Derive an expression for the resolving power of a plane diffraction grating.
- b) What is Holography? Explain construction and reconstruction of hologram with neat diagram.
- c) Explain in detail classification of optical fiber cable.

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F.E. (Part – II) (Old CGPA) Examination, 2017 ENGINEERING PHYSICS

Day and Date: Saturday, 25-11-2017 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., $N = 6.02 \times 10^{26}$ /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	on : 30 Minutes				Marks: 14
1. C	hoose the correct ans	wer:			
1) The resolving power	er of a grating is			
	a) $\lambda/d\lambda$	b) $d\lambda/\lambda$	c) $nNd\lambda$	d) n(n+1)	
2	2) The wave front corr	esponding to e-ray	is		
	a) plane	b) spherical	c) cylindrical	d) elliptical	
3	3) Stimulated absorpti	on process is math	ematically represen	ted by equation	l
	a) $A + h\gamma \rightarrow A^*$		b) $A^* + h\gamma \rightarrow A$	+ 2h γ	
	c) $A^* \rightarrow A + h\gamma$		d) $A^* + h\gamma \rightarrow A$	+ h γ	
4) The hologram recor	rds of the	e object.		

- a) Only intensity variation
- b) Only phase distribution
- c) Both intensity variation and phase distribution
- d) None of these
- 5) Control rods used in nuclear reactors are made up of
 - a) graphite b) plutonium c) boron

d) iron

6)	In optical fibre the ref	fractive index of clac	ldin	g is than th	ne r	efractive index of
	a) less	b) greater	c)	equal	d)	none of these
7)	The chirality of armo	hair CNT is				
	a) (a, 0)	b) (a, b)	c)	(a, a)	d)	(0, b)
8)	Accepter type semic	onductor is formed	by a	adding impurity of	va	lency
	a) 3	b) 4	c)	5	d)	6
9)	The Hall coefficient ((R _H) is for	N-t	ype semiconducto	or.	
	a) positive		b)	negaive		
	c) no sign		d)	both a and b		
10)	The Miller indices of	the plane parallel to	X C	and y axes are		
	a) (1 0 0)	b) (0 1 0)	c)	(0 0 1)	d)	(1 1 1)
11)	The number of atom	s per unit cell for FC	CC s	structure is		
	a) 01	b) 02	c)	03	d)	04
12)	Sabine's formula is _	(symbols	ha	ve their usual me	ani	ng).
	a) $T = (K \times V)/A$					
	b) $T = (K \times V)/\sum a.s$					
	c) $T = (K \times V)/(a1.s)$	1 + a1.s2 + + a _n .s	_n)			
	d) All of these					
13)	Ultrasonic waves pro	oduced in a medium	ca	n be detected by		
	a) A telephone		b)	Kundt's tube		
	c) Quinck's tube		d)	Spectrometer		
14)	Einstein's mass ene	rgy relation (E = mc	²) s	hows that		
	a) mass disappears	• •	0,			
	b) energy disappear	• •			ı	
	c) mass and energy		rms	s of the same enti	y	
	d) all the above stat	ements are correct				



Seat	
No.	

F.E. (Part – II) (Old CGPA) Examination, 2017 ENGINEERING PHYSICS

Day and Date: Saturday, 25-11-2017 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) Explain formation of energy bands in solids.
- b) Calculate no. of atoms per unit cell for SC, BCC and FCC crystal.
- c) State properties of ultrasonic waves.
- d) Derive the expression of time dilation.
- e) Define the term miller indices. How they are determined?
- f) A classroom has dimensions $25 \times 20 \times 15$ m³. The reverberation time is 2.5 sec, calculate the total absorption of its surfaces and the average absorption coefficient.
- g) What is speed of clock to keep correct time with respect to an observer, so that it may seem to lose 1 min per day?
- 3. What is Hall effect? Derive the relation for Hall voltage and Hall coefficient.

5

4. Attempt any two of the following:

8

- a) Define atomic packing factor and obtain its values for SC, BCC and FCC crystals.
- b) Derive Einstein's expression for mass-energy equivalence.
- c) Explain the factors affecting the architectural acoustics and their remedies.

SECTION - II

5. Attempt **any five** of the following:

15

- a) Explain with diagram
 - i) Stimulated emission
 - ii) Spontaneous emission.

Set Q



- b) Distinguish between Fresnel and Fraunhoffer diffraction.
- c) State application of LASER beam.
- d) Explain nuclear chain reaction with neat diagram.
- e) State the applications of nanotechnology.
- f) Determine the acceptance angle and numerical aperture of a step index fiber when the core refractive index $n_1 = 1.4$ and the cladding refractive index $n_2 = 1.38$.
- g) Monochromatic light of wavelength 6560A° falls normally on a grating. The spectral line is diffracted at an angle of 19.15° from the normal in first order. Find the grating element.
- 6. Obtain the expression for acceptance angle, numerical aperture and fractional refractive index change of an optical fiber.

OR

Describe He-Ne laser with its construction and working.

7. Attempt any two of the following:

- a) Derive an expression for the resolving power of a plane diffraction grating.
- b) What is Holography? Explain construction and reconstruction of hologram with neat diagram.
- c) Explain in detail classification of optical fiber cable.



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F.E. (Part – II) (Old CGPA) Examination, 2017 **ENGINEERING PHYSICS**

Day and Date: Saturday, 25-11-2017 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., $N = 6.02 \times 10^{26}$ /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 1. Choose the correct answer:

- - 1) Sabine's formula is _____ (symbols have their usual meaning).
 - a) $T = (K \times V)/A$
 - b) $T = (K \times V)/\Sigma$ a.s
 - c) $T = (K \times V)/(a1.s1 + a1.s2 + ... + a_n.s_n)$
 - d) All of these
 - 2) Ultrasonic waves produced in a medium can be detected by
 - a) A telephone

b) Kundt's tube

c) Quinck's tube

- d) Spectrometer
- 3) Einstein's mass energy relation ($E = mc^2$) shows that
 - a) mass disappears to reappear as energy
 - b) energy disappears to reappear as mass
 - c) mass and energy are two different forms of the same entity
 - d) all the above statements are correct
- 4) The resolving power of a grating is
 - a) $\lambda/d\lambda$
- b) $d\lambda/\lambda$
- c) nNdλ
- d) n(n+1)



5)	5) The wave front corresponding to e-ray is					
	a) plane	b) spherical	c) cylindrical	d) elliptical		
6)	Stimulated absorption	on process is mathe	matically represente	d by equation		
	a) $A + h\gamma \rightarrow A^*$		b) $A^* + h\gamma \rightarrow A + 2$	2hγ		
	c) $A^* \rightarrow A + h\gamma$		d) $A^* + h\gamma \rightarrow A + b$	hγ		
7)	The hologram record	ds of the	object.			
	a) Only intensity va	riation				
	b) Only phase distri	ibution				
	c) Both intensity va	riation and phase di	istribution			
	d) None of these					
8)	Control rods used in	nuclear reactors are	e made up of			
	a) graphite	b) plutonium	c) boron	d) iron		
9)	In optical fibre the re-	fractive index of clac	dding is than th	ne refractive index of		
	core.					
	a) less	b) greater	c) equal	d) none of these		
10)	The chirality of armo	chair CNT is				
	a) (a, 0)	b) (a, b)	c) (a, a)	d) (0, b)		
11)	Accepter type semiconductor is formed by adding impurity of valency					
	a) 3	b) 4	c) 5	d) 6		
12)	The Hall coefficient	(R _H) is for	N-type semiconduct	or.		
	a) positive		b) negaive			
	c) no sign		d) both a and b			
13)	The Miller indices of	the plane parallel to	o x and y axes are			
	a) (1 0 0)	b) (0 1 0)	c) (0 0 1)	d) (1 1 1)		
14)						
	a) 01	b) 02	c) 03	d) 04		



Seat	
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F.E. (Part – II) (Old CGPA) Examination, 2017 ENGINEERING PHYSICS

Day and Date: Saturday, 25-11-2017 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) Explain formation of energy bands in solids.
- b) Calculate no. of atoms per unit cell for SC, BCC and FCC crystal.
- c) State properties of ultrasonic waves.
- d) Derive the expression of time dilation.
- e) Define the term miller indices. How they are determined?
- f) A classroom has dimensions $25 \times 20 \times 15$ m³. The reverberation time is 2.5 sec, calculate the total absorption of its surfaces and the average absorption coefficient.
- g) What is speed of clock to keep correct time with respect to an observer, so that it may seem to lose 1 min per day?
- 3. What is Hall effect? Derive the relation for Hall voltage and Hall coefficient.

5

8

- 4. Attempt any two of the following:
 - a) Define atomic packing factor and obtain its values for SC, BCC and FCC crystals.
 - b) Derive Einstein's expression for mass-energy equivalence.
 - c) Explain the factors affecting the architectural acoustics and their remedies.

SECTION - II

5. Attempt any five of the following:

15

- a) Explain with diagram
 - i) Stimulated emission
 - ii) Spontaneous emission.

Set R



- b) Distinguish between Fresnel and Fraunhoffer diffraction.
- c) State application of LASER beam.
- d) Explain nuclear chain reaction with neat diagram.
- e) State the applications of nanotechnology.
- f) Determine the acceptance angle and numerical aperture of a step index fiber when the core refractive index $n_1 = 1.4$ and the cladding refractive index $n_2 = 1.38$.
- g) Monochromatic light of wavelength 6560A° falls normally on a grating. The spectral line is diffracted at an angle of 19.15° from the normal in first order. Find the grating element.
- 6. Obtain the expression for acceptance angle, numerical aperture and fractional refractive index change of an optical fiber.

OR

Describe He-Ne laser with its construction and working.

7. Attempt any two of the following:

- a) Derive an expression for the resolving power of a plane diffraction grating.
- b) What is Holography? Explain construction and reconstruction of hologram with neat diagram.
- c) Explain in detail classification of optical fiber cable.



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F.E. (Part – II) (Old CGPA) Examination, 2017 ENGINEERING PHYSICS

Max. Marks: 70
Max. Marks: 7

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

5) The chirality of armchair CNT is

b) (a, b)

a) (a, 0)

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., $N = 6.02 \times 10^{26}$ /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	n : 30 Minutes	-		Marks: 14	
1. Cho	oose the correct answ	ver:			
1)	Stimulated absorption process is mathematically represented by equation				
	a) $A + h\gamma \rightarrow A^*$		b) $A^* + h\gamma \rightarrow A$	+ 2hγ	
	c) $A^* \rightarrow A + h\gamma$		d) $A^* + h\gamma \rightarrow A$	+ hγ	
2)	The hologram record	ds of the	e object.		
	a) Only intensity va	riation			
	b) Only phase distri	bution			
	c) Both intensity va	riation and phase	distribution		
	d) None of these				
3)	Control rods used in	nuclear reactors a	are made up of		
	a) graphite	b) plutonium	c) boron	d) iron	
4)	In optical fibre the reformer.	fractive index of cla	adding is thar	n the refractive index of	
	a) less	b) greater	c) equal	d) none of these	

c) (a, a)

d) (0, b)



6)	Accepter type semiconductor is formed by adding impurity of valency					
	a) 3	b) 4	c) 5	d) 6		
7)	The Hall coefficient (R _H) is for	N-type semiconduct	or.		
	a) positive		b) negaive			
	c) no sign		d) both a and b			
8)	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)		
9)	The number of atom	s per unit cell for FC	C structure is			
	a) 01	b) 02	c) 03	d) 04		
10)	Sabine's formula is _	(symbols	have their usual me	aning).		
	a) $T = (K \times V)/A$					
	b) $T = (K \times V)/\Sigma a.s$					
	c) $T = (K \times V)/(a1.s)$	1 + a1.s2 + + a _n .s	_n)			
	d) All of these					
11)) Ultrasonic waves produced in a medium can be detected by					
	a) A telephone		b) Kundt's tube			
	c) Quinck's tube		d) Spectrometer			
12)	Einstein's mass energy relation ($E = mc^2$) shows that					
	a) mass disappears	to reappear as ene	rgy			
	b) energy disappea	• •				
	c) mass and energy		rms of the same enti	ty		
10\	d) all the above statThe resolving power					
13)			a) pNd i	d\ n(n i 1)		
4 4\	a) $\lambda/d\lambda$	b) $d\lambda/\lambda$	c) nNdλ	d) n(n+1)		
14)	The wave front corre			d) alliptical		
	a) plane	b) spherical	c) cylindrical	d) elliptical		



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F.E. (Part – II) (Old CGPA) Examination, 2017 ENGINEERING PHYSICS

Day and Date: Saturday, 25-11-2017 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) Explain formation of energy bands in solids.
- b) Calculate no. of atoms per unit cell for SC, BCC and FCC crystal.
- c) State properties of ultrasonic waves.
- d) Derive the expression of time dilation.
- e) Define the term miller indices. How they are determined?
- f) A classroom has dimensions $25 \times 20 \times 15$ m³. The reverberation time is 2.5 sec, calculate the total absorption of its surfaces and the average absorption coefficient.
- g) What is speed of clock to keep correct time with respect to an observer, so that it may seem to lose 1 min per day?
- 3. What is Hall effect? Derive the relation for Hall voltage and Hall coefficient.

5

4. Attempt any two of the following:

8

- a) Define atomic packing factor and obtain its values for SC, BCC and FCC crystals.
- b) Derive Einstein's expression for mass-energy equivalence.
- c) Explain the factors affecting the architectural acoustics and their remedies.

SECTION - II

5. Attempt any five of the following:

- a) Explain with diagram
 - i) Stimulated emission
 - ii) Spontaneous emission.



- b) Distinguish between Fresnel and Fraunhoffer diffraction.
- c) State application of LASER beam.
- d) Explain nuclear chain reaction with neat diagram.
- e) State the applications of nanotechnology.
- f) Determine the acceptance angle and numerical aperture of a step index fiber when the core refractive index $n_1 = 1.4$ and the cladding refractive index $n_2 = 1.38$.
- g) Monochromatic light of wavelength 6560A° falls normally on a grating. The spectral line is diffracted at an angle of 19.15° from the normal in first order. Find the grating element.
- 6. Obtain the expression for acceptance angle, numerical aperture and fractional refractive index change of an optical fiber.

OR

Describe He-Ne laser with its construction and working.

7. Attempt any two of the following:

- a) Derive an expression for the resolving power of a plane diffraction grating.
- b) What is Holography? Explain construction and reconstruction of hologram with neat diagram.
- c) Explain in detail classification of optical fiber cable.

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Max. Marks: 70

F.E. (Part – II) (Old) Examination, 2017 ENGINEERING CHEMISTRY (CGPA)

Day and Date : Monday, 27-11-2017

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 option.

14

- 1) EDTA method of determining hardness of water can be used to determine
 - a) All types of hardness
 - b) Temporary hardness only
 - c) Permanent hardness only
 - d) Alkaline hardness only
- 2) Coagulants help in the setting of
 - a) Dissolved impurities only
 - b) Fine suspended matter only
 - c) Colloidal particles only
 - d) Both b) and c)
- 3) Anodic coating protects the underlying metal
 - a) Due to its noble character
 - b) Sacrificially
 - c) Due to its high electrode potential
 - d) Due to both b) and c)
- 4) Suitable lubricant for delicate instruments is
 - a) greases

b) graphite

c) hazel nut oil

- d) all of these
- 5) Which of the following is condensed phase rule equation?

a)
$$F = C - P + 1$$

b)
$$F = C - P + 2$$

c)
$$F = C + P - 2$$

d)
$$C = F - P + 2$$



6)	Metal at the top of electromotive series is						
	a) most stable	b) least active					
	c) most noble	d) most active					
7)	ater, it is called						
	a) aquadag	b) oildag					
	c) blended oil	d) all of these					
8)	Most commonly used vulcanizing	g agent is					
	a) S ₈	b) Cl ₂					
	c) ZnO	d) All of these					
9)	Plastic which does not soften on	heating is called as					
	a) Thermo softening plastic	b) Thermosetting plastic					
	c) Thermo unit plastic	d) Thermoplastic					
10)	The lowest calorific value is of						
,	a) Peat	b) Lignite					
	c) Bituminous	d) Anthracite					
11)	Anthracite						
,	a) Lowest rank coal	b) Highest rank coal					
	c) Both a) and b)	d) Contains no moisture					
12)	Which of the following gas cann	not be used as carrier gas for gas liqui	id				
	chromatography?						
	a) O_2 b) N_2	c) Ar d) He					
13)	Major component of Portland cen	nent is					
,	a) Tri calcium silicate	b) CaO					
	c) MgO	d) CaSO₄					
14)	UV absorbing component in optic	· T					
,	a) Barium oxide	b) Boron oxide					
	c) Cerium oxide	d) Sodium oxide					
	o, conamonac	a, coalantonac					



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F.E. (Part – II) (Old) Examination, 2017 **ENGINEERING CHEMISTRY (CGPA)**

Day and Date: Monday, 27-11-2017 Time: 10.00 a.m. to 1.00 p.m. Marks: 56

Time :	me: 10.00 a.m. to 1.00 p.m.					
		SECTION	ON-I			
2. A)	 A) Attempt any two: a) Define hardness. Explain reverse osmosis process. b) Describe water system with phase diagram. c) On analysis water was found to contain following impurities expressed in ppm. 					
	Impurities	Amount	Mol. Wt.			
	$Ca(HCO_3)_2$	70.00	162			
	$Mg (HCO_3)_2$	55.00	146			
	CaSO ₄	33.00	136			
	CaCl ₂	20.00	111			
>		ermanent and	total hardness of water.	6		
В)	 B) Attempt any two: a) Explain mechanism of extreme pressure lubrication. b) Define corrosion. Explain hydrogen evolution mechanism of corrosion. c) Write a short note on metal cladding. 					
3. A)	A) i) Write a note on solid lubricatns. ii) Define BOD. How will you determine the BOD of water?					
	OR					
Α	A) i) What are the merits and demerits of phase rule? ii) Define lubricant. Explain functions of lubricants.					
В)	B) Attempt any two: i) Explain Galvanization process of prevention of corrosion. ii) How will you select lubricant for a) Gears b) Transformers? iii) Explain scale and sludge formation in boilers.					

