b)  $\frac{(-1)^{n-1}(n-1)!3^n}{(3x+2)^n}$ c)  $\frac{(-1)^{n-1}(n-1)!3^n}{(3x+2)^{n+1}}$ d) None of these The co-efficient of  $f^{'''}(0)$  in Maclaurin's series is \_\_\_\_\_. 2) a)  $x^{2}$  $-x^2$ b) C)  $\frac{-x^3}{3!}$ d)  $\frac{x^3}{3!}$ If  $y = x e^{2x}$ , then  $y_n =$  \_\_\_\_\_. 3) b)  $2^n x e^{2x}$ a)  $(2n)! x e^{2x}$ c)  $2^n e^{2x} x + n 2^{n-1} e^{2x}$ d)  $2^n e^{2x} x^2 + n 2^{n-2} e^{2x}$ Expansion of  $4x^2 + 5x + 12$  in powers of (x - 1) is \_\_\_\_\_. 4) a)  $21 + 13(x - 1) + 8(x - 1)^2$ b)  $21 + 13(x - 1) + 4(x - 1)^2$ c)  $21 - 3(x - 1) + 8(x - 1)^2$ d) None of these If A is a non-zero matrix of order  $4 \times 3$ , then the rank of the matrix A is \_\_\_\_\_. 5) a) equal to 4 b) greater than 4 d) None of these c) less than 3 or equal to 3 6) If A is a square matrix of order 'n' and AX = 0, where X is a  $n \times 1$  matrix of unknown and r < n, Then the system has \_\_\_\_\_

2) Figures to the right indicate full marks.

Day & Date: Friday,06-12-2019

Time: 10:00 AM To 01:00 PM

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### **Duration: 30 Minutes**

book.

#### Choose the correct alternatives from the options and rewrite the sentence. Q.1

**ENGINEERING MATHEMATICS – I** 

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer

# MCQ/Objective Type Questions

4) Use of calculator is allowed.

- 1)
  - If  $y = \log(3x + 2)$ , then  $y_n =$ \_\_\_\_\_
  - a)  $\frac{(-1)^n n! 3^n}{(3x+2)^n}$

- a) r independent solution b) (n-r) independent solutions
- c) (2n-r) independent solution d) no solution
- 7) If 2,2,8 are the eigen values of a matrix  $A_{3\times 3}$  and 6,3, k are the diagonal elements, then K is equal to
  - a) 0 b) 1 c) 2 d) 3



14

Marks: 14

Max. Marks: 70

Set P If  $u = f\left(\frac{x}{y}\right)$  then \_\_\_\_\_. 8) a)  $x \frac{\partial u}{\partial x} - y \frac{\partial u}{\partial y} = 0$ b)  $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = 0$ c)  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = u$ d)  $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = 1$ If u = x - y and V = xy then  $\frac{\partial(u,V)}{\partial(x,y)} =$ \_\_\_\_\_\_. 9) c) y - xd) x + yThe percentage error in area of ellipse when an error of 1% is made in 10) measuring the major and minor axes is \_\_\_\_\_ b) 2% a) 1% d) 4% c) 0.5% The stationary points of  $f(x, y) = x^2 + xy^2 + y^4$  is \_\_\_\_\_. 11) a) (1,0)c) (0,0)Vector  $\overline{A} = (bx^2y + yz)i + (xy^2 - xz^2)j + (2xyz - 2x^2y^2)k$  is solenoidal 12) for b \_\_\_\_\_ a) -2 c) 0.5 b) 2 d) -0.5 If  $\bar{r} = \bar{a} \sin ht + \bar{b} \cos ht$  then  $\frac{d^2 \bar{r}}{dt^2} =$ \_\_\_\_\_. 13) a)  $\bar{r}$ c)  $\bar{0}$ b)  $-\bar{r}$ d) None of these If  $\bar{a}$  is a constant vector then curl  $\bar{a} =$ \_\_\_\_\_ 14) -\_\_\_\_ b) a<sup>2</sup> a) ā c) 0 d) None of these

SLR-FR-1

Day & Time:	& Da : 10:	te: Friday,06-12-2019 Max. Marks: 00 AM To 01:00 PM	: 56
Instru	uctio	<ul> <li><b>ons:</b> 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>4) Use of calculator is allowed.</li> </ul>	
		Section – I	
Q.2	Sol	ve any three of the following questions.	09
	a)	Find the $n^{th}$ derivative of $\frac{1}{6x^2-5x+1}$ .	
	b) c)	Expand $2x^3 + 3x^2 - 8x + 7$ in terms of $(x - 2)$ . Evaluate $\lim_{x \to \frac{\pi}{2}} (\sin x)^{\tan x}$	
	d)	Find the rank of the matrix by reducing to normal form. $ \begin{bmatrix} 6 & 4 & 7 & 3 \\ 4 & 3 & 4 & 2 \\ 2 & 1 & 5 & 6 \end{bmatrix} $	
	e)	Verify the Cayley-Hamilton theorem for the matrix A where	
		$A = \begin{bmatrix} 1 & 1 & 2 \\ 3 & 1 & 1 \\ 2 & 3 & 1 \end{bmatrix}$	
Q.3	Sol	ve any three of the following questions.	09
	a) b)	By Maclaurin's series expand $\log(1 + e^x)$ in powers of upto $x^4$ . Evaluate $\lim_{x \to 0} \left(\frac{\sin x}{x}\right)^{\frac{1}{x^2}}$	
	c)	Find the values of $\lambda$ for which	
	-	$x + y + z = 1$ ; $x + 2y + 4z = \lambda$ ; $x + 4y + 10z = \lambda^2$ has a solution. Solve it in each.	
	d)	Are the vectors $X_1 = [1,3,4,2], X_2 = [3,-5,2,6], X_3 = [2,-1,3,4]$ Linearly dependent? It so express $X_2$ as a Linear combination of others.	
	e)	verify the Rolle's Theorem for the function $f(x) = x^2(1-x)^2$ in $0 \le x \le 1$ .	
Q.4	Sol a)	ve any two of the following questions. Find the eigen values and the corresponding eigen vector of the matrix A. where $A = \begin{bmatrix} 1 & 1 & 2 \\ 0 & 2 & 2 \\ -1 & 1 & 3 \end{bmatrix}$	10
	b)	If $y = [x + \sqrt{1 + x^2}]^m$ , prove that	
		$(1 + x^2)y_{n+2} + (2n + 1)xy_{n+1} + (n^2 - m^2)y_n = 0$	

$$(1+x^2)y_{n+2} + (2n+1)xy_{n+1} + (n^2 - m^2)y_n =$$

**c)** Prove that  $\log(1 + \sin x) = x - \frac{x^2}{2} + \frac{x^3}{6} \cdots$ 

## SLR-FR-1

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F.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 ENGINEERING MATHEMATICS – I

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#### Section – II

#### Q.5 Solve any three of the following questions.

- a) If u = ax + by, V = bx ay, find the value of  $\left(\frac{\partial u}{\partial x}\right)_{y} \cdot \left(\frac{\partial x}{\partial u}\right)_{y} \cdot \left(\frac{\partial y}{\partial v}\right)_{x} \cdot \left(\frac{\partial v}{\partial v}\right)_{y}$
- **b)** if  $z = f(u, v), u = \log(x^2 + y^2), v = \frac{y}{x}$ , show that  $x \frac{\partial z}{\partial v} y \frac{\partial z}{\partial x} = (1 + v^2) \frac{\partial z}{\partial x}$ .
- **c)** If  $x = a \cos hu \cos v$ ,  $y = a \sin hu \sin v$  find  $\frac{\partial(x,y)}{\partial(u,v)}$
- d) Find the maximum value of  $f = x^2y^3z^4$ , subject to the condition x + y + z = 5e) Find the directional derivatives of  $\phi = 4xz^3 3x^2y^2z$  at (2, -1, 2) in the direction from this point towards the point (4, -4, 8).

#### Q.6 Solve any three of the following questions.

If  $u = \log(1 + x^n + y^n)$  then find the value of  $\frac{\partial^2 u}{\partial x \partial y} + \frac{\partial u}{\partial x} \frac{\partial u}{\partial y}$ a)

**b)** If 
$$z = f(u, v)$$
,  $u = x^2 - y^2$ ,  $v = y^2 - x^2$ , prove that  $x \frac{\partial z}{\partial y} + y \frac{\partial z}{\partial x} = 0$ 

- c) Find  $[(2.92)^3 + (5.87)^3]^{1/5}$  approximately by using the theory of approximation.
- d) Find the angle between two surfaces  $x^2 + y^2 + az^2 = 6$  and  $z = 4 - y^2 + bxy$  at P(1,1,2).
- A particle moves on the curve  $x = 2t^2$ ,  $y = t^2 4t$ , z = 3t 5. Find the e) velocity and acceleration at t = 1 in the direction of i - 3j + 2k.

#### Q.7 Solve any two of the following questions.

- If  $u = cosec^{-1} \sqrt{\frac{x^{1/2} + y^{1/2}}{x^{1/3} + y^{1/3}}}$  then find the values of a) 1)  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$ 2)  $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2}$
- **b)** Find the minimum and maximum values of  $x^3y^2(1-x-y)$
- **c)** Prove that  $\nabla \cdot \left( r \nabla \frac{1}{r^3} \right) = \frac{3}{r^4}$

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F.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019

**ENGINEERING MATHEMATICS – I** 

Day & Date: Friday,06-12-2019 Time: 10:00 AM To 01:00 PM

**Duration: 30 Minutes** 

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

### **MCQ/Objective Type Questions**

## Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1)	If $u = f\left(\frac{x}{y}\right)$ then		
	a) $x \frac{\partial u}{\partial x} - y \frac{\partial u}{\partial y} = 0$	b)	$x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = 0$
	c) $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = u$	d)	$x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = 1$
2)	If $u = x - y$ and $V = xy$ then $\frac{\partial(u,V)}{\partial(x,y)}$	=	
	a) $x - y$ c) $y - x$	b) d)	0 x + y
3)	The percentage error in area of elli measuring the major and minor axe	pse es is	when an error of 1% is made in
	a) 1% c) 0.5%	р) d)	2% 4%
4)	The stationary points of $f(x, y) = x$	$(2^{2} + 2)$	$xy^2 + y^4$ is
	c) (0,0)	d)	(1,1)
5)	Vector $\overline{A} = (bx^2y + yz)i + (xy^2 - z)i$ for b	$(xz^2)$ j	$(2xyz - 2x^2y^2)k$ is solenoidal
	a) $-2$	b)	2
$\sim$	c) 0.5	a)	-0.5
6)	If $\bar{r} = \bar{a} \sin ht + \bar{b} \cos ht$ then $\frac{a^2 r}{dt^2} = 1$		
	a) $\bar{r}$	b)	$-\bar{r}$
7)	If $\bar{a}$ is a constant vector then curl $\bar{a}$	-u) =	
,	a) <i>ā</i>	b)	$a^2$
	c) 0	d)	None of these
8)	If $y = \log(3x + 2)$ , then $y_n = \_$	·	
	a) $\frac{(-1)^n n! 3^n}{(3x+2)^n}$	b)	$\frac{(-1)^{n-1}(n-1)!3^n}{(3x+2)^n}$
	c) $\frac{(-1)^{n-1}(n-1)!3^n}{(3x+2)^{n+1}}$	d)	None of these

SLR-FR-1

Max. Marks: 70



Marks: 14

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9)	The co-efficient of $f'''(0)$ in Maclau a) $\frac{x^2}{2!}$ c) $\frac{-x^3}{2!}$	rin's b) d)	series is $\frac{-x^2}{2!}$	
10)	If $y = x e^{2x}$ , then $y_n = $ a) $(2n)! x e^{2x}$	b)	$2^{n} x e^{2x}$	
11)	c) $2^{n} e^{2x} x + n 2^{n-1} e^{2x}$ Expansion of $4x^{2} + 5x + 12$ in power a) $21 + 13(x - 1) + 8(x - 1)^{2}$ b) $21 + 13(x - 1) + 4(x - 1)^{2}$ c) $21 - 3(x - 1) + 8(x - 1)^{2}$ d) None of these	a) ers o	$2^{n} e^{2x} x^{2} + n 2^{n-2} e^{2x}$ f $(x - 1)$ is	
12)	<ul><li>If A is a non-zero matrix of order 4 &gt;</li><li>a) equal to 4</li><li>c) less than 3 or equal to 3</li></ul>	< 3, t b) d)	hen the rank of the matrix A is greater than 4 None of these	÷
13)	If A is a square matrix of order 'n' are of unknown and $r < n$ , Then the system a) r independent solution c) $(2n - r)$ independent solution	nd A stem b) d)	$X = 0$ , where X is a $n \times 1$ matrix has (n - r) independent solutions no solution	
14)	If 2,2,8 are the eigen values of a ma elements, then K is equal to	atrix . 	$A_{3\times 3}$ and 6,3, k are the diagonal	

- a) 0 c) 2 b) 1 d) 3

Time	: 10:	00 AM To 01:00 PM	. 00
nstr	ucti	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>4) Use of calculator is allowed.</li> </ul>	
		Section – I	
Q.2	So a)	Ive any three of the following questions. Find the $n^{th}$ derivative of $\frac{1}{2}$ .	09
	b) c)	Expand $2x^3 + 3x^2 - 8x + 7$ in terms of $(x - 2)$ . Evaluate $\lim_{x \to \frac{\pi}{2}} (\sin x)^{\tan x}$	
	d)	Find the rank of the matrix by reducing to normal form. $ \begin{bmatrix} 6 & 4 & 7 & 3 \\ 4 & 3 & 4 & 2 \\ 2 & 1 & 5 & 6 \end{bmatrix} $	
	e)	Verify the Cayley-Hamilton theorem for the matrix A where $A = \begin{bmatrix} 1 & 1 & 2 \\ 3 & 1 & 1 \\ 2 & 3 & 1 \end{bmatrix}$	
Q.3	Sol a) b)	Ive any three of the following questions. By Maclaurin's series expand $log(1 + e^x)$ in powers of upto $x^4$ . Evaluate $lim \left(\frac{\sin x}{x^2}\right)^{\frac{1}{x^2}}$	09
	c)	Find the values of $\lambda$ for which $x + y + z = 1; x + 2y + 4z = \lambda; x + 4y + 10z = \lambda^2$ has a solution. Solve it in each	
	d)	Are the vectors $X_1 = [1,3,4,2], X_2 = [3,-5,2,6], X_3 = [2,-1,3,4]$ Linearly dependent? It so express $X_2$ as a Linear combination of others.	
~ 4	e) 0	Verify the Rolle's Theorem for the function $f(x) = x^2(1-x)^2$ in $0 \le x \le 1$ .	4.0
Q.4	so a)	Find the eigen values and the corresponding eigen vector of the matrix A. where [1 1 2]	10
	b)	$A = \begin{bmatrix} 0 & 2 & 2 \\ -1 & 1 & 3 \end{bmatrix}$ If $y = \begin{bmatrix} x + \sqrt{1 + x^2} \end{bmatrix}^m$ , prove that	

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#### C

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#### C

 $(1+x^2)y_{n+2} + (2n+1)xy_{n+1} + (n^2 - m^2)y_n = 0$ 

Prove that  $\log(1 + \sin x) = x - \frac{x^2}{2} + \frac{x^3}{6} \cdots$ c)

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F.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 ENGINEERING MATHEMATICS – I

Max Marks: 56

#### Section – II

#### Q.5 Solve any three of the following questions.

- a) If u = ax + by, V = bx ay, find the value of  $\left(\frac{\partial u}{\partial x}\right)_{y} \cdot \left(\frac{\partial x}{\partial u}\right)_{y} \cdot \left(\frac{\partial y}{\partial v}\right)_{x} \cdot \left(\frac{\partial v}{\partial v}\right)_{y}$
- **b)** if  $z = f(u, v), u = \log(x^2 + y^2), v = \frac{y}{x}$ , show that  $x \frac{\partial z}{\partial v} y \frac{\partial z}{\partial x} = (1 + v^2) \frac{\partial z}{\partial x}$ .
- **c)** If  $x = a \cos hu \cos v$ ,  $y = a \sin hu \sin v$  find  $\frac{\partial(x,y)}{\partial(u,v)}$
- d) Find the maximum value of  $f = x^2y^3z^4$ , subject to the condition x + y + z = 5e) Find the directional derivatives of  $\phi = 4xz^3 3x^2y^2z$  at (2, -1, 2) in the direction from this point towards the point (4, -4, 8).

#### Q.6 Solve any three of the following questions.

If  $u = \log(1 + x^n + y^n)$  then find the value of  $\frac{\partial^2 u}{\partial x \partial y} + \frac{\partial u}{\partial x} \frac{\partial u}{\partial y}$ a)

**b)** If 
$$z = f(u, v)$$
,  $u = x^2 - y^2$ ,  $v = y^2 - x^2$ , prove that  $x \frac{\partial z}{\partial y} + y \frac{\partial z}{\partial x} = 0$ 

- c) Find  $[(2.92)^3 + (5.87)^3]^{1/5}$  approximately by using the theory of approximation.
- d) Find the angle between two surfaces  $x^2 + y^2 + az^2 = 6$  and  $z = 4 - y^2 + bxy$  at P(1,1,2).
- A particle moves on the curve  $x = 2t^2$ ,  $y = t^2 4t$ , z = 3t 5. Find the e) velocity and acceleration at t = 1 in the direction of i - 3j + 2k.

#### Q.7 Solve any two of the following questions.

- If  $u = cosec^{-1} \sqrt{\frac{x^{1/2} + y^{1/2}}{x^{1/3} + y^{1/3}}}$  then find the values of a) 1)  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$ 2)  $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2}$
- **b)** Find the minimum and maximum values of  $x^3y^2(1-x-y)$
- **c)** Prove that  $\nabla \cdot \left( r \nabla \frac{1}{r^3} \right) = \frac{3}{r^4}$

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Seat No.			Set
F	.Y. (B.Tech.) (Par	rt – I) (New) (CBCS)	Examination Nov/Dec-2019
	EN	IGINEERING MATH	EMATICS – I
Day & I	Date: Friday,06-12-2	019	Max. Mark
Time: 1	10:00 AM To 01:00 P	M	

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

### MCQ/Objective Type Questions

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- If A is a non-zero matrix of order  $4 \times 3$ , then the rank of the matrix A is 1)
  - a) equal to 4 b) greater than 4
  - c) less than 3 or equal to 3 d) None of these
  - 2) If A is a square matrix of order 'n' and AX = 0, where X is a  $n \times 1$  matrix of unknown and r < n, Then the system has . b) (n-r) independent solutions
    - a) r independent solution
    - c) (2n-r) independent solution d) no solution

If 2,2,8 are the eigen values of a matrix  $A_{3\times 3}$  and 6,3, k are the diagonal 3) elements, then K is equal to \_\_\_\_

- a) 0 b) 1 d) 3 c) 2
- If  $u = f\left(\frac{x}{y}\right)$  then \_\_\_\_\_. 4)

**Duration: 30 Minutes** 

- a)  $x \frac{\partial u}{\partial x} y \frac{\partial u}{\partial y} = 0$ b)  $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = 0$ c)  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = u$ d)  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 1$
- If u = x y and V = xy then  $\frac{\partial(u,V)}{\partial(x,y)} =$ \_\_\_\_\_. a) x y b) 0 5) d) x + yc) v-x
- The percentage error in area of ellipse when an error of 1% is made in 6) measuring the major and minor axes is .

a)	1%	b)	2%
C)	0.5%	d)	4%

- The stationary points of  $f(x, y) = x^2 + xy^2 + y^4$  is \_\_\_\_\_. a) (1,0) b) (0,1) c) (0,0) d) (1,1) 7)

Vector  $\overline{A} = (bx^2y + yz)i + (xy^2 - xz^2)j + (2xyz - 2x^2y^2)k$  is solenoidal 8) for b .

a)	-2	b)	)	2
C)	0.5	d)	)	-0.5

## SLR-FR-1



Max. Marks: 70

Marks: 14

If  $\bar{r} = \bar{a} \sin ht + \bar{b} \cos ht$  then  $\frac{d^2 \bar{r}}{dt^2} =$ \_\_\_\_\_. 9) b)  $-\bar{r}$ a) *r* d) None of these c) 0 If  $\bar{a}$  is a constant vector then curl  $\bar{a} = \_$ 10) b) *a*<sup>2</sup> a) ā c) 0 d) None of these 11) If  $y = \log(3x + 2)$ , then  $y_n =$ \_\_\_\_\_ a)  $\frac{(-1)^n n! 3^n}{(3x+2)^n}$ b)  $\frac{(-1)^{n-1}(n-1)!3^n}{(3x+2)^n}$ c)  $\frac{(-1)^{n-1}(n-1)!3^n}{(3x+2)^{n+1}}$ d) None of these The co-efficient of  $f^{'''}(0)$  in Maclaurin's series is \_\_\_\_\_. 12) a)  $\frac{x^2}{2!}$ b)  $-x^2$ 2! C)  $\frac{-x^3}{3!}$ d)  $\frac{x^3}{3!}$ If  $y = x e^{2x}$ , then  $y_n =$  \_\_\_\_\_. 13) b)  $2^n x e^{2x}$ a)  $(2n)! x e^{2x}$ c)  $2^n e^{2x} x + n 2^{n-1} e^{2x}$ d)  $2^n e^{2x} x^2 + n 2^{n-2} e^{2x}$ Expansion of  $4x^2 + 5x + 12$  in powers of (x - 1) is \_\_\_\_\_. 14) a)  $21 + 13(x - 1) + 8(x - 1)^2$ b)  $21 + 13(x - 1) + 4(x - 1)^2$ 

- c)  $21 3(x 1) + 8(x 1)^2$
- d) None of these

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ວay & Time	& Da : 10:	te: Friday,06-12-2019 Max. Marks 00 AM To 01:00 PM	: 56
nstr	uctio	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>4) Use of calculator is allowed.</li> </ul>	
		Section – I	
Q.2	Sol	ve any three of the following questions.	09
	a)	Find the $n^{th}$ derivative of $\frac{1}{6r^2-5r+1}$ .	
	b) c)	Expand $2x^3 + 3x^2 - 8x + 7$ in terms of $(x - 2)$ . Evaluate $\lim_{x \to \frac{\pi}{2}} (\sin x)^{\tan x}$	
	d)	Find the rank of the matrix by reducing to normal form. $ \begin{bmatrix} 6 & 4 & 7 & 3 \\ 4 & 3 & 4 & 2 \\ 2 & 1 & 5 & 6 \end{bmatrix} $	
	e)	Verify the Cayley-Hamilton theorem for the matrix A where	
		$A = \begin{bmatrix} 1 & 1 & 2 \\ 3 & 1 & 1 \\ 2 & 3 & 1 \end{bmatrix}$	
Q.3	Sol	ve any three of the following questions.	09
	a) b)	By Maclaurin's series expand $\log(1 + e^x)$ in powers of upto $x^+$ . Evaluate $\lim_{x \to 0} \left(\frac{\sin x}{x}\right)^{\frac{1}{x^2}}$	
	c)	Find the values of $\hat{\lambda}$ for which	
		$x + y + z = 1$ ; $x + 2y + 4z = \lambda$ ; $x + 4y + 10z = \lambda^2$ has a solution. Solve it in each.	
	d)	Are the vectors $X_1 = [1,3,4,2], X_2 = [3,-5,2,6], X_3 = [2,-1,3,4]$ Linearly dependent? It so express $X_2$ as a Linear combination of others.	
	e)	verify the Rolle's Theorem for the function $f(x) = x^2(1-x)^2$ in $0 \le x \le 1$ .	
Q.4	Sol a)	Ive any two of the following questions. Find the eigen values and the corresponding eigen vector of the matrix A. where	10
		$A = \begin{bmatrix} 1 & 1 & 2 \\ 0 & 2 & 2 \\ -1 & 1 & 3 \end{bmatrix}$	
	b)	If $y = [x + \sqrt{1 + x^2}]^m$ , prove that	

**c)** Prove that  $\log(1 + \sin x) = x - \frac{x^2}{2} + \frac{x^3}{6} \cdots$ 

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### Seat No.

F.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 ENGINEERING MATHEMATICS – I

Day & Date: Friday 06-12-2019

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#### Section – II

#### Q.5 Solve any three of the following questions.

- a) If u = ax + by, V = bx ay, find the value of  $\left(\frac{\partial u}{\partial x}\right)_{y} \cdot \left(\frac{\partial x}{\partial u}\right)_{y} \cdot \left(\frac{\partial y}{\partial v}\right)_{x} \cdot \left(\frac{\partial v}{\partial y}\right)_{y}$
- **b)** if  $z = f(u, v), u = \log(x^2 + y^2), v = \frac{y}{x}$ , show that  $x \frac{\partial z}{\partial v} y \frac{\partial z}{\partial x} = (1 + v^2) \frac{\partial z}{\partial x}$ .
- c) If  $x = a \cos hu \cos v$ ,  $y = a \sin hu \sin v$  find  $\frac{\partial(x,y)}{\partial(u,v)}$
- d) Find the maximum value of  $f = x^2y^3z^4$ , subject to the condition x + y + z = 5e) Find the directional derivatives of  $\phi = 4xz^3 3x^2y^2z$  at (2, -1, 2) in the direction from this point towards the point (4, -4, 8).

#### Q.6 Solve any three of the following questions.

**a)** If  $u = \log(1 + x^n + y^n)$  then find the value of  $\frac{\partial^2 u}{\partial x \partial y} + \frac{\partial u}{\partial x} \frac{\partial u}{\partial y}$ 

**b)** If 
$$z = f(u, v)$$
,  $u = x^2 - y^2$ ,  $v = y^2 - x^2$ , prove that  $x \frac{\partial z}{\partial y} + y \frac{\partial z}{\partial x} = 0$ 

- c) Find  $[(2.92)^3 + (5.87)^3]^{1/5}$  approximately by using the theory of approximation.
- d) Find the angle between two surfaces  $x^2 + y^2 + az^2 = 6$  and  $z = 4 - y^2 + bxy$  at P(1,1,2).
- e) A particle moves on the curve  $x = 2t^2$ ,  $y = t^2 4t$ , z = 3t 5. Find the velocity and acceleration at t = 1 in the direction of i - 3j + 2k.

#### Q.7 Solve any two of the following questions.

If 
$$u = cosec^{-1} \sqrt{\frac{x^{1/2} + y^{1/2}}{x^{1/3} + y^{1/3}}}$$
 then find the values of  
1)  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$   
2)  $x^{2} \frac{\partial^{2} u}{\partial x} + 2xy \frac{\partial^{2} u}{\partial y} + x^{2} \frac{\partial^{2} u}{\partial x}$ 

- $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2}$ **b)** Find the minimum and maximum values of  $x^3y^2(1 - x - y)$
- **c)** Prove that  $\nabla \cdot \left( r \nabla \frac{1}{r^3} \right) = \frac{3}{r^4}$

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		MCQ/Objective T	ype	Questions
Dura	tion: 3	0 Minutes		Marks: 14
Q.1	Choc 1)	The percentage error in area of ellip measuring the major and minor axe a) 1% c) 0.5%	neo sev sis b) d)	ptions and rewrite the sentence. 14 when an error of 1% is made in 2% 4%
	2)	The stationary points of $f(x, y) = x^2$ a) (1,0) c) (0,0)	$x^2 + x$ b) d)	$y^2 + y^4$ is (0,1) (1,1)
	3)	Vector $\bar{A} = (bx^2y + yz)i + (xy^2 - x)i $	b) d)	+ $(2xyz - 2x^2y^2)k$ is solenoidal 2 -0.5
	4)	If $\bar{r} = \bar{a} \sin ht + \bar{b} \cos ht$ then $\frac{d^2 \bar{r}}{dt^2} = -$ a) $\bar{r}$ c) $\bar{0}$	b) d)	$-\bar{r}$ None of these
	5)	If $\bar{a}$ is a constant vector then curl $\bar{a}$ : a) $\bar{a}$ c) 0	= b) d)	$a^2$ None of these
	6)	If $y = \log(3x + 2)$ , then $y_n =$ a) $\frac{(-1)^n n! 3^n}{(3x+2)^n}$ c) $\frac{(-1)^{n-1} (n-1)! 3^n}{(3x+2)^{n+1}}$	 b) d)	$\frac{(-1)^{n-1}(n-1)!3^n}{(3x+2)^n}$ None of these
	7)	The co-efficient of $f'''(0)$ in Maclau a) $\frac{x^2}{2!}$ c) $\frac{-x^3}{3!}$	rin's b) d)	series is $\frac{-x^2}{2!}$ $\frac{x^3}{3!}$
	8)	If $y = x e^{2x}$ , then $y_n = $ a) $(2n)! x e^{2x}$	b)	$2^n x e^{2x}$

book.

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

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer

Day & Date: Friday,06-12-2019 Max. Marks: 70 Time: 10:00 AM To 01:00 PM

**ENGINEERING MATHEMATICS – I** 

No. F.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019

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

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## SLR-FR-1

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SLR-FR-1 Set S Expansion of  $4x^2 + 5x + 12$  in powers of (x - 1) is \_\_\_\_\_. 9) a)  $21 + 13(x - 1) + 8(x - 1)^2$ b)  $21 + 13(x - 1) + 4(x - 1)^2$ c)  $21 - 3(x - 1) + 8(x - 1)^2$ d) None of these 10) If A is a non-zero matrix of order  $4 \times 3$ , then the rank of the matrix A is \_\_\_\_\_. a) equal to 4 b) greater than 4 c) less than 3 or equal to 3 d) None of these 11)If A is a square matrix of order 'n' and AX = 0, where X is a  $n \times 1$  matrix of unknown and r < n, Then the system has \_\_\_\_\_ a) r independent solution b) (n-r) independent solutions c) (2n-r) independent solution d) no solution 12) If 2,2,8 are the eigen values of a matrix  $A_{3\times 3}$  and 6,3, k are the diagonal elements, then K is equal to \_ a) 0 b) 1 c) 2 d) 3 If  $u = f\left(\frac{x}{y}\right)$  then \_\_\_\_\_. 13) a)  $x \frac{\partial u}{\partial x} - y \frac{\partial u}{\partial y} = 0$ b)  $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = 0$ c)  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = u$ d)  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 1$ 14) If u = x - y and V = xy then  $\frac{\partial(u,V)}{\partial(x,y)} =$ \_\_\_\_\_. b) 0

x + y

a) 
$$x - y$$
 b)  
c)  $y - x$  d)

Гime	: 10:	00 AM To 01:00 PM	
nstr	uctio	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>4) Use of calculator is allowed.</li> </ul>	
		Section – I	
ຊ.2	So	ve any three of the following questions.	09
	a)	Find the $n^{th}$ derivative of $\frac{1}{6x^2-5x+1}$ .	
	b) c)	Expand $2x^3 + 3x^2 - 8x + 7$ in terms of $(x - 2)$ . Evaluate $\lim_{x \to \frac{\pi}{2}} (\sin x)^{\tan x}$	
	d)	Find the rank of the matrix by reducing to normal form. $ \begin{bmatrix} 6 & 4 & 7 & 3 \\ 4 & 3 & 4 & 2 \\ 2 & 1 & 5 & 6 \end{bmatrix} $	
	e)	Verify the Cayley-Hamilton theorem for the matrix A where	
		$A = \begin{bmatrix} 1 & 1 & 2 \\ 3 & 1 & 1 \\ 2 & 3 & 1 \end{bmatrix}$	
ຊ.3	So	ve any three of the following questions.	09
	a) b)	By Maclaurin's series expand $\log(1 + e^x)$ in powers of up to $x^+$ . Evaluate $\lim_{x \to 0} \left(\frac{\sin x}{x}\right)^{\frac{1}{x^2}}$	
	c)	Find the values of $\lambda$ for which $x + y + z = 1$ ; $x + 2y + 4z = \lambda$ ; $x + 4y + 10z = \lambda^2$ has a solution. Solve it in each	
	d)	Are the vectors $X_1 = [1,3,4,2], X_2 = [3,-5,2,6], X_3 = [2,-1,3,4]$ Linearly dependent? It so express $X_2$ as a Linear combination of others.	
	e)	verify the Rolle's Theorem for the function $f(x) = x^2(1-x)^2$ in $0 \le x \le 1$ .	
Q.4	Sol a)	<b>Ive any two of the following questions.</b> Find the eigen values and the corresponding eigen vector of the matrix A. where [1 1 2]	10
	b)	$A = \begin{bmatrix} 0 & 2 & 2 \\ -1 & 1 & 3 \end{bmatrix}$ If $y = \begin{bmatrix} x + \sqrt{1 + x^2} \end{bmatrix}^m$ , prove that	

$$(1+x^2)y_{n+2} + (2n+1)xy_{n+1} + (n^2 - m^2)y_n = 0$$

**c)** Prove that  $\log(1 + \sin x) = x - \frac{x^2}{2} + \frac{x^3}{6} \cdots$ 

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Max. Marks: 56

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F.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 ENGINEERING MATHEMATICS – I

Day & Date: Friday,06-12-2019

### C

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## C

#### Section – II

#### Q.5 Solve any three of the following questions.

- a) If u = ax + by, V = bx ay, find the value of  $\left(\frac{\partial u}{\partial x}\right)_{y} \cdot \left(\frac{\partial x}{\partial u}\right)_{y} \cdot \left(\frac{\partial y}{\partial v}\right)_{x} \cdot \left(\frac{\partial v}{\partial y}\right)_{y}$
- **b)** if  $z = f(u, v), u = \log(x^2 + y^2), v = \frac{y}{x}$ , show that  $x \frac{\partial z}{\partial v} y \frac{\partial z}{\partial x} = (1 + v^2) \frac{\partial z}{\partial x}$ .
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- d) Find the maximum value of  $f = x^2y^3z^4$ , subject to the condition x + y + z = 5e) Find the directional derivatives of  $\phi = 4xz^3 3x^2y^2z$  at (2, -1, 2) in the direction from this point towards the point (4, -4, 8).

#### Q.6 Solve any three of the following questions.

**a)** If  $u = \log(1 + x^n + y^n)$  then find the value of  $\frac{\partial^2 u}{\partial x \partial y} + \frac{\partial u}{\partial x} \frac{\partial u}{\partial y}$ 

**b)** If 
$$z = f(u, v)$$
,  $u = x^2 - y^2$ ,  $v = y^2 - x^2$ , prove that  $x \frac{\partial z}{\partial y} + y \frac{\partial z}{\partial x} = 0$ 

- c) Find  $[(2.92)^3 + (5.87)^3]^{1/5}$  approximately by using the theory of approximation.
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- e) A particle moves on the curve  $x = 2t^2$ ,  $y = t^2 4t$ , z = 3t 5. Find the velocity and acceleration at t = 1 in the direction of i - 3j + 2k.

#### Q.7 Solve any two of the following questions.

If 
$$u = cosec^{-1} \sqrt{\frac{x^{1/2} + y^{1/2}}{x^{1/3} + y^{1/3}}}$$
 then find the values of  
1)  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$   
2)  $x^{2} \frac{\partial^{2} u}{\partial x} + 2xy \frac{\partial^{2} u}{\partial y} + x^{2} \frac{\partial^{2} u}{\partial x}$ 

- $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2}$ **b)** Find the minimum and maximum values of  $x^3y^2(1 - x - y)$
- **c)** Prove that  $\nabla \cdot \left( r \nabla \frac{1}{r^3} \right) = \frac{3}{r^4}$

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Time	: 10:00	D AN	1 To 01:00 PM				
Instr	uction	1 <b>s:</b> 1 2 3	<ul> <li>) Q. No. 1 is compulsory and sho book.</li> <li>) Figures to the right indicates fullet ) Assume suitable data wherever</li> </ul>	uld b Il mar r need	e solved in first 30 minutes i ks ded and mention it clearly.	n ansv	ver
			MCQ/Objective Ty	vpe C	Questions		
Dura	tion: 3	0 Mi	nutes			Marks	: 14
Q.1	<b>Choc</b> 1)	ose t Whi a) c)	<b>he correct alternatives from th</b> ich one doesn't comes under Cal Limestone Chalk	e opt carec b) d)	ions and rewrite the sente ous Rocks? Cement rock Marine shell deposits	nce.	14
	2)	The a) c)	blended meal is sieved and fed Clinker Granulator	into a b) d)	rotating dish called a Kiln Raw meal		
	3)	Wh a) c)	ich chemical composition has hig Alumina Lime	hest ( b) d)	content in OPC? Silica Iron Oxide		
	4)	In th a fix a) c)	ne soundness test a specimen of ked time. Freeze Boiled	hard b) d)	ened cement paste is Dry Dipped in water	_ for	
	5)	Wo a) c)	rkability of concrete is directly pro Grading of the aggregates Aggregates cement ratio	portio b) d)	onal to Time of transit Water cement ratio		
	6)	Ten a) c)	sile test can be performed on Impact testing machine Rockwell tester	b) d)	 Universal testing machine Brinell tester		
	7)	Wh a) c)	ich of the following option doesn't Plasticizers Super plasticizer	t com b) d)	e in chemical admixtures? Pozzolanic Accelerator		
	8)	Shr a) c)	inkage, which takes place before Autogenous Shrinkage Plastic Shrinkage	conc b) d)	rete has set is known as Drying shrinkage Carbonation Shrinkage		
	9)	The stre a) c)	e tensile strength of concrete is al ength. 10 to 15% 50%	b) b) d)	of its compressive 30 to 40% 60 to 70%		

S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Civil Engineering CONCRETE TECHNOLOGY, MATERIAL TESTING & EVALUATION

SLR-FR-11

Max. Marks: 70

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Day & Date: Saturday,07-12-2019

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- Shrinkage increases with . 10)
  - a) Increases in water-cement ratio.
  - b) Increases in cement content.
  - c) Decreases in humidity.
  - d) All of above.
- IS provision for concrete mix design is given by \_\_\_\_ 11)
  - IS 383-1970 a) IS 4031-1968 b)
  - c) IS 456-2000 d) IS 10262-2009
- For the construction of the retaining structures, the type of concrete mix 12) to be used, is \_\_\_\_\_.
  - 1:2:4 a) 1:3:6 b)
  - c) 1: 1.5 : 3 d) 1:1:2

#### If the average compressive strength is 4000 kg/cm<sup>2</sup> and standard 13) deviation is 500, the co-efficient of variation is

- b) 12.5%
- a) 10% c) 15% d) 20%
- Permissible compressive strength of M 200 concrete grade is \_\_\_\_\_. 14)
  - $100 \text{kg/cm}^2$ a)

150kg/cm<sup>2</sup> b)

200 kg/cm<sup>2</sup> c)

d)  $250 kg/cm^2$ 

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#### Seat No.

S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering

### CONCRETE TECHNOLOGY, MATERIAL TESTING & EVALUATION

Day & Date: Saturday,07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Figures to the right indicates full marks.

- 2) All questions are compulsory.
- 3) Assume suitable data wherever needed and mention it clearly.

#### Section – I

#### Q.2 Attempt any two of the following question.

- a) What is the chemical Composition of Cement with its Significance?
- b) Explain die manufacturing process of cement by Wet Process with flow chart construction.
- **c)** What is Hydration? Explain the role of "C<sub>3</sub>S, C<sub>2</sub>S, C<sub>3</sub>A and C<sub>4</sub>AF" during the hydration process?
- d) Find the fineness modulus of Sand and also define which type of Fine Aggregate it is with its Zone number. Below table 01 is given content of Sieve size and weight retained. (Use grading limit table 02)
   Table 01

Weight retained

0.138

0.161

0.290

0.282

0.116

0.006

0.007

Sieve Size

4.75

2.36

1.18

600

300

150

Pan

Table 02								
I.S. Sieve Percentage passing by weight for								
Designation, mm	Grading	Grading	Grading	Grading				
	Zone – I	Zone – II	Zone – III	Zone – IV				
10	100	100	100	100				
4.75	90-100	90-100	90-100	95-100				
2.36	60-95	75-100	85-100	95-100				
1.18	30-70	55-90	75-100	90-100				
0.6	15-34	35-59	60-79	80-100				
0.3	5-20	8-30	12-40	15-50				
0.15	0-10	0-10	0-10	0-15				

### **Q.3** Attempt any four of the following question.

- **a)** Write a note on bulking of Sand.
- **b)** Write a brief note on Retarders and retarding admixtures and Accelerators and Accelerating Admixture.
- c) Write a note on Standard Grading Curve.
- d) Enlist types of Cement and explain in the any three of it.
- e) How the shape of aggregate effect on performance of Concrete?
- f) Write a note sulphate and chloride attack on concrete.

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Max. Marks: 56

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			Section – I			
Q.4	Wri a) b) c) d) e) f)	<b>te a n</b> e Shrir Alkal Qual Tens Dura Brine	ote on any four of the following. hkage and Types of shrinkage li aggregate reaction ity control of concrete sion test on mild steel bility of concrete ell or Rockwell hardness test on me	etal		12
Q.4	Wri a) b) c) d)	te a no Cree Com Type Effec	ote on any three of the following p of concrete and list factors affect pression test on mild steel es of Mixes of w/c ratio on Durability of concr	ing o ete	n creep	12
Q.5	Des 1) 2)	ign M: Stipu A) B) C) D) E) F) G) H) J) Test A) B) C) D) E) F)	25 Concrete Mix as per IS Code 10 Ilations for proportioning Grade Designation: Types of cement: Max nominal size of aggregate: Workability: Exposure Condition: Method of concrete placing: Degree of Supervision: Type of aggregate: Maximum cement content: Chemical admixture type: data for material Cement Used: Specific gravity of course aggreg Specific gravity of Course aggreg Specific gravity of Fine aggregate: Water abortion: Course aggregate: Fine aggregate: Sieve analysis: Course aggregate: Fine aggregate: Fine aggregate: Fine aggregate:	D262: M29 20n 75n Moo Pur Goo Cru Nil Nil ate:	2009 using following data: 5 C 43 Grade conforming to IS nm nm(Slump) derate (For RCC) mping od ished angular aggregate OPC 43 grade 3.15 2.9 2.8 0.6% 1.0% Conforming to IS 383 Conforming to grading zone I of IS 383	16

## SLR-FR-11 Set P

SI No.	Grade of Concrete	Assume	d Standard Deviatio
(1)	(2)		(3)
i) ii)	M 10 M 15		3.5
(11)	M 20]		40
is)	M 25 5		7.0
>>	M 307		
vi)	M 35		
vii)	M 40 5		50
viii)	M 45 [		2.0
*****			
ix)	M 50		
ix) x) Ta	M SO M SS ble 2 Maximur Metre of C	n Water ( Concrete fo	Content per Cubic or Nominal
ix) x) Ta	M 50 M 55 ble 2 Maximur Metre of C Maximur (Clause	n Water Concrete for m Size of A s 4.2, A-5	Content per Cubic or Nominal Aggregate and B-5)
ix) x) Ta	M 50 M 55 ble 2 Maximur Metre of C Maximur (Clause Nominal Ma Size of Age	n Water C Concrete for m Size of A s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content <sup>19</sup>
ix) x) Ta Sl No.	M 50 M 55 ble 2 Maximur Metre of C Maximur (Clause Nominal Ma Size of Age mm	n Water Concrete for m Size of . s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content " kg
ix) x) Ta Sl No. (1)	M 50 M 55 ble 2 Maximur Metre of C Maximur (Clause Nominal Ma Size of Age mm (2)	n Water C Concrete for m Size of A s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content " kg (3)
ix) x) Ta Sl No. (1) i)	M 50 M 55 ble 2 Maximur Metre of C Maximur (Clause Nominal Ma Size of Age mm (2) 10	n Water C Concrete for m Size of . s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content " kg (3) 208
ix) x) Ta Sl No. (1) i)	M 50 M 55 ble 2 Maximur Metre of C Maximur (Clause Nominal Ma Size of Age mm (2) 10 20	n Water C Concrete for m Size of A s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content <sup>10</sup> kg (3) 208 186
ix) x) Ta SI No. (1) ii) iii) iii)	M 50 M 55 ble 2 Maximur Metre of C Maximur (Clause Nominal Ma Size of Age mm (2) 10 20 40	n Water C Concrete for Size of A s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content " kg (3) 208 186 165

## SLR-FR-11 Set P

## Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate (Clauses 4.4, A-7 and B-7)

SI No.	Nominal Maximum Size of	Volume of Coarse Aggregate <sup>11</sup> per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate					
(1)	mm	Zone IV	Zone III	Zone 11	Zone l		
	(2)	(3)	(4)	(5)	(6)		
i)	10	0.50	0.48	0.46	0.44		
11)	20	0.66	0.64	0.62	0.60		
111)	40	0.75	0.73	0.71	0.69		

<sup>1)</sup> Volumes are based on aggregates in saturated surface dry condition.

#### Table 5 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal Maximum Size

SI No.	Fxposure		Plain Concrete			Reinforced Concret	e
		Minimum Cement Content kg/m <sup>2</sup>	Maximum Free Water- Cement Ratio	aximum Minimum te Water- Grade of nent Ratio Concrete		Maximum Free Water- Cement Ratio	Minimum Grade of Concrete
1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1)	Mild	220	0.60	-	300	0.55	M 20
m)	Moderate	240	0.60	M 15	300	0.50	M 25
商	Severe	250	0.50	M 20	320	0.45	M 30
IV)	Very severe	260	0.45	M 20	340	0.45	M 35
v)	Extreme	280	0.40	M 25	360	0,40	M 40

(Clauses 6.1.2, 8.2.4.1 and 9.1.2)

## S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Civil Engineering**

### **CONCRETE TECHNOLOGY, MATERIAL TESTING & EVALUATION**

Day & Date: Saturday,07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicates full marks
- Assume suitable data wherever needed and mention it clearly.

#### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

c)

a)

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No.

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- Shrinkage, which takes place before concrete has set is known as \_\_\_\_\_. 1)
  - a) Autogenous Shrinkage **Plastic Shrinkage**
- Drving shrinkage b) d) **Carbonation Shrinkage**
- The tensile strength of concrete is about \_\_\_\_\_ of its compressive 2) strength.
  - 10 to 15% a) b) 30 to 40% 60 to 70% 50%
  - d) c)
- 3) Shrinkage increases with .
  - a) Increases in water-cement ratio.
  - b) Increases in cement content.
  - c) Decreases in humidity.
  - d) All of above.
- 4) IS provision for concrete mix design is given by \_
  - a) IS 4031-1968 IS 383-1970 b)
  - c) IS 456-2000 d) IS 10262-2009
- 5) For the construction of the retaining structures, the type of concrete mix to be used, is \_\_\_\_\_.
  - a) 1:3:6 b) 1:2:41: 1.5 : 3 C) d) 1:1:2
- If the average compressive strength is 4000 kg/cm<sup>2</sup> and standard 6) deviation is 500, the co-efficient of variation is
  - 10% 12.5% a) b)
  - 15% d) 20% C)
- 7) Permissible compressive strength of M 200 concrete grade is .  $100 \text{kg/cm}^2$ 
  - 150kg/cm<sup>2</sup> b)
  - $200 \text{ kg/cm}^2$ 250kg/cm<sup>2</sup> d) c)
- Which one doesn't comes under Calcareous Rocks? 8)
  - Limestone b) Cement rock a) c) Chalk d) Marine shell deposits

SLR-FR-11



Max. Marks: 70

Marks: 14

9) The blended meal is sieved and fed into a rotating dish called a	
---	--

a) Clinker

- Kiln b)
- Raw meal c) Granulator d)
- Which chemical composition has highest content in OPC? 10)
  - a) Alumina b) Silica
  - c) Lime d) Iron Oxide
- 11) In the soundness test a specimen of hardened cement paste is \_\_\_\_\_ for a fixed time.
  - a) Freeze

- b) Dry
- c) Boiled d) Dipped in water
- 12) Workability of concrete is directly proportional to \_\_\_\_
  - a) Grading of the aggregates c) Aggregates cement ratio
    - b) Time of transit d)
      - Water cement ratio

Brinell tester

- 13) Tensile test can be performed on \_\_\_\_ a) Impact testing machine
  - b) Universal testing machine
  - c) Rockwell tester d)
- Which of the following option doesn't come in chemical admixtures? 14)
  - a) Plasticizers
  - c) Super plasticizer

Page 8 of 24

- b) Pozzolanic
- d) Accelerator

- SLR-FR-11
  - Set Q

## Seat No.

S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering

### CONCRETE TECHNOLOGY, MATERIAL TESTING & EVALUATION

Day & Date: Saturday,07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Figures to the right indicates full marks.

- 2) All questions are compulsory.
- 3) Assume suitable data wherever needed and mention it clearly.

#### Section – I

#### Q.2 Attempt any two of the following question.

- a) What is the chemical Composition of Cement with its Significance?
- b) Explain die manufacturing process of cement by Wet Process with flow chart construction.
- **c)** What is Hydration? Explain the role of "C<sub>3</sub>S, C<sub>2</sub>S, C<sub>3</sub>A and C<sub>4</sub>AF" during the hydration process?
- d) Find the fineness modulus of Sand and also define which type of Fine Aggregate it is with its Zone number. Below table 01 is given content of Sieve size and weight retained. (Use grading limit table 02)
   Table 01

Weight retained

0.138

0.161

0.290

0.282

0.116

0.006

Sieve Size

4.75

2.36

1.18

600

300

150

Pan

		0.00				
Table 02						
I.S. Sieve	I.S. Sieve Percentage passing by weight for					
Designation, mm	Grading	Grading	Grading	Grading		
	Zone – I	Zone – II	Zone – III	Zone – IV		
10	100	100	100	100		
4.75	90-100	90-100	90-100	95-100		
2.36	60-95	75-100	85-100	95-100		
1.18	30-70	55-90	75-100	90-100		
0.6	15-34	35-59	60-79	80-100		
0.3	5-20	8-30	12-40	15-50		
0.15	0-10	0-10	0-10	0-15		

### **Q.3** Attempt any four of the following question.

- **a)** Write a note on bulking of Sand.
- **b)** Write a brief note on Retarders and retarding admixtures and Accelerators and Accelerating Admixture.
- c) Write a note on Standard Grading Curve.
- d) Enlist types of Cement and explain in the any three of it.
- e) How the shape of aggregate effect on performance of Concrete?
- f) Write a note sulphate and chloride attack on concrete.

12

16



Max. Marks: 56

					SLR-FR	-11
					Set	Q
			Section – II			
Q.4	Wri	te a n	ote on any four of the following.			12
<b>_</b>	a)	Shri	nkage and Types of shrinkage			•-
	b)	Alka	li aggregate reaction			
	C)	Qua	lity control of concrete			
	d)	Tens	sion test on mild steel			
	e)	Dura	ability of concrete			
	f)	Brine	ell or Rockwell hardness test on me	tal		
Q.4	Wri	te a n	ote on any three of the following			12
	a)	Cree	ep of concrete and list factors affect	ing oi	n creep	
	b)	Corr	pression test on mild steel			
	C)	Туре	es of Mixes			
	d)	Effe	ct of w/c ratio on Durability of concre	ete		
Q.5	Des	sign M	25 Concrete Mix as per IS Code 10	262:2	2009 using following data:	16
	1)	Stipu	ulations for proportioning			
		A)	Grade Designation:	M25	5	
		B)	Types of cement:	OPO	C 43 Grade conforming to IS	
		C)	Max nominal size of aggregate:	20m	nm	
		D)	Workability:	75m	nm(Slump)	
		E)	Exposure Condition:	IVIOC	derate (For RCC)	
		F)	Method of concrete placing:	Pun	nping	
		С) Ц\	Degree of Supervision.	Cru	ou shad angular aggregate	
		п) N	Maximum coment content:	Nil	shed angular aggregate	
		יי 1)	Chemical admixture type:	Nil		
	2)	Test	data for material			
	-,	A)	Cement Used:		OPC 43 grade	
		B)	Specific gravity of cement:		3.15	
		Ć)	Specific gravity of Course aggrega	ate:	2.9	
		D)	Specific gravity of Fine aggregate		2.8	
		E)	Water abortion:			
			Course aggregate:		0.6%	
			Fine aggregate:		1.0%	
		F)	Sieve analysis:			
			Course aggregate:		Conforming to IS 383	
			Fine aggregate:		Conforming to grading zone I of IS 383	

## SLR-FR-11 Set Q

SI No.		Grade of Concrete	Assume	d Standard Deviatio
(1)		(2)		(3)
i)		M 10		3.5
ii)		MISS		
111)		M 20]		10
iv)		M 25 5	and the second s	4.0
		M 300		
~ 1		M 35		
viii		M 40		6.0
wiiii)		M 45 (		5.0
× 111.2				
ix)		M 50		
ix) x)	Tabl	M SO M SS e 2 Maximur Metre of C	n Water ( Concrete f	Content per Cubic or Nominal
ix) x)	Tabl	M 50 M 55 e 2 Maximur Metre of C Maximur (Clause.	n Water Concrete for m Size of s 4.2, A-5	Content per Cubic or Nominal Aggregate and B-5)
ix) x)	Tabl	M 50 M 55 e 2 Maximur Metre of C Maximur ( <i>Clause</i> , Nominal Ma Size of Age	n Water Concrete for m Size of . s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content "
ix) x)	Tabl SI No.	M SO M SS e 2 Maximur Metre of C Maximur (Clause. Nominal Ma Size of Agg mm	n Water Concrete for m Size of . s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content <sup>19</sup> kg
ix) x)	Tabl SI No.	M 50 M 55 e 2 Maximur Metre of C Maximur (Clause. Nominal Ma Size of Age mm (2)	n Water G Concrete for m Size of . s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content " kg (3)
ix) x)	Tabl SI No. (1)	M SO M SS e 2 Maximur Metre of C Maximur (Clause Nominal Ma Size of Agg mm (2) 10	n Water Concrete for m Size of . s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content <sup>10</sup> kg (3) 208
ix) x)	Tabl SI No. (1) ii)	M 50 M 55 e 2 Maximur Metre of C Maximur (Clause. Nominal Ma Size of Age mm (2) 10 20	n Water G Concrete for m Size of . s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content <sup>10</sup> kg (3) 208 186
ix) x)	Tabl SI No. (1) ii) iii) iu)	M 50 M 55 e 2 Maximur Metre of C Maximur (Clause. Nominal Ma Size of Agg mm (2) 10 20 40	n Water Concrete for Size of . s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content " kg (3) 208 186 165

## SLR-FR-11 Set Q

## Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate (Clauses 4.4, A-7 and B-7)

SI No.	Nominal Maximum Size of	Volume of Coarse Aggregate <sup>10</sup> per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate					
(1)	mm	Zone IV	Zone III	Zone 11	Zone l		
	(2)	(3)	(4)	(5)	(6)		
1)	10	0.50	0.48	0.46	0.44		
11)	20	0.66	0.64	0.62	0.60		
111)	40	0.75	0.73	0.71	0.69		

<sup>1)</sup> Volumes are based on aggregates in saturated surface dry condition.

#### Table 5 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal Maximum Size

SI No.	Fxposure		Plain Concrete		2	Reinforced Concret	e
		Minimum Maximum Cement Free Water- Content Cement Ratio kg/m <sup>2</sup>		Minimum Grade of Concrete	Minimum Cement Content kg/m	Maximum Free Water- Cement Ratio	Minimum Grade of Concrete
1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1)	Mild	220	0.60	-	300	0.55	M 20
m)	Moderate	240	0.60	M 15	300	0.50	M 25
商	Severe	250	0.50	M 20	320	0.45	M 30
IV)	Very severe	260	0.45	M 20	340	0.45	M 35
v)	Extreme	280	0.40	M 25	360	0,40	M 40

(Clauses 6.1.2, 8.2.4.1 and 9.1.2)

S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering CONCRETE TECHNOLOGY, MATERIAL TESTING & EVALUATION	
Day & Date: Saturday,07-12-2019 Max. Marks: Time: 10:00 AM To 01:00 PM	7(
<ul> <li>Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.</li> <li>2) Figures to the right indicates full marks</li> <li>3) Assume suitable data wherever needed and mention it clearly.</li> </ul>	эr
MCQ/Objective Type Questions	

**Duration: 30 Minutes** 

Seat

No.

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

b)

Universal testing machine

- Workability of concrete is directly proportional to \_ 1) Time of transit b)
  - a) Grading of the aggregates
  - c) Aggregates cement ratio d) Water cement ratio
- 2) Tensile test can be performed on
  - a) Impact testing machine C)
    - Brinell tester Rockwell tester d)

#### 3) Which of the following option doesn't come in chemical admixtures?

- a) Plasticizers Pozzolanic b) c) Super plasticizer d) Accelerator
- Shrinkage, which takes place before concrete has set is known as \_\_\_\_\_. 4)
  - a) Autogenous Shrinkage b) Drying shrinkage
  - c) Plastic Shrinkage d) **Carbonation Shrinkage**
- The tensile strength of concrete is about of its compressive 5) strength.
  - a) 10 to 15% b) 30 to 40%
  - 60 to 70% c) 50% d)
- Shrinkage increases with \_\_\_\_ 6)
  - a) Increases in water-cement ratio.
  - b) Increases in cement content.
  - c) Decreases in humidity.
  - d) All of above.

IS provision for concrete mix design is given by \_ 7)

- a) IS 4031-1968 b) IS 383-1970
- c) IS 456-2000 d) IS 10262-2009
- 8) For the construction of the retaining structures, the type of concrete mix to be used, is \_\_\_\_\_
  - 1:3:6 a) b) 1:2:4
  - d) 1:1:2 c) 1: 1.5 : 3
- If the average compressive strength is 4000 kg/cm<sup>2</sup> and standard 9) deviation is 500, the co-efficient of variation is \_
  - a) 10% b) 12.5%
  - 15% d) 20% C)

SLR-FR-11



Max. Marks: 70

Marks: 14

			SLR-FR-11
			Set R
10)	Permissible compressive strength	of M 20	00 concrete grade is
	a) 100kg/cm <sup>2</sup>	b)	150kg/cm <sup>2</sup>
	c) 200 kg/cm <sup>2</sup>	d)	250kg/cm <sup>2</sup>
11)	Which one doesn't comes under (	Calcared	ous Rocks?
	a) Limestone	b)	Cement rock
	c) Chalk	d)	Marine shell deposits
12)	The blended meal is sieved and for	ed into a	a rotating dish called a
	a) Clinker	b)	Kiln
	c) Granulator	d)	Raw meal
13)	Which chemical composition has	highest	content in OPC?
	a) Alumina	b)	Silica
	c) Lime	d)	Iron Oxide

- 14) In the soundness test a specimen of hardened cement paste is \_\_\_\_\_ for a fixed time.
  - b) Dry
  - a) Freeze c) Boiled
- d) Dipped in water

Seat	
No.	

S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering

### CONCRETE TECHNOLOGY, MATERIAL TESTING & EVALUATION

Day & Date: Saturday,07-12-2019 Time: 10:00 AM To 01:00 PM

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

- 2) All questions are compulsory.
- 3) Assume suitable data wherever needed and mention it clearly.

#### Section – I

#### Q.2 Attempt any two of the following question.

- a) What is the chemical Composition of Cement with its Significance?
- b) Explain die manufacturing process of cement by Wet Process with flow chart construction.
- **c)** What is Hydration? Explain the role of "C<sub>3</sub>S, C<sub>2</sub>S, C<sub>3</sub>A and C<sub>4</sub>AF" during the hydration process?
- d) Find the fineness modulus of Sand and also define which type of Fine Aggregate it is with its Zone number. Below table 01 is given content of Sieve size and weight retained. (Use grading limit table 02)
   Table 01

Weight retained

0.138

0.161

0.290

0.282

0.116

0.006

Sieve Size

4.75

2.36

1.18

600

300

150

Pan

Table 02								
I.S. Sieve	Percentage passing by weight for							
Designation, mm	Grading	Grading	Grading	Grading				
	Zone – I	Zone – II	Zone – III	Zone – IV				
10	100	100	100	100				
4.75	90-100	90-100	90-100	95-100				
2.36	60-95	75-100	85-100	95-100				
1.18	30-70	55-90	75-100	90-100				
0.6	15-34	35-59	60-79	80-100				
0.3	5-20	8-30	12-40	15-50				
0.15	0-10	0-10	0-10	0-15				

### **Q.3** Attempt any four of the following question.

- a) Write a note on bulking of Sand.
- **b)** Write a brief note on Retarders and retarding admixtures and Accelerators and Accelerating Admixture.
- c) Write a note on Standard Grading Curve.
- d) Enlist types of Cement and explain in the any three of it.
- e) How the shape of aggregate effect on performance of Concrete?
- f) Write a note sulphate and chloride attack on concrete.

12

16



Max. Marks: 56

Set R

					SLR-FR	-11
					Set	R
			Section – I	l		
Q.4	Wri a) b) c) d) e) f)	<b>te a n</b> e Shrir Alkal Qual Tens Dura Brine	ote on any four of the following. hkage and Types of shrinkage i aggregate reaction ity control of concrete ion test on mild steel bility of concrete ell or Rockwell hardness test on me	etal		12
Q.4	Wri a) b) c) d)	te a no Cree Com Type Effec	ote on any three of the following p of concrete and list factors affect pression test on mild steel s of Mixes at of w/c ratio on Durability of concr	ing o rete	n creep	12
Q.5	Des 1) 2)	ign M2 Stipu A) B) C) D) E) F) G) H) J) Test A) B) C) D) E) F)	25 Concrete Mix as per IS Code 10 lations for proportioning Grade Designation: Types of cement: Max nominal size of aggregate: Workability: Exposure Condition: Method of concrete placing: Degree of Supervision: Type of aggregate: Maximum cement content: Chemical admixture type: data for material Cement Used: Specific gravity of cement: Specific gravity of Course aggreg Specific gravity of Fine aggregate Water abortion: Course aggregate: Fine aggregate: Sieve analysis: Course aggregate: Fine aggregate: Fine aggregate: Fine aggregate:	)262:: M25 OP( 20m 75m Moo Pun Goo Cru: Nil Nil ate:	2009 using following data: 5 C 43 Grade conforming to IS 7 7 7 7 7 7 7 7 7 7 7 7 7	16

## SLR-FR-11 Set R

SI No.	Grade of Concrete	Assume	d Standard Deviatio
(1)	(2)		(3)
i)	M 10		3.5
ii)	M 15 5		
(())	M 20]		4.0
iv)	M 25 5		7.0
~	M 300		
vil	M 35		
vii)	M 40		5.0
viii)	M 45 (		5.0
Contraction of the second s			
ix)	M 50		
ix) x) Ta	M 50 M 55 ble 2 Maximur Metre of C	n Water Concrete fo	Content per Cubic or Nominal
ix) x) Ta	M 50 M 55 ble 2 Maximur Metre of C Maximur (Clause	n Water C Concrete for m Size of A s 4.2, A-5	Content per Cubic or Nominal Aggregate and B-5)
ix) x) Ta	M 50 M 55 ble 2 Maximur Metre of C Maximur (Clause Nominal Ma Size of Age	n Water C Concrete for m Size of J s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content <sup>10</sup>
ix) x) Ta SI No.	M 50 M 55 ble 2 Maximur Metre of C Maximur (Clause Nominal Ma Size of Age mm	n Water C Concrete for m Size of A s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content " kg
ix) x) Ta SI No. (1)	M 50 M 55 ble 2 Maximur Metre of C Maximur (Clause Nominal Ma Size of Age mm (2)	n Water C Concrete for Size of J s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content " kg (3)
ix) x) Ta SI No. (1) i)	M 50 M 55 ble 2 Maximur Metre of C Maximur (Clause Nominal Ma Size of Age mm (2) 10	n Water C Concrete for Size of A s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content <sup>10</sup> kg (3) 208
ix) x) Ta SI No. (1) ii)	M 50 M 55 ble 2 Maximur Metre of C Maximur (Clause Nominal Ma Size of Age mm (2) 10 20	n Water C Concrete for Size of A s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content " kg (3) 208 186
ix) x) Ta SI No. (1) ii) iii) iii)	M 50 M 55 ble 2 Maximur Metre of C Maximur (Clause Nominal Ma Size of Age mm (2) 10 20 40	n Water C Concrete for Size of A s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content " kg (3) 208 186 165

## SLR-FR-11 Set R

## Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate (Clauses 4.4, A-7 and B-7)

SI No.	Nominal Maximum Size of	Volume of Coarse Aggregate <sup>11</sup> per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate					
(1)	mm	Zone IV	Zone III	Zone 11	Zone 1		
	(2)	(3)	(4)	(5)	(6)		
i)	10	0.50	0.48	0.46	0.44		
11)	20	0.66	0.64	0.62	0.60		
111)	40	0.75	0.73	0.71	0.69		

<sup>1)</sup> Volumes are based on aggregates in saturated surface dry condition.

#### Table 5 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal Maximum Size

SI Faposare No.		000	Plain Concrete			Reinforced Concrete		
	Minimum Cement Content kg/m <sup>2</sup>	Maximum Free Water- Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m	Maximum Free Water- Cement Ratio	Minimum Grade of Concrete		
1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
1)	Mild	220	0.60	-	300	0.55	M 20	
m)	Moderate	240	0.60	M 15	300	0.50	M 25	
商	Severe	250	0.50	M 20	320	0.45	M 30	
IV)	Very severe	260	0.45	M 20	340	0.45	M 35	
v)	Extreme	280	0.40	M 25	360	0.40	M 40	

(Clauses 6.1.2, 8.2.4.1 and 9.1.2)

Seat	
No.	

S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Civil Engineering** 

### **CONCRETE TECHNOLOGY, MATERIAL TESTING & EVALUATION**

Day & Date: Saturday,07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicates full marks
- Assume suitable data wherever needed and mention it clearly.

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Marks: 14

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Shrinkage increases with
  - a) Increases in water-cement ratio.
  - b) Increases in cement content.
  - c) Decreases in humidity.
  - d) All of above.

a) Limestone

c) Chalk

#### 2) IS provision for concrete mix design is given by \_

- a) IS 4031-1968 IS 383-1970 b)
- c) IS 456-2000 d) IS 10262-2009
- 3) For the construction of the retaining structures, the type of concrete mix to be used, is .
  - 1:3:6 1:2:4 a) b) 1: 1.5 : 3 d) 1:1:2 c)
- If the average compressive strength is 4000 kg/cm<sup>2</sup> and standard 4) deviation is 500, the co-efficient of variation is
  - 10% b) 12.5% a)
  - 15% d) 20% c)
- Permissible compressive strength of M 200 concrete grade is . 5)
  - $100 \text{kg/cm}^2$ 150kg/cm<sup>2</sup> b) a) C)
    - $200 \text{ kg/cm}^2$ d)  $250 \text{kg/cm}^2$

Which one doesn't comes under Calcareous Rocks? 6)

- b) Cement rock
  - d) Marine shell deposits
- The blended meal is sieved and fed into a rotating dish called a . 7)
  - a) Clinker Kiln b)
  - c) Granulator d) Raw meal
- Which chemical composition has highest content in OPC? 8)
  - a) Alumina Silica b)
  - c) Lime d) Iron Oxide

S Set

Max. Marks: 70

					Set	S
9)	In ti a fiz a) c)	he soundness test a specimen of ked time. Freeze Boiled	harde b) d)	ened cement paste is Dry Dipped in water	_ for	
10)	Wo a) c)	rkability of concrete is directly pro Grading of the aggregates Aggregates cement ratio	portio b) d)	onal to Time of transit Water cement ratio		
11)	Ter a) c)	nsile test can be performed on Impact testing machine Rockwell tester	b) d)	 Universal testing machine Brinell tester		
12)	Wh a) c)	ich of the following option doesn' Plasticizers Super plasticizer	t com b) d)	e in chemical admixtures? Pozzolanic Accelerator		
13)	Shr a) c)	inkage, which takes place before Autogenous Shrinkage Plastic Shrinkage	conc b) d)	rete has set is known as Drying shrinkage Carbonation Shrinkage		
14)	The stre	e tensile strength of concrete is all ength.	_ out	of its compressive		
	a) C)	50%	d)	60 to 70%		
S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering

# CONCRETE TECHNOLOGY, MATERIAL TESTING & EVALUATION

Day & Date: Saturday,07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Figures to the right indicates full marks.

- 2) All questions are compulsory.
- 3) Assume suitable data wherever needed and mention it clearly.

### Section – I

## Q.2 Attempt any two of the following question.

- a) What is the chemical Composition of Cement with its Significance?
- b) Explain die manufacturing process of cement by Wet Process with flow chart construction.
- **c)** What is Hydration? Explain the role of "C<sub>3</sub>S, C<sub>2</sub>S, C<sub>3</sub>A and C<sub>4</sub>AF" during the hydration process?
- d) Find the fineness modulus of Sand and also define which type of Fine Aggregate it is with its Zone number. Below table 01 is given content of Sieve size and weight retained. (Use grading limit table 02)
   Table 01

Weight retained

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0.161

0.290

0.282

0.116

0.006

0.007

Sieve Size

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300

150

Pan

	•	Table 02						
I.S. Sieve Percentage passing by weight for								
Designation, mm	Grading	Grading	Grading	Grading				
	Zone – I	Zone – II	Zone – III	Zone – IV				
10	100	100	100	100				
4.75	90-100	90-100	90-100	95-100				
2.36	60-95	75-100	85-100	95-100				
1.18	30-70	55-90	75-100	90-100				
0.6	15-34	35-59	60-79	80-100				
0.3	5-20	8-30	12-40	15-50				
0.15	0-10	0-10	0-10	0-15				

# **Q.3** Attempt any four of the following question.

- **a)** Write a note on bulking of Sand.
- **b)** Write a brief note on Retarders and retarding admixtures and Accelerators and Accelerating Admixture.
- c) Write a note on Standard Grading Curve.
- d) Enlist types of Cement and explain in the any three of it.
- e) How the shape of aggregate effect on performance of Concrete?
- f) Write a note sulphate and chloride attack on concrete.