SECTION - II

4. A) Attempt any two:

8

- i) Define propellant. Explain different types of propellant.
- ii) Define conductive polymer. Write applications of conductive polymers.
- iii) During the determination of calorific value of solid fuel by Bomb calorimeter the following result were obtained.

a) Water equivalent of the calorimeter = 570 gm

b) Water taken in the calorimeter = 1500 gm

c) Observed rise in temp = 3.70° C

d) Acid correction = 0.5 kcal. e) Fuse Wire correction = 4.20 cal.

f) Cooling correction = 0.05° C

g) Latent Heat of Steam = 587 cal/gm h) % of hydrogen = 6.5%

i) Weight of solid fuel = 1.650 gm

Calculate the high calorific value and low calorific value of the solid fuel.

B) Solve any two:

6

2

4

- i) Explain compound constituents of cement.
- ii) Write properties and application steel.
- iii) Write difference between thermosetting and thermo softening plastics.
- 5. A) i) Write the chemical reaction involved in Vulcanization of natural rubber.
 - ii) How much $CaCl_2$ is required to prepare 250 ml of 0.05 N and 0.5 N aqueous solution? (Mol Wt of $CaCl_2 = 111$).

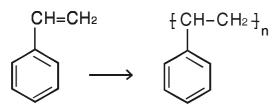
OR

i) Define chromatography. Explain instrumentation of GLC.

4

ii) Calculate degree of polymerization of polystyrene having mol. wt 3200. (At. wt of C = 12 Cl = 35.5, H = 1)

2



B) Attempt any two:

- i) Define glass. Explain manufacturing of glass.
- ii) Explain properties and application Buna-S and epoxy resin.
- iii) Define Coal. Explain different types of coal.

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	F.E.	(Part – II) GINEERINO		•		
-	and Date : Monday, 2 e : 10.00 a.m. to 1.00				Max. Mark	s:70
	2)	minutes in Al one mark. Answer MC 0	nswer Book F Q/Objective	Page No. 3. E type questi	e solved in first 3 ach question carrie ons on Page No. et (P/Q/R/S) on To	es 3
D		MCQ/Obje	ctive Type Q	uestions		4.4
Dura	ation : 30 Minutes				Mark	s: 14
1.	Choose the correct o	ption.				14
	 Most commonly to a) S₈ c) ZnO Plastic which does a) Thermo softer c) Thermo unit p 	es not soften on	b) Cl d) Al on heating is b) Th	of these	plastic	
	 3) The lowest caloriante a) Peat c) Bituminous 4) Anthracite a) Lowest rank control b) Both a) and b) 	oal	b) Li _t d) Ai b) Hi	gnite nthracite ighest rank c ontains no m		
	5) Which of the foll chromatography a) O ₂	owing gas c	,	ed as carrie		d
	6) Major component a) Tri calcium sil c) MgO	of Portland o	ement is b) Ca		,	
	7) UV absorbing cora) Barium oxidec) Cerium oxide	mponent in op	otical glass is b) Bo	-		



- 8) EDTA method of determining hardness of water can be used to determine
 - a) All types of hardness
 - b) Temporary hardness only
 - c) Permanent hardness only
 - d) Alkaline hardness only
- 9) Coagulants help in the setting of
 - a) Dissolved impurities only
 - b) Fine suspended matter only
 - c) Colloidal particles only
 - d) Both b) and c)
- 10) Anodic coating protects the underlying metal
 - a) Due to its noble character
 - b) Sacrificially
 - c) Due to its high electrode potential
 - d) Due to both b) and c)
- 11) Suitable lubricant for delicate instruments is
 - a) greases

b) graphite

c) hazel nut oil

- d) all of these
- 12) Which of the following is condensed phase rule equation?
 - a) F = C P + 1

b) F = C - P + 2

c) F = C + P - 2

- d) C = F P + 2
- 13) Metal at the top of electromotive series is
 - a) most stable

b) least active

c) most noble

- d) most active
- 14) When graphite is dispersed in water, it is called
 - a) aquadag

b) oildag

c) blended oil

d) all of these



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F.E. (Part – II) (Old) Examination, 2017 **ENGINEERING CHEMISTRY (CGPA)**

Day and Date: Monday, 27-11-2017 Marks: 56

•	,	10.00 a.m. to 1.00 p	Warto . oo	•		
			SECT	ΓΙΟN – I		
2.	A)	 A) Attempt any two: a) Define hardness. Explain reverse osmosis process. b) Describe water system with phase diagram. c) On analysis water was found to contain following impurities expressed in ppm. 				3
		Impurities	Amount	Mol. Wt.		
		$Ca(HCO_3)_2$	70.00	162		
		$Mg (HCO_3)_2$	55.00	146		
		CaSO ₄	33.00	136		
		CaCl ₂	20.00	111		
		Calculate temporar	y, permanent ar	nd total hardness o	f water.	
	B)	 Attempt any two: a) Explain mechanism of extreme pressure lubrication. b) Define corrosion. Explain hydrogen evolution mechanism of corrosion. c) Write a short note on metal cladding. 				
3.	A)	i) Write a note on	solid lubricatns.		3	3
	ii) Define BOD. How will you determine the BOD of water?					3
		C)R			
A) i) What are the merits and demerits of phase rule?					3	3
	ii) Define lubricant. Explain functions of lubricants.					3
	 B) Attempt any two: i) Explain Galvanization process of prevention of corrosion. ii) How will you select lubricant for a) Gears b) Transformers? 					3
		iii) Explain scale ar	nd sludge format	ion in boilers.		
					0-4-0	

SECTION - II

4. A) Attempt any two:

8

- i) Define propellant. Explain different types of propellant.
- ii) Define conductive polymer. Write applications of conductive polymers.
- iii) During the determination of calorific value of solid fuel by Bomb calorimeter the following result were obtained.
 - a) Water equivalent of the calorimeter = 570 gm
 - b) Water taken in the calorimeter = 1500 gm
 - c) Observed rise in temp = 3.70° C
 - d) Acid correction = 0.5 kcal.
 - e) Fuse Wire correction = 4.20 cal.
 - f) Cooling correction = 0.05° C
 - g) Latent Heat of Steam = 587 cal/gm
 - h) % of hydrogen = 6.5%
 - i) Weight of solid fuel = 1.650 gm

Calculate the high calorific value and low calorific value of the solid fuel.

B) Solve any two:

6

- i) Explain compound constituents of cement.
- ii) Write properties and application steel.
- iii) Write difference between thermosetting and thermo softening plastics.
- 5. A) i) Write the chemical reaction involved in Vulcanization of natural rubber.
- 2

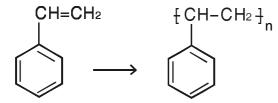
4

ii) How much $CaCl_2$ is required to prepare 250 ml of 0.05 N and 0.5 N aqueous solution? (Mol Wt of $CaCl_2 = 111$).

OR

- i) Define chromatography. Explain instrumentation of GLC.
- 4
- ii) Calculate degree of polymerization of polystyrene having mol. wt 3200.
 - (At. wt of C = 12 CI = 35.5, H = 1)

2



B) Attempt any two:

- i) Define glass. Explain manufacturing of glass.
- ii) Explain properties and application Buna-S and epoxy resin.
- iii) Define Coal. Explain different types of coal.

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SLR-TJ - 12

F.E. (Part – II) (Old) Examination, 2017 **ENGINEERING CHEMISTRY (CGPA)**

Day and Date: Monday, 27-11-2017 Max. Marks: 70

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

7) Anthracite

a) Lowest rank coal

c) Both a) and b)

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

b) Highest rank coal

d) Contains no moisture

	only. Don't forget to i of Page.	nention, Q.P. Set (P/Q/R/S) on Top
Duration : 30 Minutes	MCQ/Objective Typ	e Questions Marks : 14
a) F = C - P + c) F = C + P - 2	lowing is condensed pha 1 b 2 d of electromotive series	F = C - P + 2 C = F - P + 2
c) most noble	d is dispersed in water, it i b	most active
4) Most commonly a) S ₈ c) ZnO		is Cl ₂ All of these
5) Plastic which doa) Thermo softec) Thermo unit	• .	g is called as Thermosetting plastic Thermoplastic
6) The lowest caloa) Peatc) Bituminous	b	Lignite Anthracite



8)	Which of the following gas cannot be chromatography?	e used as	carrier gas	for gas liquid
	a) O ₂ b) N ₂	c) Ar	d) H	Не
9)	Major component of Portland cement			
	a) Tri calcium silicate	b) CaO		
10\	c) MgO	d) CaSO ₄		
10)	UV absorbing component in optical gl a) Barium oxide	ass is b) Boron c	vida	
	c) Cerium oxide	d) Sodium		
11)	EDTA method of determining hardness	s of water o	can be used t	o determine
	a) All types of hardness			
	b) Temporary hardness only			
	c) Permanent hardness only			
	d) Alkaline hardness only			
12)	Coagulants help in the setting of			
	a) Dissolved impurities onlyb) Fine suspended matter only			
	c) Colloidal particles only			
	d) Both b) and c)			
13)	Anodic coating protects the underlying	g metal		
,	a) Due to its noble character			
	b) Sacrificially			
	c) Due to its high electrode potential			
	d) Due to both b) and c)			
14)	Suitable lubricant for delicate instrum			
	a) greases	b) graphite		
	c) hazel nut oil	d) all of th	U SE	



Seat	
No.	

F.E. (Part – II) (Old) Examination, 2017 ENGINEERING CHEMISTRY (CGPA)

Day and Date: Monday, 27-11-2017 Marks: 56

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

rime:		10.00 a.m. to 1.00 p.m.					
			SECTION	DN – I			
2.	A)	 Attempt any two: a) Define hardness. Explain reverse osmosis process. b) Describe water system with phase diagram. c) On analysis water was found to contain following impurities expressed in ppm. 					
		Impurities A	mount	Mol. Wt.			
		\ 3/2	70.00	162			
		J \ J/Z	55.00	146			
		4	33.00	136			
		۷	20.00	111			
			Calculate temporary, permanent and total hardness of water.				
	B)	Attempt any two:			6		
		a) Explain mechanism ofb) Define corrosion. Expc) Write a short note on	olain hydroge	n evolution mechanism of corrosion.			
3.	A)	i) Write a note on solid	lubricatns.		3		
	,	ii) Define BOD. How wil	l you determi	ne the BOD of water?	3		
		OR					
	A)	i) What are the merits a	and demerits	of phase rule ?	3		
	,	ii) Define lubricant. Exp		•	3		
	B)	Attempt any two:			8		
	,	i) Explain Galvanization	n process of p	prevention of corrosion.			
		ii) How will you select lu	ubricant for				
		a) Gears					
		b) Transformers?					
		iii) Explain scale and slu	dge formatio	n in boilers.			

SECTION - II

4. A) Attempt any two:

8

- i) Define propellant. Explain different types of propellant.
- ii) Define conductive polymer. Write applications of conductive polymers.
- iii) During the determination of calorific value of solid fuel by Bomb calorimeter the following result were obtained.

a) Water equivalent of the calorimeter = 570 gm

b) Water taken in the calorimeter = 1500 gm

c) Observed rise in temp = 3.70° C

d) Acid correction = 0.5 kcal. e) Fuse Wire correction = 4.20 cal.

f) Cooling correction = 0.05° C

g) Latent Heat of Steam = 587 cal/gm

h) % of hydrogen = 6.5%

i) Weight of solid fuel = 1.650 gm

Calculate the high calorific value and low calorific value of the solid fuel.

B) Solve any two:

6

- i) Explain compound constituents of cement.
- ii) Write properties and application steel.
- iii) Write difference between thermosetting and thermo softening plastics.
- 5. A) i) Write the chemical reaction involved in Vulcanization of natural rubber.
 - ber. **2**
 - ii) How much $CaCl_2$ is required to prepare 250 ml of 0.05 N and 0.5 N aqueous solution? (Mol Wt of $CaCl_2 = 111$).

OR

i) Define chromatography. Explain instrumentation of GLC.

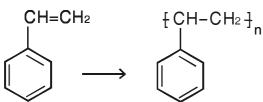
4

4

2

ii) Calculate degree of polymerization of polystyrene having mol. wt 3200.

(At. wt of C = 12 CI = 35.5, H = 1)



B) Attempt any two:

- i) Define glass. Explain manufacturing of glass.
- ii) Explain properties and application Buna-S and epoxy resin.
- iii) Define Coal. Explain different types of coal.

chromatography?

a) Barium oxide

c) Cerium oxide

a) Tri calcium silicate

a) All types of hardnessb) Temporary hardness onlyc) Permanent hardness onlyd) Alkaline hardness only

a) O_2

c) MgO

b) N₂

4) Major component of Portland cement is

5) UV absorbing component in optical glass is

SLR-TJ - 12

Seat No.		Set S
) Examination, 2017 HEMISTRY (CGPA)
•	nd Date : Monday, 27-11-2017 : 10.00 a.m. to 1.00 p.m.	Max. Marks : 70
	minutes in Answe one mark. 2) Answer MCQ/Ob	oulsory. It should be solved in first 30 or Book Page No. 3. Each question carries ojective type questions on Page No. 3 to mention, Q.P. Set (P/Q/R/S) on Top
Durati	MCQ/Objective ion: 30 Minutes	Type Questions Marks: 14
1. C	choose the correct option.	14
ı	The lowest calorific value is ofa) Peatb) Bituminous	b) Lignited) Anthracite
	2) Anthracite a) Lowest rank coal c) Both a) and b)	b) Highest rank coal d) Contains no moisture
3	3) Which of the following gas cannot	t be used as carrier gas for gas liquid

c) Ar

b) CaOd) CaSO₄

6) EDTA method of determining hardness of water can be used to determine

b) Boron oxided) Sodium oxide

d) He



- 7) Coagulants help in the setting of
 - a) Dissolved impurities only
 - b) Fine suspended matter only
 - c) Colloidal particles only
 - d) Both b) and c)
- 8) Anodic coating protects the underlying metal
 - a) Due to its noble character
 - b) Sacrificially
 - c) Due to its high electrode potential
 - d) Due to both b) and c)
- 9) Suitable lubricant for delicate instruments is
 - a) greases

b) graphite

c) hazel nut oil

- d) all of these
- 10) Which of the following is condensed phase rule equation?
 - a) F = C P + 1

b) F = C - P + 2

c) F = C + P - 2

- d) C = F P + 2
- 11) Metal at the top of electromotive series is
 - a) most stable

b) least active

c) most noble

- d) most active
- 12) When graphite is dispersed in water, it is called
 - a) aquadag

b) oildag

c) blended oil

- d) all of these
- 13) Most commonly used vulcanizing agent is
 - a) S₈

b) Cl₂

c) ZnO

- d) All of these
- 14) Plastic which does not soften on heating is called as
 - a) Thermo softening plastic
- b) Thermosetting plastic
- c) Thermo unit plastic

d) Thermoplastic



Seat	
No.	

F.E. (Part – II) (Old) Examination, 2017 **ENGINEERING CHEMISTRY (CGPA)**

Day and Date: Monday, 27-11-2017 Marks: 56

Time	: 10	0.00 a.m. to 1.00 p	o.m.			
		·		TON – I		
2. A	a) b)	Attempt any two: a) Define hardness. Explain reverse osmosis process. b) Describe water system with phase diagram. c) On analysis water was found to contain following impurities expressed in ppm.				
		Impurities	Amount	Mol. Wt.		
		$Ca(HCO_3)_2$ Mg $(HCO_3)_2$ $CaSO_4$	70.00 55.00 33.00 20.00	162 146 136 111		
	<u> </u>	CaCl ₂			of water	
В) At a) b)	alculate temporary tempt any two : Explain mechani Define corrosion Write a short not	sm of extreme p	oressure lubrication gen evolution med		6
3. A		Define BOD. Ho	w will you deter	mine the BOD of	water?	3 3
	 A) i) Write a note on solid lubricatns. ii) Define BOD. How will you determine the BOD of water? OR A) i) What are the merits and demerits of phase rule? ii) Define lubricant. Explain functions of lubricants. B) Attempt any two: i) Explain Galvanization process of prevention of corrosion. ii) How will you select lubricant for a) Gears b) Transformers? 					3 3 8

SECTION - II

4. A) Attempt any two:

8

- i) Define propellant. Explain different types of propellant.
- ii) Define conductive polymer. Write applications of conductive polymers.
- iii) During the determination of calorific value of solid fuel by Bomb calorimeter the following result were obtained.
 - a) Water equivalent of the calorimeter = 570 gm
 - b) Water taken in the calorimeter = 1500 gm
 - c) Observed rise in temp = 3.70° C
 - d) Acid correction = 0.5 kcal.
 - e) Fuse Wire correction = 4.20 cal.
 - f) Cooling correction = 0.05° C
 - g) Latent Heat of Steam = 587 cal/gm
 - h) % of hydrogen = 6.5% i) Weight of solid fuel = 1.650 gm

Calculate the high calorific value and low calorific value of the solid fuel.