16

12

Set S

Max. Marks: 56

					SLR-FR	-11				
					Set	S				
			Section – I							
Q.4	Wri a) b) c) d) e) f)	te a no Shrink Alkali Qualit Tensid Durab Brinel	te on any four of the following. kage and Types of shrinkage aggregate reaction y control of concrete on test on mild steel vility of concrete I or Rockwell hardness test on me OR	etal		12				
Q.4	Wri a) b) c) d)	<b>te a no</b> Creep Comp Types Effect	te on any three of the following of concrete and list factors affect ression test on mild steel of Mixes of w/c ratio on Durability of concr	any three of the following. ncrete and list factors affecting on creep in test on mild steel xes c ratio on Durability of concrete crete Mix as per IS Code 10262:2009 using following data: for proportioning						
Q.5	Des 1) 2)	sign M2 Stipul A) B) C) D) E) F) G) H) J) Test c A) B) C) D) E)	5 Concrete Mix as per IS Code 10 ations for proportioning Grade Designation: Types of cement: Max nominal size of aggregate: Workability: Exposure Condition: Method of concrete placing: Degree of Supervision: Type of aggregate: Maximum cement content: Chemical admixture type: lata for material Cement Used: Specific gravity of course aggreg Specific gravity of Course aggreg Specific gravity of Fine aggregate Water abortion: Course aggregate: Fine aggregate: Sieve analysis: Course aggregate: Fine aggregate: Fine aggregate: Fine aggregate:	M28 OP 20n 75n Moo Pur Goo Cru Nil Nil ate:	2009 using following data: 5 C 43 Grade conforming to IS nm nm(Slump) derate (For RCC) nping od shed angular aggregate OPC 43 grade 3.15 2.9 2.8 0.6% 1.0% Conforming to IS 383 Conforming to grading zone I of IS 383	16				

# SLR-FR-11 Set S

SI No.		Grade of Concrete	Assumed Standard Deviat		
(1)		(2)		(3)	
i)		M 10]		3.5	
ii)		MISS			
(iii)		M 20]		4.0	
iv)		M 25 5		4.0	
~		M 30)			
vil		M 35			
vii)		M 40		5.0	
		M 45 (		5.0	
XIII)					
ix)		M 50			
ix) x)	Tabl	M 50 M 55 e 2 Maximur Metre of C	n Water ( Concrete f	Content per Cubic or Nominal	
ix) x)	Tabl	M 50 M 55 e 2 Maximur Metre of C Maximur (Clause.	n Water Concrete for m Size of . s 4.2, A-5	Content per Cubic or Nominal Aggregate and B-5)	
ix) x)	Tabl	M 50 M 55 e 2 Maximur Metre of C Maximur ( <i>Clause</i> , Nominal Ma Size of Age	n Water Concrete for n Size of . s 4.2, A-5 aximum tregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content <sup>10</sup>	
ix) x)	Tabl Sl No.	M 50 M 55 e 2 Maximur Metre of C Maximur ( <i>Clause</i> Nominal Ma Size of Age mm	n Water Concrete for m Size of . s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content " kg	
ix) x)	Tabl SI No.	M 50 M 55 e 2 Maximur Metre of C Maximur ( <i>Clause</i> , Nominal Ma Size of Age mm (2)	n Water C Concrete fe n Size of . s 4.2, A-5 aximum tregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content " kg (3)	
ix) x)	Tabl Sl No. (1)	M 50 M 55 e 2 Maximur Metre of C Maximur ( <i>Clause</i> Nominal Ma Size of Age mm (2) 10	n Water G Concrete for n Size of . s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content <sup>10</sup> kg (3) 208	
ix) x)	Tabl SI No. (1) ii)	M 50 M 55 e 2 Maximur Metre of C Maximur ( <i>Clause</i> , Nominal Ma Size of Age mm (2) 10 20	n Water C Concrete for n Size of . s 4.2, A-5 aximum tregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content <sup>10</sup> kg (3) 208 186	
ix) x)	Tabl SI No. (1) ii) iii) iii)	M 50 M 55 e 2 Maximur Metre of C Maximur (Clause. Nominal Ma Size of Age mm (2) 10 20 40	n Water Concrete for n Size of . s 4.2, A-5 aximum gregate	Content per Cubic or Nominal Aggregate and B-5) Maximum Water Content <sup>10</sup> kg (3) 208 186 165	

# SLR-FR-11 Set S

# Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate (Clauses 4.4, A-7 and B-7)

SI No.	Nominal Maximum Size of	Volume ( Volu Differe	Volume of Coarse Aggregate <sup>10</sup> per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate					
(1)	mm	Zone IV	Zone III	Zone 11	Zone l			
	(2)	(3)	(4)	(5)	(6)			
1)	10	0.50	0.48	0.46	0.44			
11)	20	0.66	0.64	0.62	0.60			
111)	40	0.75	0.73	0.71	0.69			

<sup>1)</sup> Volumes are based on aggregates in saturated surface dry condition.

### Table 5 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal Maximum Size

SI No.	Fxposure		Plain Concrete			Reinforced Concret	Reinforced Concrete			
		Minimum Cement Content kg/m <sup>2</sup>	Maximum Free Water- Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m	Maximum Free Water- Cement Ratio	Minimum Grade of Concrete			
1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)			
1)	Mild	220	0.60	-	300	0.55	M 20			
m)	Moderate	240	0.60	M 15	300	0.50	M 25			
商	Severe	250	0.50	M 20	320	0.45	M 30			
IV)	Very severe	260	0.45	M 20	340	0.45	M 35			
v)	Extreme	280	0.40	M 25	360	0,40	M 40			

(Clauses 6.1.2, 8.2.4.1 and 9.1.2)

# No. S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Civil Engineering**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Seat

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

**SURVEYING & GEOMATICS** 

2) Figures to the right indicate full marks.

# MCQ/Objective Type Questions

### **Duration: 30 Minutes** Q.1

- Choose the correct alternatives from the options and rewrite the sentence. 14 1)
  - In tilting level the leveling of longitudinal bubble tube is done \_\_\_\_\_. Using tilting screw before taking every staff reading a)
  - Using tilting screw after taking every staff reading b)
  - Using the foot screws after taking every staff reading c)
  - Using the foot screws before taking every staff reading d)
  - 2) During direct method of Contouring, the staff reading observed on Bench mark of 500.000m Reduced level, is 3.000m. What should be the staff readings for locating the contour of 499.000m?
    - a) 1m b) 2m
    - c) 3m d) 4m
  - 3) During block contouring the following staff readings are observed at four corners of a block having 5m by 5m size on ground.

It is required to locate a route from P to Q at an upward gradient of 1 in 500. The contour map of the area is available at a contour interval of 10m at a scale of 1:10000 which is shown in the fig. The radius of the arc required to obtain the route path is



- a) Linear measurements are more precise
  - b) Angular measurements are more precise
  - c) Both linear and angular measurements are equally precise
  - d) None of these



Set

Max. Marks: 70

Ρ

Marks: 14

		Set	Ρ
6)	<ul> <li>The Bow Ditches rule is used for correcting the consecutive</li> <li>a) Linear measurements are more precise</li> <li>b) Angular measurements are more precise</li> <li>c) Both linear and angular measurements are equally pred)</li> <li>d) None of these</li> </ul>	coordinates if	
7)	<ul> <li>Resection is the process of</li> <li>a) Orienting the telescope of total station towards North d</li> <li>b) Orienting the telescope of total station using the data d station and Back sight point</li> <li>c) Finding the coordinates of the instrument station from t coordinates of two known points</li> <li>d) Locating the station from its known coordinates</li> </ul>	irection of occupied the	
8)	Global positioning services (GPS) uses 24 satelite in a) 9 Orbit b) 8 Orbit c) 7 Orbit d) 6 Orbit	·	
9)	Which of the following are known as GPS positioning metho a) Static b) Real time kinem c) Stop and go d) All of these	ods? atics	
10)	In a raster overlay, a point is represented by a a) String of cells b) Group of cells c) Single cell d) All of these		
11)	Cell like units are characteristics of a) Raster data structures b) Cellular data structures c) Both (a) and (b) d) Vector data structure	uctures ctures	
12)	A passive sensor uses which of the following sources of ene a) Sun b) Flashlight c) Its own source d) Moon	ergy?	
13)	<ul> <li>Setting out is done</li> <li>a) Prior to the preparation of plans</li> <li>b) Along with the preparation of plans</li> <li>c) After the preparation of plans</li> <li>d) If obstructions are there</li> </ul>		
14)	<ul> <li>Setting out of bridge involves determination of</li> <li>a) Length of Central Line and height of piers</li> <li>b) Direction of Central Line and height of piers</li> <li>c) Length of Central Line and position of piers</li> <li>d) None of these</li> </ul>		

04

# SLR-FR-12

Set

Ρ

Seat No.

> S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Civil Engineering SURVEYING & GEOMATICS**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 2 & Q. No. 6 is compulsory.

- 2) Attempt any two questions from each section.
- 3) Figures to the right indicate fill marks.

## Section I

- Q.2 Explain the construction and working principle of Tilting Level with suitable 04 a) sketches.
  - During block contouring the following staff readings are observed at four b) corners of a block having 5m by 5m size on ground.

Station and Cartesian coordinate (m)	Staff reading (m)					R.L	Remark
	B.S.	I.S.	F.S.	Rise	Fall		
	4.000					500.000	Bench mark
0,0		3.000					
0,5		0.000					
5,5		1.000					
5,0			2.000				

- 1) Calculate the R.L. of stations at four corners using rise and fall 02 method. Take usual arithmetic check.
- Draw the block at 1:50 scale on the answer sheet and show the 02 2) Reduced Levels as per conditions.
- Draw contours at 1m contour interval. Use arithmetic method of 3) 04 interpolation.

#### Q.3 Explain

- Explain the uses of contour map with suitable example for checking the 04 a) inter-visibility from opposite ends of a line. 04
- Explain the construction and working of digital level. b)
- Q.4 Compare the Bow Ditches rule and transit rule. a)
  - b) Calculate the independent coordinates for the following traverse using 04 Transit rule.

Station	Lino	Longth	С	Independent Coordinates				
Station Line		Lengin	Latitude		Departur	е	L	D
			Northing	Southing	Easting	Westing	Ν	Е
Р	SP	85	13.29		83.95		500	600
Q	PQ	100	99.98		1.74			
R	QR	80	8.36			79.56		
S	RS	95		94.98		1.66		

Max. Marks: 56

						Set	Ρ				
Q.5	Exc	olain									
• -	a) '	Use of Tot	al station for sta	ke out.			04				
	b)	Use of tota	al station for Ren	note elevation meas	surement.		04				
~ ~	- \	0									
Q.6	a)		on & use of Mirro	or stereoscope.	m and 200 m raana	otivolv	04				
	D)	i wo point	S A and B having	y elevations of 500 r	h and 300 m respe	Set P ant. 04 04 04 04 04 06 06 06 06 06 06 06 06 06 06					
		& flying al	titude of 2500m /	venical photograph	corrected photogra	noi 20 cm	et P 04 04 04 06 m 05 04 05 04 05 04 05 04 05 04 05 04 05 04 05 04 05 04 05 04 05 04 05 04 05 04 04 04 06				
		coordinate	and the of 2000m a		confected photogra	phic					
		Point x co-ordinate y co-ordinate									
			a	+ 265 mm	+ 136 mm						
			b	- 192 mm	- 365 mm						
		Determine	the length of gr	ound line AB.							
Q.7	a)	What are	the segments of	GPS? Describe the	m briefly.		05	P 04 04 04 06 05 04 05 04 05 04 05			
	b)	Describe (	GPS receivers &	PS receivers & its type. 0							
Q.8	a)	Write a no	ote on Spatial data & non spatial data.								
	b)	Explain se	tting out of Tunr	nel.			04				
Q.9	a)	What are	the different App	lication of GPS?			04				
	b)	What are t	the different App	lication of GIS?			05				

What are the different Application of GIS? b)

SLR-FR-12

			SURVETING & G		VIANCS		
Day Time	& Date : 10:0	e: Tue 0 AM	esday, 10-12-2019 I To 01:00 PM		Ma	x. Marks	: 70
Instr	uctio	<b>ns:</b> 1)	) Q. No. 1 is compulsory and sho book.	uld b	e solved in first 30 minutes	s in ansv	ver
		2	) Figures to the right indicate fi	ui ma	arks.		
<b>Dr</b> a	tion. 0	O M.	MCQ/Objective Ty	be Q	uestions	Marka	
Dura	uon: 3		nutes			Warks	: 14
Q.1	<b>Cho</b> ( 1)	ose t Glol a) c)	he correct alternatives from the bal positioning services (GPS) us 9 Orbit 7 Orbit	es 24 b) d)	ions and rewrite the sen I satelite in 8 Orbit 6 Orbit	tence.	14
	2)	Whi a) c)	ch of the following are known as Static Stop and go	GPS b) d)	positioning methods? Real time kinematics All of these		
	3)	In a a) c)	raster overlay, a point is represe String of cells Single cell	nted b) d)	by a Group of cells All of these		
	4)	Cell a) c)	like units are characteristics of _ Raster data structures Both (a) and (b)	b) d)	Cellular data structures Vector data structures		
	5)	A pa a) c)	assive sensor uses which of the f Sun Its own source	ollow b) d)	ing sources of energy? Flashlight Moon		
	6)	Sett a) b) c) d)	ing out is done Prior to the preparation of plans Along with the preparation of pla After the preparation of plans If obstructions are there	ans			
	7)	Sett a) b) c) d)	ing out of bridge involves determ Length of Central Line and heig Direction of Central Line and he Length of Central Line and posi None of these	inatic ht of ight c tion c	n of piers of piers f piers		
	8)	In til a) b) c) d)	Iting level the leveling of longitudi Using tilting screw before taking Using tilting screw after taking e Using the foot screws after taking Using the foot screws before tal	nal b i evei ivery ng ev king é	ubble tube is done ry staff reading staff reading ery staff reading every staff reading		

# S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering

Seat No.



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Set

Q

# SLR-FR-12 Set Q

- 9) During direct method of Contouring, the staff reading observed on Bench mark of 500.000m Reduced level, is 3.000m. What should be the staff readings for locating the contour of 499.000m?
  - a) 1m b) 2m c) 3m d) 4m
  - c) 3m d) 4
- 10) During block contouring the following staff readings are observed at four corners of a block having 5m by 5m size on ground. It is required to locate a route from P to Q at an upward gradient of 1 in 500. The contour map of the area is available at a contour interval of 10m at a scale of 1:10000 which is shown in the fig. The radius of the arc required to obtain the route path is



- a) Linear measurements are more precise
- b) Angular measurements are more precise
- c) Both linear and angular measurements are equally precise
- d) None of these
- 13) The Bow Ditches rule is used for correcting the consecutive coordinates if \_\_\_\_\_.
  - a) Linear measurements are more precise
  - b) Angular measurements are more precise
  - c) Both linear and angular measurements are equally precise
  - d) None of these
- 14) Resection is the process of \_\_\_\_\_
  - a) Orienting the telescope of total station towards North direction
  - b) Orienting the telescope of total station using the data of occupied station and Back sight point
  - c) Finding the coordinates of the instrument station from the coordinates of two known points
  - d) Locating the station from its known coordinates

04

# SLR-FR-12

Set

Q

Seat No.

> S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Civil Engineering SURVEYING & GEOMATICS**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 2 & Q. No. 6 is compulsory.

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- 3) Figures to the right indicate fill marks.

## Section I

- Q.2 Explain the construction and working principle of Tilting Level with suitable 04 a) sketches.
  - During block contouring the following staff readings are observed at four b) corners of a block having 5m by 5m size on ground.

Station and Cartesian coordinate (m)	Staff reading (m)					R.L	Remark
	B.S.	I.S.	F.S.	Rise	Fall		
	4.000					500.000	Bench mark
0,0		3.000					
0,5		0.000					
5,5		1.000					
5,0			2.000				

- 1) Calculate the R.L. of stations at four corners using rise and fall 02 method. Take usual arithmetic check.
- Draw the block at 1:50 scale on the answer sheet and show the 02 2) Reduced Levels as per conditions.
- Draw contours at 1m contour interval. Use arithmetic method of 3) 04 interpolation.

#### Q.3 Explain

- Explain the uses of contour map with suitable example for checking the 04 a) inter-visibility from opposite ends of a line. 04
- Explain the construction and working of digital level. b)
- Q.4 Compare the Bow Ditches rule and transit rule. a)
  - b) Calculate the independent coordinates for the following traverse using 04 Transit rule.

Station	Lino	Longth	С	Independent Coordinates				
Station Line		Lengin	Latitude		Departur	е	L	D
			Northing	Southing	Easting	Westing	Ν	Е
Р	SP	85	13.29		83.95		500	600
Q	PQ	100	99.98		1.74			
R	QR	80	8.36			79.56		
S	RS	95		94.98		1.66		

Max. Marks: 56

						Set	Q	
Q.5	Exp	lain						
	a) ˈ	Use of Tot	al station for sta	ke out.			04	
	b)	Use of tota	al station for Ren	note elevation meas	surement.		04	
				Section II				
Q.6	a)	Constructi	on & use of Mirro	or stereoscope.			04	
	b)	Two points	s A and B having	gelevations of 500 r	n and 300 m respe	ctively	06	
		above dat	um appear on a	vertical photograph	having focal length	n of 20 cm		
		& flying alt	itude of 2500m a	above datum. Their	corrected photogra	aphic		
		coordinate	es are as follow:					
			Point	x co-ordinate	y co-ordinate			
			а	+ 265 mm	+ 136 mm			
			b	- 192 mm	- 365 mm			
		Determine	the length of gro	ound line AB.				
Q.7	a)	What are t	he segments of	GPS? Describe the	m briefly.		05	
	b)	Describe GPS receivers & its type.						
Q.8	a)	Write a no	te on Spatial dat	a & non spatial data	a.		05	
	b)	Explain se	tting out of Tunn	el.			04	
Q.9	a)	What are the different Application of GPS?						
	b)	What are the different Application of GIS? 0						

Seat No.

> S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering SURVEYING & GEOMATICS

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# MCQ/Objective Type Questions

**Duration: 30 Minutes** 

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
  - 1) The Transit Rule is used for applying correction to consecutive coordinates if
    - a) Linear measurements are more precise
    - b) Angular measurements are more precise
    - c) Both linear and angular measurements are equally precise
    - d) None of these
  - 2) The Bow Ditches rule is used for correcting the consecutive coordinates if \_\_\_\_\_.
    - a) Linear measurements are more precise
    - b) Angular measurements are more precise
    - c) Both linear and angular measurements are equally precise
    - d) None of these
  - 3) Resection is the process of \_\_\_\_\_
    - a) Orienting the telescope of total station towards North direction
    - b) Orienting the telescope of total station using the data of occupied station and Back sight point
    - c) Finding the coordinates of the instrument station from the coordinates of two known points
    - d) Locating the station from its known coordinates
  - 4) Global positioning services (GPS) uses 24 satelite in \_\_\_\_\_.
    - a) 9 Orbit b) 8 Orbit
    - c) 7 Orbit d) 6 Orbit

5) Which of the following are known as GPS positioning methods?

- a) Static b) Real time kinematics
- c) Stop and go d) All of these

6) In a raster overlay, a point is represented by a \_\_\_\_\_

- a) String of cellsb) Group of cellsc) Single celld) All of these
- 7) Cell like units are characteristics of \_\_\_\_\_.
  - a) Raster data structures b) Cellular data structures
    - c) Both (a) and (b) d) Vector data structures
- A passive sensor uses which of the following sources of energy?
   a) Sun
   b) Flashlight
  - a) Sun c) Its ow
    - Sunb)FlashlIts own sourced)Moon

Set R

Max. Marks: 70

Marks: 14

- 9) Setting out is done .
  - a) Prior to the preparation of plans
  - Along with the preparation of plans b)
  - c) After the preparation of plans
  - If obstructions are there d)
- 10) Setting out of bridge involves determination of \_\_\_\_\_.
  - Length of Central Line and height of piers a)
  - Direction of Central Line and height of piers b)
  - Length of Central Line and position of piers c)
  - d) None of these
- In tilting level the leveling of longitudinal bubble tube is done \_\_\_\_\_. 11)
  - Using tilting screw before taking every staff reading a)
  - Using tilting screw after taking every staff reading b)
  - Using the foot screws after taking every staff reading c)
  - Using the foot screws before taking every staff reading d)
- 12) During direct method of Contouring, the staff reading observed on Bench mark of 500.000m Reduced level, is 3.000m. What should be the staff readings for locating the contour of 499.000m?
  - 1m a) b) 2m
  - 3m d) c) 4m
- During block contouring the following staff readings are observed at four 13) corners of a block having 5m by 5m size on ground.

It is required to locate a route from P to Q at an upward gradient of 1 in 500. The contour map of the area is available at a contour interval of 10m at a scale of 1:10000 which is shown in the fig. The radius of the arc required to obtain the route path is



Both a)and b) c)

- None of these d)

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Set | R

04

# SLR-FR-12

Set

R

Seat No.

> S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Civil Engineering SURVEYING & GEOMATICS**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

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## Section I

- Q.2 Explain the construction and working principle of Tilting Level with suitable 04 a) sketches.
  - During block contouring the following staff readings are observed at four b) corners of a block having 5m by 5m size on ground.

Station and Cartesian coordinate (m)	Staff reading (m)					R.L	Remark
	B.S.	I.S.	F.S.	Rise	Fall		
	4.000					500.000	Bench
							mark
0,0		3.000					
0,5		0.000					
5,5		1.000					
5,0			2.000				

- 1) Calculate the R.L. of stations at four corners using rise and fall 02 method. Take usual arithmetic check.
- Draw the block at 1:50 scale on the answer sheet and show the 02 2) Reduced Levels as per conditions.
- Draw contours at 1m contour interval. Use arithmetic method of 3) 04 interpolation.

#### Q.3 Explain

- Explain the uses of contour map with suitable example for checking the 04 a) inter-visibility from opposite ends of a line. 04
- Explain the construction and working of digital level. b)
- Q.4 Compare the Bow Ditches rule and transit rule. a)
  - b) Calculate the independent coordinates for the following traverse using 04 Transit rule.

Station	Lino	Longth	С	Independent Coordinates				
Station Line		Length	Latitude		Departure		L	D
			Northing	Southing	Easting	Westing	Ν	E
Ρ	SP	85	13.29		83.95		500	600
Q	PQ	100	99.98		1.74			
R	QR	80	8.36			79.56		
S	RS	95		94.98		1.66		

Max. Marks: 56

						Set	R		
Q.5	Exp a) b)	<b>lain</b> Use of Tot Use of tota	al station for sta al station for Ren	ke out. note elevation meas <b>Section II</b>	surement.		04 04		
Q.6	a) b)	Construction & use of Mirror stereoscope. Two points A and B having elevations of 500 m and 300 m respectively above datum appear on a vertical photograph having focal length of 20 cm & flying altitude of 2500m above datum. Their corrected photographic coordinates are as follow:							
		Determine	the length of gro	ound line AB.					
Q.7	a) b)	What are t Describe 0	What are the segments of GPS? Describe them briefly.CDescribe GPS receivers & its type.C						
Q.8	a) b)	Write a note on Spatial data & non spatial data. Explain setting out of Tunnel.							
Q.9	a) b)	What are t What are t	That are the different Application of GPS?04/hat are the different Application of GIS?05						

## Seat No.

**Duration: 30 Minutes** 

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Civil Engineering SURVEYING & GEOMATICS** 

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2) Figures to the right indicate full marks.

# MCQ/Objective Type Questions

b)

d)

Group of cells

All of these

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence.

- 1) In a raster overlay, a point is represented by a \_
  - String of cells a)
  - Single cell c)
- 2) Cell like units are characteristics of
  - b) Raster data structures Cellular data structures a) Vector data structures
  - c) Both (a) and (b) d)
- 3) A passive sensor uses which of the following sources of energy?
  - Flashlight a) Sun b) Moon
  - c) Its own source d)

#### 4) Setting out is done

- Prior to the preparation of plans a)
- Along with the preparation of plans b)
- After the preparation of plans C)
- If obstructions are there d)
- 5) Setting out of bridge involves determination of \_\_\_\_\_
  - Length of Central Line and height of piers a)
  - Direction of Central Line and height of piers b)
  - Length of Central Line and position of piers c)
  - None of these d)

#### 6) In tilting level the leveling of longitudinal bubble tube is done \_\_\_\_\_.

- Using tilting screw before taking every staff reading a)
- Using tilting screw after taking every staff reading b)
- Using the foot screws after taking every staff reading c)
- d) Using the foot screws before taking every staff reading
- 7) During direct method of Contouring, the staff reading observed on Bench mark of 500.000m Reduced level, is 3.000m. What should be the staff readings for locating the contour of 499.000m?
  - 1m a) b) 2m c)
    - 3m

SLR-FR-12



Max. Marks: 70

Marks: 14

8) During block contouring the following staff readings are observed at four corners of a block having 5m by 5m size on ground. It is required to locate a route from P to Q at an upward gradient of 1 in 500. The contour map of the area is available at a contour interval of 10m at a scale of 1:10000 which is shown in the fig. The radius of the arc required to obtain the route path is



- a) 0.1m b) c) 0.3m d)
  - ) 0.2m ) 0.5m
- 9) The digital level can measure \_
  - a) Staff readingc) Both a)and b)
- b) Horizontal distanced) None of these
- 10) The Transit Rule is used for applying correction to consecutive coordinates if \_\_\_\_\_.
  - a) Linear measurements are more precise
  - b) Angular measurements are more precise
  - c) Both linear and angular measurements are equally precise
  - d) None of these
- 11) The Bow Ditches rule is used for correcting the consecutive coordinates if \_\_\_\_\_.
  - a) Linear measurements are more precise
  - b) Angular measurements are more precise
  - c) Both linear and angular measurements are equally precise
  - d) None of these

Static

a)

- 12) Resection is the process of \_\_\_\_\_.
  - a) Orienting the telescope of total station towards North direction
  - b) Orienting the telescope of total station using the data of occupied station and Back sight point
  - c) Finding the coordinates of the instrument station from the coordinates of two known points
  - d) Locating the station from its known coordinates
- 13) Global positioning services (GPS) uses 24 satelite in \_\_\_\_\_.
  - a) 9 Orbit b)
  - c) 7 Orbit d) 6 Orbit
- 14) Which of the following are known as GPS positioning methods?
  - b) Real time kinematics

8 Orbit

c) Stop and go d) All of these

04

SLR-FR-12

Seat

No.

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Civil Engineering SURVEYING & GEOMATICS** 

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 2 & Q. No. 6 is compulsory.

- 2) Attempt any two questions from each section.
- 3) Figures to the right indicate fill marks.

# Section I

- Q.2 Explain the construction and working principle of Tilting Level with suitable 04 a) sketches.
  - During block contouring the following staff readings are observed at four b) corners of a block having 5m by 5m size on ground.

Station and Cartesian coordinate (m)	Staff reading (m)					R.L	Remark
	B.S.	I.S.	F.S.	Rise	Fall		
	4.000					500.000	Bench
							mark
0,0		3.000					
0,5		0.000					
5,5		1.000					
5,0			2.000				

- 1) Calculate the R.L. of stations at four corners using rise and fall 02 method. Take usual arithmetic check.
- Draw the block at 1:50 scale on the answer sheet and show the 02 2) Reduced Levels as per conditions.
- Draw contours at 1m contour interval. Use arithmetic method of 3) 04 interpolation.

#### Q.3 Explain

- Explain the uses of contour map with suitable example for checking the 04 a) inter-visibility from opposite ends of a line. 04
- Explain the construction and working of digital level. b)
- Q.4 Compare the Bow Ditches rule and transit rule. a)
  - b) Calculate the independent coordinates for the following traverse using 04 Transit rule.

Station	Lino	Longth	Consecutive coordinates				Independent Coordinates	
Station Line		Lengin	Latitude		Departure		L	D
			Northing	Southing	Easting	Westing	Ν	E
Р	SP	85	13.29		83.95		500	600
Q	PQ	100	99.98		1.74			
R	QR	80	8.36			79.56		
S	RS	95		94.98		1.66		

Max. Marks: 56

S Set

						Jel	3	
Q.5	Exc	olain						
	a)	Use of To	tal station for sta	ke out.			04	
	b)	Use of tota	al station for Ren	note elevation meas	surement.		04	
				Section II				
Q.6	a)	Constructi	on & use of Mirro	or stereoscope.			04	
	b)	Two point	s A and B having	g elevations of 500 r	n and 300 m respe	ectively	06	
	above datum appear on a vertical photograph having focal lengt							
		& flying altitude of 2500m above datum. Their corrected photographic						
		coordinates are as follow:						
			Point	x co-ordinate	y co-ordinate	-		
			a	+ 265 mm	+ 136 mm	-		
			b	- 192 mm	- 365 mm	]		
		Determine	e the length of gro	ound line AB.				
Q.7	a)	What are the segments of GPS? Describe them briefly.						
	b)	Describe GPS receivers & its type.						
Q.8	a)	Write a no	te on Spatial dat	ta & non spatial data	a.		05	
	b)	Explain se	etting out of Tunr	nel.			04	
Q.9	a)	What are the different Application of GPS?						
	b)	What are	the different App	lication of GIS?			05	

What are the different Application of GIS? b)

SLR-FR-12 Set S

# SLR-FR-13 Set

Seat	
No.	

# S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Civil Engineering BUILDING CONSTRUCTION & DRAWING**

Day & Date: Thursday, 12-12-2019

Time: 10:00 AM To 02:00 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
  - 2) Figures to the right indicate full marks.
  - 3) Assume suitable data if necessary and state it clearly.

# **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

#### Q.1 A) State whether following statement is true or false.

- If depth of footing is less than or equal width of footing then it is called 1) as shallow foundation.
- 2) Style is part of door frame.
- Landing width is equal to flight width of staircase. 3)
- 4) In case of roofs, water flows from valley to ridge.
- Lintel is provided to carry load of wall above opening provided in wall. 5)
- Varnish is applied on wood surfaces. 6)
- Plastering is the process of covering rough surfaces of wall, column 7) and ceiling etc.
- B) Choose the correct alternatives from the options and rewrite the sentence.
  - 1) The aggregate minimum area of window opening for light and ventilation in dry climate is floor area \_
    - 1/8th 1/20th a) b) 1/10<sup>th</sup> 1/5th C) d)
  - System of air conditioning is \_ 2)
    - Central system Self-contained system a) b)
    - Combined system d) All above c)
  - ventilation involves placement of windows in both windward 3) and leeward walls.
    - a) Lateral b) Diagonal
    - Indirect Cross d) C)
  - 4) Going and Nosing makes one
    - Arcade Tread a) b)
    - Arch Shutter C) d)
  - The weight of Queen closure is 200 gms then the weight of the full 5) brick shall be \_\_\_\_\_ gms.
    - a) 600 b) 800 c) 400 d) 200

Max. Marks: 70

Ρ

Marks: 14 07

# SLR-FR-13 Set P

- 6) IS brick size is \_\_\_\_\_ in mm.
  - 90 x 90 x 200 b) 100 x 90 x 210 a) C)
    - 90 x 90 x 190 d) 100 x 100 x 190
- The lowest part of a structure which transmits the load to the soil is 7) known as \_\_\_\_\_. super structure
  - b) d)
  - foundation C)

a)

plinth basement

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Civil Engineering** 

**BUILDING CONSTRUCTION & DRAWING** 

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 02:00 PM

Instructions: 1) All questions are compulsory.

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

### Section – I

### Q.2 Answer any seven of the following:

- a) Write note on Functional requirements of a building as a whole.
- **b)** What is thermal insulation? Explain any one method of thermal insulation?
- c) Write a note on UCR masonry and coursed rubble masonry and explain importance of through stone.
- Define Foundation. Draw plan and section of any two types of foundation. d)
- e) Explain step by step procedure of providing Brick Bat coba roof water proofing.
- Write requirement of staircase with specifications of landing width, flight **f**) width, riser, tread.
- g) Enlist the type of stone masonry. Explain any one in detail.
- **h)** Enlist various basic forms of pitched roof. Explain brief with sketch about any one type.
- i) Describe in brief about:
  - 1) Wind effect
  - 2) Stack effect

#### Section – II

**Q.3** Draw to a scale 1:10 Plan forodd courses & even courses and Elevation for 12 10 courses for a L shaped portion of brick wall with English bond. The wall is one and half brick thick throughout. Take brick size as 100 x 100 x 200 mm including mortar joints. Height wall portion is 1000 mm.

#### OR

Draw to scale 1:5 'Horizontal Section' and 'Front Elevation' for two leaf, fully alazed wooden window of overall size of 1000 mm x 1200 mm use Following:

- a) Frame Wooden section 60 mm x 100 mm
- Shutter Wooden shutter frame section 30 mm x 100mm b)
- c) Glass thickness 05 mm (Select and assume other suitable data is required)

Max. Marks: 56

28

Seat No.





12

- **Q.4** Design a suitable Staircase for residential building using the following data:
  - a) Size of stair hall 5.20 m x 2.50 m
  - **b)** Floor to floor height 3.10 m
  - c) Wall thickness 230 mm
  - d) Thickness of slab 120 mm
    - Assume suitable data if necessary.
    - 1) Draw detailed plan
    - 2) Sectional elevation

(write step by step calculation on sheet with pencil only)

#### OR

Design and draw to scale 1:20

- a) Plan
- **b)** Sectional elevation

Dog legged RCC staircase. Use following data:

- 1) Height to be climbed = 3000 mm
- 2) Tread =270 to 300 mm
- 3) Riser = 150 to 180 mm
- 4) Width of stair flights = 1200 mm
- 5) Waist slab thickness = 125 mm
- Reinforcement details not expected.

(Write step by step calculation on sheet with pencil only)

**Q.5** Draw perspective for given sketch taking eye level 2.0 m above the G.L. Use scale 1:100. Symbols have usual meaning.



# Set S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering

# **BUILDING CONSTRUCTION & DRAWING**

Day & Date: Thursday, 12-12-2019

Time: 10:00 AM To 02:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Seat

No.

# Q.1 A) State whether following statement is true or false.

- 1) In case of roofs, water flows from valley to ridge.
- 2) Lintel is provided to carry load of wall above opening provided in wall.
- 3) Varnish is applied on wood surfaces.
- 4) Plastering is the process of covering rough surfaces of wall, column and ceiling etc.
- 5) If depth of footing is less than or equal width of footing then it is called as shallow foundation.
- 6) Style is part of door frame.
- 7) Landing width is equal to flight width of staircase.

# B) Choose the correct alternatives from the options and rewrite the sentence.

- 1) Going and Nosing makes one \_\_\_\_\_.
  - a) Arcade b) Tread
  - c) Arch d) Shutter

### The weight of Queen closure is 200 gms then the weight of the full brick shall be \_\_\_\_\_ gms.

- a) 600 b) 800 c) 400 d) 200
- 3) IS brick size is \_\_\_\_\_ in mm.
  - a) 90 x 90 x 200 b) 100 x 90 x 210
  - c) 90 x 90 x 190 d) 100 x 100 x 190
- The lowest part of a structure which transmits the load to the soil is known as \_\_\_\_\_.
  - a) super structure b) plinth
  - c) foundation d) basement
- 5) The aggregate minimum area of window opening for light and ventilation in dry climate is floor area \_\_\_\_\_.
  - a) 1/8th b) 1/20th c) 1/5th d) 1/10<sup>th</sup>

# 6) System of air conditioning is \_\_\_\_\_.

- a) Central system b) Self-contained system
- c) Combined system d) All above

SLR-FR-13

Max. Marks: 70



Marks: 14

07

# 7) \_\_\_\_\_ ventilation involves placement of windows in both windward and leeward walls.

- a) Lateral
- c) Cross

Diagonal Indirect b)

SLR-FR-13

Set Q

d)

Set Q

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering

**BUILDING CONSTRUCTION & DRAWING** 

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 02:00 PM

Seat

No.

Instructions: 1) All questions are compulsory.

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

# Section – I

# Q.2 Answer any seven of the following:

- a) Write note on Functional requirements of a building as a whole.
- **b)** What is thermal insulation? Explain any one method of thermal insulation?
- c) Write a note on UCR masonry and coursed rubble masonry and explain importance of through stone.
- d) Define Foundation. Draw plan and section of any two types of foundation.
- e) Explain step by step procedure of providing Brick Bat coba roof water proofing.
- f) Write requirement of staircase with specifications of landing width, flight width, riser, tread.
- g) Enlist the type of stone masonry. Explain any one in detail.
- **h)** Enlist various basic forms of pitched roof. Explain brief with sketch about any one type.
- i) Describe in brief about:
  - 1) Wind effect
  - 2) Stack effect

# Section – II

Q.3 Draw to a scale 1:10 Plan forodd courses & even courses and Elevation for 12 courses for a L shaped portion of brick wall with English bond. The wall is one and half brick throughout. Take brick size as 100 x 100 x 200 mm including mortar joints. Height wall portion is 1000 mm.

#### OR

Draw to scale 1:5 'Horizontal Section' and 'Front Elevation' for two leaf, fully glazed wooden window of overall size of 1000 mm x 1200 mm use Following:

- a) Frame Wooden section 60 mm x 100 mm
- b) Shutter Wooden shutter frame section 30 mm x 100mm
- c) Glass thickness 05 mm
   (Select and assume other suitable data is required)

Max. Marks: 56



12

- **Q.4** Design a suitable Staircase for residential building using the following data:
  - a) Size of stair hall 5.20 m x 2.50 m
  - **b)** Floor to floor height 3.10 m
  - c) Wall thickness 230 mm
  - d) Thickness of slab 120 mm
    - Assume suitable data if necessary.
    - 1) Draw detailed plan
    - 2) Sectional elevation

(write step by step calculation on sheet with pencil only)

#### OR

Design and draw to scale 1:20

- a) Plan
- **b)** Sectional elevation

Dog legged RCC staircase. Use following data:

- 1) Height to be climbed = 3000 mm
- 2) Tread =270 to 300 mm
- 3) Riser = 150 to 180 mm
- 4) Width of stair flights = 1200 mm
- 5) Waist slab thickness = 125 mm
- Reinforcement details not expected.

(Write step by step calculation on sheet with pencil only)

Q.5 Draw perspective for given sketch taking eye level 2.0 m above the G.L. Use of scale 1:100. Symbols have usual meaning.



Seat	
No.	

# S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering BUILDING CONSTRUCTION & DRAWING

Day & Date: Thursday, 12-12-2019

Time: 10:00 AM To 02:00 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
  - 2) Figures to the right indicate full marks.
  - 3) Assume suitable data if necessary and state it clearly.

# MCQ/Objective Type Questions

**Duration: 30 Minutes** 

# Q.1 A) State whether following statement is true or false.

- 1) Varnish is applied on wood surfaces.
- Plastering is the process of covering rough surfaces of wall, column and ceiling etc.
- 3) If depth of footing is less than or equal width of footing then it is called as shallow foundation.
- 4) Style is part of door frame.
- 5) Landing width is equal to flight width of staircase.
- 6) In case of roofs, water flows from valley to ridge.
- 7) Lintel is provided to carry load of wall above opening provided in wall.
- B) Choose the correct alternatives from the options and rewrite the sentence.
  - IS brick size is \_\_\_\_\_ in mm.
     a) 90 x 90 x 200
    - 90 x 90 x 200 b) 100 x 90 x 210
    - c) 90 x 90 x 190 d) 100 x 100 x 190

### The lowest part of a structure which transmits the load to the soil is known as \_\_\_\_\_.

- a) super structure b) plinth
- c) foundation d) basement

# 3) The aggregate minimum area of window opening for light and ventilation in dry climate is floor area \_\_\_\_\_.

a)	1/8th	b)	1/20th
c)	1/5th	d)	1/10 <sup>th</sup>

- 4) System of air conditioning is \_\_\_\_\_.
  - a) Central system b) Self-contained system
  - c) Combined system d) All above
- 5) \_\_\_\_\_ ventilation involves placement of windows in both windward and leeward walls.
  - a) Lateral b) Diagonal
  - c) Cross d) Indirect
- 6) Going and Nosing makes one \_\_\_\_\_.
  - a) Arcade b) Tread
  - c) Arch d) Shutter

Set R

Max. Marks: 70

Marks: 14

07



- The weight of Queen closure is 200 gms then the weight of the full 7) brick shall be \_\_\_\_\_ gms.
  - 600 400 b) 800 a)
  - c) d) 200

Set R

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering

**BUILDING CONSTRUCTION & DRAWING** 

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 02:00 PM

Seat No.

Instructions: 1) All questions are compulsory.

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

# Section – I

# Q.2 Answer any seven of the following:

- a) Write note on Functional requirements of a building as a whole.
- **b)** What is thermal insulation? Explain any one method of thermal insulation?
- c) Write a note on UCR masonry and coursed rubble masonry and explain importance of through stone.
- d) Define Foundation. Draw plan and section of any two types of foundation.
- e) Explain step by step procedure of providing Brick Bat coba roof water proofing.
- f) Write requirement of staircase with specifications of landing width, flight width, riser, tread.
- g) Enlist the type of stone masonry. Explain any one in detail.
- h) Enlist various basic forms of pitched roof. Explain brief with sketch about any one type.
- i) Describe in brief about:
  - 1) Wind effect
  - 2) Stack effect

# Section – II

Q.3 Draw to a scale 1:10 Plan forodd courses & even courses and Elevation for 12 courses for a L shaped portion of brick wall with English bond. The wall is one and half brick throughout. Take brick size as 100 x 100 x 200 mm including mortar joints. Height wall portion is 1000 mm.

#### OR

Draw to scale 1:5 'Horizontal Section' and 'Front Elevation' for two leaf, fully glazed wooden window of overall size of 1000 mm x 1200 mm use Following:

- a) Frame Wooden section 60 mm x 100 mm
- b) Shutter Wooden shutter frame section 30 mm x 100mm
- c) Glass thickness 05 mm
   (Select and assume other suitable data is required)

Max. Marks: 56



- **Q.4** Design a suitable Staircase for residential building using the following data:
  - a) Size of stair hall 5.20 m x 2.50 m
  - **b)** Floor to floor height 3.10 m
  - c) Wall thickness 230 mm
  - d) Thickness of slab 120 mm
    - Assume suitable data if necessary.
    - 1) Draw detailed plan
    - 2) Sectional elevation

(write step by step calculation on sheet with pencil only)

#### OR

Design and draw to scale 1:20

- a) Plan
- **b)** Sectional elevation

Dog legged RCC staircase. Use following data:

- 1) Height to be climbed = 3000 mm
- 2) Tread =270 to 300 mm
- 3) Riser = 150 to 180 mm
- 4) Width of stair flights = 1200 mm
- 5) Waist slab thickness = 125 mm
- Reinforcement details not expected.

(Write step by step calculation on sheet with pencil only)

**Q.5** Draw perspective for given sketch taking eye level 2.0 m above the G.L. Use scale 1:100. Symbols have usual meaning.



# No. S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering

# **BUILDING CONSTRUCTION & DRAWING**

Day & Date: Thursday, 12-12-2019

Time: 10:00 AM To 02:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

## MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Seat

# Q.1 A) State whether following statement is true or false.

- 1) Style is part of door frame.
- 2) Landing width is equal to flight width of staircase.
- 3) In case of roofs, water flows from valley to ridge.
- 4) Lintel is provided to carry load of wall above opening provided in wall.
- 5) Varnish is applied on wood surfaces.
- 6) Plastering is the process of covering rough surfaces of wall, column and ceiling etc.
- 7) If depth of footing is less than or equal width of footing then it is called as shallow foundation.
- B) Choose the correct alternatives from the options and rewrite the sentence.
  - System of air conditioning is \_\_\_\_\_
     Central system
    - Central system b) Self-contained system
    - c) Combined system d) All above

# 2) \_\_\_\_\_ ventilation involves placement of windows in both windward and leeward walls.

- a) Lateral b) Diagonal
- c) Cross d) Indirect
- Going and Nosing makes one \_\_\_\_\_
  - a) Arcade b) Tread c) Arch d) Shutter
- The weight of Queen closure is 200 gms then the weight of the full brick shall be \_\_\_\_\_ gms.
  - a) 600 b) 800 c) 400 d) 200
- 5) IS brick size is \_\_\_\_\_ in mm.
  - a) 90 x 90 x 200 b) 100 x 90 x 210
  - c) 90 x 90 x 190 d) 100 x 100 x 190
- The lowest part of a structure which transmits the load to the soil is known as \_\_\_\_\_.
  - a) super structure b) plinth
  - c) foundation d) basement

SLR-FR-13

Max. Marks: 70



Marks: 14

07



- 7) The aggregate minimum area of window opening for light and ventilation in dry climate is floor area \_\_\_\_\_.
  - 1/20th a) c) 1/8th b) d)
    - 1/5th 1/10<sup>th</sup>

Set S

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering

**BUILDING CONSTRUCTION & DRAWING** 

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 02:00 PM

Seat No.

Instructions: 1) All questions are compulsory.

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

## Section – I

## Q.2 Answer any seven of the following:

- a) Write note on Functional requirements of a building as a whole.
- **b)** What is thermal insulation? Explain any one method of thermal insulation?
- c) Write a note on UCR masonry and coursed rubble masonry and explain importance of through stone.
- d) Define Foundation. Draw plan and section of any two types of foundation.
- e) Explain step by step procedure of providing Brick Bat coba roof water proofing.
- f) Write requirement of staircase with specifications of landing width, flight width, riser, tread.
- g) Enlist the type of stone masonry. Explain any one in detail.
- **h)** Enlist various basic forms of pitched roof. Explain brief with sketch about any one type.
- i) Describe in brief about:
  - 1) Wind effect
  - 2) Stack effect

# Section – II

Q.3 Draw to a scale 1:10 Plan forodd courses & even courses and Elevation for 12 courses for a L shaped portion of brick wall with English bond. The wall is one and half brick throughout. Take brick size as 100 x 100 x 200 mm including mortar joints. Height wall portion is 1000 mm.

#### OR

Draw to scale 1:5 'Horizontal Section' and 'Front Elevation' for two leaf, fully glazed wooden window of overall size of 1000 mm x 1200 mm use Following:

- a) Frame Wooden section 60 mm x 100 mm
- b) Shutter Wooden shutter frame section 30 mm x 100mm
- c) Glass thickness 05 mm
   (Select and assume other suitable data is required)

Max. Marks: 56



12

- **Q.4** Design a suitable Staircase for residential building using the following data:
  - a) Size of stair hall 5.20 m x 2.50 m
  - **b)** Floor to floor height 3.10 m
  - c) Wall thickness 230 mm
  - d) Thickness of slab 120 mm
    - Assume suitable data if necessary.
    - 1) Draw detailed plan
    - 2) Sectional elevation

(write step by step calculation on sheet with pencil only)

#### OR

Design and draw to scale 1:20

- a) Plan
- **b)** Sectional elevation

Dog legged RCC staircase. Use following data:

- 1) Height to be climbed = 3000 mm
- 2) Tread =270 to 300 mm
- 3) Riser = 150 to 180 mm
- 4) Width of stair flights = 1200 mm
- 5) Waist slab thickness = 125 mm
- Reinforcement details not expected.

(Write step by step calculation on sheet with pencil only)

**Q.5** Draw perspective for given sketch taking eye level 2.0 m above the G.L. Use scale 1:100. Symbols have usual meaning.


No.					Set	Ρ
	S.Y.	. (B.Tech.) (Pa	art – I) (New) (CB Civil Engi	CS) nee	Examination Nov/Dec-2019 ring	
Day a Time	& Dat : 10:0	e: Saturday,14-12 00 AM To 01:00 P	2-2019 M	UIL	Max. Marks	: 70
Instr	uctio	<b>ns:</b> 1) Q. No. 1 is Book. 2) Figures to	s compulsory and she the right indicate ful	ould I ma	be solved in first 30 minutes in answe rks.	ər
		Γ	MCQ/Objective T	уре	Questions	
Dura	tion: 3	30 Minutes			Marks	: 14
Q.1	<b>Cho</b> 1)	ose the correct Liquids having p a) Capillary ris c) Both a and	alternatives from the predominating cohesies b	ne o ive fo b) d)	ptions and rewrite the sentence. orce shows Capillary fall None of these	14 01
	2)	The bulk modulu a) Increases w b) Is independ c) Is larger wh d) has a dime	us of elasticity with the pressure dent of pressure and nen the fluid is more nsion of (1/P)	visc com	osity pressible	01
	3)	A small plastic b is dumped into a level in the tub v a) Fall b) Rise c) Both will ha d) Not change	ooat loaded with mate a water, allowing the vill appen simultaneously	erial boa <sup>-</sup>	is floating in bath tub. If the cargo t to float empty, then the water	01
	4)	The Bouyant for a) The resulta b) The resulta c) Equal to the d) The force n	ce is Int force acting on a lant force acting on bo Int force acting on bo Int force of liquid dis Necessary to maintair	body ody splac n eqi	v due to the fluid surrounding it ced uilibrium of a submerged body	01
	5)	When a liquid ro rigid body, the p a) Decrease a b) Increase lin c) Varies inve d) Varies as s	otates at constant any ressure intensity as the square of the r nearly as the radial d rsely as the elevation quare of the radial d	gula  adia istar n alc istar	r velocity about a vertical axis as a Il distance ace ang any vertical line ace	01
	6)	In irrotational flo a) A velocity p b) All particles c) The motion d) The velocity	w of an ideal fluid ootential exists s must move in straig must be uniform y must be zero at bo	iht lii unda	nes ary	01

# Seat

# SLR-FR-14

Set P

					Set	Ρ
7)	A fl a) b) c) d)	ow net cannot be applied for the Gives zero velocity at boundari Gives some velocity at boundar Fails to represent actual flow pa Fails to represent formation of v	visc es ries atterr wake	ous fluids as it		01
8)	Da a) c)	rcy-Weisbach equation is used to Sudden enlargement Sudden contraction	o finc b) d)	l loss of head due to Friction None of the above		01
9)	Los	as of head due to entrance in pip $n^2$	e is (	given as ν,		01
	a)	$v_{2g}$	b)	/ g		
	c)	$0.5v^2/_{2g}$	d)	$v^{3}/_{2g}$		
10)	Due a) b) c) d)	e to which phenomenon water ha Incompressibility Sudden opening of valve The material of pipe being elas Sudden closure of valve	amm tic	er is caused?		01
11)	In v a) c)	vhich of the devices, Bernoulli's Venturimeter Pitot tube	equa b) d)	tion is used? Orificemeter All the above		01
12)	The a) c)	e co-efficient of discharge (C <sub>d</sub> ) of 0.95 to 0.99 0.8 to 0.85	<sup>t</sup> ven b) d)	turimeter lies within the limit 0.7 to 0.8 0.6 to 0.7		
13)	In a and is 1 a)	a pipe of 90 mm diameter water i d at a guage pressure of 350 kN/ 0 m above the datum lines 40.88 m	s flov ′m², v b)	wing with mean velocity of 2 m what will be its total head if the 45.88 m	/s pipe	02

c) 43.88 m d) 47.88 m

## Seat No.

## S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering INTRODUCTION TO FUILD MECHANICS

Day & Date: Saturday,14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.2 is compulsory. Solve any two questions from Q No.3 to Q. No. 5 Section - I.

- 2) Q.6 is compulsory. Solve any one question from Q.7 and 8 in section II.
- 3) Assume suitable data if necessary and state it clearly.
- 4) Figures to the right indicate full marks.

## Section-I

- **Q.2 a)** Enlist different methods of finding meta centre and explain any one with neat **04** sketch.
  - b) What is effect of pressure and temperature on weight density, specific 03 weight and specific gravity of a liquid?
  - c) Explain the concept of stream tube and streak line with neat sketches. 03
- **Q.3 a)** State Newton's law of Viscosity and explain the advantages of mechanical **04** gauges over manometers.
  - b) A log of wood having a square section of 0.36 m x 0.36 m and specific 05 gravity 0.8 floats in water, One edge is depressed and released causing the log to roll. Estimate the period of roll.
- **Q.4 a)** For a three dimension flow filled described by  $V = (y^2 + z^2)i + (x^2 + z^2)j + 04$  $(x^2 + y^2)k$  find at (1, 2, 3)
  - 1) The components of acceleration and
  - 2) The component of rotation
  - **b)** In finding, the metacentre of a ship of 98.1 MN displaces a weight of 490.5 **05** kN at a distance of 6 m from the longitudinal centre plane causes the ship to heel through an angle of  $3^{\circ}$ . What is the metacentric height? Hence find the angle of heel and its direction when the ship is going ahead and power transmitted 2.8336 MW is being transmitted to a single propeller shaft which is rotated at a speed of  $3 \pi \operatorname{rad}/\operatorname{sec}$ .
- Q.5 a) Briefly, explain the principle employed in the measurement of pressure by manometers and explain with neat sketch single column manometer.
  - **b)** At a depth of 2 km in the ocean, the pressure is 840 kg (f)/cm<sup>2</sup>. Assume the **05** specific weight at surface as 1025 kg(f)/m<sup>3</sup>, and that the average bulk modulus of elasticity is  $24 \times 10^3$  kg(f)/cm<sup>2</sup> for that pressure range.
    - 1) What will be the change in specific volume between that at the surface and at that depth?
    - 2) What will be the specific volume at that depth? and,
    - 3) What will be the specific weight at that depth?

Set | F

Max. Marks: 56

		Set	Ρ
Q.6	a)	The diameter of horizontal pipe is 150 mm is suddenly enlarged to 225 mm. The discharge is 0.05 m <sup>3</sup> /s. The intensity of pressure at 150 mm pipe is 110 kN/m <sup>2</sup> . Calculate Loss of head due to Sudden enlargement.	05
	b)	Derive Bernoulli's theorem for steady flow of an incompressible fluid and state assumptions made for the derivation.	06
	C)	Explain the phenomenon of drag and lift.	03
Q.7	a) b) c)	Derive Darcy-Weisbach equation for calculating loss of head due to friction. The difference in water surface level in two tanks which are connected by three pipes inseries having the length 450 m, 255 m and 315 m having diameters 30 cm, 20 cm and 40 cm respectively is 18mts. Determine the rate flow if coefficient of friction 0.0075, 0.0078 and 0.0072 respectively for all pipes, Considering Minor Losses. Using Hazen Poisulle's equation obtain the expression for friction factor in	05 06 03
		terms of Reynold's number.	
Q.8	a) b)	Explain the Hardy Cross Method of solving pipe network. Find the displacement thickness, momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $\frac{u}{U} = \frac{y}{\delta}$ , where <i>u</i> is	05 06
		the velocity at a distance y from the plate and	
		$u = \bigcup$ at $y = \delta$ and $\delta$ = boundary layer thickness. Also, Calculate $\frac{\delta^2}{\theta}$	
	c)	Define Hydraulic Gradient Line and Total Energy Line (Draw neat sketch).	03

Seat No.	t							Set	Q
	S.Y.	<b>(</b> B.	Tech.) (Pa	rt – I) (New Civil	(CBC) (CBC) Engine	S) eei	Examination Nov/E	Dec-2019	
Day a Time	& Date : 10:00	e: Sa ) AM	turday,14-12 1 To 01:00 P	2-2019 M				Max. Marks	s: 70
Instr	uctior	<b>is:</b> 1 2	) Q. No. 1 is Book.	compulsory a	and shou	ıld I nar	be solved in first 30 min	utes in answ	er
		2		ICQ/Ohiec	tive Tv	ne	Questions		
Dura	tion: 3	0 Mi	nutes			pc	Questions	Marks	s: 14
Q. 1	Choo	se tl	ne correct a	Iternatives fi	rom the	opt	ions and rewrite the s	entence.	14
	1)	Dar a) c)	cy-Weisbach Sudden enl Sudden cor	n equation is argement htraction	used to f b c	ind )) I)	loss of head due to Friction None of the above	·	01
	2)	Los a)	s of head du $\frac{v^2}{2g}$	e to entrance	e in pipe i b	is g )	iven as $^{v}/g$		01
		c)	$0.5v^{2}/_{2g}$		d	I)	$v^{3}/_{2g}$		
	3)	Due a) b) c) d)	e to which ph Incompress Sudden ope The materia Sudden clo	enomenon w ibility ening of valve al of pipe bein sure of valve	vater ham e ng elastic	nme	er is caused?		01
	4)	In w a) c)	vhich of the o Venturimete Pitot tube	devices, Bern er	oulli's eq b) d)	juat ) )	ion is used? Orificemeter All the above		01
	5)	The a) c)	co-efficient 0.95 to 0.99 0.8 to 0.85	of discharge	(C <sub>d</sub> ) of v b c	ent ) I)	urimeter lies within the I 0.7 to 0.8 0.6 to 0.7	imit	
	6)	Liqu a) c)	ids having p Capillary ris Both a and	redominating e b	cohesive b c	ə fo )) I)	rce shows Capillary fall None of these		01
	7)	The a) b) c)	bulk modulu Increases w Is independ Is larger wh	s of elasticity vith the pressuent of pressuent of pressuent the fluid is	ure ire and vi more co	isco omp	osity oressible		01

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			Set	t Q
8)	A small plastic boat loa is dumped into a water level in the tub will a) Fall b) Rise c) Both will happen s d) Not change	aded with material , allowing the boat  simultaneously	is floating in bath tub. If the cargo to float empty, then the water	01
9)	The Bouyant force is _ a) The resultant force b) The resultant force c) Equal to the volum d) The force necessa	e acting on a body e acting on body ne of liquid displac ary to maintain equ	due to the fluid surrounding it ed uilibrium of a submerged body	01
10)	<ul> <li>When a liquid rotates a rigid body, the pressure a)</li> <li>Decrease as the s</li> <li>b) Increase linearly a</li> <li>c) Varies inversely a</li> <li>d) Varies as square a</li> </ul>	at constant angular e intensity square of the radia as the radial distan s the elevation alc of the radial distan	r velocity about a vertical axis as a I distance ace ang any vertical line ace	01
11)	<ul> <li>In irrotational flow of ar</li> <li>a) A velocity potentia</li> <li>b) All particles must</li> <li>c) The motion must I</li> <li>d) The velocity must</li> </ul>	n ideal fluid al exists move in straight lir be uniform be zero at bounda	nes ary	01
12)	<ul> <li>A flow net cannot be a</li> <li>a) Gives zero velocit</li> <li>b) Gives some veloc</li> <li>c) Fails to represent</li> <li>d) Fails to represent</li> </ul>	applied for the visc y at boundaries ity at boundaries actual flow patterr formation of wake	ous fluids as it	01
13)	In a pipe of 90 mm dia and at a guage pressu is 10 m above the datu a) 40.88 m c) 43.88 m	umeter water is flow ure of 350 kN/m <sup>2</sup> , v um lines b) d)	wing with mean velocity of 2 m/s what will be its total head if the pipe 45.88 m 47.88 m	<b>02</b>

Seat	
No.	

## S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering INTRODUCTION TO FUILD MECHANICS

Day & Date: Saturday,14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.2 is compulsory. Solve any two questions from Q No.3 to Q. No. 5 Section - I.

- 2) Q.6 is compulsory. Solve any one question from Q.7 and 8 in section II.
- 3) Assume suitable data if necessary and state it clearly.
- 4) Figures to the right indicate full marks.

### Section-I

- **Q.2 a)** Enlist different methods of finding meta centre and explain any one with neat **04** sketch.
  - b) What is effect of pressure and temperature on weight density, specific 03 weight and specific gravity of a liquid?
  - c) Explain the concept of stream tube and streak line with neat sketches. 03
- **Q.3 a)** State Newton's law of Viscosity and explain the advantages of mechanical **04** gauges over manometers.
  - b) A log of wood having a square section of 0.36 m x 0.36 m and specific 05 gravity 0.8 floats in water, One edge is depressed and released causing the log to roll. Estimate the period of roll.
- **Q.4 a)** For a three dimension flow filled described by  $V = (y^2 + z^2)i + (x^2 + z^2)j + 04$  $(x^2 + y^2)k$  find at (1, 2, 3)
  - 1) The components of acceleration and
  - 2) The component of rotation
  - **b)** In finding, the metacentre of a ship of 98.1 MN displaces a weight of 490.5 **05** kN at a distance of 6 m from the longitudinal centre plane causes the ship to heel through an angle of  $3^0$ . What is the metacentric height? Hence find the angle of heel and its direction when the ship is going ahead and power transmitted 2.8336 MW is being transmitted to a single propeller shaft which is rotated at a speed of  $3 \pi \operatorname{rad}/\operatorname{sec}$ .
- Q.5 a) Briefly, explain the principle employed in the measurement of pressure by manometers and explain with neat sketch single column manometer.
  - **b)** At a depth of 2 km in the ocean, the pressure is 840 kg (f)/cm<sup>2</sup>. Assume the specific weight at surface as 1025 kg(f)/m<sup>3</sup> and that the average bulk modulus of elasticity is 24 x  $10^3$  kg(f)/cm<sup>2</sup> for that pressure range.
    - 1) What will be the change in specific volume between that at the surface and at that depth?
    - 2) What will be the specific volume at that depth? and,
    - 3) What will be the specific weight at that depth?

Set | C

Max. Marks: 56

		Set	Q
Q.6	a)	The diameter of horizontal pipe is 150 mm is suddenly enlarged to 225 mm. The discharge is 0.05 m <sup>3</sup> /s. The intensity of pressure at 150 mm pipe is 110 kN/m <sup>2</sup> . Calculate Loss of head due to Sudden enlargement.	05
	b)	Derive Bernoulli's theorem for steady flow of an incompressible fluid and state assumptions made for the derivation.	06
	C)	Explain the phenomenon of drag and lift.	03
Q.7	a) b) c)	Derive Darcy-Weisbach equation for calculating loss of head due to friction. The difference in water surface level in two tanks which are connected by three pipes inseries having the length 450 m, 255 m and 315 m having diameters 30 cm, 20 cm and 40 cm respectively is 18mts. Determine the rate flow if coefficient of friction 0.0075, 0.0078 and 0.0072 respectively for all pipes, Considering Minor Losses. Using Hazen Poisulle's equation obtain the expression for friction factor in terms of Reynold's number.	05 06 03
Q.8	a) b)	Explain the Hardy Cross Method of solving pipe network. Find the displacement thickness, momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $\frac{u}{U} = \frac{y}{\delta}$ , where <i>u</i> is the velocity at a distance <i>y</i> from the plate and $u = U$ at $y = \delta$ and $\delta$ = boundary layer thickness. Also, Calculate $\frac{\delta^*}{\alpha}$	05 06
	c)	Define Hydraulic Gradient Line and Total Energy Line (Draw neat sketch).	03

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	S.Y	. <b>(</b> B.	Tech.) (Pa	rt – I) (New) (C Civil En	BCS)	) Examin	ation Nov/	Dec-2019	
			INTR	ODUCTION TO	) FUI	_D MECH	HANICS		
Day & Time:	& Dat 10:0	e: Sa )0 AN	aturday,14-12 / To 01:00 P	2-2019 M				Max. Marks	s: 70
Instru	uctio	<b>ns:</b> 1	) Q. No. 1 is Book.	compulsory and s	should	be solved	in first 30 mi	nutes in answ	/er
		2	2) Figures to		ruli ma	rks.			
Durat	ion: 3	30 Mi	nutes	/ICQ/ODjective	туре	Questio	ons	Marks	s: 14
Q.1	<b>Cho</b> 1)	ose In v a) c)	the correct a which of the o Venturimete Pitot tube	<b>alternatives from</b> devices, Bernoulli <sup>'</sup> er	t <b>he o</b> s equa b) d)	ptions and ition is use Orificem All the at	<b>d rewrite the</b> ed? eter pove	sentence.	14 01
	2)	The a) c)	e co-efficient 0.95 to 0.99 0.8 to 0.85	of discharge (C <sub>d</sub> ) )	of ven b) d)	turimeter I 0.7 to 0.8 0.6 to 0.7	ies within the 3 7	limit	
	3)	Liqu a) c)	iids having p Capillary ris Both a and	redominating coh e b	esive fo b) d)	orce show Capillary None of t	s fall hese		01
	4)	The a) b) c) d)	bulk modulu Increases w Is independ Is larger wh has a dimer	s of elasticity vith the pressure ent of pressure al en the fluid is mo nsion of (1/P)	 nd visc re com	osity pressible			01
	5)	A sr is du leve a) b) c) d)	nall plastic b umped into a l in the tub w Fall Rise Both will ha Not change	oat loaded with m water, allowing th vill ppen simultaneou	aterial ne boa ısly	is floating t to float ei	in bath tub. If mpty, then the	the cargo water	01
<ul> <li>6) The Bouyant force is</li> <li>a) The resultant force acting on a body due to the fluid surrounding it</li> <li>b) The resultant force acting on body</li> <li>c) Equal to the volume of liquid displaced</li> <li>d) The force necessary to maintain equilibrium of a submerged body</li> </ul>					nding it d body	01			
	7)	Whe rigid a) b) c) d)	en a liquid rot I body, the pr Decrease a Increase lin Varies inver Varies as so	tates at constant a ressure intensity _ s the square of th early as the radia rsely as the eleva quare of the radia	angula  e radia I distar tion alc I distar	r velocity a Il distance nce ong any ve nce	about a vertica ertical line	al axis as a	01

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8)	In ir a) b) c) d)	rotational flow of an ideal fluid A velocity potential exists All particles must move in straig The motion must be uniform The velocity must be zero at bo	ght li unda	nes ary		01
9)	A fl a) b) c) d)	ow net cannot be applied for the Gives zero velocity at boundarie Gives some velocity at boundar Fails to represent actual flow pa Fails to represent formation of v	visc es ies atteri vake	ous fluids as it n		01
10)	Dai a) c)	rcy-Weisbach equation is used to Sudden enlargement Sudden contraction	b find b) d)	l loss of head due to Friction None of the above		01
11)	Los a) c)	ts of head due to entrance in pipe $\frac{v^2}{2g}$ $0.5v^2/_{2g}$	e is ( b) d)	given as $v/g^{v^3}/_{2g}$		01
12)	Due a) b) c) d)	e to which phenomenon water ha Incompressibility Sudden opening of valve The material of pipe being elast Sudden closure of valve	amm tic	er is caused?		01
13)	In a and is 1	a pipe of 90 mm diameter water i I at a guage pressure of 350 kN/ 0 m above the datum lines	s flo <sup>r</sup> m², v	wing with mean velocity of 2 r what will be its total head if the	n/s e pipe	02

- a) 40.88 m c) 43.88 m b) 45.88 m d) 47.88 m

Seat	
No.	

## S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering INTRODUCTION TO FUILD MECHANICS

Day & Date: Saturday,14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.2 is compulsory. Solve any two questions from Q No.3 to Q. No. 5 Section - I.

- 2) Q.6 is compulsory. Solve any one question from Q.7 and 8 in section II.
- 3) Assume suitable data if necessary and state it clearly.
- 4) Figures to the right indicate full marks.

### Section-I

- **Q.2 a)** Enlist different methods of finding meta centre and explain any one with neat **04** sketch.
  - b) What is effect of pressure and temperature on weight density, specific 03 weight and specific gravity of a liquid?
  - c) Explain the concept of stream tube and streak line with neat sketches. 03
- **Q.3 a)** State Newton's law of Viscosity and explain the advantages of mechanical **04** gauges over manometers.
  - b) A log of wood having a square section of 0.36 m x 0.36 m and specific 05 gravity 0.8 floats in water, One edge is depressed and released causing the log to roll. Estimate the period of roll.
- **Q.4 a)** For a three dimension flow filled described by  $V = (y^2 + z^2)i + (x^2 + z^2)j + 04$  $(x^2 + y^2)k$  find at (1, 2, 3)
  - 1) The components of acceleration and
  - 2) The component of rotation
  - **b)** In finding, the metacentre of a ship of 98.1 MN displaces a weight of 490.5 **05** kN at a distance of 6 m from the longitudinal centre plane causes the ship to heel through an angle of  $3^0$ . What is the metacentric height? Hence find the angle of heel and its direction when the ship is going ahead and power transmitted 2.8336 MW is being transmitted to a single propeller shaft which is rotated at a speed of  $3 \pi \operatorname{rad}/\operatorname{sec}$ .
- Q.5 a) Briefly, explain the principle employed in the measurement of pressure by manometers and explain with neat sketch single column manometer.
  - b) At a depth of 2 km in the ocean, the pressure is 840 kg (f)/cm<sup>2</sup>. Assume the specific weight at surface as 1025 kg(f)/m<sup>3</sup> and that the average bulk modulus of elasticity is 24 x  $10^3$  kg(f)/cm<sup>2</sup> for that pressure range.
    - 1) What will be the change in specific volume between that at the surface and at that depth?
    - 2) What will be the specific volume at that depth? and,
    - 3) What will be the specific weight at that depth?