B) Solve any two:

6

4

2

- i) Explain compound constituents of cement.
- ii) Write properties and application steel.
- iii) Write difference between thermosetting and thermo softening plastics.
- 5. A) i) Write the chemical reaction involved in Vulcanization of natural rubber.
 - per. 2
 - ii) How much $CaCl_2$ is required to prepare 250 ml of 0.05 N and 0.5 N aqueous solution? (Mol Wt of $CaCl_2 = 111$).

OR

i) Define chromatography. Explain instrumentation of GLC.

4

ii) Calculate degree of polymerization of polystyrene having mol. wt 3200.

(At. wt of C = 12 CI = 35.5, H = 1)

CH=CH₂ {CH-CH₂}_n

B) Attempt any two:

- i) Define glass. Explain manufacturing of glass.
- ii) Explain properties and application Buna-S and epoxy resin.
- iii) Define Coal. Explain different types of coal.

SLR-TJ - 13

Seat	
No.	

F.E. (Part – II) (CBCS) Examination, 2017 **ENGINEERING MATHEMATICS – II (New)**

Day and Date: Tuesday, 21-11-2017	Max. Marks : 70
Time: 10.00 a.m. to 1.00 n.m.	

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

- 2) Figures to **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) To solve the differential equa	tion (y y	3) 4v	(2v	21	3) $dy = 0$ we shall	

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

- 2) The orthogonal trajectories of a family of the curve xy = a is
 - a) $x^2 + y^2 = c$ b) $y^2 = 4cx$ c) x = cy d) $x^2 y^2 = c$
- 3) If $\vec{r} = xi + yj + zk$, then div $\vec{r} = ---$ c) 3 d) 2 a) 0 b) 1
- 4) If $\phi(x, y, z) = c$ represents a family of surface, then the unit normal vector to this surface is
- b) ∇φ
- c) $|\nabla \phi|$
- d) $\nabla \cdot (\nabla \phi)$
- 5) The magnitude of velocity vector of a particle moving along the curve \vec{r} = 2sin3t i + 2cos 3t j + 8t k, at any time t is
 - a) 2
- b) 4
- c) 8
- d) 10
- 6) In D'Alemberts ratio test, if $\lim_{n\to\infty} \frac{u_n}{u_{n+1}} = 1$, then
 - - a) The series $\sum u_n$ is converges b) The series $\sum u_n$ is diverges
 - c) The test fails

d) The series $\sum u_n$ is oscillatory



- 7) The factorial seires $\sum_{n=1}^{\infty} \frac{1}{n!}$ is
 - a) Convergent

b) Divergent

c) Oscillatry

- d) Conditionally convergent
- 8) For an integer m > 1, if β (m,1) = 1 then m is equal to
 - a) $\frac{1}{2}$
- b) 1
- c) $\frac{1}{m!}$
- d) $\frac{1}{m+1}$
- 9) Asymptote parallel to Y-axis to the curve $xy^2 = a^2(a x)$ is
 - a) y = a
- b) X-axis
- c) x = a
- d) x = 0

- 10) The value of $\int_{0}^{\infty} \int_{0}^{0} dx dy$ is
- b) $\frac{2}{3}$
- c) 1
- d) 3

- 11) The value of -1= b) -1
- c) 0
- d) 1
- 12) The density of any point varies as the distance of the point P(x, y) from the Y-axis then the density ρ equal to
 - a) kxy
- b) kx
- c) ky
- d) $k(x^2 + v^2)$
- 13) By changing the order of integration $\int\limits_0^{\cdot}\int\limits_x^{\cdot}f(x,y)\,dxdy$ we get
 - a) $\int_{0}^{\infty} \int_{0}^{y} f(x,y) dxdy$

b) $\int_{0}^{\infty} \int_{0}^{x} f(x,y) dx dy$

c) $\int_{0}^{\infty} \int_{0}^{\infty} f(x,y) dxdy$

- d) $\int_{0}^{\infty} \int_{0}^{\infty} f(x,y) dx dy$
- 14) The length of the arc of the curve $r = f(\theta)$ from $\theta = \theta_1$ to $\theta = \theta_2$ is
 - a) $\int_{\theta}^{\theta_2} \left[r^2 + \left(\frac{dr}{d\theta} \right)^2 \right] d\theta$

b) $\int_{0}^{\theta_{2}} \left[r + \frac{dr}{d\theta} \right]^{2} d\theta$

c) $\int_{0}^{\theta_{2}} \sqrt{r^{2} + \left(\frac{dr}{d\theta}\right)^{2}} d\theta$

d) $\int_{0}^{\theta_{2}} \sqrt{r^{2} + \left(\frac{d\theta}{dr}\right)^{2}} d\theta$

9

Seat	
No.	

F.E. (Part – II) (CBCS) Examination, 2017 ENGINEERING MATHEMATICS – II (New)

Day and Date: Tuesday, 21-11-2017 Marks: 56

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

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

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

SECTION-I

2. Solve any three from the following:

a) Solve: (x + y - 1) dx + (2x + 2y - 3) dy = 0.

- b) Find orthogonal trajectories of a family of curve $x^2 + 2y^2 y = a$, where 'a' is parameter.
- c) A particle is moves along the curve $\vec{r} = (t^3 4t) i + (t^2 + 4t) j + (8t^2 3t^3)k$, where t denotes time. Find the tangential components of acceleration at time t = 2.
- d) If $\vec{A} = x^2zi 2y^3z^2j + xy^2zk$, then find div \vec{A} and curl \vec{A} at point (1, -1, 1).
- e) Test the convergence of $\sum_{n=1}^{\infty} \left(\sqrt{n^3 + 1} \sqrt{n^3} \right)$ by using comparison test.
- 3. Solve **any three** from the following:

a) Solve: $(2xy + e^y) dx + (x^2 + xe^y) dy = 0$, given that y = 1 when x = 1.

b) Solve
$$(x^2 + 1)^2 \frac{dy}{dx} + 4x (x^2 + 1) y = 2$$
.

c) Prove that the vector $\vec{\mathbf{F}} = (\mathbf{x} + 2\mathbf{y} + a\mathbf{z}) \mathbf{i} + (b\mathbf{x} - 3\mathbf{y} - \mathbf{z}) \mathbf{j} + (4\mathbf{x} + c\mathbf{y} + 2\mathbf{z}) \mathbf{k}$ is solenoidal and determine the constants \mathbf{a} , \mathbf{b} , \mathbf{c} if the vector $\vec{\mathbf{F}}$ is irrotational.



- d) Solve: $\frac{dy}{dx}$ + tan x. tany = cosx.secy.
- e) Test the convergence of $\sum_{n=1}^{\infty} \frac{n^3 + 2}{2^n + 2}$ by using D'Alemberts ratio test.
- 4. Solve any two from the following:

a) A body of mass m falling from rest, is subjected to the force of gravity and an air resistance is equal to the k times the square of velocity. If it falls through a distance x and possesses a velocity 'v' at that instant, then prove that

$$x = \frac{m}{2k} log \left(\frac{a^2}{a^2 - v^2} \right)$$
 where $mg = ka^2$.

b) Define absolute and conditional convergence. Examine whether the series

$$5 - \frac{10}{3} + \frac{20}{9} - \frac{40}{27} + \dots$$
 is absolutely convergent or conditionally convergent.

c) Find the directional derivative of scalar point function $\phi = x^2y + y^2z + xz^2$ at point (1, 2, 1) in the direction normal to the surface

$$x^2 + y^2 - xz^2 = 1$$
 at $(1, 1, 1)$.

SECTION - II

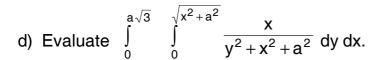
5. Attempt any three from the following:

 $(3 \times 3 = 9)$

- a) Prove that $\int_{0}^{\infty} \frac{\log(1+ax^2)}{x^2} dx = \pi \sqrt{a}$, where a > 0.
- b) Evaluate $\int_{0}^{\infty} \frac{x^{b}}{b^{x}} dx$.
- c) Trace the curve $r = a \sin(3\theta)$.







- e) Trace the curve $x = a(t + \sin t)$; $y = a(1 + \cos t)$.
- 6. Attempt any three from the following:

 $(3 \times 3 = 9)$

SLR-TJ – 13

a) Evaluate
$$\int_{0}^{a} x^{3} (a^{3} - x^{3})^{\frac{3}{2}} dx$$
.

b) Change to polar and evaluate:

$$\int_{0}^{\frac{a}{\sqrt{2}}} \int_{y}^{\sqrt{a^{2}-y^{2}}} \log (x^{2}+y^{2}) dx dy.$$

- c) Trace the curve $y^2 (a^2 + x^2) = x^2 (a^2 x^2)$.
- d) Evaluate $\int_{0}^{1} \int_{y^2}^{1} \int_{0}^{1-x} y \, dz \, dx \, dy$.
- e) Evaluate $\iint xy (x + y) dx dy$ over the area bounded by $y = x^2$ and y = x.
- 7. Attempt **any two** from the following:

 $(2 \times 5 = 10)$

- a) Find the double integration the area bounded by the parabola $y^2 = 4x$ and the line y = 2x - 4.
- b) Find the length of the curve $x = a(\theta \sin \theta)$; $y = a(1 \cos \theta)$ from $\theta = 0$ to $\theta = 2\pi$.
- c) Prove that $\int_{0}^{\infty} \frac{x^{m-1}}{(1+x)^{m+n}} dx = \beta(m, n).$

Seat	
No.	

Set Q

		• • • • • • • • • • • • • • • • • • • •	BCS) Examinati ATHEMATICS –	•	
	d Date : Tuesday, 10.00 a.m. to 1.00			Max. Mar	ks : 70
	2) 3) 4)	Use of non-prog Q. No. 1 is com in Answer Book Answer MCQ/C	t indicate full mari grammable calcula pulsory . It should Page No. 3. Eacl Objective type que		mark. only.
Duratia	va i 20 Minutas	MCQ/Objecti	ve Type Question		l.a . 1.1
	on: 30 Minutes			Mar	ks : 14
	oose the correct a				14
1)		-	1 then m is equal		
	111	b) 1	• • • • • • • • • • • • • • • • • • • •	d) $\frac{1}{m+1}$	
	a) $y = a$	b) X-axis	ne curve $xy^2 = a^2$ (c) $x = a$	a - x) is d) $x = 0$	
3)	The value of \int	dxdy is			
	The value of $\int_{0}^{1} \int_{0}^{1}$ a) $\frac{1}{3}$		c) 1	d) 3	
4)	The value of -1 = a) ∞	=			
	a) ∞	b) – 1	c) 0	d) 1	
5)	The density of a Y-axis then the c			the point P(x, y) from the	he
	a) kxy	b) kx	c) ky	d) $k(x^2 + y^2)$	
6)	By changing the	order of integrat	ion $\int_{0}^{\infty} \int_{x}^{\infty} f(x, y) dx dx$	y we get	
	a) $\int_{0}^{\infty} \int_{0}^{y} f(x,y) dx dx$	у	b) $\int_{0}^{\infty} \int_{0}^{x} f(x,y)$	dx dy	
	c) $\int_{x}^{\infty} \int_{0}^{\infty} f(x,y) dx$	ly	d) $\int_{0}^{\infty} \int_{0}^{\infty} f(x, y)$) dx dy	P.T.O.



- 7) The length of the arc of the curve $r = f(\theta)$ from $\theta = \theta_1$ to $\theta = \theta_2$ is
 - a) $\int_{0}^{\theta_{2}} \left| r^{2} + \left(\frac{dr}{d\theta} \right)^{2} \right| d\theta$

b) $\int_{\theta_{1}}^{\theta_{2}} \left[r + \frac{dr}{d\theta} \right]^{2} d\theta$

c) $\int_{0}^{\theta_{2}} \sqrt{r^{2} + \left(\frac{dr}{d\theta}\right)^{2}} d\theta$

- d) $\int_{0}^{\theta_{2}} \sqrt{r^{2} + \left(\frac{d\theta}{dr}\right)^{2}} d\theta$
- 8) To solve the differential equation (x-y-2) dx (2x-2y-3) dy = 0, we shall
- b) x y = v c) x + y = v
- d) x = X + h, y = Y + k
- 9) The orthogonal trajectories of a family of the curve xy = a is
 - a) $x^2 + y^2 = c$ b) $y^2 = 4cx$ c) x = cy
- d) $x^2 v^2 = c$
- 10) If $\vec{r} = xi + yj + zk$, then div $\vec{r} = ---$
 - a) 0

- c) 3
- d) 2
- 11) If $\phi(x, y, z) = c$ represents a family of surface, then the unit normal vector to this surface is
 - a) $\frac{\nabla \phi}{|\nabla \phi|}$
- b) $\nabla \phi$
- c) $|\nabla \phi|$
- d) $\nabla \cdot (\nabla \phi)$
- 12) The magnitude of velocity vector of a particle moving along the curve \vec{r} = 2sin3t i + 2cos 3t j + 8t k, at any time t is
 - a) 2
- b) 4
- c) 8
- d) 10
- 13) In D'Alemberts ratio test, if $\lim_{n\to\infty}\frac{u_n}{u_{n+1}}=1$, then
 - a) The series $\sum u_n$ is converges
- b) The series $\sum u_n$ is diverges

c) The test fails

- d) The series $\sum u_n$ is oscillatory
- 14) The factorial seires $\sum_{n=1}^{\infty} \frac{1}{n!}$ is
 - a) Convergent

b) Divergent

c) Oscillatry

d) Conditionally convergent

9

Seat	
No.	

F.E. (Part – II) (CBCS) Examination, 2017 ENGINEERING MATHEMATICS – II (New)

Day and Date: Tuesday, 21-11-2017 Marks: 56

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

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

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

SECTION - I

- 2. Solve any three from the following:
 - a) Solve: (x + y 1) dx + (2x + 2y 3) dy = 0.
 - b) Find orthogonal trajectories of a family of curve $x^2 + 2y^2 y = a$, where 'a' is parameter.
 - c) A particle is moves along the curve $\vec{r} = (t^3 4t) i + (t^2 + 4t) j + (8t^2 3t^3)k$, where t denotes time. Find the tangential components of acceleration at time t = 2.
 - d) If $\vec{A} = x^2zi 2y^3z^2j + xy^2zk$, then find div \vec{A} and curl \vec{A} at point (1, -1, 1).
 - e) Test the convergence of $\sum_{n=1}^{\infty} \left(\sqrt{n^3 + 1} \sqrt{n^3} \right)$ by using comparison test.
- 3. Solve any three from the following:

a) Solve: $(2xy + e^y) dx + (x^2 + xe^y) dy = 0$, given that y = 1 when x = 1.

b) Solve
$$(x^2 + 1)^2 \frac{dy}{dx} + 4x (x^2 + 1) y = 2$$
.

c) Prove that the vector $\vec{F} = (x + 2y + az) i + (bx - 3y - z) j + (4x + cy + 2z) k is solenoidal and determine the constants a, b, c if the vector <math>\vec{F}$ is irrotational.





- d) Solve: $\frac{dy}{dx}$ + tan x. tany = cosx.secy.
- e) Test the convergence of $\sum_{n=1}^{\infty} \frac{n^3 + 2}{2^n + 2}$ by using D'Alemberts ratio test.

4. Solve any two from the following:

10

a) A body of mass m falling from rest, is subjected to the force of gravity and an air resistance is equal to the k times the square of velocity. If it falls through a distance x and possesses a velocity 'v' at that instant, then prove that

$$x = \frac{m}{2k} log \left(\frac{a^2}{a^2 - v^2} \right)$$
 where $mg = ka^2$.

b) Define absolute and conditional convergence. Examine whether the series

$$5 - \frac{10}{3} + \frac{20}{9} - \frac{40}{27} + \dots$$
 is absolutely convergent or conditionally convergent.

c) Find the directional derivative of scalar point function $\phi = x^2y + y^2z + xz^2$ at point (1, 2, 1) in the direction normal to the surface

$$x^2 + y^2 - xz^2 = 1$$
 at $(1, 1, 1)$.

SECTION - II

5. Attempt any three from the following:

 $(3 \times 3 = 9)$

- a) Prove that $\int_{0}^{\infty} \frac{\log(1+ax^2)}{x^2} dx = \pi \sqrt{a}$, where a > 0.
- b) Evaluate $\int_{0}^{\infty} \frac{x^{b}}{b^{x}} dx$.
- c) Trace the curve $r = a \sin(3\theta)$.





- d) Evaluate $\int_{0}^{a\sqrt{3}} \int_{0}^{\sqrt{x^2 + a^2}} \frac{x}{y^2 + x^2 + a^2} dy dx$.
- e) Trace the curve $x = a(t + \sin t)$; $y = a(1 + \cos t)$.
- 6. Attempt any three from the following:

 $(3 \times 3 = 9)$

- a) Evaluate $\int_{0}^{a} x^{3} (a^{3} x^{3})^{3/2} dx$.
- b) Change to polar and evaluate:

$$\int_{0}^{\frac{a}{\sqrt{2}}} \int_{y}^{\sqrt{a^{2}-y^{2}}} \log (x^{2}+y^{2}) dx dy.$$

- c) Trace the curve $y^2 (a^2 + x^2) = x^2 (a^2 x^2)$.
- d) Evaluate $\int_{0}^{1} \int_{y^2}^{1} \int_{0}^{1-x} y \, dz \, dx \, dy$.
- e) Evaluate $\iint xy (x + y) dx dy$ over the area bounded by $y = x^2$ and y = x.
- 7. Attempt **any two** from the following:

 $(2 \times 5 = 10)$

- a) Find the double integration the area bounded by the parabola $y^2 = 4x$ and the line y = 2x - 4.
- b) Find the length of the curve $x = a(\theta \sin \theta)$; $y = a(1 \cos \theta)$ from $\theta = 0$ to $\theta = 2\pi$.
- c) Prove that $\int_{0}^{\infty} \frac{x^{m-1}}{(1+x)^{m+n}} dx = \beta(m, n).$

SLR-TJ - 13

Seat	
No.	