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Max. Marks: 56

		Set	R
Q.6	a)	The diameter of horizontal pipe is 150 mm is suddenly enlarged to 225 mm. The discharge is 0.05 m <sup>3</sup> /s. The intensity of pressure at 150 mm pipe is 110 kN/m <sup>2</sup> . Calculate Loss of head due to Sudden enlargement.	05
	b)	Derive Bernoulli's theorem for steady flow of an incompressible fluid and state assumptions made for the derivation.	06
	C)	Explain the phenomenon of drag and lift.	03
Q.7	a) b) c)	Derive Darcy-Weisbach equation for calculating loss of head due to friction. The difference in water surface level in two tanks which are connected by three pipes inseries having the length 450 m, 255 m and 315 m having diameters 30 cm, 20 cm and 40 cm respectively is 18mts. Determine the rate flow if coefficient of friction 0.0075, 0.0078 and 0.0072 respectively for all pipes, Considering Minor Losses. Using Hazen Poisulle's equation obtain the expression for friction factor in terms of Reynold's number	05 06 03
Q.8	a) b)	Explain the Hardy Cross Method of solving pipe network. Find the displacement thickness, momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $\frac{u}{U} = \frac{y}{\delta}$ , where <i>u</i> is the velocity at a distance y from the plate and	05 06
	- \	$u = 0$ at $y = o$ and $o =$ boundary layer thickness. Also, Calculate $\frac{1}{\theta}$	~~
	C)	Define Hydraulic Gradient Line and Total Energy Line (Draw neat sketch).	03

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	S.Y.	. (В.	Tech.) (Pa	rt – I) (New) Civil E	(CBCS) Enginee	Examination Nov/Dec-	2019	
			INTR	ODUCTION <sup>•</sup>	TO FUIL	_D MECHANICS		
Day Time	& Date : 10:0	e: Sa 0 AN	turday,14-12 1 To 01:00 P	2-2019 M		Ма	x. Marks	s: 70
Instr	uctio	<b>ns:</b> 1	) Q. No. 1 is Book.	compulsory ar	nd should	be solved in first 30 minutes	in answ	/er
		2	?) Figures to	the right indica	te full mai	rks.		
			Ν	/ICQ/Objecti	ve Type	Questions		
Dura	tion: 3	30 Mi	nutes				Marks	s: 14
Q.1	<b>Cho</b> 1)	ose t In irr a) b) c) d)	the correct a rotational flow A velocity p All particles The motion The velocity	alternatives fro w of an ideal flu otential exists must move in must be unifor must be zero	om the op uid straight lir m at bounda	<b>ptions and rewrite the sent</b> nes ary	ence.	14 01
	2)	A fle a) b) c) d)	ow net canno Gives zero Gives some Fails to repr Fails to repr	ot be applied for velocity at bour e velocity at bour resent actual flor resent formatio	or the visc ndaries undaries ow patterr n of wake	ous fluids as it		01
	3)	Dar a) c)	cy-Weisbach Sudden enl Sudden cor	n equation is us argement htraction	sed to finc b) d)	l loss of head due to Friction None of the above		01
	4)	Los a)	s of head du $v^2/_{2g}$	le to entrance i	n pipe is ç b)	given as $^{v}/g$		01
		c)	$0.5v^{2}/_{2g}$		d)	$v^{3}/_{2g}$		
	5)	Due a) b) c) d)	e to which ph Incompress Sudden ope The materia Sudden clos	nenomenon was sibility ening of valve al of pipe being sure of valve	ter hamm elastic	er is caused?		01
	6)	In w a) c)	vhich of the c Venturimete Pitot tube	devices, Bernou er	ulli's equa b) d)	tion is used? Orificemeter All the above		01
	7)	The a) c)	e co-efficient 0.95 to 0.99 0.8 to 0.85	of discharge (C )	C <sub>d</sub> ) of vent b) d)	turimeter lies within the limit 0.7 to 0.8 0.6 to 0.7		
	8)	Liqu a) c)	ids having p Capillary ris Both a and	redominating c e b	ohesive fo b) d)	orce shows Capillary fall None of these		01

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9)	<ul> <li>The bulk modulus of elasticity</li> <li>a) Increases with the pressure</li> <li>b) Is independent of pressure and viscosity</li> <li>c) Is larger when the fluid is more compressible</li> <li>d) has a dimension of (1/P)</li> </ul>	01
10)	<ul> <li>A small plastic boat loaded with material is floating in bath tub. If the cargo is dumped into a water, allowing the boat to float empty, then the water level in the tub will</li> <li>a) Fall</li> <li>b) Rise</li> <li>c) Both will happen simultaneously</li> <li>d) Not change</li> </ul>	01
11)	<ul> <li>The Bouyant force is</li> <li>a) The resultant force acting on a body due to the fluid surrounding it</li> <li>b) The resultant force acting on body</li> <li>c) Equal to the volume of liquid displaced</li> <li>d) The force necessary to maintain equilibrium of a submerged body</li> </ul>	01
12)	<ul> <li>When a liquid rotates at constant angular velocity about a vertical axis as a rigid body, the pressure intensity</li> <li>a) Decrease as the square of the radial distance</li> <li>b) Increase linearly as the radial distance</li> <li>c) Varies inversely as the elevation along any vertical line</li> <li>d) Varies as square of the radial distance</li> </ul>	01
13)	In a pipe of 90 mm diameter water is flowing with mean velocity of 2 m/s and at a guage pressure of 350 kN/m <sup>2</sup> , what will be its total head if the pipe is 10 m above the datum lines	02

- a) 40.88 m
- b) 45.88 m d) 47.88 m c) 43.88 m

Seat	
No.	

## S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Civil Engineering** INTRODUCTION TO FUILD MECHANICS

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.2 is compulsory. Solve any two questions from Q No.3 to Q. No. 5 Section - I.

- Q.6 is compulsory. Solve any one question from Q.7 and 8 in section II.
- 3) Assume suitable data if necessary and state it clearly.
- 4) Figures to the right indicate full marks.

## Section-I

- Q.2 a) Enlist different methods of finding meta centre and explain any one with neat 04 sketch.
  - **b)** What is effect of pressure and temperature on weight density, specific 03 weight and specific gravity of a liquid?
  - c) Explain the concept of stream tube and streak line with neat sketches. 03
- Q.3 a) State Newton's law of Viscosity and explain the advantages of mechanical 04 gauges over manometers.
  - b) A log of wood having a square section of 0.36 m x 0.36 m and specific 05 gravity 0.8 floats in water. One edge is depressed and released causing the log to roll. Estimate the period of roll.
- **a)** For a three dimension flow filled described by  $V = (y^2 + z^2)i + (x^2 + z$ Q.4 04  $(x^{2} + y^{2})k$  find at (1, 2, 3)
  - The components of acceleration and 1)
  - 2) The component of rotation
  - b) In finding, the metacentre of a ship of 98.1 MN displaces a weight of 490.5 05 kN at a distance of 6 m from the longitudinal centre plane causes the ship to heel through an angle of 3<sup>0</sup>. What is the metacentric height? Hence find the angle of heel and its direction when the ship is going ahead and power transmitted 2.8336 MW is being transmitted to a single propeller shaft which is rotated at a speed of  $3 \pi \text{ rad}/\text{ sec.}$
- Q.5 Briefly, explain the principle employed in the measurement of pressure by 04 a) manometers and explain with neat sketch single column manometer.
  - At a depth of 2 km in the ocean, the pressure is 840 kg (f)/cm<sup>2</sup>. Assume the 05 b) specific weight at surface as 1025 kg(f)/m<sup>3</sup>, and that the average bulk modulus of elasticity is  $24 \times 10^3 \text{ kg}(f)/\text{cm}^2$  for that pressure range.
    - 1) What will be the change in specific volume between that at the surface and at that depth?
    - What will be the specific volume at that depth? and, 2)
    - What will be the specific weight at that depth? 3)

Max. Marks: 56

		Set	S
Q.6	a)	The diameter of horizontal pipe is 150 mm is suddenly enlarged to 225 mm. The discharge is 0.05 m <sup>3</sup> /s. The intensity of pressure at 150 mm pipe is 110 kN/m <sup>2</sup> . Calculate Loss of head due to Sudden enlargement.	05
	b)	Derive Bernoulli's theorem for steady flow of an incompressible fluid and state assumptions made for the derivation.	06
	c)	Explain the phenomenon of drag and lift.	03
Q.7	a) b) c)	Derive Darcy-Weisbach equation for calculating loss of head due to friction. The difference in water surface level in two tanks which are connected by three pipes inseries having the length 450 m, 255 m and 315 m having diameters 30 cm, 20 cm and 40 cm respectively is 18mts. Determine the rate flow if coefficient of friction 0.0075, 0.0078 and 0.0072 respectively for all pipes, Considering Minor Losses. Using Hazen Poisulle's equation obtain the expression for friction factor in terms of Reynold's number	05 06 03
Q.8	a) b)	Explain the Hardy Cross Method of solving pipe network. Find the displacement thickness, momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $\frac{u}{U} = \frac{y}{\delta}$ , where <i>u</i> is the velocity at a distance y from the plate and $u = U$ at $y = \delta$ and $\delta$ = boundary layer thickness. Also, Calculate $\frac{\delta^*}{\theta}$	05 06
	C)	Define Hydraulic Gradient Line and Total Energy Line (Draw neat sketch).	03

	S.Y.	(В.	Tech) (Part – –	I) (New) (CB Civil Engi	CS) inee	Examination Nov	//Dec-2019
			E	NGINEERING	g ge	EOLOGY	
Day Time	& Date: 10:0	e: Tu 0 AN	uesday,17-12-20 /I To 01:00 PM	19			Max. Marks: 70
Instr	uctio	ns: ´	I) Q.1 is compuls	sory and should	l be s	olved in first 30 minu	tes in answer
			DOOK. 2) Figures to the	right indicate fu	ıll ma	rks	
		2	3) Draw neat and	labeled diagra	m wh	nerever necessary.	
_	_		MCG	Q/Objective 1	Гуре	Questions	
Dura	ition: 3	30 M	inutes				Marks: 14
Q.1	<b>Cho</b> 1)	ose The a) c)	the correct alte e bun shaped igr Lopolith Laccolith	rnatives from t neous intrusion	t <b>he o</b> in un b) d)	<b>ptions.</b> folded region is called Phaccolith Sill	<b>14</b> 
	2)	The a) c)	e rocks ar Rudaceous Argillaceous	e insoluble proc	ducts b) d)	of rock weathering. Arenaceous Residual	
	3)	The a) c)	e rapid cooling o Porphyritic Glassy	f lava forms	te b) d)	exture. Coarse grain Ophitic	
	4)	The	e gaseous and v structure.	apors entrappe	d dur	ing the solidification o	of lava form
		a) c)	Flow Pillow		b) d)	Ropy Vesicular	
	5)	Are	enaceous sedime	entary rock com	pose	d entirely of gi	rains.
		a) c)	Sand Boulder		b) d)	Clay Pebble	
	6)		mineral is in	mica group.			
		a) c)	Quartz Plagioclase		b) d)	Orthoclase Biotite	
	7)	The	e horizontal disp	acement of a fa	ault is	called as	
		a) c)	Throw Have		b) d)	Hade Net slip	
	8)	Slo	ping surface of v	vallev upon whic	ch da	m rests is known as	
	- /	a)	Heel		b)	Abutment	
		c)	Тое		d)	Pier	
	9)	<u></u>	is the ornam	ented stone.	<b>۲</b>	Dhullita	
		a) c)	Sandstone		(a b)	Marble	
	10)	Wh	nich of the followi	ng is oldest tvo	e of c	drillina ?	
	- /	a)	Rotary	5	b)	Calyx	
		c)	Diamond		d)	Auger	

Set

Ρ

11) \_\_\_ rock having low porosity.

a) Sandstone c) Granite

b) Limestone

- d) Shale
- Majority of landslides due to \_\_\_\_\_. 12)
  - b) Earthquake a) Heavy rain
  - c) Volcanic eruption Terrain cutting d)
- For the safe and stable construction of dam the correct geological 13) condition would be .
  - a) At crest of fold limbs dipping upstream
  - b) At trough of fold
  - c) At limb of fold
  - d) None of these
- 14) The main geological problems connected with the reservoir are \_\_\_\_\_. b) Permeable rocks
  - a) Groundwater conditions
  - Silting c)

d) All of these

Set P

	0.1	Civil Engineering	
		ENGINEERING GEOLOGY	
Day 8 Time:	a Dat 10:0	e: Tuesday,17-12-2019 Max. Marks 00 AM To 01:00 PM	: 56
Instru	uctio	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Draw neat and labeled diagram wherever necessary.</li> </ul>	
		Section – I	
Q.2	a) b)	Define fold and explain any four types of fold. Define igneous rock and explain any three igneous structures. <b>OR</b>	06 06
Q.3	a)	Define sedimentary rock and explain formation process of sedimentary rock.	06
	b)	Define volcano and explain in detail products of volcano.	06
Q.4	Wh	at is concordant igneous intrusion? Explain any three concordant intrusions. <b>OR</b>	07
Q.5	De	fine metamorphic rock? Explain in detail agents of metamorphism.	07
Q.6	Wr a) b) c) d) e)	ite short note. (Any Three) Angular unconformity Cross bedding structure Mohs scale of hardness Mica group of minerals Gneissose structure	09
		Section – II	
Q.7	a) b)	Define landslide and explain types of landslide. Explain in detail geophysical investigation for dam site. OR	06 06
Q.8	a) b)	Define earthquake and explain causes and effect of earthquake. What is building stone? Describe properties of good building stone.	06 06
Q.9	De	fine aquifer and explain types of aquifer. <b>OR</b>	07
Q.10	Exp	plain the parameters for good reservoir site.	07
Q.11	Wr a) b) c) d) e)	ite note. (Any Three) Focus and epicenter Siltation of reservoir RQD Porosity and permeability A typical core log	09

# S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Seat No.

# SLR-FR-15

Set Ρ

No.						JEI	3
	S.Y.	(B.Tech) (Pa	art – I) (New) (CB	CS)	Examination Nov/D	ec-2019	
				inee	ring		
Dov		v Tuesday 17 1		J GE		Mox Mork	o: 70
Time	: 10:00	D AM To 01:00	PM				5.70
Instr	uctior	<b>15:</b> 1) Q.1 is cor	mpulsory and should	be s	olved in first 30 minutes	in answer	
		2) Figures to 3) Draw nea	o the right indicate fu at and labeled diagra	ill ma m wh	rks. erever necessary.		
			MCQ/Objective 1	уре	Questions		
Durat	tion: 3	0 Minutes				Mark	s: 14
Q.1	Choc	se the correct	t alternatives from t	he o	ptions.		14
	1)	a) Heel	e of valley upon whic	b)	Abutment	•	
		c) Toe		d)	Pier		
	2)	is the o	rnamented stone.				
		<ul><li>a) Shale</li><li>c) Sandstone</li></ul>	à	b) d)	Phyllite Marble		
	3)	Which of the fo	- ollowina is oldest type	e of d	rilling ?		
	- /	a) Rotary	5	b)	Calyx		
		c) Diamond		d)	Auger		
	4)	rock ha	ving low porosity.				
		<ul> <li>a) Sandstone</li> <li>c) Granite</li> </ul>	9	d)	Limestone		
	5)	Maiority of land	dslides due to				
	- /	a) Heavy rair	<u></u>	b)	Earthquake		
		c) Volcanic e	eruption	d)	Terrain cutting		
	6)	For the safe an	nd stable constructio d be	n of c	lam the correct geologic	al	
		a) At crest of	fold limbs dipping u	pstrea	am		
		b) At trough	of fold				
		d) None of th	ioid iese				
	7)	The main geol	ogical problems con	necte	d with the reservoir are		
	,	a) Groundwa	ater conditions	b)	Permeable rocks		
	•	c) Silting		d)	All of these		
	8)	The bun shape a) Lopolith	ed igneous intrusion	in unt b)	olded region is called _ Phaccolith	·	
		c) Laccolith		d)	Sill		
	9)	The roo	ks are insoluble proc	ducts	of rock weathering.		
		a) Rudaceou	S	b)	Arenaceous		
		of Aigillaceo	43	u)	i coluudi		

# Seat

- Set Q

#### 10) The rapid cooling of lava forms \_\_\_\_\_ texture.

- a) Porphyritic b) Coarse grain
- c) Glassy d) Ophitic
- The gaseous and vapors entrapped during the solidification of lava form 11) \_\_\_ structure.
  - Flow b) Ropy a) c) Pillow
    - Vesicular d)

SLR-FR-15

Set Q

#### 12) Arenaceous sedimentary rock composed entirely of \_\_\_\_\_ grains.

- a) Sand Clay b)
- c) Boulder d) Pebble

#### 13) mineral is in mica group.

- a) Quartz b) Orthoclase
- c) Plagioclase Biotite d)
- The horizontal displacement of a fault is called as \_\_\_\_\_. 14)
  - a) Throw Hade b)
  - c) Have d) Net slip

		Civil Engineering				
	Det	ENGINEERING GEOLOGY				
Time:	10:0	0 AM To 01:00 PM	: 50			
Instru	ictio	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Draw neat and labeled diagram wherever necessary.</li> </ul>				
		Section – I				
Q.2	a) b)	Define fold and explain any four types of fold. Define igneous rock and explain any three igneous structures. <b>OR</b>	06 06			
Q.3	a)	Define sedimentary rock and explain formation process of sedimentary rock.	06			
	b)	Define volcano and explain in detail products of volcano.	06			
Q.4	<b>2.4</b> What is concordant igneous intrusion? Explain any three concordant intrusions.					
Q.5	De	fine metamorphic rock? Explain in detail agents of metamorphism.	07			
Q.6	Wr a) b) c) d) e)	ite short note. (Any Three) Angular unconformity Cross bedding structure Mohs scale of hardness Mica group of minerals Gneissose structure	09			
		Section – II				
Q.7	a) b)	Define landslide and explain types of landslide. Explain in detail geophysical investigation for dam site.	06 06			
Q.8	a) b)	Define earthquake and explain causes and effect of earthquake. What is building stone? Describe properties of good building stone.	06 06			
Q.9	De	fine aquifer and explain types of aquifer. <b>OR</b>	07			
Q.10	Exp	plain the parameters for good reservoir site.	07			
Q.11	Wr a) b) c) d) e)	ite note. (Any Three) Focus and epicenter Siltation of reservoir RQD Porosity and permeability A typical core log	09			

# S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Seat No.

# SLR-FR-15

Set Q

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Seat No.							Set	R
÷	S.Y.	(B.Tech) (Pa	rt – I) (New) ( Civil E ENGINEER	CBCS)   ngineer ING GE	Examination ing OLOGY	Nov/Dec-2	2019	
Day & Time:	Date 10:00	e: Tuesday,17-12 AM To 01:00 F	2-2019 PM			Max	. Marks	s: 70
Instru	ction	<b>is:</b> 1) Q.1 is con book. 2) Figures to 3) Draw neat	npulsory and sho the right indicat t and labeled dia	ould be so te full mar agram who	olved in first 30 r ks. erever necessar	ninutes in ar y.	nswer	
		Ν	//CQ/Objectiv	е Туре	Questions			
Durati	on: 3	0 Minutes	-				Marks	s: 14
Q.1	Choc 1)	<b>ose the correct</b> Arenaceous se a) Sand c) Boulder	alternatives fro dimentary rock o	o <b>m the op</b> composed b) d)	otions. d entirely of Clay Pebble	grains.		14
:	2)	mineral i a) Quartz c) Plagioclase	is in mica group. e	b) d)	Orthoclase Biotite			
:	3)	The horizontal a) Throw c) Have	displacement of	a fault is b) d)	called as Hade Net slip			
	4)	Sloping surface a) Heel c) Toe	e of valley upon v	which dar b) d)	n rests is known Abutment Pier	as		
:	5)	a) Shale c) Sandstone	namented stone	b) d)	Phyllite Marble			
	6)	Which of the fo a) Rotary c) Diamond	llowing is oldest	type of d b) d)	rilling? Calyx Auger			
	7)	<ul><li> rock hav</li><li>a) Sandstone</li><li>c) Granite</li></ul>	ving low porosity	b) d)	Limestone Shale			
	8)	Majority of land a) Heavy rain c) Volcanic en	Islides due to ruption	 b) d)	Earthquake Terrain cutting			
ļ	9)	For the safe an condition would a) At crest of b) At trough o	d stable constru l be fold limbs dippin of fold	ction of d ig upstrea	am the correct g am	eological		

- c) At limb of fold
- d) None of these

			SLR	-FK-	·15
				Set	R
The a) c)	main geological problems cor Groundwater conditions Silting	nnecte b) d)	d with the reservoir are Permeable rocks All of these		
The a)	bun shaped igneous intrusion Lopolith	n in un b)	folded region is called Phaccolith		

.

c) Laccolith d) Sill

The \_\_\_\_\_ rocks are insoluble products of rock weathering. 12)

- a) Rudaceous b) Arenaceous
- c) Argillaceous d) Residual

The rapid cooling of lava forms \_\_\_\_\_ texture. 13)

10)

11)

- a) Porphyritic b) Coarse grain
- c) Glassy d) Ophitic
- 14) The gaseous and vapors entrapped during the solidification of lava form \_\_\_ structure.
  - a) Flow b) Ropy c) Pillow Vesicular
  - d)

	••••	Civil Engineering	
		ENGINEERING GEOLOGY	
Day & Time:	Dat 10:0	e: Tuesday,17-12-2019 Max. Marks 00 AM To 01:00 PM	: 56
Instru	ıctio	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Draw neat and labeled diagram wherever necessary.</li> </ul>	
		Section – I	
Q.2	a) b)	Define fold and explain any four types of fold. Define igneous rock and explain any three igneous structures. <b>OR</b>	06 06
Q.3	a)	Define sedimentary rock and explain formation process of sedimentary rock.	06
	b)	Define volcano and explain in detail products of volcano.	06
Q.4	Wh	at is concordant igneous intrusion? Explain any three concordant intrusions. <b>OR</b>	07
Q.5	De	fine metamorphic rock? Explain in detail agents of metamorphism.	07
Q.6	Wr a) b) c) d) e)	ite short note. (Any Three) Angular unconformity Cross bedding structure Mohs scale of hardness Mica group of minerals Gneissose structure	09
		Section – II	
Q.7	a) b)	Define landslide and explain types of landslide. Explain in detail geophysical investigation for dam site. OR	06 06
Q.8	a) b)	Define earthquake and explain causes and effect of earthquake. What is building stone? Describe properties of good building stone.	06 06
Q.9	De	fine aquifer and explain types of aquifer. <b>OR</b>	07
Q.10	Exp	plain the parameters for good reservoir site.	07
Q.11	Wr a) b) c) d) e)	ite note. (Any Three) Focus and epicenter Siltation of reservoir RQD Porosity and permeability A typical core log	09

Seat

SLR-FR-15

Set R

			Civil E ENGINEER	inginee	ring EOLOGY	
Day Time	& Dat : 10:0	e: Tu )0 AN	esday,17-12-2019 / To 01:00 PM		1	/lax. Marks: 70
Insti	ructio	<b>ns:</b> 1	) Q.1 is compulsory and she	ould be s	olved in first 30 minutes i	n answer
		2	2) Figures to the right indica 3) Draw neat and labeled dia	te full ma agram wh	rks. erever necessary.	
			MCQ/Objectiv	/е Туре	Questions	
Dura	ition: 3	30 Mi	nutes			Marks: 14
Q.1	<b>Cho</b> 1)	ose t Wh a)	the correct alternatives fro ich of the following is oldest Rotary	om the o type of c b)	ptions. Irilling? Calyx	14
		C)	Diamond	d)	Auger	
	2)	a) c)	rock having low porosity Sandstone Granite	r. b) d)	Limestone Shale	
	3)	Ma a) c)	jority of landslides due to Heavy rain Volcanic eruption	 b) d)	Earthquake Terrain cutting	
	4)	For cor a) b) c) d)	the safe and stable constru- dition would be At crest of fold limbs dippir At trough of fold At limb of fold None of these	iction of c	lam the correct geologica am	l
	5)	The a) c)	e main geological problems Groundwater conditions Silting	connecte b) d)	d with the reservoir are _ Permeable rocks All of these	
	6)	Th∉ a) c)	e bun shaped igneous intrus Lopolith Laccolith	ion in un b) d)	folded region is called Phaccolith Sill	<u> </u>
	7)	Th∉ a) c)	e rocks are insoluble Rudaceous Argillaceous	products b) d)	of rock weathering. Arenaceous Residual	
	8)	Th∉ a) c)	e rapid cooling of lava forms Porphyritic Glassy	b) d)	exture. Coarse grain Ophitic	
	9)	The	e gaseous and vapors entra structure.	pped dur	ng the solidification of lav	/a form
		a) c)	Pillow	(d (b	Kopy Vesicular	

## Seat No.

S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019

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Set S

#### Arenaceous sedimentary rock composed entirely of \_\_\_\_\_ grains. 10)

a) Sand

- b) Clay Pebble d)
- c) Boulder
- \_\_\_\_\_ mineral is in mica group. 11)
  - a) Quartz b) Orthoclase
  - c) Plagioclase Biotite d)

12) The horizontal displacement of a fault is called as \_\_\_\_\_.

- Hade a) Throw b)
- c) Have d)

Sloping surface of valley upon which dam rests is known as \_\_\_\_\_. 13)

- a) Heel b)
- c) Toe d)
- 14) \_ is the ornamented stone.
  - a) Shale c) Sandstone
- Marble d)

b)

- Net slip

Phyllite

- Pier

SLR-FR-15

Set S

- Abutment

		Civil Engineering	
Day & Time:	Dat 10:0	e: Tuesday,17-12-2019 Max. Marks	: 56
Instru	ictio	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Draw neat and labeled diagram wherever necessary.</li> </ul>	
		Section – I	
Q.2	a) b)	Define fold and explain any four types of fold. Define igneous rock and explain any three igneous structures. <b>OR</b>	06 06
Q.3	a)	Define sedimentary rock and explain formation process of sedimentary rock.	06
	b)	Define volcano and explain in detail products of volcano.	06
Q.4	Wh	at is concordant igneous intrusion? Explain any three concordant intrusions. <b>OR</b>	07
Q.5	De	fine metamorphic rock? Explain in detail agents of metamorphism.	07
Q.6	Wr a) b) c) d) e)	ite short note. (Any Three) Angular unconformity Cross bedding structure Mohs scale of hardness Mica group of minerals Gneissose structure	09
		Section – II	
Q.7	a) b)	Define landslide and explain types of landslide. Explain in detail geophysical investigation for dam site. OR	06 06
Q.8	a) b)	Define earthquake and explain causes and effect of earthquake. What is building stone? Describe properties of good building stone.	06 06
Q.9	De	fine aquifer and explain types of aquifer. <b>OR</b>	07
Q.10	Exp	plain the parameters for good reservoir site.	07
Q.11	Wr a) b) c) d) e)	ite note. (Any Three) Focus and epicenter Siltation of reservoir RQD Porosity and permeability A typical core log	09

# S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering

Seat No.

# SLR-FR-15

Page **12** of **12** 

Set S

# S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Civil Engineering**

## INTRODUCTION TO SOLID MECHANICS

Day & Date: Thursday, 19-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

- Assume suitable data, if necessary & mention it clearly.
- Figures to the right indicates full marks.

## MCQ/Objective Type Questions

d)

**Duration: 30 Minutes** 

4)

#### Q.1 Choose the correct alternatives from the options.

- 1) The ratio of linear stress to linear strain is known as Bulk modulus b)
  - a) Poisson's ratio
  - c) Modulus of rigidity
- Factor of safety is equal to 2)
  - Ultimate stress yield stress a)
  - Yield stress permissible stress b)
  - c) Yield stress/permissible stress
  - d) All of the above

3) The normal stress on oblique plane is minimum when a is equal to .

- a) 0° b) 45°
- c) 30° d) 90°
- Principle planes are the planes of a) maximum shear stress b) minimum shear stress
  - c) zero shear stress d) none of the above
- The equivalent Torque under combined action of bending moment (M) & 5) Torque (T) is \_
  - $\begin{array}{l} T_e = (M^2 + T^2)^{1/2} \\ T_e = (M^2 + T^2)^2 \end{array}$ a)  $T_e = (M^2 + T^2)$ b) c)  $T_e = (M^2 + T^2)^{3/2}$ d)
- The equivalent bending moment under combined action of bending 6) moment (M) & Torque (T) is \_\_\_\_\_.

a) 
$$\sqrt{M^2 + T^2}$$
 b

c) 
$$\frac{1}{2}M\sqrt{M^2 + T^2}$$

- 7) is a Saint Venant theory.
  - Maximum shear stress theory a)
  - b) Maximum strain energy theory
  - c) Maximum principle strain theory
  - Distortion energy theory d)

b) 
$$\frac{1}{2}\sqrt{M^2 + T^2}$$
  
d)  $\frac{1}{2}(M + \sqrt{M^2 + T^2})$ 

Modulus of elasticity

Marks: 14

14

SLR-FR-16



Max. Marks: 70

Seat No.

		Set	Ρ
8)	Maximum shear stress theory is also called asa) Beltrami theoryb) Haigh theoryc) Guest theoryd) Saint Venant theory	У	
9)	<ul> <li>The point of zero bending moment, where the bending moment changes its sign is called</li> <li>a) The point of contraflexure</li> <li>b) The point of inflation</li> <li>c) The point of virtual hinge</li> <li>d) All of the above</li> </ul>	nt diagram	
10)	Bending moment on a section is maximum where shearing for a) minimuma) minimumb) maximumc) equald) zero	rce is	
11)	If a member is subjected to a uniform bending moment (M), the curvature of the deflected from of the member is given by a) $\frac{M}{I} = \frac{E}{R}$ b) $\frac{M}{R} = \frac{E}{I}$ c) $\frac{M}{I} = \frac{R}{E}$ d) $\frac{M}{E} = RI$	ne radius of 	
12)	Section modulus of rectangular section of width b & depth d is a) $\frac{db^2}{4}$ c) $\frac{bd^2}{4}$ d) $\frac{bd^2}{6}$ d) $\frac{bd^2}{6}$	\$	
13)	For a rectangular beam, the ratio of $Z_{max}/l_{ave}$ is a) 2 b) 1 c) 1.5 d) None of the above		
14)	Strength of the beam is more if it's section modulus isa) decreasedb) zeroc) increasedd) none		

Seat	
No.	

S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering INTRODUCTION TO SOLID MECHANICS

Day & Date: Thursday,19-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.2 is compulsory and Solve any two questions from remaining Question from section I.

- 2) Q. No. 6 is compulsory and Solve any two questions from remaining Question from section II.
- 3) Assume suitable data, if necessary & mention it clearly.
- 4) Figures to the right indicates full marks.

## Section – I

- **Q.2 a)** Write detailed note on any three elastic failure theories giving details of it's **06** suitability.
  - b) Draw stress strain curve & explain in detail for mild steel material. 04
- **Q.3** Find the value of unknown force 'P' and total elongation for the compound bar shown bellow take  $E = 210 \text{ GN/m}^2$



- Q.4 Find normal & tangential stresses and the resultant stresses and it's obliquity
   O9 on a plane at 20° with major Principle Plane. Take major principle stress as 120 MN/m<sup>2</sup> (Tensile) & minor principle stress as 60 MN/m<sup>2</sup> (Tensile)
- Q.5 Find Principle stresses & principle planes of a shaft section of 100 mm diameter 09 subjected to bending moment of 4000 Nm & Torque of 6000 Nm.

### Section – II

**Q.6** Draw SFD & BMD for beam as shown below:



10

Set P



Max. Marks: 56



Q.7 Find extreme stresses at top & bottom of 'T' section shown below, it section is ubjected to bending moment of 3.4 KNm.



**Q.8** Draw the shear stress distribution across the section. If section is subjected to **09** shear force of 100 KN.



**Q.9** Draw ILD for reactions at 'A' & 'B'. also draw ILD for shear force & bending moment at 3 meter from 'A'.

09



## No. S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Civil Engineering** INTRODUCTION TO SOLID MECHANICS

Day & Date: Thursday, 19-12-2019

**Duration: 30 Minutes** 

Seat

Time: 10:00 AM To 01:00 PM Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer

- Book. Assume suitable data, if necessary & mention it clearly.
  - 3) Figures to the right indicates full marks.

## MCQ/Objective Type Questions

#### Q.1 Choose the correct alternatives from the options.

- Maximum shear stress theory is also called as 1) b) Haigh theory
  - Beltrami theory a)
  - c) Guest theory d) Saint Venant theory
- The point of zero bending moment, where the bending moment diagram 2) changes its sign is called \_\_\_\_
  - The point of contraflexure a)
  - The point of inflation b)
  - c) The point of virtual hinge
  - d) All of the above

#### 3) Bending moment on a section is maximum where shearing force is \_\_\_\_\_.

- a) minimum b) maximum
- d) c) equal zero
- 4) If a member is subjected to a uniform bending moment (M), the radius of curvature of the deflected from of the member is given by .

a)	$\frac{M}{E} = \frac{E}{E}$	b)	$\frac{M}{E} = \frac{E}{E}$
c)	$\frac{\frac{I}{M}}{I} = \frac{\frac{R}{R}}{E}$	d)	$\frac{\frac{R}{M}}{E} = \frac{I}{RI}$

Section modulus of rectangular section of width b & depth d is \_\_\_\_\_. 5)

a)	db <sup>2</sup>	b)	db <sup>2</sup>
c)	$\frac{4}{bd^2}$	d)	$\frac{6}{bd^2}$
	4		6

For a rectangular beam, the ratio of  $Z_{max}/l_{ave}$  is \_\_\_\_\_. 6)

- a) 2 b) c) 1.5 d) None of the above
- 7) Strength of the beam is more if it's section modulus is \_\_\_\_\_.
  - a) decreased b) zero
  - c) increased d) none
- The ratio of linear stress to linear strain is known as 8)
  - a) Poisson's ratio Modulus of rigidity C)
- b) Bulk modulus
- d) Modulus of elasticity

SLR-FR-16



Max. Marks: 70

Marks: 14

14

Set Q

SLR-FR-16

- 9) Factor of safety is equal to \_\_\_\_\_.
  - a) Ultimate stress yield stress
  - b) Yield stress permissible stress
  - c) Yield stress/permissible stress
  - d) All of the above

## 10) The normal stress on oblique plane is minimum when a is equal to \_\_\_\_\_.

- a) 0° b) 45°
- c) 30° d) 90°
- 11) Principle planes are the planes of \_\_\_\_\_.
  - a) maximum shear stress b) minimum shear stress
  - c) zero shear stress d) none of the above
- 12) The equivalent Torque under combined action of bending moment (M) & Torque (T) is \_\_\_\_\_.
  - a)  $T_e = (M^2 + T^2)$ c)  $T_e = (M^2 + T^2)^{3/2}$ b)  $T_e = (M^2 + T^2)^{1/2}$ d)  $T_e = (M^2 + T^2)^2$
- The equivalent bending moment under combined action of bending moment (M) & Torque (T) is \_\_\_\_\_.

a) 
$$\sqrt{M^2 + T^2}$$
 b)

c) 
$$\frac{1}{2}M\sqrt{M^2 + T^2}$$

b) 
$$\frac{1}{2}\sqrt{M^2 + T^2}$$
  
d)  $\frac{1}{2}(M + \sqrt{M^2 + T^2})$ 

- 14) \_\_\_\_\_ is a Saint Venant theory.
  - a) Maximum shear stress theory
  - b) Maximum strain energy theory
  - c) Maximum principle strain theory
  - d) Distortion energy theory

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	S.Y. (B.Tech) (Par	rt – I) (New) (Cl	BCS) Exam	ir

## nation Nov/Dec-2019 **Civil Engineering** INTRODUCTION TO SOLID MECHANICS

Day & Date: Thursday, 19-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.2 is compulsory and Solve any two questions from remaining Question from section I.

- 2) Q. No. 6 is compulsory and Solve any two guestions from remaining Question from section II.
- 3) Assume suitable data, if necessary & mention it clearly.
- 4) Figures to the right indicates full marks.

## Section – I

- Q.2 Write detailed note on any three elastic failure theories giving details of it's 06 a) suitability.
  - Draw stress strain curve & explain in detail for mild steel material. 04 b)
- Q.3 Find the value of unknown force 'P' and total elongation for the compound bar 09 shown bellow take  $E = 210 \text{ GN}/\text{m}^2$



- Find normal & tangential stresses and the resultant stresses and it's obliquity Q.4 09 on a plane at 20° with major Principle Plane. Take major principle stress as 120 MN/m<sup>2</sup> (Tensile) & minor principle stress as 60 MN/m<sup>2</sup> (Tensile)
- Find Principle stresses & principle planes of a shaft section of 100 mm diameter Q.5 09 subjected to bending moment of 4000 Nm & Torque of 6000 Nm.

### Section – II

Draw SFD & BMD for beam as shown below: Q.6



10



Max. Marks: 56

Set Q

Seat N

Q.7 Find extreme stresses at top & bottom of 'T' section shown below, it section is subjected to bending moment of 3.4 KNm.



**Q.8** Draw the shear stress distribution across the section. If section is subjected to **09** shear force of 100 KN.



**Q.9** Draw ILD for reactions at 'A' & 'B'. also draw ILD for shear force & bending moment at 3 meter from 'A'.

09


### No. S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Civil Engineering** INTRODUCTION TO SOLID MECHANICS

Day & Date: Thursday, 19-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

- Assume suitable data, if necessary & mention it clearly.
- Figures to the right indicates full marks.