F.E. (Part – II) (CBCS) Examination, 2017 **ENGINEERING MATHEMATICS – II (New)**

Max. Marks: 70 Day and Date: Tuesday, 21-11-2017

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

- N.B. : 1) **All** questions are **compulsory**.
 - 2) Figures to **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) The magnitude of velocity vector of a particle moving along the curve \vec{r} = 2sin3t i + 2cos 3t j + 8t k, at any time t is
 - a) 2
- b) 4
- d) 10
- 2) In D'Alemberts ratio test, if $\lim_{n\to\infty} \frac{u_n}{u_{n+1}} = 1$, then
 - a) The series $\sum u_n$ is converges b) The series $\sum u_n$ is diverges

c) The test fails

- d) The series $\sum \mathbf{u}_{\mathbf{n}}$ is oscillatory
- 3) The factorial seires $\sum_{n=1}^{\infty} \frac{1}{n!}$ is
 - a) Convergent

b) Divergent

c) Oscillatry

- d) Conditionally convergent
- 4) For an integer m > 1, if β (m,1) = 1 then m is equal to
 - a) $\frac{1}{m}$

- c) $\frac{1}{m!}$ d) $\frac{1}{m+1}$
- 5) Asymptote parallel to Y-axis to the curve $xy^2 = a^2(a x)$ is
 - a) y = a
- b) X-axis
- c) x = a



- 6) The value of $\int_{0}^{1} \int_{0}^{1} dxdy$ is
- c) 1
- d) 3

- 7) The value of -1=___
 - a) ∞
- c) 0
- d) 1
- 8) The density of any point varies as the distance of the point P(x, y) from the Y-axis then the density ρ equal to
 - a) kxy
- b) kx
- c) ky
- d) $k(x^2 + v^2)$
- 9) By changing the order of integration $\int \int f(x,y) dxdy$ we get
 - a) $\int_{0}^{\infty} \int_{0}^{y} f(x,y) dxdy$

b) $\int_{0}^{\infty} \int_{0}^{x} f(x,y) dx dy$

c) $\int_{0}^{\infty} \int_{0}^{\infty} f(x,y) dxdy$

- d) $\int_{0}^{\infty} \int_{0}^{\infty} f(x,y) dx dy$
- 10) The length of the arc of the curve $r = f(\theta)$ from $\theta = \theta_1$ to $\theta = \theta_2$ is
 - a) $\int_{0}^{\theta_{2}} \left| r^{2} + \left(\frac{dr}{d\theta} \right)^{2} \right| d\theta$

b) $\int_{\theta}^{\theta_2} \left[r + \frac{dr}{d\theta} \right]^2 d\theta$

c) $\int_{\theta}^{\theta_2} \sqrt{r^2 + \left(\frac{dr}{d\theta}\right)^2} d\theta$

- d) $\int_{0}^{\theta_{2}} \sqrt{r^{2} + \left(\frac{d\theta}{dr}\right)^{2}} d\theta$
- 11) To solve the differential equation (x-y-2) dx (2x-2y-3) dy = 0, we shall
 - a) v = vx
- b) x y = y c) x + y = y
- d) x = X + h, y = Y + k
- 12) The orthogonal trajectories of a family of the curve xy = a is
 - a) $x^2 + y^2 = c$ b) $y^2 = 4cx$
- c) x = cy
- d) $x^2 v^2 = c$
- 13) If $\vec{r} = xi + yj + zk$, then div $\vec{r} = ----$
 - a) 0
- b) 1
- d) 2
- 14) If $\phi(x, y, z) = c$ represents a family of surface, then the unit normal vector to this surface is
 - a) $\frac{\nabla \phi}{|\nabla \phi|}$
- b) $\nabla \phi$
- c) $|\nabla \phi|$ d) $\nabla \cdot (\nabla \phi)$

SLR-TJ - 13

Seat	
No.	

F.E. (Part – II) (CBCS) Examination, 2017 ENGINEERING MATHEMATICS – II (New)

Day and Date: Tuesday, 21-11-2017 Marks: 56

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

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

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

SECTION-I

2. Solve any three from the following:

a) Solve: (x + y - 1) dx + (2x + 2y - 3) dy = 0.

- b) Find orthogonal trajectories of a family of curve $x^2 + 2y^2 y = a$, where 'a' is parameter.
- c) A particle is moves along the curve $\vec{r} = (t^3 4t) i + (t^2 + 4t) j + (8t^2 3t^3)k$, where t denotes time. Find the tangential components of acceleration at time t = 2.
- d) If $\vec{A} = x^2zi 2y^3z^2j + xy^2zk$, then find div \vec{A} and curl \vec{A} at point (1, -1, 1).
- e) Test the convergence of $\sum_{n=1}^{\infty} \left(\sqrt{n^3 + 1} \sqrt{n^3} \right)$ by using comparison test.
- 3. Solve any three from the following:

a) Solve: $(2xy + e^y) dx + (x^2 + xe^y) dy = 0$, given that y = 1 when x = 1.

- b) Solve $(x^2 + 1)^2 \frac{dy}{dx} + 4x (x^2 + 1) y = 2$.
- c) Prove that the vector $\vec{F} = (x + 2y + az) i + (bx 3y z) j + (4x + cy + 2z) k is solenoidal and determine the constants a, b, c if the vector <math>\vec{F}$ is irrotational.

9



- d) Solve: $\frac{dy}{dx}$ + tan x. tany = cosx.secy.
- e) Test the convergence of $\sum_{n=1}^{\infty} \frac{n^3 + 2}{2^n + 2}$ by using D'Alemberts ratio test.
- 4. Solve any two from the following:

a) A body of mass m falling from rest, is subjected to the force of gravity and an air resistance is equal to the k times the square of velocity. If it falls through a distance x and possesses a velocity 'v' at that instant, then prove that

$$x = \frac{m}{2k} log \left(\frac{a^2}{a^2 - v^2} \right)$$
 where $mg = ka^2$.

b) Define absolute and conditional convergence. Examine whether the series

$$5 - \frac{10}{3} + \frac{20}{9} - \frac{40}{27} + \dots$$
 is absolutely convergent or conditionally convergent.

c) Find the directional derivative of scalar point function $\phi = x^2y + y^2z + xz^2$ at point (1, 2, 1) in the direction normal to the surface

$$x^2 + y^2 - xz^2 = 1$$
 at $(1, 1, 1)$.

SECTION - II

5. Attempt any three from the following:

 $(3 \times 3 = 9)$

- a) Prove that $\int_{0}^{\infty} \frac{\log(1+ax^2)}{x^2} dx = \pi \sqrt{a}$, where a > 0.
- b) Evaluate $\int_{0}^{\infty} \frac{x^{b}}{b^{x}} dx$.
- c) Trace the curve $r = a \sin(3\theta)$.







- d) Evaluate $\int_{0}^{a\sqrt{3}} \int_{0}^{\sqrt{x^2 + a^2}} \frac{x}{y^2 + x^2 + a^2} dy dx$.
- e) Trace the curve $x = a(t + \sin t)$; $y = a(1 + \cos t)$.
- 6. Attempt any three from the following:

 $(3 \times 3 = 9)$

- a) Evaluate $\int_{0}^{a} x^{3} (a^{3} x^{3})^{3/2} dx$.
- b) Change to polar and evaluate:

$$\int_{0}^{\frac{a}{\sqrt{2}}} \int_{y}^{\sqrt{a^{2}-y^{2}}} \log (x^{2}+y^{2}) dx dy.$$

- c) Trace the curve $y^2 (a^2 + x^2) = x^2 (a^2 x^2)$.
- d) Evaluate $\int_{0}^{1} \int_{y^2}^{1} \int_{0}^{1-x} y \, dz \, dx \, dy$.
- e) Evaluate $\iint xy (x + y) dx dy$ over the area bounded by $y = x^2$ and y = x.
- 7. Attempt **any two** from the following:

 $(2 \times 5 = 10)$

- a) Find the double integration the area bounded by the parabola $y^2 = 4x$ and the line y = 2x - 4.
- b) Find the length of the curve $x = a(\theta \sin \theta)$; $y = a(1 \cos \theta)$ from $\theta = 0$ to $\theta = 2\pi$.
- c) Prove that $\int_{0}^{\infty} \frac{x^{m-1}}{(1+x)^{m+n}} dx = \beta(m, n).$

Seat	
No.	

F.E. (Part – II) (CBCS) Examination, 2017 **ENGINEERING MATHEMATICS – II (New)**

Day and Date: Tuesday, 21-11-2017 Max. Marks: 70

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

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

- 2) Figures to **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:

- 1) The value of $\int_{0}^{1} \int_{0}^{1} dxdy$ is a) $\frac{1}{3}$ b) $\frac{2}{3}$
- c) 1
- d) 3

- 2) The value of $\boxed{}=$ ______ a) ∞ b) -1
 - a) ∞

- d) 1
- 3) The density of any point varies as the distance of the point P(x, y) from the Y-axis then the density ρ equal to
 - a) kxy
- b) kx
- c) ky
- d) $k(x^2 + y^2)$
- 4) By changing the order of integration $\int_{0}^{\infty} \int_{x}^{\infty} f(x,y) dxdy$ we get

a)
$$\int_{0}^{\infty} \int_{0}^{y} f(x,y) dxdy$$
c)
$$\int_{x}^{\infty} \int_{0}^{\infty} f(x,y) dxdy$$

b)
$$\int_{0}^{\infty} \int_{0}^{x} f(x, y) dx dy$$
d)
$$\int_{0}^{\infty} \int_{0}^{\infty} f(x, y) dx dy$$

c)
$$\int_{x}^{\infty} \int_{0}^{\infty} f(x,y) dxdy$$

d)
$$\int_{0}^{\infty} \int_{0}^{\infty} f(x,y) dx dy$$



- 5) The length of the arc of the curve $r = f(\theta)$ from $\theta = \theta_1$ to $\theta = \theta_2$ is
 - a) $\int_{0}^{\theta_{2}} \left| r^{2} + \left(\frac{dr}{d\theta} \right)^{2} \right| d\theta$

b) $\int_{0}^{\theta_{2}} \left[r + \frac{dr}{d\theta} \right]^{2} d\theta$

c) $\int_{0}^{\theta_{2}} \sqrt{r^{2} + \left(\frac{dr}{d\theta}\right)^{2}} d\theta$

- d) $\int_{0}^{\theta_{2}} \sqrt{r^{2} + \left(\frac{d\theta}{dr}\right)^{2}} d\theta$
- 6) To solve the differential equation (x-y-2) dx (2x-2y-3) dy = 0, we shall
 - a) y = vx
- b) x y = v c) x + y = v
- d) x = X + h, y = Y + k
- 7) The orthogonal trajectories of a family of the curve xy = a is
 - a) $x^2 + y^2 = c$ b) $y^2 = 4cx$
- c) x = cy
- d) $x^2 v^2 = c$
- 8) If $\vec{r} = xi + yj + zk$, then $div \vec{r} = ----$
 - a) 0
- b) 1

- 9) If $\phi(x, y, z) = c$ represents a family of surface, then the unit normal vector to this surface is
 - $\nabla \phi$
- b) $\nabla \phi$
- c) $|\nabla \phi|$
- d) $\nabla \cdot (\nabla \phi)$
- The magnitude of velocity vector of a particle moving along the curve \vec{r} = 2sin3t i + 2cos 3t j + 8t k, at any time t is
 - a) 2
- b) 4
- c) 8
- d) 10
- 11) In D'Alemberts ratio test, if $\lim_{n\to\infty} \frac{u_n}{u_{n+1}} = 1$, then
 - a) The series $\sum u_n$ is converges
- b) The series $\sum u_n$ is diverges

c) The test fails

- d) The series $\sum u_n$ is oscillatory
- 12) The factorial seires $\sum_{n=1}^{\infty} \frac{1}{n!}$ is
 - a) Convergent

b) Divergent

c) Oscillatry

- d) Conditionally convergent
- 13) For an integer m > 1, if β (m,1) = 1 then m is equal to

- 14) Asymptote parallel to Y-axis to the curve $xy^2 = a^2(a x)$ is
 - a) y = a
- b) X-axis
- c) x = a

SLR-TJ - 13

Seat	
No.	

F.E. (Part – II) (CBCS) Examination, 2017 ENGINEERING MATHEMATICS – II (New)

Day and Date: Tuesday, 21-11-2017 Marks: 56

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

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

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

SECTION-I

2. Solve any three from the following:

a) Solve: (x + y - 1) dx + (2x + 2y - 3) dy = 0.

- b) Find orthogonal trajectories of a family of curve $x^2 + 2y^2 y = a$, where 'a' is parameter.
- c) A particle is moves along the curve $\vec{r} = (t^3 4t) i + (t^2 + 4t) j + (8t^2 3t^3)k$, where t denotes time. Find the tangential components of acceleration at time t = 2.
- d) If $\vec{A} = x^2zi 2y^3z^2j + xy^2zk$, then find div \vec{A} and curl \vec{A} at point (1, -1, 1).
- e) Test the convergence of $\sum_{n=1}^{\infty} \left(\sqrt{n^3 + 1} \sqrt{n^3} \right)$ by using comparison test.
- 3. Solve any three from the following:

a) Solve: $(2xy + e^y) dx + (x^2 + xe^y) dy = 0$, given that y = 1 when x = 1.

- b) Solve $(x^2 + 1)^2 \frac{dy}{dx} + 4x (x^2 + 1) y = 2$.
- c) Prove that the vector $\vec{F} = (x + 2y + az) i + (bx 3y z) j + (4x + cy + 2z) k is solenoidal and determine the constants a, b, c if the vector <math>\vec{F}$ is irrotational.

9



- d) Solve: $\frac{dy}{dx}$ + tan x. tany = cosx.secy.
- e) Test the convergence of $\sum_{n=1}^{\infty} \frac{n^3 + 2}{2^n + 2}$ by using D'Alemberts ratio test.
- 4. Solve any two from the following:

a) A body of mass m falling from rest, is subjected to the force of gravity and an air resistance is equal to the k times the square of velocity. If it falls through a distance x and possesses a velocity 'v' at that instant, then prove that

$$x = \frac{m}{2k} log \left(\frac{a^2}{a^2 - v^2} \right)$$
 where $mg = ka^2$.

b) Define absolute and conditional convergence. Examine whether the series

$$5 - \frac{10}{3} + \frac{20}{9} - \frac{40}{27} + \dots$$
 is absolutely convergent or conditionally convergent.

c) Find the directional derivative of scalar point function $\phi = x^2y + y^2z + xz^2$ at point (1, 2, 1) in the direction normal to the surface

$$x^2 + y^2 - xz^2 = 1$$
 at $(1, 1, 1)$.

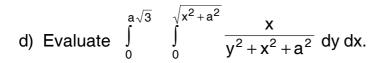
SECTION - II

5. Attempt any three from the following:

 $(3 \times 3 = 9)$

- a) Prove that $\int_{0}^{\infty} \frac{\log(1+ax^2)}{x^2} dx = \pi \sqrt{a}$, where a > 0.
- b) Evaluate $\int_{0}^{\infty} \frac{x^{b}}{b^{x}} dx$.
- c) Trace the curve $r = a \sin(3\theta)$.





- e) Trace the curve $x = a(t + \sin t)$; $y = a(1 + \cos t)$.
- 6. Attempt any three from the following:

 $(3 \times 3 = 9)$

a) Evaluate
$$\int_{0}^{a} x^{3} (a^{3} - x^{3})^{\frac{3}{2}} dx$$
.

b) Change to polar and evaluate:

$$\int_{0}^{\frac{a}{\sqrt{2}}} \int_{y}^{\sqrt{a^{2}-y^{2}}} \log (x^{2}+y^{2}) dx dy.$$

- c) Trace the curve $y^2 (a^2 + x^2) = x^2 (a^2 x^2)$.
- d) Evaluate $\int_{0}^{1} \int_{y^2}^{1} \int_{0}^{1-x} y \, dz \, dx \, dy$.
- e) Evaluate $\iint xy (x + y) dx dy$ over the area bounded by $y = x^2$ and y = x.
- 7. Attempt any two from the following:

 $(2 \times 5 = 10)$

- a) Find the double integration the area bounded by the parabola $y^2 = 4x$ and the line y = 2x 4.
- b) Find the length of the curve $x = a (\theta \sin \theta)$; $y = a (1 \cos \theta)$ from $\theta = 0$ to $\theta = 2\pi$.
- c) Prove that $\int_{0}^{\infty} \frac{x^{m-1}}{(1+x)^{m+n}} dx = \beta(m, n).$

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SLR-TJ - 14

Seat No. Set P		7	
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F.E. (Part – II) (CBCS Pattern) Examination, 2017 BASIC CIVIL ENGINEERING (New)

Day and Date: Wednesday, 22-11-2017 Max. Marks: 70

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

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

- 2) Assume suitable data, if necessary and mention it clearly.
- 3) Use of non programmable calculator is **allowed**.
- 4) Marks to the right hand side indicate full marks.
- 5) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 6) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes	Marks : 14
1. Choose the correct answer:	(1×14=14)

- 1) Civil engineer has to play a role in
 - a) Construction of house
- b) Surveying
- c) Design of a framed structure
- d) Electrification of a building
- 2) Equivalent representative fraction of nominal scale 1 cm = 100 m will be
 - a) 1/10
- b) 1/100
- c) 1/1000
- d) 1/10000
- 3) The angle between two mirrors of the optical square is
 - a) 25°
- b) 45°
- c) 63°
- d) 65°
- 4) If Reduced Bearing of a line is S 30° 30′ W, its Whole circle bearing is
 - a) 30° 30′
- b) 149° 30′
- c) 180° 30′
- d) 210° 30′

- 5) Fly leveling is used for
 - a) Establishment of new B.M.
- b) Checking purpose
- c) Survey in hilly area
- d) Road survey
- 6) The soil over which the road structure rests is the foundation soil and is known as
 - a) Formation level

b) Sub grade

c) Sub base

d) Base



7)	Ujjani Dam is an e	Jjjani Dam is an example of				
	a) River Irrigation		b) Storage Irrigation			
	c) Lift Irrigation		d) Percolation Tanks			
8)	A foundation ma structure is called	•	C.C. slab covering entire bottom of the			
	a) Slab foundation		b) Flat foundation			
	c) Raft foundation		d) Combined foundation			
9)		-	est of small portions of room by deriving nensions is treated as			
	a) Grouping	b) Circulation	c) Roominess	d) Flexibility		
10)	Bricks should not from a height of	rick or when dropped				
	a) 0.5 m	b) 1.0 m	c) 1.5 m	d) 0.75 m		
 The load is transferred to the foundation sequence 			ation in framed stru	icture in the following		
	a) Beam-column-foundation-slab		b) Slab-column-beam-foundation			
	c) Slab-beam-column-foundation		d) Column-slab-beam-foundation			
12)	Eco friendly cons	truction encourages	S			
	a) Use of cheap n	naterial	b) Use of locally available material			
	c) Use of costly n	naterial	d) None of these			
13)	GIS stands for					
	a) Geographic Information System		b) Geologic Information System			
	c) Global Information System		d) None of these			
14)	A masonry wall n	eeds	— for safety again	st earthquake forces.		
	a) Use of through	stones				
	b) Continuous band at plinth, lintel and sill					
	c) Both a)and b)					
	d) None of these					



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F.E. (Part – II) (CBCS Pattern) Examination, 2017 BASIC CIVIL ENGINEERING (New)

Day and Date: Wednesday, 22-11-2017 Marks: 56

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

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

- 2) Assume suitable data, if necessary and mention it clearly.
- 3) Use of non programmable calculator is **allowed**.
- 4) Marks to the **right** hand side indicate **full** marks.

SECTION-I

2. Solve any four out of following seven questions.

 $(4 \times 3 = 12)$

- a) Give applications of Civil Engineering to other branches of Engineering.
- b) How Civil Engineer plays his role in construction of a house? Write in short.
- c) What is an offset? Enlist equipments used for taking offsets.
- d) Define Plane and Geodetic Surveying.
- e) What are the advantages of contour map?
- f) What are the types of Canals? Draw a neat sketch.
- g) Draw a neat sketch of cross section of a State Highway showing different components.
- 3. Solve **any two** out of following three questions.

 $(8 \times 2 = 16)$

a) The distance between two stations A and B was measured with 30 m chain. The total length of line AB as observed and recorded was 3820 m. The length of the chain was checked at start, at every km of chaining and at the end. The results are noted below.

Chainage in Km	0 (Stn. A)	1	2	3	3.820 (Stn.B)
Chain length in m	30.00	30.10	30.16	29.90	29.85

Find the true distance AB.



b) Observed quadrantal bearings in a compass traverse QRSTPQ are given below:

Line	QR	RS	ST	TP	PQ
F.B.	N(43° 30′) E	N(31° 45′) W	S(61° 00′) W	S(5° 30′) E	S(62° 00′) E
B.B.	S(45° 30′) W	S(31° 45′) E	N(61° 00′) E	N(7° 30′) W	N(64° 00′) W

- i) Find out included angles. Apply checks.
- ii) Find out corrected bearings in the same system of bearings.
- iii) Tabulate the results. Draw the traverse.
- c) The following consecutive readings were taken on a 3 m leveling staff with dumpy level at a common interval of 20 m.

0.385, 1.030, 1.925, 2.825, 3.730, 4.685, 0.625, 2.005, 3.110, 4.485

The very first reading was taken on a point having RL 208.125. Calculate the gradient of line joining first point and last point. Use Rise and Fall method.

SECTION - II

4. Solve **any four** out of following six questions.

 $(4 \times 4 = 16)$

- a) What do you understand by the term foundation? What are the objectives of providing foundation?
- b) What are the requirements of earthquake resistant structure?
- c) A rectangular plot 20m × 25m (20 m dimension facing road) is to have three storeyed building of equal built up area on each storey. Front and rear margins are 3 m. side margins are 2.5m. FSI limit is 1.5. Find the limit on built up area.
- d) State the characteristics of bricks.
- e) State different grades of concrete and mention their uses.
- f) Discuss the concept of green building.

5. Solve **any two** out of following three questions.

 $(6 \times 2 = 12)$

- a) Draw a neat sectional elevation showing different components of building. Also state the functions of these components.
- b) Explain following principles of planning
 - i) Privacy
- ii) Grouping
- iii) Roominess
- c) Define remote sensing. State applications of remote sensing in various fields.

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F.E. (Part – II) (CBCS Pattern) Examination, 2017 BASIC CIVIL ENGINEERING (New)

Day and Date: Wednesday, 22-11-2017 Max. Marks: 70

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

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

- 2) Assume suitable data, if necessary and mention it clearly.
- 3) Use of non programmable calculator is **allowed**.
- 4) Marks to the right hand side indicate full marks.
- 5) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 6) Answer MCQ/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) A foundation made up of thick R.C.C. slab covering entire bottom of the structure is called as
 - a) Slab foundation

1. Choose the correct answer:

b) Flat foundation

c) Raft foundation

- d) Combined foundation
- 2) The effect achieved by making the best of small portions of room by deriving maximum benefit from minimum dimensions is treated as
 - a) Grouping
- b) Circulation
- c) Roominess
- d) Flexibility
- 3) Bricks should not break, when struck against another brick or when dropped from a height of
 - a) 0.5 m
- b) 1.0 m
- c) 1.5 m
- d) 0.75 m
- 4) The load is transferred to the foundation in framed structure in the following sequence
 - a) Beam-column-foundation-slab
- b) Slab-column-beam-foundation
- c) Slab-beam-column-foundation
- d) Column-slab-beam-foundation
- 5) Eco friendly construction encourages
 - a) Use of cheap material
- b) Use of locally available material
- c) Use of costly material
- d) None of these

 $(1 \times 14 = 14)$



6)	GIS stands for					
	a) Geographic Inf	ormation System	b) Geologic Inforn	nation System		
	c) Global Informa	tion System	d) None of these			
7)	A masonry wall ne	eeds ———	—— for safety against earthquake force			
	a) Use of through	stones				
	b) Continuous ba	nd at plinth, lintel ar	nd sill			
	c) Both a)and b)					
	d) None of these					
8)	a) Construction (c) Design of a fr	• •	b) Surveyingd) Electrification	of a building		
۵)	,		,	•		
9)	a) 1/10	sentative fraction of b) 1/100	c) 1/1000	d) 1/10000		
10)	,	•	•	d) 1/10000		
10)	a) 25°	en two mirrors of the b) 45°	c) 63°	d) 65°		
	,	,	,	,		
11)		ng of a line is S 30°		_		
	a) 30° 30′	b) 149° 30′	c) 180° 30′	d) 210° 30′		
12)	Fly leveling is use	ed for				
	a) Establishment		b) Checking purpo	ose		
	c) Survey in hilly	area	d) Road survey			
13)	The soil over wh known as	ich the road struct	ure rests is the fo	undation soil and is		
	a) Formation leve	l	b) Sub grade			
	c) Sub base		d) Base			
14)	Ujjani Dam is an e	example of				
	a) River Irrigation		b) Storage Irrigation	on		
	c) Lift Irrigation		d) Percolation Tar	nks		

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F.E. (Part – II) (CBCS Pattern) Examination, 2017 BASIC CIVIL ENGINEERING (New)

Day and Date: Wednesday, 22-11-2017 Marks: 56

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

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

- 2) Assume suitable data, if necessary and mention it clearly.
- 3) Use of non programmable calculator is **allowed**.
- 4) Marks to the **right** hand side indicate **full** marks.

SECTION - I

2. Solve any four out of following seven questions.

 $(4 \times 3 = 12)$

- a) Give applications of Civil Engineering to other branches of Engineering.
- b) How Civil Engineer plays his role in construction of a house? Write in short.
- c) What is an offset? Enlist equipments used for taking offsets.
- d) Define Plane and Geodetic Surveying.
- e) What are the advantages of contour map?
- f) What are the types of Canals? Draw a neat sketch.
- g) Draw a neat sketch of cross section of a State Highway showing different components.
- 3. Solve **any two** out of following three questions.

 $(8 \times 2 = 16)$

a) The distance between two stations A and B was measured with 30 m chain. The total length of line AB as observed and recorded was 3820 m. The length of the chain was checked at start, at every km of chaining and at the end. The results are noted below.

Chainage in Km	0 (Stn. A)	1	2	3	3.820 (Stn.B)
Chain length in m	30.00	30.10	30.16	29.90	29.85

Find the true distance AB.



b) Observed quadrantal bearings in a compass traverse QRSTPQ are given below:

Line	QR	RS	ST	TP	PQ
F.B.	N(43° 30′) E	N(31° 45′) W	S(61° 00′) W	S(5° 30′) E	S(62° 00′) E
B.B.	S(45° 30′) W	S(31° 45′) E	N(61° 00′) E	N(7° 30′) W	N(64° 00′) W

- i) Find out included angles. Apply checks.
- ii) Find out corrected bearings in the same system of bearings.
- iii) Tabulate the results. Draw the traverse.
- c) The following consecutive readings were taken on a 3 m leveling staff with dumpy level at a common interval of 20 m.

0.385, 1.030, 1.925, 2.825, 3.730, 4.685, 0.625, 2.005, 3.110, 4.485

The very first reading was taken on a point having RL 208.125. Calculate the gradient of line joining first point and last point. Use Rise and Fall method.

SECTION - II

4. Solve **any four** out of following six questions.

 $(4 \times 4 = 16)$

- a) What do you understand by the term foundation? What are the objectives of providing foundation?
- b) What are the requirements of earthquake resistant structure?
- c) A rectangular plot 20m × 25m (20 m dimension facing road) is to have three storeyed building of equal built up area on each storey. Front and rear margins are 3 m. side margins are 2.5m. FSI limit is 1.5. Find the limit on built up area.
- d) State the characteristics of bricks.
- e) State different grades of concrete and mention their uses.
- f) Discuss the concept of green building.
- 5. Solve **any two** out of following three questions.

 $(6 \times 2 = 12)$

- a) Draw a neat sectional elevation showing different components of building. Also state the functions of these components.
- b) Explain following principles of planning
 - i) Privacy
- ii) Grouping
- iii) Roominess
- c) Define remote sensing. State applications of remote sensing in various fields.

SLR-TJ – 14

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F.E. (Part – II) (CBCS Pattern) Examination, 2017 BASIC CIVIL ENGINEERING (New)

Day and Date: Wednesday, 22-11-2017 Max. Marks: 70

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

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

- 2) Assume suitable data, if necessary and mention it clearly.
- 3) Use of non programmable calculator is **allowed**.
- 4) Marks to the right hand side indicate full marks.
- 5) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 6) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

 $(1 \times 14 = 14)$

- 1) Fly leveling is used for
 - a) Establishment of new B.M.
- b) Checking purpose
- c) Survey in hilly area
- d) Road survey
- 2) The soil over which the road structure rests is the foundation soil and is known as
 - a) Formation level

b) Sub grade

c) Sub base

- d) Base
- 3) Ujjani Dam is an example of
 - a) River Irrigation

b) Storage Irrigation

c) Lift Irrigation

- d) Percolation Tanks
- 4) A foundation made up of thick R.C.C. slab covering entire bottom of the structure is called as
 - a) Slab foundation

b) Flat foundation

c) Raft foundation

- d) Combined foundation
- 5) The effect achieved by making the best of small portions of room by deriving maximum benefit from minimum dimensions is treated as
 - a) Grouping
- b) Circulation
- c) Roominess
- d) Flexibility



6)	 Bricks should not break, when struck against another brick or when dropped from a height of 					
	a) 0.5 m	b) 1.0 m	c) 1.5 m	d) 0.75 m		
7)	The load is transf sequence	erred to the founda	tion in framed stru	cture in the following		
	a) Beam-column-f	foundation-slab	b) Slab-column-be	eam-foundation		
	c) Slab-beam-colu	umn-foundation	d) Column-slab-be	eam-foundation		
8)	Eco friendly const	truction encourages	3			
	a) Use of cheap n	naterial	b) Use of locally a	vailable material		
	c) Use of costly m	naterial	d) None of these			
9)	GIS stands for					
	a) Geographic Inf	ormation System	b) Geologic Inforn	nation System		
	c) Global Informa	tion System	d) None of these			
10)	A masonry wall no	eeds———	— for safety agains	st earthquake forces.		
	a) Use of through	stones				
	b) Continuous ba	nd at plinth, lintel ar	nd sill			
	c) Both a)and b)					
	d) None of these					
11)	Civil engineer ha					
	a) Construction ofc) Design of a fra	of house amed structure	b) Surveyingd) Electrification	of a building		
12)	Equivalent repres	sentative fraction of	nominal scale 1 cr	m = 100 m will be		
	a) 1/10	b) 1/100	c) 1/1000	d) 1/10000		
13)	The angle between	en two mirrors of the	e optical square is			
	a) 25°	b) 45°	c) 63°	d) 65°		
14)	If Reduced Bearing	ng of a line is S 30°	30' W, its Whole	circle bearing is		
	a) 30° 30′	b) 149° 30′	c) 180° 30′	d) 210° 30′		



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F.E. (Part – II) (CBCS Pattern) Examination, 2017 BASIC CIVIL ENGINEERING (New)

Day and Date: Wednesday, 22-11-2017 Marks: 56

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

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

- 2) Assume suitable data, if necessary and mention it clearly.
- 3) Use of non programmable calculator is **allowed**.
- 4) Marks to the **right** hand side indicate **full** marks.

SECTION - I

2. Solve any four out of following seven questions.

 $(4 \times 3 = 12)$

- a) Give applications of Civil Engineering to other branches of Engineering.
- b) How Civil Engineer plays his role in construction of a house? Write in short.
- c) What is an offset? Enlist equipments used for taking offsets.
- d) Define Plane and Geodetic Surveying.
- e) What are the advantages of contour map?
- f) What are the types of Canals? Draw a neat sketch.
- g) Draw a neat sketch of cross section of a State Highway showing different components.
- 3. Solve **any two** out of following three questions.

 $(8 \times 2 = 16)$

a) The distance between two stations A and B was measured with 30 m chain. The total length of line AB as observed and recorded was 3820 m. The length of the chain was checked at start, at every km of chaining and at the end. The results are noted below.

Chainage in Km	0 (Stn. A)	1	2	3	3.820 (Stn.B)
Chain length in m	30.00	30.10	30.16	29.90	29.85

Find the true distance AB.



-4-

b) Observed quadrantal bearings in a compass traverse QRSTPQ are given below:

Line	QR	RS	ST	TP	PQ
F.B.	N(43° 30′) E	N(31° 45′) W	S(61° 00′) W	S(5° 30′) E	S(62° 00′) E
B.B.	S(45° 30′) W	S(31° 45′) E	N(61° 00′) E	N(7° 30′) W	N(64° 00′) W

- i) Find out included angles. Apply checks.
- ii) Find out corrected bearings in the same system of bearings.
- iii) Tabulate the results. Draw the traverse.
- c) The following consecutive readings were taken on a 3 m leveling staff with dumpy level at a common interval of 20 m.

0.385, 1.030, 1.925, 2.825, 3.730, 4.685, 0.625, 2.005, 3.110, 4.485

The very first reading was taken on a point having RL 208.125. Calculate the gradient of line joining first point and last point. Use Rise and Fall method.

SECTION - II

4. Solve **any four** out of following six questions.

 $(4 \times 4 = 16)$

- a) What do you understand by the term foundation? What are the objectives of providing foundation?
- b) What are the requirements of earthquake resistant structure?
- c) A rectangular plot 20m × 25m (20 m dimension facing road) is to have three storeyed building of equal built up area on each storey. Front and rear margins are 3 m. side margins are 2.5m. FSI limit is 1.5. Find the limit on built up area.
- d) State the characteristics of bricks.
- e) State different grades of concrete and mention their uses.
- f) Discuss the concept of green building.
- 5. Solve **any two** out of following three questions.

 $(6 \times 2 = 12)$

- a) Draw a neat sectional elevation showing different components of building. Also state the functions of these components.
- b) Explain following principles of planning
 - i) Privacy
- ii) Grouping
- iii) Roominess
- c) Define remote sensing. State applications of remote sensing in various fields.

SLR-TJ – 14

Seat	
No.	