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

a)

3)

Seat

#### Q.1 Choose the correct alternatives from the options.

The equivalent Torque under combined action of bending moment (M) & 1) Torque (T) is  $T_{e} = (M^{2} + T^{2})^{1/2}$  $T_{e} = (M^{2} + T^{2})^{2}$ b)

d)

- a)  $T_e = (M^2 + T^2)$
- c)  $T_e = (M^2 + T^2)^{3/2}$
- The equivalent bending moment under combined action of bending 2) moment (M) & Torque (T) is \_

a) 
$$\sqrt{M^2 + T^2}$$
  
c)  $\frac{1}{2}M\sqrt{M^2 + T^2}$ 

- is a Saint Venant theory.
- Maximum shear stress theory a)
- b) Maximum strain energy theory
- Maximum principle strain theory c)
- d) Distortion energy theory

#### 4) Maximum shear stress theory is also called as

- Beltrami theory Haigh theory b) a)
- c) Guest theory d) Saint Venant theory
- 5) The point of zero bending moment, where the bending moment diagram changes its sign is called .
  - The point of contraflexure a)
  - The point of inflation b)
  - c) The point of virtual hinge
  - d) All of the above

#### 6) Bending moment on a section is maximum where shearing force is .

- a) minimum b) maximum equal d) C) zero
- 7) If a member is subjected to a uniform bending moment (M), the radius of curvature of the deflected from of the member is given by .

a) 
$$\frac{M}{I} = \frac{E}{R}$$
  
c)  $\frac{M}{I} = \frac{R}{E}$   
b)  $\frac{M}{R} = \frac{E}{I}$   
d)  $\frac{M}{E} = RI$ 

b) 
$$\frac{1}{2}\sqrt{M^2 + T^2}$$
  
d)  $\frac{1}{2}(M + \sqrt{M^2 + T^2})$ 



Max. Marks: 70

Marks: 14

14

Set R



8)	Sec	tion modulus of rectangular secti	on of	width b & depth d is .
-,	a)	db <sup>2</sup>	b)	db <sup>2</sup>
	c)	$\frac{\frac{4}{bd^2}}{4}$	d)	$\frac{\frac{6}{bd^2}}{6}$
9)	For a) c)	a rectangular beam, the ratio of 2 1.5	Z <sub>max</sub> / b) d)	l <sub>ave</sub> is 1 None of the above
10)	Stre a) c)	ength of the beam is more if it's so decreased increased	ection b) d)	modulus is zero none
11)	The a) c)	e ratio of linear stress to linear stra Poisson's ratio Modulus of rigidity	ain is b) d)	known as Bulk modulus Modulus of elasticity
12)	Fac a) b) c) d)	tor of safety is equal to Ultimate stress – yield stress Yield stress – permissible stress Yield stress/permissible stress All of the above		
13)	The a) c)	normal stress on oblique plane i 0° 30°	s min b) d)	imum when a is equal to 45° 90°
14)	Prin a)	ciple planes are the planes of maximum shear stress	 b)	minimum shear stress

- c) zero shear stress d)
- none of the above

Seat	
No.	

S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Civil Engineering** INTRODUCTION TO SOLID MECHANICS

Day & Date: Thursday, 19-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.2 is compulsory and Solve any two questions from remaining Question from section I.

- 2) Q. No. 6 is compulsory and Solve any two questions from remaining Question from section II.
- 3) Assume suitable data, if necessary & mention it clearly.
- 4) Figures to the right indicates full marks.

#### Section – I

- Q.2 Write detailed note on any three elastic failure theories giving details of it's 06 a) suitability.
  - Draw stress strain curve & explain in detail for mild steel material. 04 b)
- Q.3 Find the value of unknown force 'P' and total elongation for the compound bar 09 shown bellow take  $E = 210 \text{ GN}/\text{m}^2$



- Find normal & tangential stresses and the resultant stresses and it's obliquity Q.4 09 on a plane at 20° with major Principle Plane. Take major principle stress as 120 MN/m<sup>2</sup> (Tensile) & minor principle stress as 60 MN/m<sup>2</sup> (Tensile)
- Find Principle stresses & principle planes of a shaft section of 100 mm diameter Q.5 09 subjected to bending moment of 4000 Nm & Torque of 6000 Nm.

#### Section – II

Draw SFD & BMD for beam as shown below: Q.6



10

Set R

Max. Marks: 56



Q.7 Find extreme stresses at top & bottom of 'T' section shown below, it section is ubjected to bending moment of 3.4 KNm.



**Q.8** Draw the shear stress distribution across the section. If section is subjected to **09** shear force of 100 KN.



**Q.9** Draw ILD for reactions at 'A' & 'B'. also draw ILD for shear force & bending moment at 3 meter from 'A'.

09



		INTRODUCTION TO SO	∍rın _ID	g MECHANICS	
Day Time	& Date : 10:0	e: Thursday,19-12-2019 0 AM To 01:00 PM		ſ	Max. Marks: 70
Instr	uctio	ns: 1) Q. No. 1 is compulsory and shoul	d be	solved in first 30 minu	ites in answer
		2) Assume suitable data, if necessa 3) Figures to the right indicates full r	°y & nark	mention it clearly. s.	
		MCQ/Objective Typ	e Q	uestions	
Dura	ition: 3	30 Minutes			Marks: 14
Q.1	<b>Cho</b> 1)	ose the correct alternatives from theBending moment on a section is maxima)a)minimumb)c)equald	<b>optio</b> num ) i ) :	<b>ons.</b> where shearing force maximum zero	14 is
	2)	If a member is subjected to a uniform be curvature of the deflected from of the r a) $\frac{M}{1} = \frac{E}{R}$ b c) $\frac{M}{1} = \frac{R}{E}$ d	) end nemi ) <sup>1</sup>	ing moment (M), the rate ber is given by $\frac{M}{R} = \frac{E}{I}$ $\frac{M}{E} = RI$	adius of
	3)	Section modulus of rectangular section a) $\frac{db^2}{4}$ b c) $\frac{bd^2}{4}$ d	) (	width b & depth d is $\frac{db^2}{6}$ $\frac{bd^2}{6}$	
	4)	For a rectangular beam, the ratio of Z <sub>m</sub> a) 2 b c) 1.5 d	ax /la )	<sub>ave</sub> is 1 None of the above	
	5)	Strength of the beam is more if it's sec a) decreased b c) increased d	tion ) : ) I	modulus is zero none	
	6)	The ratio of linear stress to linear straina) Poisson's ratiob) b) c) Modulus of rigidityc) d)	n is k ) ∣ ) ∣	known as Bulk modulus Modulus of elasticity	
	7)	<ul> <li>Factor of safety is equal to</li> <li>a) Ultimate stress – yield stress</li> <li>b) Yield stress – permissible stress</li> <li>c) Yield stress/permissible stress</li> <li>d) All of the above</li> </ul>			
	8)	The normal stress on oblique plane isa) 0°bc) 30°d	ninir ) <sup>2</sup>	mum when a is equal t 45° 90°	.0

Seat No.

# S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019



- 9) Principle planes are the planes of \_\_\_\_
  - a) maximum shear stress
- minimum shear stress b) d) none of the above
- c) zero shear stress
- The equivalent Torque under combined action of bending moment (M) & 10) Torque (T) is \_
  - $T_e = (M^2 + T^2)^{1/2}$  $T_e = (M^2 + T^2)^2$ a)  $T_e = (M^2 + T^2)$ b) c)  $T_e = (M^2 + T^2)^{3/2}$ d)
- The equivalent bending moment under combined action of bending 11) moment (M) & Torque (T) is

a) 
$$\sqrt{M^2 + T^2}$$

c) 
$$\frac{1}{2}M\sqrt{M^2 + T^2}$$

- a) Maximum shear stress theory
- b) Maximum strain energy theory
- c) Maximum principle strain theory
- d) Distortion energy theory
- Maximum shear stress theory is also called as 13)
  - a) Beltrami theory Haigh theory b)
  - d) Saint Venant theory c) Guest theory
- 14) The point of zero bending moment, where the bending moment diagram changes its sign is called \_\_\_\_\_.
  - a) The point of contraflexure
  - The point of inflation b)
  - c) The point of virtual hinge
  - d) All of the above

- b)  $\frac{1}{2}\sqrt{M^2 + T^2}$ d)  $\frac{1}{2}(M + \sqrt{M^2 + T^2})$
- SLR-FR-16 Set S

Seat	
No.	

#### S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Civil Engineering INTRODUCTION TO SOLID MECHANICS

Day & Date: Thursday,19-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No.2 is compulsory and Solve any two questions from remaining Question from section I.

- 2) Q. No. 6 is compulsory and Solve any two questions from remaining Question from section II.
- 3) Assume suitable data, if necessary & mention it clearly.
- 4) Figures to the right indicates full marks.

#### Section – I

- **Q.2 a)** Write detailed note on any three elastic failure theories giving details of it's **06** suitability.
  - b) Draw stress strain curve & explain in detail for mild steel material. 04
- **Q.3** Find the value of unknown force 'P' and total elongation for the compound bar shown bellow take  $E = 210 \text{ GN/m}^2$



- Q.4 Find normal & tangential stresses and the resultant stresses and it's obliquity
   O9 on a plane at 20° with major Principle Plane. Take major principle stress as 120 MN/m<sup>2</sup> (Tensile) & minor principle stress as 60 MN/m<sup>2</sup> (Tensile)
- Q.5 Find Principle stresses & principle planes of a shaft section of 100 mm diameter
   O9 subjected to bending moment of 4000 Nm & Torque of 6000 Nm.

#### Section – II

**Q.6** Draw SFD & BMD for beam as shown below:



10

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Max. Marks: 56



Q.7 Find extreme stresses at top & bottom of 'T' section shown below, it section is ubjected to bending moment of 3.4 KNm.



**Q.8** Draw the shear stress distribution across the section. If section is subjected to **09** shear force of 100 KN.



**Q.9** Draw ILD for reactions at 'A' & 'B'. also draw ILD for shear force & bending moment at 3 meter from 'A'.

09



No. S.Y (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Mechanical Engineering** APPLIED THERMODYNAMICS

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

- Use of Steam tables and Mollier diagram is allowed.
- 3) Use of Scientific calculator is allowed.
- 4) Assume suitable data if required and state it clearly.
- 5) Neat diagrams must be drawn wherever necessary.

#### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Seat

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
  - The term coefficient of performance is related with 1)
    - Heat pump b) Heat Engine a)
      - c) Steam Engine d) Gas Turbine
  - Reversible adiabatic process has \_ 2) a) ds = 0b)  $ds \le 0$ 
    - ds = dhc) ds  $\geq 0$ d)
  - 3) A liquid, whose temperature is less than the saturation temperature at the given pressure, is called as \_\_\_\_\_.
    - a) Saturated liquid b) Sub cooled liquid
    - Both a and b none of the above c) d)
  - 4) The state, at which saturated liquid line with respect to vaporisation and saturated vapour line on p-v diagram of pure substance, meet is called as

Superheated Vapour State

- Saturation state Critical state a) b)
- Vaporisation state d) C)
- 5) The ratio of heat actually used in producing the steam to the heat liberated in the furnace is called as
  - Equivalent evaporation b) Evaporative capacity a)
  - **Boiler efficiency** d) Factor of evaporation c)
- The major heat loss in boiler is due to 6)
  - Moisture in fuel Dry fuel gases a) b)
  - c) steam formation Unburnt fuel d)
- 7) Rankine cycle efficiency of good steam power plant may be in the range of
  - 15 to 20% 35 to 45% a) b) 90 to 95% 70 to 80% d) c)

SLR-FR-17

Set

Max. Marks: 70



Ρ

Marks: 14

- 8) Rankine cycle comprises of \_\_\_\_\_.
  - a) Two isentropic processes and two const. volume processes
  - b) Two isentropic processes and two const. pressure processes
  - c) Two isothermal processes and two const. pressure processes
  - d) None of the above
- 9) Effect of friction in nozzle \_\_\_\_\_ dryness fraction of steam.
  - a) Increases b) Decreases
  - c) No change d) None of the above
- 10) Critical pressure ration for Supeheated steam is \_\_\_\_\_.
  - a) 0.528 b) 0.582
  - c) 0.577 d) 0.546
- 11) Thermal efficiency of engine with condenser as compared to without condenser, for a given pressure and temperature of steam is \_\_\_\_\_.
  - a) Higher
  - b) Lower
  - c) Same as long as initial press. and temp are unchanged
  - d) None of the above
- 12) The Compounding of turbine is done in order to \_\_\_\_\_
  - a) Increase tangential force
- b) Improve efficiency
- Reduce exit losses
- d) reduce rotational Speed

Set

- 13) In single stage single acting reciprocating compressor without clearance volume, the work done is minimum during \_\_\_\_\_.
  - a) Isothermal compression
- b) Isentropic compression
- c) Polytropic compression
- d) None of the above
- 14) Due to intercooling, the required work done for compression \_\_\_\_\_.
  - a) Remains constant
- b) Increases

c) Decreases

d) None of the above

#### Seat No.

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering APPLIED THERMODYNAMICS

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) out of remaining questions solve any two questions from each Section.

- 2) Use of Steam tables and Mollier diagram is allowed.
  - 3) Use of Scientific calculator is allowed.
  - 4) Assume suitable data if required and state it clearly.
  - 5) Neat diagrams must be drawn wherever necessary.

#### Section – I

- Q.2 State Kelvin-Plank and Clausius statements of second law of thermodynamics 05 a) and how they are equivalent to each other. A Carnot engine works between temperature limit of 825<sup>°</sup> C and 125<sup>°</sup> C. b) 05 the engine receives 3600 kJ of heat per minute. Determine power of engine and amount of heat rejected to sink per second. Ice melts at 0°C with latent heat of fusion of 334.92 kJ/kg. At atm.press. c) 04 water boils at 100° C with latent heat of vaporization 2254 kJ/kg. Calculate the entropy change fusion and vaporization processes. Q.3 Explain with the help of sketch Property diagram for Phase-change 05 a) process. b) A boiler produces wet steam having dryness fraction 0.90. The working 05 pressure of boiler is 12 bar absolute It generates steam at the rate of 640 kg/hr and consumes coal at the rate of 80 kg/hr, if the calorific value of coal is 31,400 kJ/kg and water is fed at temp, of 20°C, calculate 1) equivalent evaporation/kg of coal 2) factor of evaporation boiler efficiency. 3) With the help of formulas explain the different heat losses occurs in the 04 c) boiler plant Q.4 Derive an expression for entropy change of an ideal gas undergoing 05 a) change of state, in terms of initial and final temperatures and volumes. In a Rankine cycle, dry saturated steam enters turbine at a pressure of 15 b) 05 bar and the exhaust pressure is 0.074 bar. determine Rankine cycle efficiency 1) 2) Specific steam consumption Work ratio 3) Explain the effect of different operating conditions on Rankine cycle C) 04 efficiency Section – II 05 Q.5 Steam enters a nozzle with a velocity of 250 m/s, pressure of 3 bar and a) dryness fraction 0.95. If the isentropic expansion in nozzle proceeds till the pressure at exit is 2 bar, calculate the exit velocity and area at exit from nozzle for flow of 0.75 kg/sec. Also show process on Mollier Diagram.
  - b) Define condenser, & explain with Sketch the elements of steam condensing 05 plant.

Max. Marks: 56

Set P

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			-
	c)	Explain the advantages of Steam turbine.	04
Q.6	a)	Derive an expression for maximum discharge through the nozzle.	05
	b)	Show that maximum blade efficiency in a single stage impulse turbine is given by $n_{\text{bmax}} = \cos^2 \alpha 1$ with usual notations.	05
	c)	Draw a Combined Velocity diagram of a Impulse turbine and mention the different notations used for it.	04
Q.7	a)	Derive the expression for a polytropic work input required in a single stage reciprocating air compressor with a suitable P-V diagram.	05
	b)	<ul> <li>A single stage reciprocating compressor has a bore of 200 mm and stroke of 300 mm. It runs at speed of 480 rpm. The clearance volume is 6% of the swept volume and law for compression, expantion is PV<sup>1.32</sup>=C. Intake pressure is 98 kPa and temp. is 27°C and compressor delivery} pressure is 500 kPa. Determine</li> <li>1) Volumetric efficiency</li> <li>2) Power required to run compressor</li> <li>3) Isothermal power</li> <li>4) Isothermal efficiency</li> </ul>	05
	c)	What is necessity of multistage compression? Discuss advantages of multistage compression with intercooling.	04

#### SLR-FR-17 Set Q

Seat No.

> S.Y (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Mechanical Engineering** APPLIED THERMODYNAMICS

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

- Use of Steam tables and Mollier diagram is allowed.
- 3) Use of Scientific calculator is allowed.
- 4) Assume suitable data if required and state it clearly.
- 5) Neat diagrams must be drawn wherever necessary.

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

4)

Marks: 14

Max. Marks: 70

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
  - Rankine cycle comprises of 1)
    - Two isentropic processes and two const. volume processes a)
    - b) Two isentropic processes and two const. pressure processes
    - c) Two isothermal processes and two const. pressure processes
    - d) None of the above
  - Effect of friction in nozzle \_\_\_\_\_ dryness fraction of steam. 2)
    - Increases Decreases b) a)
    - No change d) None of the above C)
  - 3) Critical pressure ration for Supeheated steam is \_
    - 0.528 b) 0.582 a) 0.577 d) 0.546 c)
    - Thermal efficiency of engine with condenser as compared to without

condenser, for a given pressure and temperature of steam is \_\_\_\_\_. a) Higher

- b) Lower
- Same as long as initial press. and temp are unchanged c)
- d) None of the above
- The Compounding of turbine is done in order to 5)
  - Increase tangential force a) c)
- Improve efficiency
- Reduce exit losses reduce rotational Speed d)
- 6) In single stage single acting reciprocating compressor without clearance volume, the work done is minimum during \_
  - a) Isothermal compression
- b) None of the above
- c) Polytropic compression
- 7) Due to intercooling, the required work done for compression \_\_\_\_\_.
  - Remains constant a) Decreases c)
- Increases b) d) None of the above
- Isentropic compression

b)

8)	The	e term coefficient of performance	is rela	ated with
	a)	Heat pump	b)	Heat Engine
	c)	Steam Engine	d)	Gas Turbine
9)	Rev	versible adiabatic process has		
	a)	ds = 0	b)	$ds \leq 0$
	c)	$ds \ge 0$	d)	ds = dh
10)	A lie give	quid, whose temperature is less t en pressure, is called as	han tł	ne saturation temperature at the
	a)	Saturated liquid	b)	Sub cooled liquid
	c)	Both a and b	d)	none of the above
11)	The sate	e state, at which saturated liquid l urated vapour line on p-v diagram	ine wi n of pu	th respect to vaporisation and ure substance, meet is called as
	a)	 Saturation state	b)	Critical state
	c)	Vaporisation state	d)	Superheated Vapour State
12)	The libe	e ratio of heat actually used in pro trated in the furnace is called as _	ducin	ig the steam to the heat
	a)	Equivalent evaporation	b)	Evaporative capacity
	c)	Boiler efficiency	d)	Factor of evaporation
13)	The	e major heat loss in boiler is due t	0	·
	a)	Moisture in fuel	b)	Dry fuel gases
	c)	steam formation	d)	Unburnt fuel
14)	Rar of	nkine cycle efficiency of good stea	am po	ower plant may be in the range
	a) _	15 to 20%	b)	35 to 45%

d)

90 to 95%

c) 70 to 80%

SLR-FR-17

Set Q

#### Seat No.

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering APPLIED THERMODYNAMICS

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) out of remaining questions solve any two questions from each Section.

- 2) Use of Steam tables and Mollier diagram is allowed.
  - 3) Use of Scientific calculator is allowed.
  - 4) Assume suitable data if required and state it clearly.
  - 5) Neat diagrams must be drawn wherever necessary.

#### Section – I

- Q.2 State Kelvin-Plank and Clausius statements of second law of thermodynamics 05 a) and how they are equivalent to each other. A Carnot engine works between temperature limit of  $825^{\circ}$  C and  $125^{\circ}$  C. b) 05 the engine receives 3600 kJ of heat per minute. Determine power of engine and amount of heat rejected to sink per second. Ice melts at 0°C with latent heat of fusion of 334.92 kJ/kg. At atm.press. c) 04 water boils at 100° C with latent heat of vaporization 2254 kJ/kg. Calculate the entropy change fusion and vaporization processes. Q.3 Explain with the help of sketch Property diagram for Phase-change 05 a) process. b) A boiler produces wet steam having dryness fraction 0.90. The working 05 pressure of boiler is 12 bar absolute It generates steam at the rate of 640 kg/hr and consumes coal at the rate of 80 kg/hr, if the calorific value of coal is 31,400 kJ/kg and water is fed at temp, of 20°C, calculate 1) equivalent evaporation/kg of coal 2) factor of evaporation boiler efficiency. 3) With the help of formulas explain the different heat losses occurs in the 04 c) boiler plant Q.4 Derive an expression for entropy change of an ideal gas undergoing 05 a) change of state, in terms of initial and final temperatures and volumes. In a Rankine cycle, dry saturated steam enters turbine at a pressure of 15 b) 05 bar and the exhaust pressure is 0.074 bar. determine Rankine cycle efficiency 1) 2) Specific steam consumption Work ratio 3) Explain the effect of different operating conditions on Rankine cycle C) 04 efficiency Section – II 05 Q.5 Steam enters a nozzle with a velocity of 250 m/s, pressure of 3 bar and a) dryness fraction 0.95. If the isentropic expansion in nozzle proceeds till the pressure at exit is 2 bar, calculate the exit velocity and area at exit from nozzle for flow of 0.75 kg/sec. Also show process on Mollier Diagram.
  - b) Define condenser, & explain with Sketch the elements of steam condensing 05 plant.

Set Q

Max. Marks: 56

Set	Q
Set	Q

			<u> </u>
	c)	Explain the advantages of Steam turbine.	04
Q.6	a)	Derive an expression for maximum discharge through the nozzle.	05
	b)	Show that maximum blade efficiency in a single stage impulse turbine is given by $n_{\text{bmax}} = \cos^2 \alpha 1$ with usual notations.	05
	c)	Draw a Combined Velocity diagram of a Impulse turbine and mention the different notations used for it.	04
Q.7	a)	Derive the expression for a polytropic work input required in a single stage reciprocating air compressor with a suitable P-V diagram.	05
	b)	<ul> <li>A single stage reciprocating compressor has a bore of 200 mm and stroke of 300 mm. It runs at speed of 480 rpm. The clearance volume is 6% of the swept volume and law for compression, expantion is PV<sup>1.32</sup>=C. Intake pressure is 98 kPa and temp. is 27<sup>o</sup>C and compressor delivery} pressure is 500 kPa. Determine</li> <li>1) Volumetric efficiency</li> <li>2) Power required to run compressor</li> <li>3) Isothermal power</li> <li>4) Isothermal efficiency</li> </ul>	05
	c)	What is necessity of multistage compression? Discuss advantages of multistage compression with intercooling.	04

S.Y (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Mechanical Engineering** APPLIED THERMODYNAMICS

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

- Use of Steam tables and Mollier diagram is allowed.
- 3) Use of Scientific calculator is allowed.
- 4) Assume suitable data if required and state it clearly.
- 5) Neat diagrams must be drawn wherever necessarv.

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
  - The ratio of heat actually used in producing the steam to the heat 1) liberated in the furnace is called as
    - a) Equivalent evaporation
    - b) c) Boiler efficiency d) Factor of evaporation
  - 2) The major heat loss in boiler is due to
    - Dry fuel gases a) Moisture in fuel b)
    - steam formation Unburnt fuel d) c)
  - Rankine cycle efficiency of good steam power plant may be in the range 3) of \_.
    - 15 to 20% 35 to 45% a) b)
    - 70 to 80% d) 90 to 95% c)
  - 4) Rankine cycle comprises of \_\_\_\_\_.
    - Two isentropic processes and two const. volume processes a)
    - Two isentropic processes and two const. pressure processes b)
    - c) Two isothermal processes and two const. pressure processes
    - d) None of the above
  - 5) Effect of friction in nozzle \_\_\_\_\_ dryness fraction of steam.
    - Increases Decreases b) a)
    - c) No change d) None of the above
  - 6) Critical pressure ration for Supeheated steam is
    - a) 0.528 b) 0.582
    - d) 0.546 c) 0.577
  - 7) Thermal efficiency of engine with condenser as compared to without condenser, for a given pressure and temperature of steam is \_\_\_\_\_.
    - a) Higher
    - b) Lower
    - Same as long as initial press. and temp are unchanged C)
    - d) None of the above

SLR-FR-17



Max. Marks: 70

Marks: 14

Seat No.

- Evaporative capacity

				Set R
8)	The a) c)	Compounding of turbine is done Increase tangential force Reduce exit losses	in or b) d)	der to Improve efficiency reduce rotational Speed
9)	In si volu a) c)	ngle stage single acting reciproc me, the work done is minimum c Isothermal compression Polytropic compression	ating luring b) d)	compressor without clearance  Isentropic compression None of the above
10)	Due a) c)	to intercooling, the required wor Remains constant Decreases	k dor b) d)	e for compression Increases None of the above
11)	The a) c)	term coefficient of performance Heat pump Steam Engine	is rela b) d)	ated with Heat Engine Gas Turbine
12)	Rev a) c)	ersible adiabatic process has ds = 0 ds $\ge 0$	b) d)	$ds \le 0$ ds = dh
13)	A liq give a) c)	uid, whose temperature is less t n pressure, is called as Saturated liquid Both a and b	han tl b) d)	ne saturation temperature at the Sub cooled liquid none of the above
14)	The satu	state, at which saturated liquid li irated vapour line on p-v diagram 	ne wi n of pi	th respect to vaporisation and ure substance, meet is called as

- a) Saturation state
- b) Critical state
- c) Vaporisation state
- d) Superheated Vapour State

#### Seat No.

#### S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering APPLIED THERMODYNAMICS

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) out of remaining questions solve any two questions from each Section.

- 2) Use of Steam tables and Mollier diagram is allowed.
  - 3) Use of Scientific calculator is allowed.
  - 4) Assume suitable data if required and state it clearly.
  - 5) Neat diagrams must be drawn wherever necessary.

### Section – I

Q.2	a)	State Kelvin-Plank and Clausius statements of second law of thermodynamics and how they are equivalent to each other	05
	b)	A Carnot engine works between temperature limit of 825 <sup>°</sup> C and 125 <sup>°</sup> C. the engine receives 3600 kJ of heat per minute. Determine power of engine and amount of heat rejected to sink per second.	05
	c)	Ice melts at $0^{\circ}$ C with latent heat of fusion of 334.92 kJ/kg. At atm.press. water boils at $100^{\circ}$ C with latent heat of vaporization 2254 kJ/kg. Calculate the entropy change fusion and vaporization processes.	04
Q.3	a)	Explain with the help of sketch Property diagram for Phase-change process.	05
	b)	<ul> <li>A boiler produces wet steam having dryness fraction 0.90. The working pressure of boiler is 12 bar absolute It generates steam at the rate of 640 kg/hr and consumes coal at the rate of 80 kg/hr, if the calorific value of coal is 31,400 kJ/kg and water is fed at temp, of 20°C,calculate</li> <li>1) equivalent evaporation/kg of coal</li> <li>2) factor of evaporation</li> <li>3) boiler efficiency</li> </ul>	05
	c)	With the help of formulas explain the different heat losses occurs in the boiler plant	04
Q.4	a)	Derive an expression for entropy change of an ideal gas undergoing change of state, in terms of initial and final temperatures and volumes.	05
	b)	<ul> <li>In a Rankine cycle, dry saturated steam enters turbine at a pressure of 15 bar and the exhaust pressure is 0.074 bar. determine</li> <li>1) Rankine cycle efficiency</li> <li>2) Specific steam consumption</li> <li>3) Work ratio</li> </ul>	05
	c)	Explain the effect of different operating conditions on Rankine cycle efficiency	04
		Section – II	
Q.5	a)	Steam enters a nozzle with a velocity of 250 m/s, pressure of 3 bar and dryness fraction 0.95. If the isentropic expansion in nozzle proceeds till the pressure at exit is 2 bar, calculate the exit velocity and area at exit from nozzle for flow of 0.75 kg/sec. Also show process on Mollier Diagram.	05

b) Define condenser, & explain with Sketch the elements of steam condensing 05 plant.

2010

Max. Marks: 56



Set	R

			• •
	c)	Explain the advantages of Steam turbine.	04
Q.6	a)	Derive an expression for maximum discharge through the nozzle.	05
	b)	Show that maximum blade efficiency in a single stage impulse turbine is given by $n_{\text{bmax}} = \cos^2 \alpha 1$ with usual notations.	05
	c)	Draw a Combined Velocity diagram of a Impulse turbine and mention the different notations used for it.	04
Q.7	a)	Derive the expression for a polytropic work input required in a single stage reciprocating air compressor with a suitable P-V diagram.	05
	b)	<ul> <li>A single stage reciprocating compressor has a bore of 200 mm and stroke of 300 mm. It runs at speed of 480 rpm. The clearance volume is 6% of the swept volume and law for compression, expantion is PV<sup>1.32</sup>=C. Intake pressure is 98 kPa and temp. is 27<sup>o</sup>C and compressor delivery} pressure is 500 kPa. Determine</li> <li>1) Volumetric efficiency</li> <li>2) Power required to run compressor</li> <li>3) Isothermal power</li> <li>4) Isothermal efficiency</li> </ul>	05
	c)	What is necessity of multistage compression? Discuss advantages of multistage compression with intercooling.	04

### No. S.Y (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Mechanical Engineering** APPLIED THERMODYNAMICS

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

Use of Steam tables and Mollier diagram is allowed.

3) Use of Scientific calculator is allowed.

4) Assume suitable data if required and state it clearly.

5) Neat diagrams must be drawn wherever necessary.

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Seat

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
  - Critical pressure ration for Supeheated steam is 1)
    - a) 0.528 b) 0.582
    - c) 0.577 d) 0.546
  - Thermal efficiency of engine with condenser as compared to without 2) condenser, for a given pressure and temperature of steam is \_\_\_\_\_.
    - a) Higher
    - b) Lower

a)

- c) Same as long as initial press. and temp are unchanged
- d) None of the above
- 3) The Compounding of turbine is done in order to \_\_\_\_\_
  - a) Increase tangential force Improve efficiency b)
  - c) Reduce exit losses reduce rotational Speed d)
- In single stage single acting reciprocating compressor without clearance 4) volume, the work done is minimum during

d)

- Isothermal compression Isentropic compression b)
- c) Polytropic compression
- 5) Due to intercooling, the required work done for compression \_\_\_\_\_.
  - a) Remains constant b) c) Decreases d) None of the above
- The term coefficient of performance is related with 6)
  - a) Heat pump b)
  - Gas Turbine c) Steam Engine d)
- Reversible adiabatic process has 7)
  - a) ds = 0b)  $ds \le 0$
  - c) ds  $\geq 0$ d) ds = dh
- 8) A liquid, whose temperature is less than the saturation temperature at the given pressure, is called as Sub cooled liquid
  - a) Saturated liquid b)
  - c) Both a and b none of the above d)

SLR-FR-17



Max. Marks: 70

- Marks: 14

- Increases

None of the above

- Heat Engine

- 9) The state, at which saturated liquid line with respect to vaporisation and saturated vapour line on p-v diagram of pure substance, meet is called as
  - Saturation state a)
  - Vaporisation state c)
- b) Critical state

Evaporative capacity

- d) Superheated Vapour State
- 10) The ratio of heat actually used in producing the steam to the heat liberated in the furnace is called as
  - a) Equivalent evaporation
  - c) Boiler efficiency Factor of evaporation d)
- 11) The major heat loss in boiler is due to
  - a) Moisture in fuel Dry fuel gases b)
  - c) steam formation Unburnt fuel d)
- Rankine cycle efficiency of good steam power plant may be in the range 12) of
  - a) 15 to 20% b)
  - 70 to 80% d) 90 to 95% C)
- 13) Rankine cycle comprises of \_\_\_\_\_.
  - a) Two isentropic processes and two const. volume processes
  - b) Two isentropic processes and two const. pressure processes
  - c) Two isothermal processes and two const. pressure processes
  - d) None of the above
- 14) Effect of friction in nozzle \_\_\_\_\_ dryness fraction of steam.
  - Increases a)

c)

- b) Decreases
- No change d) None of the above



b)

- - 35 to 45%

### Seat

#### S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Mechanical Engineering APPLIED THERMODYNAMICS**

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) out of remaining questions solve any two questions from each Section.

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  - 3) Use of Scientific calculator is allowed.
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### Section – I

Q.2	a)	State Kelvin-Plank and Clausius statements of second law of thermodynamics	05
	b)	A Carnot engine works between temperature limit of 825 <sup>°</sup> C and 125 <sup>°</sup> C. the engine receives 3600 kJ of heat per minute. Determine power of engine and amount of heat rejected to sink per second.	05
	c)	Ice melts at 0 <sup>°</sup> C with latent heat of fusion of 334.92 kJ/kg. At atm.press. water boils at 100 <sup>°</sup> C with latent heat of vaporization 2254 kJ/kg. Calculate the entropy change fusion and vaporization processes.	04
Q.3	a)	Explain with the help of sketch Property diagram for Phase-change process.	05
	b)	A boiler produces wet steam having dryness fraction 0.90. The working pressure of boiler is 12 bar absolute It generates steam at the rate of 640 kg/hr and consumes coal at the rate of 80 kg/hr, if the calorific value of coal is 31,400 kJ/kg and water is fed at temp, of 20°C,calculate 1) equivalent evaporation/kg of coal 2) factor of evaporation 3) boiler efficiency.	05
	c)	With the help of formulas explain the different heat losses occurs in the boiler plant	04
Q.4	a)	Derive an expression for entropy change of an ideal gas undergoing change of state, in terms of initial and final temperatures and volumes.	05
	b)	<ul> <li>In a Rankine cycle, dry saturated steam enters turbine at a pressure of 15</li> <li>bar and the exhaust pressure is 0.074 bar. determine</li> <li>1) Rankine cycle efficiency</li> <li>2) Specific steam consumption</li> <li>3) Work ratio</li> </ul>	05
	c)	Explain the effect of different operating conditions on Rankine cycle efficiency	04
		Section – II	
Q.5	a)	Steam enters a nozzle with a velocity of 250 m/s, pressure of 3 bar and dryness fraction 0.95. If the isentropic expansion in nozzle proceeds till the pressure at exit is 2 bar, calculate the exit velocity and area at exit from nozzle for flow of 0.75 kg/sec. Also show process on Mollier Diagram.	05

b) Define condenser, & explain with Sketch the elements of steam condensing 05 plant.