F.E. (Part – II) (CBCS Pattern) Examination, 2017 **BASIC CIVIL ENGINEERING (New)**

Day and Date: Wednesday, 22-11-2017 Max. Marks: 70

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

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

- 2) Assume suitable data, if necessary and mention it clearly.
- 3) Use of non programmable calculator is **allowed**.
- 4) Marks to the **right** hand side indicate **full** marks.
- 5) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 6) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

 $(1 \times 14 = 14)$

- 1) Bricks should not break, when struck against another brick or when dropped from a height of
 - a) 0.5 m
- b) 1.0 m
- c) 1.5 m
- d) 0.75 m
- 2) The load is transferred to the foundation in framed structure in the following sequence
 - a) Beam-column-foundation-slab
- b) Slab-column-beam-foundation
- c) Slab-beam-column-foundation
- d) Column-slab-beam-foundation
- 3) Eco friendly construction encourages
 - a) Use of cheap material
- b) Use of locally available material
- c) Use of costly material
- d) None of these

- 4) GIS stands for
 - a) Geographic Information System
 - b) Geologic Information System
 - c) Global Information System
 - d) None of these



5)	A masonry wall no	eeds ———	— for safety agains	t earthquake forces.	
	a) Use of through	stones			
	b) Continuous ba	nd at plinth, lintel ar	nd sill		
	c) Both a)and b)				
	d) None of these				
6)	Civil engineer ha a) Construction o c) Design of a fra		b) Surveying d) Electrification	of a building	
7)	Equivalent repres	entative fraction of	nominal scale 1 cn	n = 100 m will be	
	a) 1/10	b) 1/100	c) 1/1000	d) 1/10000	
8)	The angle between	en two mirrors of the	e optical square is		
	a) 25°	b) 45°	c) 63°	d) 65°	
9)	If Reduced Bearing	ng of a line is S 30°	30' W, its Whole o	circle bearing is	
	a) 30° 30′	b) 149° 30′	c) 180° 30′	d) 210° 30′	
10)	Fly leveling is use	ed for			
	a) Establishment	of new B.M.	b) Checking purpo	se	
	c) Survey in hilly	area	d) Road survey		
11)	The soil over wh known as	ich the road struct	ure rests is the fo	undation soil and is	
	a) Formation leve	I	b) Sub grade		
	c) Sub base		d) Base		
12)	Ujjani Dam is an e	example of			
	a) River Irrigation		b) Storage Irrigation	on	
	c) Lift Irrigation		d) Percolation Tan	ks	
13)	A foundation mad structure is called	•	.C. slab covering e	entire bottom of the	
	a) Slab foundation	1	b) Flat foundation		
	c) Raft foundation		d) Combined found	dation	
14)		ed by making the be from minimum dim	•	s of room by deriving as	
	a) Grouping	b) Circulation	c) Roominess	d) Flexibility	



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F.E. (Part – II) (CBCS Pattern) Examination, 2017 BASIC CIVIL ENGINEERING (New)

Day and Date: Wednesday, 22-11-2017 Marks: 56

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

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

- 2) Assume suitable data, if necessary and mention it clearly.
- 3) Use of non programmable calculator is **allowed**.
- 4) Marks to the **right** hand side indicate **full** marks.

SECTION - I

2. Solve any four out of following seven questions.

 $(4 \times 3 = 12)$

- a) Give applications of Civil Engineering to other branches of Engineering.
- b) How Civil Engineer plays his role in construction of a house? Write in short.
- c) What is an offset? Enlist equipments used for taking offsets.
- d) Define Plane and Geodetic Surveying.
- e) What are the advantages of contour map?
- f) What are the types of Canals? Draw a neat sketch.
- g) Draw a neat sketch of cross section of a State Highway showing different components.
- 3. Solve **any two** out of following three questions.

 $(8 \times 2 = 16)$

a) The distance between two stations A and B was measured with 30 m chain. The total length of line AB as observed and recorded was 3820 m. The length of the chain was checked at start, at every km of chaining and at the end. The results are noted below.

Chainage in Km	0 (Stn. A)	1	2	3	3.820 (Stn.B)
Chain length in m	30.00	30.10	30.16	29.90	29.85

Find the true distance AB.



b) Observed quadrantal bearings in a compass traverse QRSTPQ are given below:

Line	QR	RS	ST	TP	PQ
F.B.	N(43° 30′) E	N(31° 45′) W	S(61° 00′) W	S(5° 30′) E	S(62° 00′) E
B.B.	S(45° 30′) W	S(31° 45′) E	N(61° 00′) E	N(7° 30′) W	N(64° 00′) W

- i) Find out included angles. Apply checks.
- ii) Find out corrected bearings in the same system of bearings.
- iii) Tabulate the results. Draw the traverse.
- c) The following consecutive readings were taken on a 3 m leveling staff with dumpy level at a common interval of 20 m.

0.385, 1.030, 1.925, 2.825, 3.730, 4.685, 0.625, 2.005, 3.110, 4.485

The very first reading was taken on a point having RL 208.125. Calculate the gradient of line joining first point and last point. Use Rise and Fall method.

SECTION - II

4. Solve **any four** out of following six questions.

 $(4 \times 4 = 16)$

- a) What do you understand by the term foundation? What are the objectives of providing foundation?
- b) What are the requirements of earthquake resistant structure?
- c) A rectangular plot 20m × 25m (20 m dimension facing road) is to have three storeyed building of equal built up area on each storey. Front and rear margins are 3 m. side margins are 2.5m. FSI limit is 1.5. Find the limit on built up area.
- d) State the characteristics of bricks.
- e) State different grades of concrete and mention their uses.
- f) Discuss the concept of green building.
- 5. Solve **any two** out of following three questions.

 $(6 \times 2 = 12)$

- a) Draw a neat sectional elevation showing different components of building. Also state the functions of these components.
- b) Explain following principles of planning
 - i) Privacy
- ii) Grouping
- iii) Roominess
- c) Define remote sensing. State applications of remote sensing in various fields.

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F.E. (Part – II) (New CBCS) Examination, 2017 BASIC ELECTRONICS

Day and Date: Thursday, 23-11-2017	Max. Marks : 35
Times : 10 00 a ma to 10 00 magain	

Time: 10.00 a.m. to 12.00 noon

Instructions: 1) All questions are compulsory.

- 2) Q. No. 1 is compulsory. It should be solved in first 15 minutes 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.

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	MCQ/Objective	Type Questions	
Duratio	on: 15 Minutes		Marks: 7
1. Ch	noose the correct answer :		7
1)	The Boolean expression $A(\overline{A+B})$ i	s equal to	
	a) A	b) 1	
	c) Zero	d) A + B	
2)	Two's complement representation a) $(111011110)_2$ c) $(00010001)_2$	of a number (- 17) ₁₀ is b) (11101111) ₂ d) (00010010) ₂	
3)	 Lowest output resistance is obtained a) Common base configuration b) Common emitter configuration c) Common collector configuration d) Both a) and b) 		
4)	Thermocouple is transdu a) Passive, temperature c) Active, displacement	ucer and it is used for measureme b) Active, light sensitivity d) Active, temperature	nt of

-2-



5)	Rectification efficiency of a full wave	bridge rectifier will be
	a) 81.2%	b) 40.6%
	c) 48%	d) 100%
6)	Ideal diode in forward bias offers switch.	resistance and it is equivalent to
	a) Zero, open	b) Zero, closed
	c) Infinite, closed	d) Infinite, open
7)	A PN junction which emits light when	it is forward biased is known as
	a) Light dependent resistor	b) Light emitting diode
	c) Photo diode	d) Photo transistor



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F.E. (Part – II) (New CBCS) Examination, 2017 **BASIC ELECTRONICS**

Day and Date: Thursday, 23-11-2017 Marks: 28

Time: 10.00 a.m. to 12.00 noon

SECTION-I

2. Attempt any two:

 $(2 \times 3 = 6)$

- 1) Draw and explain working of LED as 7-segment display.
- 2) Explain working of BJT transistor as a switch.
- 3) Draw circuit diagram and explain V-I characteristics of PN junction diode.
- 3. Attempt any two:

 $(2 \times 4 = 8)$

- 1) Explain working of zener as a regulator with diagram.
- 2) For bridge rectifier, derive for
- ii) V_{rms}
- iii) Ripple factor iv) Efficiency
- 3) Draw input and output characteristics of common base and common emitter configuration.

SECTION - II

4. Attempt any two:

 $(2 \times 3 = 6)$

- 1) What is NTC and PTC? Explain each with example.
- 2) Explain strain gauge transducer and also define gauge factor.
- 3) Explain following gates with symbol, equation and truth table.
 - i) XNOR
- ii) OR
- iii) NAND

5. Attempt any two:

 $(2 \times 4 = 8)$

- 1) Derive basic gates using NOR universal gate.
- 2) State and prove distributive law and commutative law.
- 3) Perform the following arithmetic operations using 2's complement method. Show the result in decimal form

i)
$$(35)_{10} - (27)_{10}$$

ii)
$$(56)_8 - (45)_8$$

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No.	Set	Q

F.E. (Part – II) (New CBCS) Examination, 2017 BASIC ELECTRONICS

Day and Date: Thursday, 23-11-2017 Max. Marks: 35

Time: 10.00 a.m. to 12.00 noon

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

- 2) Q. No. 1 is compulsory. It should be solved in first 15 minutes 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

Duration: 15 Minutes

Marks: 7

1. Choose the correct answer:

1) Lowest output resistance is obtained in

a) Common base configuration

b) Common emitter configuration

c) Common collector configuration

2) Rectification efficiency of a full wave bridge rectifier will be

a) 81.2%

b) 40.6%

c) 48%

d) 100%

3) A PN junction which emits light when it is forward biased is known as

a) Light dependent resistor

b) Light emitting diode

c) Photo diode

d) Both a) and b)

d) Photo transistor

4) The Boolean expression $A(\overline{A+B})$ is equal to

a) A

b) 1

c) Zero

d) A + B

-2-



5)	Ideal diode in forward bias of switch.	fers resistance and it is equivalent to
	a) Zero, open	b) Zero, closed
	c) Infinite, closed	d) Infinite, open
6)	Two's complement represent a) (11101110) ₂ c) (00010001) ₂	tation of a number (– 17) ₁₀ is b) (11101111) ₂ d) (00010010) ₂
7)	Thermocouple ist a) Passive, temperature c) Active, displacement	ransducer and it is used for measurement of b) Active, light sensitivity d) Active, temperature



Seat	
No.	

F.E. (Part – II) (New CBCS) Examination, 2017 **BASIC ELECTRONICS**

Day and Date: Thursday, 23-11-2017 Marks: 28 Time: 10.00 a.m. to 12.00 noon

SECTION-I

2. Attempt any two:

- 1) Draw and explain working of LED as 7-segment display.
- 2) Explain working of BJT transistor as a switch.
- 3) Draw circuit diagram and explain V-I characteristics of PN junction diode.
- 3. Attempt any two:

 $(2 \times 4 = 8)$

 $(2 \times 3 = 6)$

- 1) Explain working of zener as a regulator with diagram.
- 2) For bridge rectifier, derive for
- ii) V_{rms}
- iii) Ripple factor iv) Efficiency
- 3) Draw input and output characteristics of common base and common emitter configuration.

SECTION - II

4. Attempt any two:

 $(2 \times 3 = 6)$

- 1) What is NTC and PTC? Explain each with example.
- 2) Explain strain gauge transducer and also define gauge factor.
- 3) Explain following gates with symbol, equation and truth table.
 - i) XNOR
- ii) OR
- iii) NAND

5. Attempt any two:

 $(2 \times 4 = 8)$

- 1) Derive basic gates using NOR universal gate.
- 2) State and prove distributive law and commutative law.
- 3) Perform the following arithmetic operations using 2's complement method. Show the result in decimal form

i)
$$(35)_{10} - (27)_{10}$$

ii)
$$(56)_8 - (45)_8$$

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F.E. (Part – II) (New CBCS) Examination, 2017 BASIC ELECTRONICS

Day and Date: Thursday, 23-11-2017 Max. Marks: 35

Time: 10.00 a.m. to 12.00 noon

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

- 2) Q. No. 1 is compulsory. It should be solved in first 15 minutes 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	e Type Questions	
Duratio	on : 15 Minutes		Marks
1. Ch	oose the correct answer:		
1)	Thermocouple is transd a) Passive, temperature c) Active, displacement	lucer and it is used for measurement b) Active, light sensitivity d) Active, temperature	ıt of
2)	Lowest output resistance is obtain a) Common base configuration b) Common emitter configuration c) Common collector configuration d) Both a) and b)		
3)	Rectification efficiency of a full wa a) 81.2% c) 48%	ve bridge rectifier will be b) 40.6% d) 100%	
4)	A PN junction which emits light wha) Light dependent resistorc) Photo diode	nen it is forward biased is known as b) Light emitting diode d) Photo transistor	

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5)	Two's complement representation of a) $(11101110)_2$ c) $(00010001)_2$	b)	umber (– 17) ₁₀ is (11101111) ₂ (00010010) ₂
6)	The Boolean expression $A(\overline{A+B})$ is C	equ	al to
	a) A	b)	1
	c) Zero	d)	A + B
7)	Ideal diode in forward bias offers switch.		_ resistance and it is equivalent to
	a) Zero, open	b)	Zero, closed
	c) Infinite, closed	d)	Infinite, open



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F.E. (Part – II) (New CBCS) Examination, 2017 **BASIC ELECTRONICS**

Day and Date: Thursday, 23-11-2017 Marks: 28 Time: 10.00 a.m. to 12.00 noon

SECTION-I

2. Attempt any two:

 $(2 \times 3 = 6)$

- 1) Draw and explain working of LED as 7-segment display.
- 2) Explain working of BJT transistor as a switch.
- 3) Draw circuit diagram and explain V-I characteristics of PN junction diode.
- 3. Attempt any two:

 $(2 \times 4 = 8)$

- 1) Explain working of zener as a regulator with diagram.
- 2) For bridge rectifier, derive for
- ii) V_{rms}
- iii) Ripple factor iv) Efficiency
- 3) Draw input and output characteristics of common base and common emitter configuration.

SECTION - II

4. Attempt any two:

 $(2 \times 3 = 6)$

- 1) What is NTC and PTC? Explain each with example.
- 2) Explain strain gauge transducer and also define gauge factor.
- 3) Explain following gates with symbol, equation and truth table.
 - i) XNOR
- ii) OR
- iii) NAND

5. Attempt any two:

 $(2 \times 4 = 8)$

- 1) Derive basic gates using NOR universal gate.
- 2) State and prove distributive law and commutative law.
- 3) Perform the following arithmetic operations using 2's complement method. Show the result in decimal form

i)
$$(35)_{10} - (27)_{10}$$

ii)
$$(56)_8 - (45)_8$$

 				
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F.E. (Part – II) (New CBCS) Examination, 2017 **BASIC ELECTRONICS**

Day and Date: Thursday, 23-11-2017 Max. Marks: 35

Time: 10.00 a.m. to 12.00 noon

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

- 2) Q. No. 1 is compulsory. It should be solved in first 15 minutes 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	
Duratio	on : 15 Minutes	Marks:	7
1. Ch	oose the correct answer :		7
1)	Ideal diode in forward bias offers switch.	resistance and it is equivalent to	
	a) Zero, openc) Infinite, closed	b) Zero, closedd) Infinite, open	
2)	Thermocouple is transduction a) Passive, temperature c) Active, displacement	cer and it is used for measurement of b) Active, light sensitivity d) Active, temperature	
3)	The Boolean expression $A(\overline{A+B})$ is a) A c) Zero	equal to b) 1 d) A + B	
4)	Rectification efficiency of a full wave a) 81.2% c) 48%	e bridge rectifier will be b) 40.6% d) 100%	

-2-



- 5) Lowest output resistance is obtained in
 - a) Common base configuration
 - b) Common emitter configuration
 - c) Common collector configuration
 - d) Both a) and b)
- 6) A PN junction which emits light when it is forward biased is known as
 - a) Light dependent resistor

b) Light emitting diode

c) Photo diode

d) Photo transistor

7) Two's complement representation of a number $(-17)_{10}$ is

a) (11101110)₂

b) (11101111)₂

c) $(00010001)_2$

d) $(00010010)_2$



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F.E. (Part – II) (New CBCS) Examination, 2017 **BASIC ELECTRONICS**

Day and Date: Thursday, 23-11-2017 Marks: 28 Time: 10.00 a.m. to 12.00 noon

SECTION-I

2. Attempt any two:

 $(2 \times 3 = 6)$

- 1) Draw and explain working of LED as 7-segment display.
- 2) Explain working of BJT transistor as a switch.
- 3) Draw circuit diagram and explain V-I characteristics of PN junction diode.
- 3. Attempt any two:

 $(2 \times 4 = 8)$

- 1) Explain working of zener as a regulator with diagram.
- 2) For bridge rectifier, derive for
- ii) V_{rms}
- iii) Ripple factor iv) Efficiency
- 3) Draw input and output characteristics of common base and common emitter configuration.

SECTION - II

4. Attempt any two:

 $(2 \times 3 = 6)$

- 1) What is NTC and PTC? Explain each with example.
- 2) Explain strain gauge transducer and also define gauge factor.
- 3) Explain following gates with symbol, equation and truth table.
 - i) XNOR
- ii) OR
- iii) NAND

5. Attempt any two:

 $(2 \times 4 = 8)$

- 1) Derive basic gates using NOR universal gate.
- 2) State and prove distributive law and commutative law.
- 3) Perform the following arithmetic operations using 2's complement method. Show the result in decimal form

i)
$$(35)_{10} - (27)_{10}$$

ii)
$$(56)_8 - (45)_8$$

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T.E. (Part – I) (All Branches) (CGPA) Examination, 2017 SOCIOLOGY Introduction to Sociology (Self Learning) (HSS)

Day and Date: Wednesday, 13-12-2017 Max. Marks: 50

Time: 10.00 a.m. to 12.00 Noon

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

- 2) Figures to the **right** indicate **full** marks.
- 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) The term sociology was for the first time coined by a) Auguste Comte b) Ginsberg d) Socrates c) Aristotle 2) Sociology as a subject deals with _____ a) Man and society b) Human associations c) Social relations among individuals d) Rights and duties of the citizens 3) Which of the following is not a characteristic of primary group? a) Formality b) Closeness c) Familiarity d) Integrity 4) The nature of urbanization is _____ b) Static a) Pioneering c) Dynamic d) Homogeneous 5) Social change is responsible for ____ a) Social progress b) Social evolution c) Social disorganisation d) All the above



6)	An unskilled worker becomes mobility is this? a) Intra generational occupati b) Inter generational occupati c) Vertical social mobility d) Horizontal social mobility	-
7)	Who has been initiated the Na a) Anna Hazare c) Sundarlal Bahuguna	rmada Bachao Andolan (Movement) ? b) Medha Patkar d) J. P. Narayan
8)	Which of the following is the ea) Street vendor c) Rag picker	example of informal sector ? b) Waste picker d) All the above
9)	a) Change c) Modernization	d continues process. b) Poverty d) All the above

b) Before child's birth

d) In youth age

10) Process of socialization starts _____

a) After birth of child

c) After getting maturity



Seat	
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T.E. (Part – I) (All Branches) (CGPA) Examination, 2017 SOCIOLOGY Introduction to Sociology (Self Learning) (HSS)

Day and Date: Wednesday, 13-12-2017 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.