Max. Marks: 56

Set S



Set	S

			U
	c)	Explain the advantages of Steam turbine.	04
Q.6	a)	Derive an expression for maximum discharge through the nozzle.	05
	b)	Show that maximum blade efficiency in a single stage impulse turbine is given by $n_{\text{bmax}} = \cos^2 \alpha 1$ with usual notations.	05
	c)	Draw a Combined Velocity diagram of a Impulse turbine and mention the different notations used for it.	04
Q.7	a)	Derive the expression for a polytropic work input required in a single stage reciprocating air compressor with a suitable P-V diagram.	05
	b)	<ul> <li>A single stage reciprocating compressor has a bore of 200 mm and stroke of 300 mm. It runs at speed of 480 rpm. The clearance volume is 6% of the swept volume and law for compression, expantion is PV<sup>1.32</sup>=C. Intake pressure is 98 kPa and temp. is 27<sup>o</sup>C and compressor delivery} pressure is 500 kPa. Determine</li> <li>1) Volumetric efficiency</li> <li>2) Power required to run compressor</li> <li>3) Isothermal power</li> <li>4) Isothermal efficiency</li> </ul>	05
	c)	What is necessity of multistage compression? Discuss advantages of multistage compression with intercooling.	04

Day a Time	& Date : 10:00	e: Tue 0 AM	esday, 10-12-2019 To 01:00 PM		Max. Marks:	70
Instr	uctior	<b>is:</b> 1)	Q. No. 1 is compulsory and shou book.	uld be	e solved in first 30 minutes in answ	/er
		2)	Figures to the right indicate full r	narks	5.	
_			MCQ/Objective Typ	e Qu	lestions	
Dura	tion: 3	0 Min	nutes		Marks	14
Q.1	<b>Choc</b> 1)	D <b>se th</b> The appl	ne correct alternatives from the stress due to suddenly applied lo ied load. Two	ad is	ons and rewrite the sentence. times the gradually	14
		c)	Four	d)	Five	
	2)	Angl a) c)	e between the principal planes as 90° 120°	nd pla b) d)	ane of maximum shear stress is 45° None of the above	
	3)	The a) c)	property of material same in all d Homogeneous Elasticity	irectio b) d)	on is known as Isotropic None of these	
	4)	A sir of th a) b) c) d)	mply supported beam of span (I) e beam. The shear force diagram a rectangle a triangle two equal and opposite rectangl two equal and opposite triangles	carrie n will es	s a point load (w) at the center be	
<ul> <li>5) For a cantilever loaded with one-point load applied not at the free end maximum deflection occurs at the</li> <li>a) free end b) load point</li> <li>c) fixed end d) both a and b</li> </ul>				applied not at the free end, the load point both a and b		
	6)	The inter a) c)	torque transmitted by hollow share nal diameter (d) is equal to $\frac{\pi}{32} \tau (D^3 - d^3)$ $\frac{\pi}{16} \tau (D^4 - d^4)$	ft of e  b) d)	external diameter (D) and $\frac{\pi}{16} \tau (D^3 - d^3)$ $\frac{\pi}{32} \tau (\frac{D^4 - d^4}{D})$	
	7)	For a a) b) c) d)	an I – section. Bending stress is maximum at th Shear stress is zero at the neutr Bending stress is zero at the edu Shear stress is maximum at the	ne ne al axi ges neuti	utral axis s al axis	

#### Seat No.

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering MECHANICS OF MATERIALS

SLR-FR-18

Set P

Set | 8) For a simply supported beam of length (L) carrying a U.D.L. of w/m on its entire span, maximum slope is given by \_ 5wl<sup>4</sup>/384 El wl<sup>3</sup>/48EI a) b) wl<sup>3</sup>/6EI d)  $wl^3/24El$ c) The radius of Mohr's circle always represents \_\_\_\_\_. 9) minimum principal stress a) difference between the principal stresses b) c) maximum principal stress maximum shear stress d) 10) The bending moment on a section is maximum where shearing force is . Minimum b) Maximum a) c) Average d) Changing sign 11) Variation of shear stress across the depth of a section of a beam is . Linear b) Parabolic a) Cubic d) Exponential C) In case of circular section the section modulus is given as \_\_\_\_\_. 12)  $\frac{\pi}{16}d^2$  $\frac{\pi}{16}d^3$ a) b)  $\frac{\pi}{32}d^{3}$  $\frac{\pi}{16}d^{4}$ d) c) 13) Total strain energy stored in a body is called as \_\_\_\_\_ Impact load Modulus of resilience b) a) resilience C) d) proof resilience

- 14) If E = Young's Modulus, K = Bulk Modulus and G = Shear Modulus, then \_\_\_\_\_.
  - a) E = 9KG/(3K + G) b) E = 3KG/(3K + G)
  - c) E = 3KG/(6K + G)
- b) E = 3KG/(9K + G)d) E = 6KG/(3K + G)

SLR-FR-18

d) E = 6KG/(3K

Seat No.

> S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering MECHANICS OF MATERIALS

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Solve any two questions from each section.

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

Steel

wire

A

4) Assume additional suitable data, if necessary and mention it clearly.

copper wire

B

#### Section I

**Q.2** a) Two wires of equal length supports a rigid body AB of 85 kN as shown in figure below. If cross-section area of each wire is 400 mm<sup>2</sup>, calculate load and stress shared by each wire, If length of each wire is 3 m. Take  $E_{st} = 200$  GPa and  $E_{cu} = 110$  GPa.

111



85 KA

- Q.3 a) At a point in a strained material, the principal stresses are 130 MPa and 50 MPa respectively. Both stresses are tensile in nature. The plane inclined at 30° with major principal plane. Find normal, tangential and resultant stress on this plane along with angle of obliquity by using Mohr's circle method only.
  - b) A hollow of diameter ratio 3/8 is required to transmit 375 kW at 110 r.p.m The maximum torque = 1.25 mean torque. The shear stress is not to exceed 65 N/mm<sup>2</sup>, and twist in a length of 4 m not to exceed 2<sup>o</sup>. Calculate the external and internal diameter of the shaft, which will satisfy these conditions.

Take G =  $0.85 \times 10^5 \text{ N/mm}^2$ .

Max. Marks: 56

Set P

**Q.4** a) Prove that: E =3K (1-2µ).

b)

diagram.

b) A 15 mm diameter M.S. bar of 1.2 m is stressed by a weight of 135 N dropping freely through a distance 25 mm before commencing to stretch the bar. Find the maximum instantaneous stress and strain energy stored in the bar.

Take  $E = 2 \times 10^5 \text{ N/mm}^2$ .

- c) A point in a strained material is subjected to stresses as shown in figure.
   05
   Find
  - 1) Magnitude of principal stresses and direction of principal plane.
  - 2) Magnitude of maximum shear stress.



#### Section II

20 KN-m

**Q.5 a)** Draw the shear force and bending moment diagram for the following loaded beam. Indicate important points and calculate the maximum bending moment.

compressive stresses developed. Also draw bending stress distribution

- Q.6 a) A beam of I-section is simply supported on span 7 m carries u.d.l. of 'w' kN/m. Both flanges of I-section are 150 mm wide and 20 mm thick and web 300 mm deep and 10 mm thick. Find the U.D.L. on the beam, if the tensile stress shall not exceed 35 N/mm<sup>2</sup>.
  - b) An Inverted T section has the flange 150 mm x 50 mm and the web 150 mm X 50 mm. A vertical shear force of 50 kN acts on it when web is held vertically. Determine the shear stress induced at important points and plot the shear stress distribution across the section.

**08** 

05

04

SLR-FR-18

Set

06

80

# SLR-FR-18 Set P

04

- Q.7 a) A cantilever beam of length 4 m carries a point load of 30 kN at free end and another point load of 25 kN at distance 2 m from fixed end. If E = 110 GPa and I = 2 x 10<sup>8</sup> N/mm<sup>2</sup>. For the cantilever, find the slope and deflection at free end by moment area method.
   b) Define the terms Slope and Deflection.
  - c) Draw S.F.D. and B.M.D. for a cantilever beam having length (L) and subjected point load 'w' at free end.

Day Time	& Date : 10:0	e: Tue 0 AM	esday, 10-12-2019 To 01:00 PM		Max. Marks	: 70	
Instr	uctio	ns: 1)	) Q. No. 1 is compulsory and book.	should be	e solved in first 30 minutes in ansv	ver	
		Z,			».		
Dura	tion: 3	BO Mir	nutes	e Type Qu	lestions Marks	: 14	
Q.1	Cho	ose ti	he correct alternatives fror	n the opti	ons and rewrite the sentence.	14	
	1)	For entir	a simply supported beam of re span, maximum slope is g	length (L)	carrying a U.D.L. of w/m on its		
		a) c)	5wl⁺/384 El wl <sup>3</sup> /6El	b) d)	wl <sup>3</sup> /24El wl <sup>3</sup> /24El		
	<ul> <li>2) The radius of Mohr's circle always represents</li> <li>a) minimum principal stress</li> <li>b) difference between the principal stresses</li> <li>c) maximum principal stress</li> <li>d) maximum shear stress</li> </ul>						
	3)	<ul> <li>The bending moment on a section is maximum where shearing force is</li> <li>a) Minimum</li> <li>b) Maximum</li> <li>c) Average</li> <li>d) Changing sign</li> </ul>					
	4)	Variation of shear stress across the depth of a section of a beam is a) Linear b) Parabolic c) Cubic d) Exponential					
	5)	In ca a)	ase of circular section the se $\frac{\pi}{16}d^2$	ction mode b)	ulus is given as $\frac{\pi}{16}d^3$		
		c)	$\frac{\pi}{32}d^{3}$	d)	$\frac{\pi}{16}d^4$		
	6)	Tota a) c)	al strain energy stored in a bo Impact load resilience	ody is calle b) d)	ed as Modulus of resilience proof resilience		
	7)	lf E a) c)	= Young's Modulus, K = Bull E = $9KG/(3K + G)$ E = $3KG/(6K + G)$	k Modulus b) d)	and G = Shear Modulus, then E = $3KG/(9K + G)$ E = $6KG/(3K + G)$		
	8)	The appl a) c)	stress due to suddenly appli lied load. Two Four	ed load is b) d)	times the gradually Three Five		
	9)	Ang a) c)	le between the principal plar 90° 120°	es and pla b) d)	ane of maximum shear stress is _ 45° None of the above	<u> </u>	

Seat

No.

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering MECHANICS OF MATERIALS

SLR-FR-18

Set

Q

- 10) The property of material same in all direction is known as \_\_\_\_\_.
  - a) Homogeneous

- b) Isotropic
- c) Elasticity
- d) None of these

Set Q

- 11) A simply supported beam of span (I) carries a point load (w) at the center of the beam. The shear force diagram will be \_\_\_\_\_.
  - a) a rectangle
  - b) a triangle
  - c) two equal and opposite rectangles
  - d) two equal and opposite triangles
- 12) For a cantilever loaded with one-point load applied not at the free end, the maximum deflection occurs at the \_\_\_\_\_.
  - a) free end b) load point
  - c) fixed end d) both a and b
- 13) The torque transmitted by hollow shaft of external diameter (D) and internal diameter (d) is equal to \_\_\_\_\_.
  - a)  $\frac{\pi}{32} \tau(D^3 d^3)$ c)  $\frac{\pi}{16} \tau(D^4 - d^4)$ b)  $\frac{\pi}{16} \tau(D^3 - d^3)$ d)  $\frac{\pi}{32} \tau(\frac{D^4 - d^4}{D})$
- 14) For an I section.
  - a) Bending stress is maximum at the neutral axis
  - b) Shear stress is zero at the neutral axis
  - c) Bending stress is zero at the edges
  - d) Shear stress is maximum at the neutral axis

### SLR-FR-18 Set

Seat No.

> S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Mechanical Engineering MECHANICS OF MATERIALS**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Solve any two questions from each section.

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

Steel

wire

A

4) Assume additional suitable data, if necessary and mention it clearly.

copper wive

B

### Section I

Two wires of equal length supports a rigid body AB of 85 kN as shown in Q.2 a) **08** figure below. If cross-section area of each wire is 400 mm<sup>2</sup>, calculate load and stress shared by each wire. If length of each wire is 3 m. Take  $E_{st} = 200$  GPa and  $E_{cu} = 110$  GPa.

111



- Q.3 At a point in a strained material, the principal stresses are 130 MPa and 06 a) 50 MPa respectively. Both stresses are tensile in nature. The plane inclined at 30° with major principal plane. Find normal, tangential and resultant stress on this plane along with angle of obliguity by using Mohr's circle method only.
  - A hollow of diameter ratio 3/8 is required to transmit 375 kW at 110 r.p.m b) **08** The maximum torque = 1.25 mean torque. The shear stress is not to exceed 65 N/mm<sup>2</sup>, and twist in a length of 4 m not to exceed 2<sup>0</sup>. Calculate the external and internal diameter of the shaft, which will satisfy these conditions.

Take G =  $0.85 \times 10^5 \text{ N/mm}^2$ .

Q

Max. Marks: 56

- Q.4 Prove that:  $E = 3K (1-2\mu)$ . a)
  - A 15 mm diameter M.S. bar of 1.2 m is stressed by a weight of 135 N b) dropping freely through a distance 25 mm before commencing to stretch the bar. Find the maximum instantaneous stress and strain energy stored in the bar.

Take E =  $2 \times 10^5 \text{ N/mm}^2$ .

c) A point in a strained material is subjected to stresses as shown in figure. 05 Find

120 H/mm2

20 KN-m

- Magnitude of principal stresses and direction of principal plane. 1)
- 2) Magnitude of maximum shear stress.



Q.5 a) Draw the shear force and bending moment diagram for the following loaded beam. Indicate important points and calculate the maximum bending moment.

5m

\* 2m \* A beam is of 'T' section having top flange 120 mm x 20 mm and web b) 20 mm x 100 mm is simply supported over a span 5 m and carries U.D.L. of 3 kN/m over the entire span. Determine maximum tensile and compressive stresses developed. Also draw bending stress distribution diagram.

- A beam of I-section is simply supported on span 7 m carries u.d.l. of 'w' Q.6 a) kN/m. Both flanges of I-section are 150 mm wide and 20 mm thick and web 300 mm deep and 10 mm thick. Find the U.D.L. on the beam, if the tensile stress shall not exceed 35 N/mm<sup>2</sup>.
  - An Inverted T section has the flange 150 mm x 50 mm and the web b) 150 mm X 50 mm. A vertical shear force of 50 kN acts on it when web is held vertically. Determine the shear stress induced at important points and plot the shear stress distribution across the section.

**08** 

06

06

80



# SLR-FR-18 Set Q

04

- Q.7 a) A cantilever beam of length 4 m carries a point load of 30 kN at free end and another point load of 25 kN at distance 2 m from fixed end. If E = 110 GPa and I = 2 x 10<sup>8</sup> N/mm<sup>2</sup>. For the cantilever, find the slope and deflection at free end by moment area method.
   b) Define the terms Slope and Deflection.
  - c) Draw S.F.D. and B.M.D. for a cantilever beam having length (L) and subjected point load 'w' at free end.

### SLR-FR-18 Set

### S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Mechanical Engineering MECHANICS OF MATERIALS**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

#### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

C)

#### 14 Q.1 Choose the correct alternatives from the options and rewrite the sentence.

- 1) For a cantilever loaded with one-point load applied not at the free end, the maximum deflection occurs at the
  - free end a) fixed end
- b) load point d) both a and b
- The torque transmitted by hollow shaft of external diameter (D) and 2) internal diameter (d) is equal to \_\_\_\_\_
  - $\frac{\frac{\pi}{32}}{\frac{\pi}{16}}\tau(D^3 d^3)$ a) c)
- 3) For an I – section.
  - Bending stress is maximum at the neutral axis a)
  - Shear stress is zero at the neutral axis b)
  - Bending stress is zero at the edges c)
  - Shear stress is maximum at the neutral axis d)
- 4) For a simply supported beam of length (L) carrying a U.D.L. of w/m on its entire span, maximum slope is given by \_\_\_\_\_.

a)	5wl <sup>4</sup> /384 El	b)	wl <sup>3</sup> /48EI
c)	wl <sup>3</sup> /6El	d)	wl <sup>3</sup> /24EI

5) The radius of Mohr's circle always represents \_\_\_\_\_.

- minimum principal stress a)
- b) difference between the principal stresses
- maximum principal stress c)
- maximum shear stress d)

#### The bending moment on a section is maximum where shearing force is \_\_\_\_\_. 6)

- a) Minimum b) Maximum c) d)
  - Average Changing sign

#### 7) Variation of shear stress across the depth of a section of a beam is .

- Parabolic a) Linear b) Cubic Exponential c) d)
- 8) In case of circular section the section modulus is given as \_\_\_\_\_.

a)	$\frac{\pi}{16}d^{2}$	b)	$\frac{\pi}{16}d^{3}$
	10		10

 $\frac{\pi}{16}d^{4}$  $\frac{\pi}{32}d^{3}$ C) d)

Seat No.

Max. Marks: 70

R

Marks: 14



			SLR-FR-18
			Set R
9)	Total strain energy stored in a body a) Impact load c) resilience	is calle b) d)	ed as Modulus of resilience proof resilience
10)	If E = Young's Modulus, K = Bulk Mo a) E = $9KG/(3K + G)$ c) E = $3KG/(6K + G)$	odulus b) d)	and G = Shear Modulus, then E = $3KG/(9K + G)$ E = $6KG/(3K + G)$
11)	The stress due to suddenly applied applied load. a) Two c) Four	oad is b) d)	times the gradually Three Five
12)	Angle between the principal planes ( a) 90° c) 120°	and pla b) d)	ane of maximum shear stress is 45° None of the above
13)	<ul><li>The property of material same in all</li><li>a) Homogeneous</li><li>c) Elasticity</li></ul>	directio b) d)	on is known as Isotropic None of these
14)	<ul> <li>A simply supported beam of span (I) of the beam. The shear force diagra</li> <li>a) a rectangle</li> <li>b) a triangle</li> <li>c) two equal and opposite rectangle</li> <li>d) two equal and opposite triangle</li> </ul>	carrie m will gles es	s a point load (w) at the center be
Set

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Mechanical Engineering MECHANICS OF MATERIALS** 

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Solve any two questions from each section.

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

Steel

wire

A

4) Assume additional suitable data, if necessary and mention it clearly.

copper wive

B

### Section I

Two wires of equal length supports a rigid body AB of 85 kN as shown in Q.2 a) **08** figure below. If cross-section area of each wire is 400 mm<sup>2</sup>, calculate load and stress shared by each wire. If length of each wire is 3 m. Take  $E_{st} = 200$  GPa and  $E_{cu} = 110$  GPa.

111



85 KA

- Q.3 At a point in a strained material, the principal stresses are 130 MPa and 06 a) 50 MPa respectively. Both stresses are tensile in nature. The plane inclined at 30° with major principal plane. Find normal, tangential and resultant stress on this plane along with angle of obliguity by using Mohr's circle method only.
  - A hollow of diameter ratio 3/8 is required to transmit 375 kW at 110 r.p.m b) **08** The maximum torque = 1.25 mean torque. The shear stress is not to exceed 65 N/mm<sup>2</sup>, and twist in a length of 4 m not to exceed 2<sup>0</sup>. Calculate the external and internal diameter of the shaft, which will satisfy these conditions.

Take G =  $0.85 \times 10^5 \text{ N/mm}^2$ .

No.

Seat

Max. Marks: 56



# **Q.4** a) Prove that: E =3K (1-2µ).

A 15 mm diameter M.S. bar of 1.2 m is stressed by a weight of 135 N dropping freely through a distance 25 mm before commencing to stretch the bar. Find the maximum instantaneous stress and strain energy stored in the bar.

Take  $E = 2 \times 10^5 \text{ N/mm}^2$ .

c) A point in a strained material is subjected to stresses as shown in figure.
 05
 Find

120 H/mm2

SONIMON

20 KN-m

- 1) Magnitude of principal stresses and direction of principal plane.
- 2) Magnitude of maximum shear stress.



Q.5 a) Draw the shear force and bending moment diagram for the following loaded beam. Indicate important points and calculate the maximum bending moment.

b) A beam is of 'T' section having top flange 120 mm x 20 mm and web 20 mm x 100 mm is simply supported over a span 5 m and carries U.D.L. of 3 kN/m over the entire span. Determine maximum tensile and compressive stresses developed. Also draw bending stress distribution

diagram.
 Q.6 a) A beam of I-section is simply supported on span 7 m carries u.d.l. of 'w' kN/m. Both flanges of I-section are 150 mm wide and 20 mm thick and web 300 mm deep and 10 mm thick. Find the U.D.L. on the beam, if the

tensile stress shall not exceed 35 N/mm<sup>2</sup>.

b) An Inverted T section has the flange 150 mm x 50 mm and the web 150 mm X 50 mm. A vertical shear force of 50 kN acts on it when web is held vertically. Determine the shear stress induced at important points and plot the shear stress distribution across the section.

08

06

06

80



05

# SLR-FR-18 Set R

- Q.7 a) A cantilever beam of length 4 m carries a point load of 30 kN at free end and another point load of 25 kN at distance 2 m from fixed end. If E = 110 GPa and I = 2 x 10<sup>8</sup> N/mm<sup>2</sup>. For the cantilever, find the slope and deflection at free end by moment area method.
   b) Define the terms Slope and Deflection.
  - c) Draw S.F.D. and B.M.D. for a cantilever beam having length (L) and subjected point load 'w' at free end.

			MECHANICS OF	MAT	ERIALS
Day Time	& Date : 10:00	e: Tue D AM	esday, 10-12-2019 To 01:00 PM		Max. Marks: 70
Instr	uctior	<b>is:</b> 1)	Q. No. 1 is compulsory and sho book.	uld be	e solved in first 30 minutes in answer
		2)	Figures to the right indicate full	marks	5.
			MCQ/Objective Ty	be Qu	lestions
Dura	tion: 3	0 Mir	nutes		Marks: 14
Q.1	<b>Choc</b> 1)	<b>se th</b> The a) c)	<b>ne correct alternatives from the</b> bending moment on a section is Minimum Average	<b>e opti</b> maxir b) d)	ons and rewrite the sentence. 14 num where shearing force is Maximum Changing sign
	2)	Varia a) c)	ation of shear stress across the c Linear Cubic	lepth b) d)	of a section of a beam is Parabolic Exponential
	3)	In ca a)	ase of circular section the section $\frac{\pi}{16}d^2$	mod b)	ulus is given as $\frac{\pi}{16}d^3$
		c)	$\frac{\pi}{32}d^3$	d)	$rac{\pi}{16}d^4$
	4)	Tota a) c)	I strain energy stored in a body is Impact load resilience	s calle b) d)	ed as Modulus of resilience proof resilience
	5)	lf E ⊧ a) c)	= Young's Modulus, K = Bulk Mo E = 9KG/(3K + G) E = 3KG/(6K + G)	dulus b) d)	and G = Shear Modulus, then E = $3KG/(9K + G)$ E = $6KG/(3K + G)$
	6)	The appl a) c)	stress due to suddenly applied lo ied load. Two Four	bad is b) d)	times the gradually Three Five
	7)	Angl a) c)	e between the principal planes a 90° 120°	nd pla b) d)	ane of maximum shear stress is 45° None of the above
	8)	The a) c)	property of material same in all c Homogeneous Elasticity	lirecti b) d)	on is known as Isotropic None of these
	9)	A sir of th a) b) c) d)	mply supported beam of span (I) e beam. The shear force diagran a rectangle a triangle two equal and opposite rectang two equal and opposite triangles	carrie n will es	es a point load (w) at the center be

Seat

No.

# S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering MECHANICS OF MATERIALS

Page **16** of **20** 

SLR-FR-18

Set

S

10) For a cantilever loaded with one-point load applied not at the free end, the maximum deflection occurs at the \_

- load point free end b) a)
- fixed end both a and b C) d)
- The torque transmitted by hollow shaft of external diameter (D) and 11) The torque transmissary, internal diameter (d) is equal to \_\_\_\_\_. b)
  - $\frac{\pi}{32}\tau(D^3 d^3)$  $\frac{\pi}{16}\tau(D^4 d^4)$ a) c) ď

$$\frac{\pi}{16}\tau(D^3 - d^3) = \frac{\pi}{32}\tau(\frac{D^4 - d^4}{D})$$

SLR-FR-18

Set

- For an I section. 12)
  - Bending stress is maximum at the neutral axis a)
  - b) Shear stress is zero at the neutral axis
  - Bending stress is zero at the edges c)
  - Shear stress is maximum at the neutral axis d)
- For a simply supported beam of length (L) carrying a U.D.L. of w/m on its 13) entire span, maximum slope is given by \_\_\_\_\_.
  - wl<sup>3</sup>/48EI 5wl<sup>4</sup>/384 El a) b)
  - wl<sup>3</sup>/6EI d) wl<sup>3</sup>/24EI c)
- 14) The radius of Mohr's circle always represents \_\_\_\_\_.
  - minimum principal stress a)
  - difference between the principal stresses b)
  - maximum principal stress C)
  - maximum shear stress d)

copper wive

B

# S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Mechanical Engineering MECHANICS OF MATERIALS**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Solve any two questions from each section.

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

Steel

wire

A

4) Assume additional suitable data, if necessary and mention it clearly.

# Section I

Two wires of equal length supports a rigid body AB of 85 kN as shown in Q.2 a) **08** figure below. If cross-section area of each wire is 400 mm<sup>2</sup>, calculate load and stress shared by each wire. If length of each wire is 3 m. Take  $E_{st} = 200$  GPa and  $E_{cu} = 110$  GPa.

111



85 KA

- Q.3 At a point in a strained material, the principal stresses are 130 MPa and 06 a) 50 MPa respectively. Both stresses are tensile in nature. The plane inclined at 30° with major principal plane. Find normal, tangential and resultant stress on this plane along with angle of obliguity by using Mohr's circle method only.
  - A hollow of diameter ratio 3/8 is required to transmit 375 kW at 110 r.p.m b) **08** The maximum torque = 1.25 mean torque. The shear stress is not to exceed 65 N/mm<sup>2</sup>, and twist in a length of 4 m not to exceed 2<sup>0</sup>. Calculate the external and internal diameter of the shaft, which will satisfy these conditions.

Take G =  $0.85 \times 10^5 \text{ N/mm}^2$ .

Seat No.

Max. Marks: 56

Set S

#### Q.4 Prove that: $E = 3K (1-2\mu)$ . a)

A 15 mm diameter M.S. bar of 1.2 m is stressed by a weight of 135 N b) dropping freely through a distance 25 mm before commencing to stretch the bar. Find the maximum instantaneous stress and strain energy stored in the bar.

Take E =  $2 \times 10^5 \text{ N/mm}^2$ .

c) A point in a strained material is subjected to stresses as shown in figure. 05 Find

120 H/mm2

SONIMON

20 KN-m

- Magnitude of principal stresses and direction of principal plane. 1)
- 2) Magnitude of maximum shear stress.



Q.5 a) Draw the shear force and bending moment diagram for the following loaded beam. Indicate important points and calculate the maximum bending moment.

5m

× 2m yr A beam is of 'T' section having top flange 120 mm x 20 mm and web b) 20 mm x 100 mm is simply supported over a span 5 m and carries U.D.L. of 3 kN/m over the entire span. Determine maximum tensile and compressive stresses developed. Also draw bending stress distribution diagram.

A beam of I-section is simply supported on span 7 m carries u.d.l. of 'w' Q.6 a) kN/m. Both flanges of I-section are 150 mm wide and 20 mm thick and web 300 mm deep and 10 mm thick. Find the U.D.L. on the beam, if the tensile stress shall not exceed 35 N/mm<sup>2</sup>.

An Inverted T section has the flange 150 mm x 50 mm and the web b) 150 mm X 50 mm. A vertical shear force of 50 kN acts on it when web is held vertically. Determine the shear stress induced at important points and plot the shear stress distribution across the section.

**08** 

06

06

80



05

# SLR-FR-18 Set S

04

Q.7	a)	A cantilever beam of length 4 m carries a point load of 30 kN at free end and another point load of 25 kN at distance 2 m from fixed end. If E = 110 GPa and I = 2 x $10^8$ N/mm <sup>2</sup> . For the cantilever, find the slope and	08
		deflection at free end by moment area method.	
	b)	Define the terms Slope and Deflection.	02

c) Draw S.F.D. and B.M.D. for a cantilever beam having length (L) and subjected point load 'w' at free end.

# Seat No. S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Mechanical Engineering**

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

a)

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MANUFACTURING PROCESSES

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

# **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

### Q.1 Choose the correct alternatives from the options and rewrite the A) sentence. (1 marks each)

- Which of the following material is not used for charging in cupola? 1)
  - Pig iron a) MS scrap b)
  - Returns d) CI borings c)
- The furnace commonly used in non ferrous foundries is . 2) Cupola
  - Direct arc furnaces b) d) any of above
  - Induction furnace c)
- 3) Higher ramming density gives \_\_\_\_\_ to mould. b) Low permeability
  - Good Collapsibility a) c)
    - Low strength High permeability d)
- Following is the product of Thermosetting Plastics 4)
  - Oil bottle a) Bucket c)
- Plastic dishes b) **Electrical components** d)
- 5) is one of filler metal used in the soldering.
  - a) Fe b) Ar d) Au C) Ag

Which of the following additives in sand is reducing agent? 6)

- Saw dust Coal dust a) b)
- C) iron oxide d) Bentonite
- Mild Steel bar used for workshop practical is manufactured by 7)
  - rolling b) Casting a)
  - c) forging d) Extrusion
- The billet is uniformly confined from all sides in case of \_\_\_\_\_ 8) Extrusion
  - Direct Indirect a) b)
  - Hydrostatic d) Impact C)

# SLR-FR-19

Set



Max. Marks: 70

Ρ

Marks: 14

### Q.1 B) Choose the correct alternatives from the options and rewrite the sentence. (2 marks each)

- For joining of two parts without use of extra filler metal, following 1) processes are used \_\_\_\_\_.
  - a) Brazing
- b) TIG welding
- MIG welding C)
- Resistance welding d)
- Investment Casting process \_\_\_\_\_. 2)
  - uses Metal Pattern a)
  - is suitable for Mass Production b)
  - uses wax pattern C)
  - is used for manufacturing of Lathe Bed d)
- Cam shaft for automotive is manufactured by \_\_\_\_\_. 3)
  - Casting a) Extrusion C)

Forging b) d) Rolling

Set

Ρ

Seat No.				Set	Ρ				
S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering MANUFACTURING PROCESSES									
Day & Time:	& Da : 10:	te: Thursday,12-12 00 AM To 01:00 Pl	2-2019 M	Max. Marks	: 56				
Instru	<ul> <li>Instructions: 1) Attempt any two questions from each section.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Assume suitable data if necessary.</li> <li>4) Neat sketches must be drawn wherever necessary.</li> </ul>								
			Section – I						
Q.2	a)	Explain the follow 1) Follow board 2) Horizontal co	ving with neat sketch: d pattern ore		06				
	b) c)	Explain the vario What are the adv	us allowances provided on pattern. /antages of casting process?		05 03				
Q.3	a) b) c)	Enlist requisite p Explain the adva Explain various e ratio?	roperties of green molding sand. ntages and limitations of Investment casting p elements of gating system with neat sketch. W	process. /hat is gating	04 04 06				
Q.4	a) b) c)	Explain with neat Explain any five o Explain the adva	t sketch construction and steps in operation of common important defects in castings with ne ntages of mechanization in a foundry.	f cupola. eat sketch.	06 05 03				
			Section – II						
Q.5	a) b) c)	Compare betwee Explain with neat Explain classifica mill.	en Hot working and cold working processes. I sketch the process of closed die forging. In ation of Rolling mills on the basis of no of stand	ds in rolling	04 05 05				
Q.6	a)	Explain with neat	t sketch, process of Direct extrusion, with its a	idvantages	05				
	b) c)	Explain the proce Enlist the proces drawing with floa	ess of Rod drawing with neat sketch. ses of tube drawing and explain the process o ting mandrel.	of tube	04 05				
Q.7	a) b) c)	Explain various t Compare betwee Compare betwee	ypes of flames in gas welding with neat sketcl en TIG welding and MIG welding. en welding and brazing.	h.	06 04 04				

# No. S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Mechanical Engineering**

# MANUFACTURING PROCESSES

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

# **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

7)

#### Q.1 Choose the correct alternatives from the options and rewrite the A) **08** sentence. (1 marks each) 1)

- is one of filler metal used in the soldering.
  - a) Fe b) Ar
  - d) Au Ag C)
- Which of the following additives in sand is reducing agent? 2)
  - Saw dust b) Coal dust a) c) iron oxide d) Bentonite
- 3) Mild Steel bar used for workshop practical is manufactured by
  - rolling Casting a) b)
  - forging d) Extrusion C)
- 4) The billet is uniformly confined from all sides in case of \_\_\_\_\_ Extrusion
  - a) Direct b) Indirect
    - Hydrostatic d) Impact c)
- Which of the following material is not used for charging in cupola? 5) Pia iron
  - MS scrap a) b) Returns C)
    - d) CI borings

b)

d)

The furnace commonly used in non ferrous foundries is . 6)

- Direct arc furnaces a)
- Induction furnace C)
- Higher ramming density gives \_ to mould.
  - Good Collapsibility Low permeability a) b)
  - Low strength High permeability C) d)

8) Following is the product of Thermosetting Plastics

- Oil bottle a) c) Bucket
- Plastic dishes b)

Cupola

any of above

d) **Electrical components** 



Max. Marks: 70

Seat

Marks: 14

Set Q

06

# Q.1 B) Choose the correct alternatives from the options and rewrite the sentence. (2 marks each)

- 1) Investment Casting process \_\_\_\_\_.
  - a) uses Metal Pattern
  - b) is suitable for Mass Production
  - c) uses wax pattern
  - d) is used for manufacturing of Lathe Bed
- 2) Cam shaft for automotive is manufactured by \_\_\_\_\_.
  - a) Casting b) Forging
  - c) Extrusion d) Rolling
- 3) For joining of two parts without use of extra filler metal, following processes are used \_\_\_\_\_.
  - a) Brazing
  - c) MIG welding
- b) TIG welding
- d) Resistance welding

Seat No.			Set	Q			
S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering MANUFACTURING PROCESSES							
Day 8 Time:	& Dat 10:0	te: Thursday,12-12-2019 00 AM To 01:00 PM	Max. Marks	: 56			
Instru	uctic	<ul> <li><b>ns:</b> 1) Attempt any two question (2) Figures to the right (3) Assume suitable duestication (4) Neat sketches mustion (1)</li> </ul>	estions from each section. indicate full marks. ata if necessary. t be drawn wherever necessary.				
			Section – I				
Q.2	a)	<ul><li>Explain the following with</li><li>1) Follow board patterr</li><li>2) Horizontal core</li></ul>	neat sketch:	06			
	b) c)	Explain the various allow What are the advantages	ances provided on pattern. of casting process?	05 03			
Q.3	a) b) c)	Enlist requisite properties Explain the advantages a Explain various elements ratio?	s of green molding sand. and limitations of Investment casting process. of gating system with neat sketch. What is gating	04 04 06			
Q.4	a) b) c)	Explain with neat sketch Explain any five commor Explain the advantages of	construction and steps in operation of cupola. important defects in castings with neat sketch. of mechanization in a foundry.	06 05 03			
			Section – II				
Q.5	a) b) c)	Compare between Hot w Explain with neat sketch Explain classification of I mill.	orking and cold working processes. the process of closed die forging. Rolling mills on the basis of no of stands in rolling	04 05 05			
Q.6	a)	Explain with neat sketch	process of Direct extrusion, with its advantages	05			
	b) c)	Explain the process of R Enlist the processes of tu drawing with floating ma	od drawing with neat sketch. Ibe drawing and explain the process of tube Indrel.	04 05			
Q.7	a) b) c)	Explain various types of Compare between TIG w Compare between welding	lames in gas welding with neat sketch. elding and MIG welding. ng and brazing.	06 04 04			