Define sociology and explain the characteristics of culture.
 Define industrialization and explain its key features in Indian context.
 Elucidate the vital trends of urbanization in India.
 10

5. Define social movements and elucidate the objectives of "India against corruption movement".

6. Do you think that modern technology leads to environment crisis? Discuss. 10

7. Discuss the changing pattern of family system in urban society.

10

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Marks: 10

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T.E. (Part – I) (All Branches) (CGPA) Examination, 2017 SOCIOLOGY Introduction to Sociology (Self Learning) (HSS)

Day and Date: Wednesday, 13-12-2017 Max. Marks: 50

Time: 10.00 a.m. to 12.00 Noon

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

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

1. Choose the correct answer: 1) _____ is a natural and continues process. a) Change b) Poverty d) All the above c) Modernization 2) Process of socialization starts _____ a) After birth of child b) Before child's birth c) After getting maturity d) In youth age 3) Who has been initiated the Narmada Bachao Andolan (Movement)? a) Anna Hazare b) Medha Patkar c) Sundarlal Bahuguna d) J. P. Narayan 4) Which of the following is the example of informal sector? a) Street vendor b) Waste picker c) Rag picker d) All the above 5) The term sociology was for the first time coined by a) Auguste Comte b) Ginsberg c) Aristotle d) Socrates

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₹-T	J – 601 -2-		
6)	Sociology as a subject deals with a) Man and society b) Human associations c) Social relations among individuals d) Rights and duties of the citizens		
7)	Which of the following is not a characa) Formality c) Familiarity	cteristic of b) Close d) Integr	ness
8)	The nature of urbanization isa) Pioneering c) Dynamic	b) Static	
9)	Social change is responsible for a) Social progress c) Social disorganisation	b) Socia d) All the	l evolution e above
10)	An unskilled worker becomes semis mobility is this?	killed and	later on skilled. What type of

- - a) Intra generational occupational mobility
 - b) Inter generational occupational mobility
 - c) Vertical social mobility
 - d) Horizontal social mobility



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T.E. (Part – I) (All Branches) (CGPA) Examination, 2017 SOCIOLOGY Introduction to Sociology (Self Learning) (HSS)

Marks: 40 Day and Date: Wednesday, 13-12-2017

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. Define sociology and explain the characteristics of culture. 10 10 3. Define industrialization and explain its key features in Indian context. 4. Elucidate the vital trends of urbanization in India. 10 5. Define social movements and elucidate the objectives of "India against corruption 10 movement". 6. Do you think that modern technology leads to environment crisis? Discuss. 10

7. Discuss the changing pattern of family system in urban society.

10

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T.E. (Part – I) (All Branches) (CGPA) Examination, 2017 SOCIOLOGY Introduction to Sociology (Self Learning) (HSS)

Day and Date: Wednesday, 13-12-2017 Max. Marks: 50

Time: 10.00 a.m. to 12.00 Noon

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

- 2) Figures to the **right** indicate **full** marks.
- 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) Social change is responsible for _____ a) Social progress b) Social evolution c) Social disorganisation d) All the above 2) An unskilled worker becomes semiskilled and later on skilled. What type of mobility is this? a) Intra generational occupational mobility b) Intergenerational occupational mobility c) Vertical social mobility d) Horizontal social mobility 3) _____ is a natural and continues process. a) Change b) Poverty d) All the above c) Modernization 4) Process of socialization starts _____ a) After birth of child b) Before child's birth d) In youth age c) After getting maturity 5) Which of the following is not a characteristic of primary group? a) Formality b) Closeness c) Familiarity d) Integrity

6)	The nature of urbanization is a) Pioneering c) Dynamic	b) Static d) Homogeneous
7)	The term sociology was for the first tile a) Auguste Comte c) Aristotle	me coined by b) Ginsberg d) Socrates
8)	Sociology as a subject deals with a) Man and society b) Human associations c) Social relations among individuals d) Rights and duties of the citizens	
9)	Who has been initiated the Narmada E a) Anna Hazare c) Sundarlal Bahuguna	Bachao Andolan (Movement) ? b) Medha Patkar d) J. P. Narayan
10)	Which of the following is the example a) Street vendor c) Rag picker	of informal sector ? b) Waste picker d) All the above



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T.E. (Part – I) (All Branches) (CGPA) Examination, 2017 SOCIOLOGY Introduction to Sociology (Self Learning) (HSS)

Day and Date: Wednesday, 13-12-2017 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.

Define sociology and explain the characteristics of culture.
 Define industrialization and explain its key features in Indian context.
 Elucidate the vital trends of urbanization in India.
 Define social movements and elucidate the objectives of "India against corruption movement".

6. Do you think that modern technology leads to environment crisis? Discuss. **10**

7. Discuss the changing pattern of family system in urban society.

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Max. Marks: 50

T.E. (Part – I) (All Branches) (CGPA) Examination, 2017 SOCIOLOGY

Introduction to Sociology (Self Learning) (HSS)

Day and Date: Wednesday, 13-12-2017 Time: 10.00 a.m. to 12.00 Noon

a) Anna Hazare

c) Sundarlal Bahuguna

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

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

b) Medha Patkar

d) J. P. Narayan

MCQ/Objective Type Questions Marks: 10 1. Choose the correct answer: 10 1) Which of the following is not a characteristic of primary group? a) Formality b) Closeness c) Familiarity d) Integrity 2) The nature of urbanization is _____ b) Static a) Pioneering d) Homogeneous c) Dynamic Social change is responsible for _____ a) Social progress b) Social evolution c) Social disorganisation d) All the above 4) An unskilled worker becomes semiskilled and later on skilled. What type of mobility is this? a) Intra generational occupational mobility b) Intergenerational occupational mobility c) Vertical social mobility d) Horizontal social mobility 5) Who has been initiated the Narmada Bachao Andolan (Movement)?

6)	Which of the following is the example	of	informal sector?
	a) Street vendor	b)	Waste picker
	c) Rag picker	d)	All the above
7)	is a natural and contin	ues	s process.
	a) Change	b)	Poverty
	c) Modernization	d)	All the above
8)	Process of socialization starts		
	a) After birth of child	b)	Before child's birth
	c) After getting maturity	d)	In youth age
9)	The term sociology was for the first til	me	coined by
	a) Auguste Comte	b)	Ginsberg
	c) Aristotle	d)	Socrates
10)	Sociology as a subject deals witha) Man and society		
	b) Human associations		
	c) Social relations among individuals		
	d) Rights and duties of the citizens		



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T.E. (Part – I) (All Branches) (CGPA) Examination, 2017 SOCIOLOGY Introduction to Sociology (Self Learning) (HSS)

Day and Date: Wednesday, 13-12-2017 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.

Define sociology and explain the characteristics of culture.
 Define industrialization and explain its key features in Indian context.
 Elucidate the vital trends of urbanization in India.
 Define social movements and elucidate the objectives of "India against corruption movement".
 Do you think that modern technology leads to environment crisis? Discuss.
 Discuss the changing pattern of family system in urban society.

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T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 SELF LEARNING – HSS – PROFESSIONAL ETHICS AND HUMAN VALUES

Day and Date : Wednesday, 13-12-2017	Max. Marks : 50
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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.
- 4) Make suitable assumptions, if required and state them clearly.

MCQ/Objective Type Questions

Marks	:	10

1. Choose the correct answer: (10×1=10)

1) HR means

A) Head Resource B) Honorary Responsibility

C) Human Resource D) All of the above

2) CSR means

A) Corporate Social Responsibility B) Cooperation Society Responsibility

C) Class Social Representative D) None of the above

3) _____ is not the part of internal communication.

A) Mailers

B) Electronic mails

C) Advertise and market honoring values

D) Internal news letter

4) In SWOT, T represents

A) Temperature B) Threats C) Table D) Teacher

5) FMEA is a tool of

A) Financial analysis B) Risk analysis

C) Equity analysis D) None of the above

6) Rights theory is related toA) MotivationC) Leadership	,	Ethics Team building
7) Maslow has demonstrated the hierardA) BeliefsC) Needs	B)	of Team None of the above
8) The bargain by a Trade Union for imp is called asA) StrikeC) Collective bargaining	B)	ing the economic and other interest Authority Responsibility None of the above
9) Gilligan theory is related toA) Moral developmentC) Motivation	,	Human values Team working
10	 A specific exclusive right, describing rand artistic work is called as A) Patent C) Copy right 	В)	ts given to creator for their literature Trademark None of the above



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T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 SELF LEARNING – HSS – PROFESSIONAL ETHICS AND HUMAN VALUES

Day and Date: Wednesday, 13-12-2017 Marks: 40

Time: 10.00 a.m. to 12.00 noon

Note: Solve any 4 questions.

6. What are human values? Explain their types.

Explain variety of moral issues.
 Differentiate between Kohlberg's and Gilligan's theory.
 Explain types of inquiries in detail.
 Explain the method of Failure Mode and Effect Analysis (FMEA).
 Explain the method of Failure Mode and Effect Analysis (FMEA).

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T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 SELF LEARNING – HSS – PROFESSIONAL ETHICS AND HUMAN VALUES

Day and Date: Wednesday, 13-12-2017 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.
- 4) Make suitable assumptions, if required and state them **clearly**.

MCQ/Objective Type Questions

Marks: 10

 Choose the correct answer : 	(10×1=10)
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1) Gilligan theory is related to

A) Moral developmentB) Human valuesC) MotivationD) Team working

2) A specific exclusive right, describing rights given to creator for their literature and artistic work is called as

A) Patent B) Trademark

C) Copy right D) None of the above

3) Maslow has demonstrated the hierarchy of

A) Beliefs B) Team

C) Needs D) None of the above

4) The bargain by a Trade Union for improving the economic and other interest is called as

A) Strike B) Authority Responsibility

C) Collective bargaining D) None of the above

5) HR means

A) Head Resource B) Honorary Responsibility

C) Human Resource D) All of the above



(6) CSR means A) Corporate Social Responsibility C) Class Social Representative	, .
-	7) is not the part of internal A) Mailers B) Electronic mails C) Advertise and market honoring va D) Internal news letter	
8	B) In SWOT, T represents A) Temperature C) Table	B) Threats D) Teacher
(9) FMEA is a tool ofA) Financial analysisC) Equity analysis	B) Risk analysis D) None of the above
10	D) Rights theory is related toA) MotivationC) Leadership	B) Ethics D) Team building

Set Q



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T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 SELF LEARNING – HSS – PROFESSIONAL ETHICS AND HUMAN VALUES

Day and Date: Wednesday, 13-12-2017 Marks: 40

Time: 10.00 a.m. to 12.00 noon

Note: Solve any 4 questions.

6. What are human values? Explain their types.

Explain variety of moral issues.
 Differentiate between Kohlberg's and Gilligan's theory.
 Explain types of inquiries in detail.
 Explain the method of Failure Mode and Effect Analysis (FMEA).
 Explain the method of Failure Mode and Effect Analysis (FMEA).

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T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 SELF LEARNING - HSS - PROFESSIONAL ETHICS AND HUMAN **VALUES**

Day and Date: Wednesday, 13-12-2017 Max. Marks: 50

Time: 10.00 a.m. to 12.00 noon

D) Internal news letter

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.
- 4) Make suitable assumptions, if required and state them **clearly**.

MCQ/Objective Type Questions

Marks: 10

	Warks. 10
Choose the correct answer:	(10×1=10)
1) FMEA is a tool of	
A) Financial analysis	B) Risk analysis
C) Equity analysis	D) None of the above
2) Rights theory is related to	
A) Motivation	B) Ethics
C) Leadership	D) Team building
3) Gilligan theory is related to	
A) Moral development	B) Human values
C) Motivation	D) Team working
4) A specific exclusive right, describing r	ights given to creator for their literature
and artistic work is called as	
A) Patent	B) Trademark
C) Copy right	D) None of the above
5)is not the part of internal of	communication.
A) Mailers	
B) Electronic mails	
C) Advertise and market honoring val	ues

6)	In SWOT, T represents A) Temperature C) Table	s) Threats b) Teacher	
7)	HR means A) Head Resource C) Human Resource	Honorary Respons All of the above	ibility
8)	CSR means A) Corporate Social Responsibility C) Class Social Representative	Cooperation Societ None of the above	y Responsibility
9)	Maslow has demonstrated the hierard A) Beliefs C) Needs	y of b) Team b) None of the above	
10)	The bargain by a Trade Union for imp is called as A) Strike	s) Authority Respons	
	C) Collective bargaining) None of the above	

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T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 SELF LEARNING – HSS – PROFESSIONAL ETHICS AND HUMAN VALUES

Day and Date: Wednesday, 13-12-2017 Marks: 40

Time: 10.00 a.m. to 12.00 noon

Note: Solve any 4 questions.

6. What are human values? Explain their types.

Explain variety of moral issues.
 Differentiate between Kohlberg's and Gilligan's theory.
 Explain types of inquiries in detail.
 Explain the method of Failure Mode and Effect Analysis (FMEA).
 Explain the method of Failure Mode and Effect Analysis (FMEA).

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T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 SELF LEARNING – HSS – PROFESSIONAL ETHICS AND HUMAN VALUES

Day and Date: Wednesday, 13-12-2017 Max. Marks: 50

Time: 10.00 a.m. to 12.00 noon

A) Beliefs

C) Needs

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.
- 4) Make suitable assumptions, if required and state them clearly.

MCQ/Objective Type Questions Marks: 10 1. Choose the correct answer: $(10 \times 1 = 10)$ 1) _____ is not the part of internal communication. A) Mailers B) Electronic mails C) Advertise and market honoring values D) Internal news letter 2) In SWOT, T represents A) Temperature B) Threats C) Table D) Teacher 3) FMEA is a tool of A) Financial analysis B) Risk analysis D) None of the above C) Equity analysis 4) Rights theory is related to A) Motivation B) Ethics C) Leadership D) Team building 5) Maslow has demonstrated the hierarchy of

B) Team

D) None of the above



6) The bargain by a Trade Union for im is called as	proving the economic and other interest
A) Strike	B) Authority Responsibility
C) Collective bargaining	D) None of the above
7) Gilligan theory is related to	
A) Moral development	B) Human values
C) Motivation	D) Team working
A specific exclusive right, describing and artistic work is called as	g rights given to creator for their literature
A) Patent	B) Trademark
C) Copy right	D) None of the above
9) HR means	
A) Head Resource	B) Honorary Responsibility
C) Human Resource	D) All of the above
10) CSR means	
A) Corporate Social Responsibility	B) Cooperation Society Responsibility
C) Class Social Representative	D) None of the above

Set S



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T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 SELF LEARNING - HSS - PROFESSIONAL ETHICS AND HUMAN **VALUES**

Day and Date: Wednesday, 13-12-2017 Marks: 40

Time: 10.00 a.m. to 12.00 noon

Note: Solve any 4 questions.

2. Explain variety of moral issues. 10 3. Differentiate between Kohlberg's and Gilligan's theory. 10 4. Explain types of inquiries in detail. 10 5. Explain the method of Failure Mode and Effect Analysis (FMEA). 10 6. What are human values? Explain their types.

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Set P

Toal Marks: 50

10

T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 ECONOMICS

(Self Learning - H.S.S.)

Day and Date: Wednesday, 13-12-2017

Time: 10.00 a.m. to 12.00 noon

Instructions: 1) Attempt any four questions out of Q. 2 to 7.

- 2) Figtures at right indicates marks.
- 3) Q. No. 1 is compulsory. It should be solved in first 15 minutes in Answer Book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 15 Minutes Marks: 10

- 1. Choose the correct alternatives:
 - 1) Macro study is
 - a) Study of individual

b) Study of aggregate

c) Both above

d) None of above

- 2) Utility analysis is
 - a) Subjective and changes
 - b) Objective and des no change
 - c) Can be measured numerically
 - d) Not measurable at all by any means
- 3) Demand is always influenced, as per law of demand, by
 - a) Price of commodity under reference
 - b) Price of substitute commodity
 - c) By both above
 - d) By none above
- 4) If the price of petrol continuously increase, it will create
 - a) Positive impact on demand of scooter
 - b) Negative impact on demand of scooter
 - c) Shall not create any impact
 - d) All above alternatives are irrelevant



- 5) International tarde is a trade between
 - a) Two different firms in the same country
 - b) Two different industries in the same country
 - c) Two different firms in different countries
 - d) Two different regions in the same country
- 6) Balance of trade and balance of payment are
 - a) Same concepts
 - b) Different in matter of quantity of trade
 - c) Balance of payment is wider than balance of trade
 - d) Balance of trade is wider than balance of payment
- 7) Monetary policy is
 - a) Formulated and implemented by RBI
 - b) Formulated by RBI but implemented by Finance Dept.
 - c) Formulated by Finance Dept and implemented by RBI
 - d) Neither formulated nor implemented by RBI
- 8) RBI was establised under
 - a) Banking Regulation Act, 1949
- b) RBI Act, 1935

c) RBI Act, 1934

- d) Govt. of India Act, 1935
- 9) Consumption is majorly influenced by
 - a) Income
- b) Pricing
- c) Taxation
- d) Advertisement

- 10) Inflation refers to
 - a) Continuous rise in prices
 - b) Continuous fall in prices
 - c) No change in the prices
 - d) Price has no relation with inflation



T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 ECONOMICS (Self Learning – H.S.S.)

Day and Date: Wednesday, 13-12-2017 Marks: 40

Time: 10.00 a.m. to 12.00 noon

Instructions: 1) Attempt any four questions out of Q. 2 to 7.

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

2. Define Economics. Explain the importance of economics theories for business firms. 10 3. "Law of demand shall come into effect only on remaining other things constant" - Discuss. 10 10 4. Examine critically the laws of return to scale. 5. What do you understand by National Income? How it is measured in any country? 10 6. What is Central Banking? In what respect it is different from commercial banking? 10 7. What do you understand by international trade? Why countries go for international trade? 10

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Toal Marks: 50

Q

T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 ECONOMICS (Self Learning H.S.S.)

(Self Learning – H.S.S.)

Day and Date: Wednesday, 13-12-2017

Time: 10.00 a.m. to 12.00 noon

Instructions: 1) Attempt **any four** questions out of Q. **2** to **7**.

- 2) Figtures at right indicates marks.
- 3) Q. No. 1 is compulsory. It should be solved in first 15 minutes in Answer Book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 15 Minutes Marks: 10

1. Choose the correct alternatives:

10

- 1) Consumption is majorly influenced by
 - a) Income
- b) Pricing
- c) Taxation
- d) Advertisement

- 2) Inflation refers to
 - a) Continuous rise in prices
 - b) Continuous fall in prices
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 - d) Price has no relation with inflation
- 3) Monetary policy is
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 - b) Formulated by RBI but implemented by Finance Dept.
 - c) Formulated by Finance Dept and implemented by RBI
 - d) Neither formulated nor implemented by RBI
- 4) RBI was establised under
 - a) Banking Regulation Act, 1949
- b) RBI Act, 1935

c) RBI Act, 1934

d) Govt. of India Act, 1935

- 5) Macro study is
 - a) Study of individual

b) Study of aggregate

c) Both above

d) None of above



- 6) Utility analysis is
 - a) Subjective and changes
 - b) Objective and des no change
 - c) Can be measured numerically
 - d) Not measurable at all by any means
- 7) Demand is always influenced, as per law of demand, by
 - a) Price of commodity under reference
 - b) Price of substitute commodity
 - c) By both above
 - d) By none above
- 8) If the price of petrol continuously increase, it will create
 - a) Positive impact on demand of scooter
 - b) Negative impact on demand of scooter
 - c) Shall not create any impact
 - d) All above alternatives are irrelevant
- 9) International tarde is a trade between
 - a) Two different firms in the same country
 - b) Two different industries in the same country
 - c) Two different firms in different countries
 - d) Two different regions in the same country
- 10) Balance of trade and balance of payment are
 - a) Same concepts
 - b) Different in matter of quantity of trade
 - c) Balance of payment is wider than balance of trade
 - d) Balance of trade is wider than balance of payment



T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 ECONOMICS (Self Learning – H.S.S.)

Day and Date: Wednesday, 13-12-2017 Marks: 40

Time: 10.00 a.m. to 12.00 noon

Instructions: 1) Attempt any four questions out of Q. 2 to 7.

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

2. Define Economics. Explain the importance of economics theories for business firms. 10 3. "Law of demand shall come into effect only on remaining other things constant" - Discuss. 10 10 4. Examine critically the laws of return to scale. 5. What do you understand by National Income? How it is measured in any country? 10 6. What is Central Banking? In what respect it is different from commercial banking? 10 7. What do you understand by international trade? Why countries go for international trade? 10

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Toal Marks: 50

T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 ECONOMICS (Solf Learning H.S.S.)

(Self Learning – H.S.S.)

Day and Date: Wednesday, 13-12-2017

Time: 10.00 a.m. to 12.00 noon

Instructions: 1) Attempt any four questions out of Q. 2 to 7.

- 2) Figtures at right indicates marks.
- 3) Q. No. 1 is compulsory. It should be solved in first 15 minutes in Answer Book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 15 Minutes Marks: 10

1. Choose the correct alternatives:

- 1) International tarde is a trade between
 - a) Two different firms in the same country
 - b) Two different industries in the same country
 - c) Two different firms in different countries
 - d) Two different regions in the same country
- 2) Balance of trade and balance of payment are
 - a) Same concepts
 - b) Different in matter of quantity of trade
 - c) Balance of payment is wider than balance of trade
 - d) Balance of trade is wider than balance of payment
- 3) Consumption is majorly influenced by
 - a) Income
- b) Pricing
- c) Taxation
- d) Advertisement

- 4) Inflation refers to
 - a) Continuous rise in prices
 - b) Continuous fall in prices
 - c) No change in the prices
 - d) Price has no relation with inflation



- 5) Demand is always influenced, as per law of demand, by
 - a) Price of commodity under reference
 - b) Price of substitute commodity
 - c) By both above
 - d) By none above
- 6) If the price of petrol continuously increase, it will create
 - a) Positive impact on demand of scooter
 - b) Negative impact on demand of scooter
 - c) Shall not create any impact
 - d) All above alternatives are irrelevant
- 7) Macro study is
 - a) Study of individual

b) Study of aggregate

c) Both above

d) None of above

- 8) Utility analysis is
 - a) Subjective and changes
 - b) Objective and des no change
 - c) Can be measured numerically
 - d) Not measurable at all by any means
- 9) Monetary policy is
 - a) Formulated and implemented by RBI
 - b) Formulated by RBI but implemented by Finance Dept.
 - c) Formulated by Finance Dept and implemented by RBI
 - d) Neither formulated nor implemented by RBI
- 10) RBI was establised under
 - a) Banking Regulation Act, 1949
- b) RBI Act, 1935

c) RBI Act, 1934

d) Govt. of India Act, 1935



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T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 ECONOMICS (Self Learning – H.S.S.)

Day and Date: Wednesday, 13-12-2017 Marks: 40

Time: 10.00 a.m. to 12.00 noon

Instructions: 1) Attempt any four questions out of Q. 2 to 7.

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

2. Define Economics. Explain the importance of economics theories for business firms. 10 3. "Law of demand shall come into effect only on remaining other things constant" - Discuss. 10 10 4. Examine critically the laws of return to scale. 5. What do you understand by National Income? How it is measured in any 10 country? 6. What is Central Banking? In what respect it is different from commercial banking? 10 7. What do you understand by international trade? Why countries go for international trade? 10



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T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 ECONOMICS (Self Learning – H.S.S.)

Day and Date: Wednesday, 13-12-2017 Toal Marks: 50

Time: 10.00 a.m. to 12.00 noon

Instructions: 1) Attempt any four questions out of Q. 2 to 7.

- 2) Figtures at **right** indicates marks.
- 3) Q. No. 1 is compulsory. It should be solved in first 15 minutes in Answer Book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 15 Minutes Marks: 10

1. Choose the correct alternatives:

10

- 1) Demand is always influenced, as per law of demand, by
 - a) Price of commodity under reference
 - b) Price of substitute commodity
 - c) By both above
 - d) By none above
- 2) If the price of petrol continuously increase, it will create
 - a) Positive impact on demand of scooter
 - b) Negative impact on demand of scooter
 - c) Shall not create any impact
 - d) All above alternatives are irrelevant
- 3) International tarde is a trade between
 - a) Two different firms in the same country
 - b) Two different industries in the same country
 - c) Two different firms in different countries
 - d) Two different regions in the same country



- 4) Balance of trade and balance of payment are
 - a) Same concepts
 - b) Different in matter of quantity of trade
 - c) Balance of payment is wider than balance of trade
 - d) Balance of trade is wider than balance of payment
- 5) Monetary policy is
 - a) Formulated and implemented by RBI
 - b) Formulated by RBI but implemented by Finance Dept.
 - c) Formulated by Finance Dept and implemented by RBI
 - d) Neither formulated nor implemented by RBI
- 6) RBI was establised under
 - a) Banking Regulation Act, 1949
- b) RBI Act, 1935

c) RBI Act, 1934

- d) Govt. of India Act, 1935
- 7) Consumption is majorly influenced by
 - a) Income
- b) Pricing
- c) Taxation
- d) Advertisement

- 8) Inflation refers to
 - a) Continuous rise in prices
 - b) Continuous fall in prices
 - c) No change in the prices
 - d) Price has no relation with inflation
- 9) Macro study is
 - a) Study of individual

b) Study of aggregate

c) Both above

d) None of above

- 10) Utility analysis is
 - a) Subjective and changes
 - b) Objective and des no change
 - c) Can be measured numerically
 - d) Not measurable at all by any means



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T.E. (All Branches) (Part – I(CGPA) Examination, 2017 ECONOMICS (Self Learning – H.S.S.)

Day and Date: Wednesday, 13-12-2017 Marks: 40

Time: 10.00 a.m. to 12.00 noon

Instructions: 1) Attempt any four questions out of Q. 2 to 7.

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

2. Define Economics. Explain the importance of economics theories for business firms. 10 3. "Law of demand shall come into effect only on remaining other things constant" - Discuss. 10 10 4. Examine critically the laws of return to scale. 5. What do you understand by National Income? How it is measured in any 10 country? 6. What is Central Banking? In what respect it is different from commercial banking? 10 7. What do you understand by international trade? Why countries go for international trade? 10

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Set P

T.E. (Part – I) (All Branches) (CGPA) Examination, 2017 Self Learning (HSS) STRESS AND COPING

		OIIILO		ooi iita		
-	Date : Wednesday, .00 a.m. to 12.00 n		7		Max. Marks :	50
	Note: i) Q. ii) Sc		-	ory. No. 2 to Q. No. 7 .		
1. A) Ch	noose amongst the	right altern	ative.			5
1)	Technological ch stress.	ange, ecor	nomic c	onditions are	causes of	
	a) Political	b) Environ	mental	c) Occupational	d) Cultural	
2)	Stress which is he	ealthy for o	rganisa	tion or for the indi	vidual is known as	
	a) Eustress	b) Distress	8	c) Resistance	d) None of these	
3)	High BP, Heart di	seases are		symptoms	of stress.	
	a) Behavioral	b) Psychol	ogical	c) Physiological	d) None of these	
4)	is expectations from			occupant that th	ere are too many	
	a) Role stagnation	b) Role ero	osion	c) Role overload	d) Role isolation	
5)	up with multiple jo			and scheduling th	ne activities to cope	
	a) Physical exerc	ise		b) Relaxation		
	c) Wellness progr	rams		d) Time managen	nent	
B) Ma	atch the pairs :					5
	Set "A"		Set "B	"		
1)	Individual coping	1)	Techno	ological change		
2)	Organisational ca	uses 2)	Relativ	es es		
3)	Environmental ca	uses 3)	Physic	al exercise		
4)	Social support	4)	Confus	sion		
5)	Role ambiguity	5)	Proced	dure and structure		

2.	Explain the individual ways to stress management.	10
3.	Elaborate on the common sources of stress.	10
4.	The consequences of stress can be harmful. Explain this statement.	10
5.	Highlight the role of social support in minimising the effects of stress.	10
6.	Define stress and state the current and historical status of stress.	10
7.	Explain the nature of stress response.	10

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Set

T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMENT (Self Learning (HSS))

Day and Date: Wednesday, 13-12-2017 Max. Marks: 50

Time: 10.00 a.m. to 12.00 noon

N.B.: 1) Attempt all questions.

- 2) Figures to the right indicate full marks.
- 3) Q. No. 1 is compulsory. It should be solved in Answer Book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks: 10

1. Choose correct answers:

10

- 1) What is the term of a patent?
 - a) 35 years

b) 25 years

c) 20 years

- d) 15 years
- 2) What is copyright meant for ?
 - a) Film work

b) Books

c) Essay

- d) All the above
- 3) 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
- 4) 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



5)	The first Patent Law was enacted in a) 1856 c) 1905	b)	ia in the year 1880 1850
6)	No patent shall be granted in respect a) Atomic energy c) Solar energy	b)	an invention relating to Bio energy Wind energy
7)	Which of the following is not specific legislation? a) Industrial designs	ally	
	c) Copyrights	,	Trade secrets
8)	All of the following are examples of into a) Copyrights c) Contracts	b)	ctual property protections EXCEPT Patents Trademarks
9)	Intellectual Property Rights are resultanted a) Mental workto Technical work	b)	Physical work Communication
10)	To apply for a patent, an inventor mua) File an application at a patent office technical requirementsb) Draft the full specification of the patent amended	ce v ate	nt they seek, which cannot be later
	c) Demonstrate that their invention vd) None of above	wor	KS



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T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMENT (Self Learning (HSS))

Day and Date: Wednesday, 13-12-2017 Max. Marks: 50

Time: 10.00 a.m. to 12.00 noon

N.B.: 1) Attempt all questions.

- 2) Figures to the right indicate full marks.
- 3) Q. No. 1 is compulsory. It should be solved in Answer Book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks: 10

1. Choose correct answers:

10

- 1) Intellectual Property Rights are result of
 - a) Mental work

b) Physical work

c) Technical work

- d) Communication
- 2) 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 above
- 3) Which of the following is not specifically protected by intellectual property legislation?
 - a) Industrial designs

b) Trademarks

c) Copyrights

- d) Trade secrets
- 4) All of the following are examples of intellectual property protections EXCEPT
 - a) Copyrights

b) Patents

c) Contracts

d) Trademarks

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SLR-TJ - 605 -2-

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5)	What is the term of a patent? a) 35 years c) 20 years	•	25 years 15 years
6)	What is copyright meant for ? a) Film work c) Essay	•	Books All the above
7)	A person develops a new process for Fats and Cholesterol. He wishes to p suitable? a) Patent c) Trademarks	rot b)	•
8)	The legislation covering Intellectual Rechnology is a) Information Technology Act, 2003 b) Information Technology Act, 2003 c) Information Technology Act, 2008 d) None of the above	Pro	G
9)	The first Patent Law was enacted in a) 1856 c) 1905	b)	lia in the year 1880 1850
10)	No patent shall be granted in respect a) Atomic energy c) Solar energy	b)	an invention relating to Bio energy Wind energy



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T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMENT (Self Learning (HSS))

Day and Date: Wednesday, 13-12-2017 Max. Marks: 50

Time: 10.00 a.m. to 12.00 noon

N.B.: 1) Attempt all questions.

- 2) Figures to the **right** indicate **full** marks.
- 3) Q. No. 1 is compulsory. It should be solved in Answer Book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks: 10

1. Choose correct answers:

10

- 1) The first Patent Law was enacted in India in the year
 - a) 1856

b) 1880

c) 1905

- d) 1850
- 2) No patent shall be granted in respect of an invention relating to
 - a) Atomic energy

b) Bio energy

c) Solar energy

- d) Wind energy
- 3) Intellectual Property Rights are result of
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- 4) 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 above



5)		r making cheese from milk having low protect it. Which form of IPR would be
	a) Patent	b) Copyright
	c) Trademarks	d) Industrial Design
6)	The legislation covering Intellectual Rechnology is a) Information Technology Act, 2003 b) Information Technology Act, 2003 c) Information Technology Act, 2008 d) None of the above)
7)	What is the term of a patent?	
	a) 35 years	b) 25 years
	c) 20 years	d) 15 years
8)	What is copyright meant for ?	
	a) Film work	b) Books
	c) Essay	d) All the above
9)	Which of the following is not specific	cally protected by intellectual property
	legislation?	
	a) Industrial designs	b) Trademarks
	c) Copyrights	d) Trade secrets
10)	All of the following are examples of into	ellectual property protections EXCEPT
	a) Copyrights	b) Patents
	c) Contracts	d) Trademarks



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T.E. (All Branches) (Part – I) (CGPA) Examination, 2017 INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT AND MANAGEMENT (Self Learning (HSS))

Day and Date: Wednesday, 13-12-2017 Max. Marks: 50

Time: 10.00 a.m. to 12.00 noon

N.B.: 1) Attempt all questions.

- 2) Figures to the right indicate full marks.
- 3) Q. No. 1 is compulsory. It should be solved in Answer Book Page No. 3. Each question carries one mark.
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MCQ/Objective Type Questions

Marks: 10

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- 1) 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
- 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) The first Patent Law was enacted in India in the year

a) 1856

b) 1880

c) 1905

- d) 1850
- 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 specific legislation?	cally protected by intellectual property
	a) Industrial designs	b) Trademarks
	c) Copyrights	d) Trade secrets
6)	All of the following are examples of int	ellectual property protections EXCEPT
	a) Copyrights	b) Patents
	c) Contracts	d) Trademarks
7)	Intellectual Property Rights are resu	It of
	a) Mental work	b) Physical work
	c) Technical work	d) Communication
8)	To apply for a patent, an inventor mu	ust
	a) File an application at a patent office	ce which must comply with formal and
	technical requirements	
	 b) Draft the full specification of the p amended 	atent they seek, which cannot be later
	c) Demonstrate that their invention	works
	d) None of above	
9)	What is the term of a patent?	
	a) 35 years	b) 25 years
	c) 20 years	d) 15 years
10)	What is copyright meant for ?	h) Dagle
	a) Film workc) Essay	b) Booksd) All the above
	0, L33ay	a) All the above



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