No. S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019

**Mechanical Engineering** MANUFACTURING PROCESSES

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

# **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

Seat

#### Q.1 Choose the correct alternatives from the options and rewrite the A) **08** sentence. (1 marks each)

- Higher ramming density gives \_\_\_\_\_ to mould. 1) a)
  - Good Collapsibility b) Low permeability
  - Low strength d) High permeability c)
- Following is the product of Thermosetting Plastics 2)
  - Oil bottle b) Plastic dishes a)
  - c) Bucket d) **Electrical components**
- 3) \_ is one of filler metal used in the soldering.
  - Fe Ar a) b) c) Ag d) Au
- Which of the following additives in sand is reducing agent? 4)
  - Saw dust Coal dust a) b)
  - c) iron oxide d) Bentonite
- 5) Mild Steel bar used for workshop practical is manufactured by
  - rollina a) b) Casting forging d) Extrusion c)
- The billet is uniformly confined from all sides in case of 6) Extrusion
  - a) Direct b) Indirect
  - c) Hydrostatic d) Impact
- Which of the following material is not used for charging in cupola? 7)
  - Pig iron MS scrap b) a)
  - **CI** borings C) Returns d)
- 8) The furnace commonly used in non ferrous foundries is \_\_\_\_\_.
  - Direct arc furnaces a) Induction furnace C)
- b) Cupola d) any of above

# SLR-FR-19



Max. Marks: 70

Marks: 14

Set R

# Q.1 B) Choose the correct alternatives from the options and rewrite the sentence. (2 marks each)

- 1) Cam shaft for automotive is manufactured by \_\_\_\_\_.
  - a) Casting b) Forging
  - c) Extrusion d) Rolling
- 2) For joining of two parts without use of extra filler metal, following processes are used \_\_\_\_\_.
  - a) Brazing

- b) TIG welding
- c) MIG welding d) Resistance welding
- 3) Investment Casting process \_\_\_\_\_.
  - a) uses Metal Pattern
  - b) is suitable for Mass Production
  - c) uses wax pattern
  - d) is used for manufacturing of Lathe Bed

Seat No.		S	et	R				
S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering MANUFACTURING PROCESSES								
Day & Time:	Dat 10:0	te: Thursday,12-12-2019 Max. M 00 AM To 01:00 PM	arks	: 56				
Instru	ictio	<ul> <li>Attempt any two questions from each section.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Assume suitable data if necessary.</li> <li>4) Neat sketches must be drawn wherever necessary.</li> </ul>						
		Section – I						
Q.2	a)	Explain the following with neat sketch: 1) Follow board pattern 2) Horizontal core		06				
	b) c)	Explain the various allowances provided on pattern. What are the advantages of casting process?		05 03				
Q.3	a) b) c)	Enlist requisite properties of green molding sand. Explain the advantages and limitations of Investment casting process. Explain various elements of gating system with neat sketch. What is gati ratio?	ng	04 04 06				
Q.4	a) b) c)	Explain with neat sketch construction and steps in operation of cupola. Explain any five common important defects in castings with neat sketch. Explain the advantages of mechanization in a foundry.		06 05 03				
		Section – II						
Q.5	a) b) c)	Compare between Hot working and cold working processes. Explain with neat sketch the process of closed die forging. Explain classification of Rolling mills on the basis of no of stands in rollin mill.	g	04 05 05				
Q.6	a)	Explain with neat sketch, process of Direct extrusion, with its advantages	6	05				
	b) c)	Explain the process of Rod drawing with neat sketch. Enlist the processes of tube drawing and explain the process of tube drawing with floating mandrel.		04 05				
Q.7	a) b) c)	Explain various types of flames in gas welding with neat sketch. Compare between TIG welding and MIG welding. Compare between welding and brazing.		06 04 04				

# No. S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Mechanical Engineering**

# MANUFACTURING PROCESSES

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

# **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

Seat

### Q.1 Choose the correct alternatives from the options and rewrite the A) sentence. (1 marks each)

- Mild Steel bar used for workshop practical is manufactured by 1)
  - a) rolling c)

c)

- b) Casting d) Extrusion forging
- 2) The billet is uniformly confined from all sides in case of \_\_\_\_\_ Extrusion
  - a) Direct b) Indirect
  - c) Hydrostatic d) Impact
- Which of the following material is not used for charging in cupola? 3) Pig iron

CI borings

any of above

**Plastic dishes** 

- a) MS scrap b) Returns c)
  - d)
- The furnace commonly used in non ferrous foundries is \_\_\_\_\_. 4) b) Cupola
  - Direct arc furnaces a)
  - Induction furnace d) C)
- Higher ramming density gives \_ to mould. 5)
  - Good Collapsibility b) Low permeability a)
  - Low strength d) High permeability C)

Following is the product of Thermosetting Plastics 6)

- Oil bottle a) b)
  - **Bucket** d) **Electrical components**
- is one of filler metal used in the soldering. 7)
  - a) Fe b) Ar Ag d) Au C)
- 8) Which of the following additives in sand is reducing agent?
  - Saw dust Coal dust a) b)
  - iron oxide d) **Bentonite** C)

# SLR-FR-19

Set

Max. Marks: 70



S

Marks: 14

### Q.1 B) Choose the correct alternatives from the options and rewrite the sentence. (2 marks each)

- For joining of two parts without use of extra filler metal, following 1) processes are used \_\_\_\_\_.
  - a) Brazing C)
- b) TIG welding Resistance welding d)
- MIG welding
- Investment Casting process \_\_\_\_\_. 2)
  - uses Metal Pattern a)
  - is suitable for Mass Production b)
  - uses wax pattern C)
  - is used for manufacturing of Lathe Bed d)
- Cam shaft for automotive is manufactured by \_\_\_\_\_. 3)
  - Casting a) Extrusion C)
- Forging b) d) Rolling

06

S

# SLR-FR-19

Set

Seat No.		Set	S					
S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering MANUFACTURING PROCESSES								
Day & Time:	a Dat 10:0	e: Thursday,12-12-2019 Max. Marks: 00 AM To 01:00 PM	: 56					
Instru	ictio	<ul> <li>ns: 1) Attempt any two questions from each section.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Assume suitable data if necessary.</li> <li>4) Neat sketches must be drawn wherever necessary.</li> </ul>						
		Section – I						
Q.2	a)	<ul><li>Explain the following with neat sketch:</li><li>1) Follow board pattern</li><li>2) Horizontal core</li></ul>	06					
	b) c)	Explain the various allowances provided on pattern. What are the advantages of casting process?	05 03					
Q.3	a) b) c)	Enlist requisite properties of green molding sand. Explain the advantages and limitations of Investment casting process. Explain various elements of gating system with neat sketch. What is gating ratio?	04 04 06					
Q.4	a) b) c)	Explain with neat sketch construction and steps in operation of cupola. Explain any five common important defects in castings with neat sketch. Explain the advantages of mechanization in a foundry.	06 05 03					
		Section – II						
Q.5	a) b) c)	Compare between Hot working and cold working processes. Explain with neat sketch the process of closed die forging. Explain classification of Rolling mills on the basis of no of stands in rolling mill.	04 05 05					
Q.6	a)	Explain with neat sketch, process of Direct extrusion, with its advantages	05					
	b) c)	Explain the process of Rod drawing with neat sketch. Enlist the processes of tube drawing and explain the process of tube drawing with floating mandrel.	04 05					
Q.7	a) b) c)	Explain various types of flames in gas welding with neat sketch. Compare between TIG welding and MIG welding. Compare between welding and brazing.	06 04 04					

ct truss is J, th	nen numbe	r of member
b)	2J – 3	

rotational motion

- d) None of these
- On a ladder resting on a rough floor and leaning against a smooth vertical 4) wall, the force of friction acts \_\_\_\_
  - Downwards at its upper end a)
  - Upwards at its upper end b)
  - Perpendicular to the wall at its upper end c)
  - Zero at its upper end d)
- 5) If number of joints in a perfect in the frame m is \_\_\_\_\_.
  - a) 2 J
  - C) 2J + 3 2J – 4 d)
- 6) A couple can produces \_\_\_\_\_
  - translatory motion a) b)
  - combined (a) and (b) c) d) None of these

**ENGINEERING MECHANICS** Day & Date: Monday, 09-12-2019 Time: 10:00 AM To 01:00 PM Book Page.

Seat

**Duration: 30 Minutes** 

No.

2) Figures to the right indicate full marks.

10 kN

# **MCQ/Objective Type Questions**

# **Instructions:** 1) Q. No 1 is compulsory. It should be solved in first 30 minutes in Answer.

#### Q.1 Choose the correct alternative from the options and rewrite the sentence. 14

- The resulatant of two forces P and Q acting at an angle  $\theta$  is \_\_\_\_\_. 1)
  - $P^2 + Q^2 + 2P\sin\theta$  $P^2 + Q^2 + 2PQ \cos \theta$ a) b) c)
    - $P^2 + O^2 + 2PO$ d)  $\sqrt{P^2 + O^2 + 2PO\cos\theta}$
- The beam a shown in the Figure no 1. A hinge support at A and a roller support 2) at B. The reaction  $R_A$  of the hinged support A of the beam is \_\_\_\_\_.



- a) 30 kN d) 40 kN C)
- 3) A body which can retain its original shape and size even if it subjected to external forces, is known as \_\_\_\_
  - Plastic body b) Elastic body a)
  - Rigid body c)

SLR-FR-2

Marks: 14

Max. Marks: 70

Set F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019

SLR-FR-2 Set P

- The ratio of static friction to dynamic friction is always \_\_\_\_\_\_.
  - a) =1 b) <1
  - c) >1 d) None of these
- 8) A particle is dropped from a height 'h' above the ground. Assuming negligible air resistance. The velocity with which it will strikes the ground is

	•		
a)	2gh	b)	(2gh) <sup>1/2</sup>
c)	(2gh) <sup>3/2</sup>	d)	2 (gh) <sup>1/2</sup>

- The principle which converts a dynamic problem into static problem is known as \_\_\_\_\_.
  - a) D' Alembert's Principle
  - b) Principle of conservation of energy
  - c) Principle of transmissibility
  - d) Principle of conservation

# 10) During elastic impact, the relative velocity of two bodies after impacts is \_\_\_\_\_\_ the relative velocity of the two bodies before impact.

- a) Equal to b) Less than
- c) Greater than d) None of these
- 11) The work done on a body is zero when, \_\_\_\_\_
  - a) There is no displacement of the body
  - b) Resultant of forces acting on it is zero
  - c) The displacement is perpendicular to the direction of force
  - d) All of the above
- 12) The unit for impulse is \_\_\_\_\_.
  - a) N-sec b) N-mm
  - c) N-cm<sup>2</sup> d) N/mm
- The rate of change of displacement of a body with respect to time, is known as \_\_\_\_\_.
  - a) Velocityc) Speed
    - b) Accelerationd) None of these
- 14) If the periodic motion takes place without any external force, the vibration is called as \_\_\_\_\_.
  - a) Free Vibration

C)

- b) Forced Vibration
- both a and b d) None of these

# Set F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019

**ENGINEERING MECHANICS** 

Day & Date: Monday, 09-12-2019 Time: 10:00 AM To 01:00 PM

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

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

### Section I

### Q.2 Attempt any four of the following questions.

Draw the free body diagram of ball of weight W, supported by string AB a) and resting against a smooth vertical wall at C and also resting against a smooth horizontal floor at D as shown in Fig No 2.

B

11

Fig No 2

- b) Enlist different types of supports and also draw its sketch.
- Define and explain characteristics of couple. C)
- State and Explain Lami's Theorem. d)
- Find Center of Gravity of T -section as shown in Fig No 3. e)



**f)** State assumptions made in the analysis of perfect frame. Max. Marks: 56

SLR-FR-2



### Q.3 Attempt any two of the following questions.

a) A beam is loaded as shown in Fig No 4. Determine the reactions at supports.



**b)** Determine the forces in the truss shown in Fig No.5 which carries horizontal load of 12kN and vertical load of 18kN.

16KN

- A body of weight ZON is placed on a rough horizontal plane. To just me
- c) A body of weight 70N is placed on a rough horizontal plane. To just move the body on the horizontal plane, a push of 20N inclined at 20° to the horizontal plane is required. Find the co-efficient of friction.





## Q.4 Attempt any four of the following questions.

- a) Distinguish between angular motion and linear motion.
- **b)** Explain the term free vibration.
- **c)** A circular disc has a mass moment of inertia of 12 kg-m<sup>2</sup> about its axis of rotation. If it is initially at rest, find its angular velocity after 3 seconds, if it is acted upon by a torque of magnitude 800 Nm.
- d) State principle of conservation of energy. Give its application.
- e) Explain coefficient of restitution.
- f) A body is rotating with an angular velocity of 5 radians/sec. After 4 sec, the angular velocity of body becomes 13 rad/sec. Determine the angular acceleration of the body.

### Q.5 Attempt any two of the following questions.

- a) An elevator cage of a mine shaft weighing 8 kN, when empty is lifted or lowered by means of a wire rope. Once a man weighing 600N, entered it and lowered with uniform acceleration such that when a distance of 187.5 m was covered, the velocity of the cage was 25 m/s. Determine the tension in the rope and the force exerted by the man on the floor of the cage.
- b) A particle is projected in air with a velocity of u=100 m/s at an angle of  $\alpha = 30^{\circ}$  with the horizontal.
  - Find.
  - 1) The horizontal range
  - 2) The maximum height reached by the particle
  - 3) Total time of flight
- c) Two cars are travelling towards each other on a single lane road at the velocities12 m/s and 9 m/s. respectively. When 100 m apart, both drivers realize the situation and apply their brakes. They succeed in stopping simultaneously and just short of colliding. Assume constant deceleration for each case and determine.
  - 1) Time required for cars to stop
  - 2) Deceleration of each car and
  - 3) The distance travelled by each car while slowing down

16

12

SLR-FR-2 Set P

#### Book Page. Figures to the right indicate full marks. **MCQ/Objective Type Questions** Marks: 14 Choose the correct alternative from the options and rewrite the sentence. A particle is dropped from a height 'h' above the ground. Assuming 1) $(2gh)^{1/2}$ 2gh a) b) 2 (gh)<sup>1/2</sup> (2gh)<sup>3/2</sup> d) c) 2) The principle which converts a dynamic problem into static problem is known as D' Alembert's Principle a) Principle of conservation of energy b) Principle of transmissibility C) Principle of conservation d) During elastic impact, the relative velocity of two bodies after impacts is 3) the relative velocity of the two bodies before impact. a) Equal to b) Less than Greater than None of these d) c) The work done on a body is zero when, \_\_\_\_\_ 4) There is no displacement of the body a) Resultant of forces acting on it is zero b) The displacement is perpendicular to the direction of force C) d) All of the above 5) The unit for impulse is \_\_\_\_\_. a) N-sec b) N-mm N-cm<sup>2</sup> c) d) N/mm 6) The rate of change of displacement of a body with respect to time, is known as Velocity a) b) Acceleration c) Speed d) None of these 7) If the periodic motion takes place without any external force, the vibration is called as **Forced Vibration** Free Vibration b) a) None of these d)

**Instructions:** 1) Q. No 1 is compulsory. It should be solved in first 30 minutes in Answer.

**ENGINEERING MECHANICS** 

**Duration: 30 Minutes** 

Day & Date: Monday, 09-12-2019

Time: 10:00 AM To 01:00 PM

Seat

No.

# Q.1

negligible air resistance. The velocity with which it will strikes the ground is

- - c) both a and b
  - The resulatant of two forces P and Q acting at an angle  $\theta$  is \_\_\_\_\_
  - $P^2 + Q^2 + 2P \sin \theta$ a)  $P^2 + Q^2 + 2PQ$ c)

8)

 $P^2 + Q^2 + 2PQ\cos\theta$ b) d)  $\sqrt{P^2 + O^2 + 2PO \cos\theta}$ 

SLR-FR-2

F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019

Q

14

Max. Marks: 70

# $\begin{array}{c} \text{SLR-FR-2} \\ \text{Set} \quad \boxed{\textbf{Q}} \\ \end{array}$ The beam a shown in the Figure no 1. A hinge support at A and a roller support at B. The reaction R<sub>A</sub> of the hinged support A of the beam is



9)

c) >1 d) None of these

# Set F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019

**ENGINEERING MECHANICS** 

Day & Date: Monday, 09-12-2019 Time: 10:00 AM To 01:00 PM

Seat

No.

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

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

### Section I

### Q.2 Attempt any four of the following questions.

Draw the free body diagram of ball of weight W, supported by string AB a) and resting against a smooth vertical wall at C and also resting against a smooth horizontal floor at D as shown in Fig No 2.

B

11

Fig No 2

- b) Enlist different types of supports and also draw its sketch.
- Define and explain characteristics of couple. C)
- State and Explain Lami's Theorem. d)
- Find Center of Gravity of T -section as shown in Fig No 3. e)



**f)** State assumptions made in the analysis of perfect frame. Max. Marks: 56

**SLR-FR-2** 

Q

### Q.3 Attempt any two of the following questions.

a) A beam is loaded as shown in Fig No 4. Determine the reactions at supports.



**b)** Determine the forces in the truss shown in Fig No.5 which carries horizontal load of 12kN and vertical load of 18kN.

16KN

- 1.5m 1.5m 2m 24kh 2m 24kh 2m Fig No 5A body of weight ZON is placed on a rough horizontal place. To just me
- c) A body of weight 70N is placed on a rough horizontal plane. To just move the body on the horizontal plane, a push of 20N inclined at 20° to the horizontal plane is required. Find the co-efficient of friction.





# Q.4 Attempt any four of the following questions.

- a) Distinguish between angular motion and linear motion.
- **b)** Explain the term free vibration.
- **c)** A circular disc has a mass moment of inertia of 12 kg-m<sup>2</sup> about its axis of rotation. If it is initially at rest, find its angular velocity after 3 seconds, if it is acted upon by a torque of magnitude 800 Nm.
- d) State principle of conservation of energy. Give its application.
- e) Explain coefficient of restitution.
- f) A body is rotating with an angular velocity of 5 radians/sec. After 4 sec, the angular velocity of body becomes 13 rad/sec. Determine the angular acceleration of the body.

### Q.5 Attempt any two of the following questions.

- a) An elevator cage of a mine shaft weighing 8 kN, when empty is lifted or lowered by means of a wire rope. Once a man weighing 600N, entered it and lowered with uniform acceleration such that when a distance of 187.5 m was covered, the velocity of the cage was 25 m/s. Determine the tension in the rope and the force exerted by the man on the floor of the cage.
- b) A particle is projected in air with a velocity of u=100 m/s at an angle of  $\alpha = 30^{\circ}$  with the horizontal.
  - Find.
  - 1) The horizontal range
  - 2) The maximum height reached by the particle
  - 3) Total time of flight
- c) Two cars are travelling towards each other on a single lane road at the velocities12 m/s and 9 m/s. respectively. When 100 m apart, both drivers realize the situation and apply their brakes. They succeed in stopping simultaneously and just short of colliding. Assume constant deceleration for each case and determine.
  - 1) Time required for cars to stop
  - 2) Deceleration of each car and
  - 3) The distance travelled by each car while slowing down



SLR-FR-2

Set

110.					
F.	Y. (B	. Teo	ch) (Semester - I) (New) ( ENGINEERING	CBCS) MECH	Examination Nov/Dec-2019
Day & Time	& Date : 10:00	e: Mo 0 AM	nday, 09-12-2019 To 01:00 PM		Max. Marks: 70
Instr	uctior	<b>າຣ:</b> 1)	Q. No 1 is compulsory. It shou Book Page.	uld be s	olved in first 30 minutes in Answer.
		2	) Figures to the right indicate fu	Ill mark	S.
Duro	tion: 2	O MI.	MCQ/Objective T	ype Qu	lestions
	0011. 3		luies	o ontio	IVIAIRS. 14
Q. I	1)	If nu fram a)	mber of joints in a perfect truss ne m is 2 J	b)	2J - 3
		c)	2J + 3	d)	2J – 4
	2)	A co a) c)	ouple can produces translatory motion combined (a) and (b)	b) d)	rotational motion None of these
	3)	The a) c)	ratio of static friction to dynam =1 >1	ic frictio b) d)	n is always <1 None of these
	4)	A pa neg	article is dropped from a height ligible air resistance. The veloc	'h' abov ity with	ve the ground. Assuming which it will strikes the ground is
		a) c)	2gh (2gh) <sup>3/2</sup>	b) d)	(2gh) <sup>7/2</sup> 2 (gh) <sup>1/2</sup>
	5)	The knov a) b) c) d)	principle which converts a dyn wn as D' Alembert's Principle Principle of conservation of er Principle of transmissibility Principle of conservation	amic pr nergy	oblem into static problem is
	6)	Duri a)	ng elastic impact, the relative v the relative velocity of the Equal to	velocity two bo b)	of two bodies after impacts is dies before impact. Less than
	7)	c) The a) b) c) d)	Greater than work done on a body is zero w There is no displacement of th Resultant of forces acting on The displacement is perpendi All of the above	d) /hen, ne body it is zero cular to	None of these 
	8)	The a) c)	unit for impulse is N-sec N-cm <sup>2</sup>	b) d)	N-mm N/mm

Page **11** of **20** 

SLR-FR-2

# Seat No.

Set R

- 9) The rate of change of displacement of a body with respect to time, is known as Acceleration b)
  - Velocity a)
  - Speed d) None of these C)
- 10) If the periodic motion takes place without any external force, the vibration is called as
  - Free Vibration a)

c)

- b) None of these d)
- 11) The resulatant of two forces P and Q acting at an angle  $\theta$  is \_\_\_\_\_.
  - $P^2 + Q^2 + 2P \sin \theta$ a)

both a and b

- $P^2 + Q^2 + 2PQ$ c)
- 12) The beam a shown in the Figure no 1. A hinge support at A and a roller support at B. The reaction  $R_A$  of the hinged support A of the beam is \_\_\_\_\_.
  - RA RB Fig No 1 a) 10.8 kN b) 20 kN 40 kN C) 30 kN d)
- 13) A body which can retain its original shape and size even if it subjected to external forces, is known as
  - Plastic body b) Elastic body a)
  - Rigid body d) None of these C)
- 14) On a ladder resting on a rough floor and leaning against a smooth vertical wall, the force of friction acts
  - Downwards at its upper end a)
  - b) Upwards at its upper end
  - Perpendicular to the wall at its upper end C)
  - Zero at its upper end d)

- b)  $P^2 + Q^2 + 2PQ\cos\theta$
- $\sqrt{P^2 + Q^2 + 2PQ \cos\theta}$ d)



Forced Vibration

Seat No.

# F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 ENGINEERING MECHANICS

Day & Date: Monday, 09-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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

# Section I

# Q.2 Attempt any four of the following questions.

a) Draw the free body diagram of ball of weight W, supported by string AB and resting against a smooth vertical wall at C and also resting against a smooth horizontal floor at D as shown in Fig No 2.

B

11

Fig No 2

- b) Enlist different types of supports and also draw its sketch.
- c) Define and explain characteristics of couple.
- d) State and Explain Lami's Theorem.
- e) Find Center of Gravity of T -section as shown in Fig No 3.



f) State assumptions made in the analysis of perfect frame.

Max. Marks: 56



### Q.3 Attempt any two of the following questions.

a) A beam is loaded as shown in Fig No 4. Determine the reactions at supports.



**b)** Determine the forces in the truss shown in Fig No.5 which carries horizontal load of 12kN and vertical load of 18kN.

16KN

- 15m24kh2m24kh2mFig No 5
- c) A body of weight 70N is placed on a rough horizontal plane. To just move the body on the horizontal plane, a push of 20N inclined at 20° to the horizontal plane is required. Find the co-efficient of friction.





# Q.4 Attempt any four of the following questions.

- a) Distinguish between angular motion and linear motion.
- **b)** Explain the term free vibration.
- **c)** A circular disc has a mass moment of inertia of 12 kg-m<sup>2</sup> about its axis of rotation. If it is initially at rest, find its angular velocity after 3 seconds, if it is acted upon by a torque of magnitude 800 Nm.
- d) State principle of conservation of energy. Give its application.
- e) Explain coefficient of restitution.
- f) A body is rotating with an angular velocity of 5 radians/sec. After 4 sec, the angular velocity of body becomes 13 rad/sec. Determine the angular acceleration of the body.

### Q.5 Attempt any two of the following questions.

- a) An elevator cage of a mine shaft weighing 8 kN, when empty is lifted or lowered by means of a wire rope. Once a man weighing 600N, entered it and lowered with uniform acceleration such that when a distance of 187.5 m was covered, the velocity of the cage was 25 m/s. Determine the tension in the rope and the force exerted by the man on the floor of the cage.
- b) A particle is projected in air with a velocity of u=100 m/s at an angle of  $\alpha = 30^{\circ}$  with the horizontal.
  - Find.
  - 1) The horizontal range
  - 2) The maximum height reached by the particle
  - 3) Total time of flight
- c) Two cars are travelling towards each other on a single lane road at the velocities12 m/s and 9 m/s. respectively. When 100 m apart, both drivers realize the situation and apply their brakes. They succeed in stopping simultaneously and just short of colliding. Assume constant deceleration for each case and determine.
  - 1) Time required for cars to stop
  - 2) Deceleration of each car and
  - 3) The distance travelled by each car while slowing down

16

12

SLR-FR-2 Set R

				ENGINEERIN		IANICS	
Day Time	& Date : 10:00	e: Mo D AM	nday, 09-12 To 01:00 P	-2019 M			Max. Marks: 70
Instr	uctior	<b>is:</b> 1)	Q. No 1 is Book Page	compulsory. It s	hould be so	olved in first 30 minute	es in Answer.
		2	) Figures to	the right indicate	e full marks	3.	
				MCQ/Objectiv	e Type Qu	lestions	
Dura	tion: 3	0 Mir	nutes				Marks: 14
Q.1	Choo 1)	Dise tl Duri	he correct a ng elastic in the rela	alternative from npact, the relativ ative velocity of	the optio ve velocity of the two boo	ns and rewrite the so of two bodies after imp dies before impact.	entence. 14 bacts is
		a) C)	Greater that	an	b) d)	None of these	
	2)	<ul> <li>The work done on a body is zero when,</li> <li>a) There is no displacement of the body</li> <li>b) Resultant of forces acting on it is zero</li> <li>c) The displacement is perpendicular to the direction of force</li> <li>d) All of the above</li> </ul>					
	3)	The a) c)	unit for imp N-sec N-cm <sup>2</sup>	ulse is	b) d)	N-mm N/mm	
	4)	The knov a) c)	rate of char wn as Velocity Speed	nge of displacem 	nent of a bo b) d)	ody with respect to tim Acceleration None of these	ie, is
	5)	lf the is ca a) c)	e periodic m alled as Free Vibra both a and	otion takes plac  tion b	e without a b) d)	iny external force, the Forced Vibration None of these	vibration
	6)	The a) c)	resulatant c $P^2 + Q^2 + Z^2$ $P^2 + Q^2 + Z^2$	of two forces Ρ a 2P sin θ 2PQ	nd Q acting b) d)	g at an angle $\theta$ is $P^2 + Q^2 + 2PQ \cos \theta$ $\sqrt{P^2 + Q^2 + 2PQ \cos \theta}$	 )
	7)	The at B	beam a sho . The reactio	own in the Figure on $R_A$ of the hing	e no 1. A hi jed support	inge support at A and t A of the beam is	a roller support 
				$ \begin{array}{c} 10 \text{ kN} \\ A \\ \uparrow = 2 \text{ m} \rightarrow 3 \text{ m} \\ RA \end{array} $	20 kN 	10 kN B m	
		2)	10 8 KN		LIG INO I	20 KN	
		a) C)	30 kN		d)	40 kN	

Seat

No.

# F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019

SLR-FR-2

Set

S

C
				Set	S
8)	A bo exte a) c)	ody which can retain its original sl ernal forces, is known as Plastic body Rigid body	hape  b) d)	and size even if it subjected to Elastic body None of these	
9)	On a wall a) b) c) d)	a ladder resting on a rough floor a , the force of friction acts Downwards at its upper end Upwards at its upper end Perpendicular to the wall at its u Zero at its upper end	and le  Ipper	eaning against a smooth vertical	
10)	lf nu fram a) c)	umber of joints in a perfect truss is ne m is 2 J 2J + 3	s J, th b) d)	nen number of member in the 2J – 3 2J – 4	
11)	A co a) c)	ouple can produces translatory motion combined (a) and (b)	b) d)	rotational motion None of these	
12)	The a) c)	ratio of static friction to dynamic =1 >1	frictio b) d)	n is always <1 None of these	
13)	A pa neg	article is dropped from a height 'h ligible air resistance. The velocity	' abo with	ve the ground. Assuming which it will strikes the ground is	
	<u></u>	 2ab	b)	$(2ab)^{1/2}$	

a)	2gh	b)	(2gh) <sup>1/2</sup>
c)	(2gh) <sup>3/2</sup>	d)	2 (gh) <sup>1/2</sup>

- The principle which converts a dynamic problem into static problem is 14) known as \_\_\_\_
  - a)
  - D' Alembert's Principle Principle of conservation of energy Principle of transmissibility b)
  - c)
  - Principle of conservation d)

### Seat No. F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019

Day & Date: Monday, 09-12-2019 Time: 10:00 AM To 01:00 PM

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

2) Use of non programmable scientific calculator is allowed.

**ENGINEERING MECHANICS** 

3) Figures to the right indicate full marks.

#### Section I

#### Q.2 Attempt any four of the following questions.

Draw the free body diagram of ball of weight W, supported by string AB a) and resting against a smooth vertical wall at C and also resting against a smooth horizontal floor at D as shown in Fig No 2.

B

11

Fig No 2

- b) Enlist different types of supports and also draw its sketch.
- Define and explain characteristics of couple. C)
- State and Explain Lami's Theorem. d)
- Find Center of Gravity of T -section as shown in Fig No 3. e)



Cm

**f)** State assumptions made in the analysis of perfect frame.



SLR-FR-2

Set

S

12

### Q.3 Attempt any two of the following questions.

a) A beam is loaded as shown in Fig No 4. Determine the reactions at supports.



**b)** Determine the forces in the truss shown in Fig No.5 which carries horizontal load of 12kN and vertical load of 18kN.

16KN

- 15m24kn2m24kn2mFig No 5
- c) A body of weight 70N is placed on a rough horizontal plane. To just move the body on the horizontal plane, a push of 20N inclined at 20° to the horizontal plane is required. Find the co-efficient of friction.





### Q.4 Attempt any four of the following questions.

- a) Distinguish between angular motion and linear motion.
- **b)** Explain the term free vibration.
- **c)** A circular disc has a mass moment of inertia of 12 kg-m<sup>2</sup> about its axis of rotation. If it is initially at rest, find its angular velocity after 3 seconds, if it is acted upon by a torque of magnitude 800 Nm.
- d) State principle of conservation of energy. Give its application.
- e) Explain coefficient of restitution.
- f) A body is rotating with an angular velocity of 5 radians/sec. After 4 sec, the angular velocity of body becomes 13 rad/sec. Determine the angular acceleration of the body.

#### Q.5 Attempt any two of the following questions.

- a) An elevator cage of a mine shaft weighing 8 kN, when empty is lifted or lowered by means of a wire rope. Once a man weighing 600N, entered it and lowered with uniform acceleration such that when a distance of 187.5 m was covered, the velocity of the cage was 25 m/s. Determine the tension in the rope and the force exerted by the man on the floor of the cage.
- b) A particle is projected in air with a velocity of u=100 m/s at an angle of  $\alpha = 30^{\circ}$  with the horizontal.
  - Find.
  - 1) The horizontal range
  - 2) The maximum height reached by the particle
  - 3) Total time of flight
- c) Two cars are travelling towards each other on a single lane road at the velocities12 m/s and 9 m/s. respectively. When 100 m apart, both drivers realize the situation and apply their brakes. They succeed in stopping simultaneously and just short of colliding. Assume constant deceleration for each case and determine.
  - 1) Time required for cars to stop
  - 2) Deceleration of each car and
  - 3) The distance travelled by each car while slowing down

16

## SLR-FR-2 Set S

12

	S.Y.	<b>(B.</b> 1	Гесh.) (Part – I) (New Mechar MACHINE	v) (CE lical E E DR <i>A</i>	BCS) Engin AWIN(	Examination Nov/ eering G & CAD	Dec-2019
Day & Time	& Date : 10:00	e: Sat 0 AM	urday, 14-12-2019 To 01:00 PM				Max. Marks: 70
Instru	uctior	ns: 1) 2) 3) 4)	Q. No. 1 is compulsory Figures to the right indic Assume suitable data if Retain all the constructi	and sh cate fu neces onal d	nould b II mark ssary. etails.	e solved in first 30 mir s.	nutes.
			MCQ/Objec	tive 1	Гуре	Questions	
Durat	tion: 3	0 Min	lutes				Marks: 14
Q.1	<b>Type</b>	:1 M Colu Profi	atch the pairs Imn- I le of Surface	a)	Colu	mn- II	03
	2)	Cond	centricity	b)	<b>⊘</b>		
	3)	Runo	out	c) d)			
	Туре	: 2 C	orrect or Incorrect				02
	4)	$\oplus$	- is the symbol for exter	mal th	reads.		
	5)		is the material	conve	ention u	used for steel and alloy	/S.
	Туре	: 3 M	ultiple Correct Answer	s (2 m	arks e	ach)	04
	6)	Whic	ch of the following repres	ents ir	nterfere	ence fit?	
		a)	$\Phi 80H_7S_6$		D)	$Φ80H_7r_6$	
	7)	Whic	$\Phi_{0017}e_8$	sition f	tit?	$\Psi 0011_71_7$	
	.,	a)	$\Phi 35 H_7 f_7$		b)	Ф35H <sub>7</sub> j <sub>6</sub>	
		c)	$\Phi 35H_7k_6$		d)	Ф35H <sub>7</sub> g <sub>6</sub>	
	Туре	:4 S	Straight objective quest	ions (	1 marl	( each)	05
	8)	As p	er BIS, the standard size	e for A	-3 shee	et is	
		a)	420 X 594		b)	420 X 297	
	- )	C)	841 X 1189		a)	210 X 297	
	9)	Foot	step bearing is used for		shafts	Vortical	
		a) C)	Inclined		(d	none of above	
	10)	unclu	ided angle for Buttress th	vroade	ic		
	10)	a)	55°	iicaus	b)	 29°	
		c)	45°		d)	60°	
	11)	The	thickness of the washer	to be ι	used w	ith M10 nut & bolt is _	
		a)	0.1 mm		b)	1.5 mm	
		c)	1.75 mm		d)	0.15 mm	

### Seat No.

# SLR-FR-20

Set P



12) Which of following symbol represents symmetry tolerance?

a)		b)	$\wedge$
c)	$\angle$	d)	

Seat	
No.	

### S.Y. (B. Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering MACHINE DRAWING & CAD

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 2 is compulsory.

- 2) Attempt any two questions out of Q.3, Q.4. & Q.5.
- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 5) Retain all the constructional details.
- Q.2 Figure 1 shows details of swivel bearing containing. Draw assembly drawing containing front view and top view. Prepare bill of material.Given details include following parts
  - 1) Body CI qty 1
  - 2) Bearing CI- qty 1
  - 3) Fork MS gty 1
  - 4) Spindle MS gty 1
  - 5) Lock nut MS qty 1
  - 6) Set screw MS qty 1
  - 7) Set screw MS qty 1
  - 8) Set screw MS qty 2
  - 9) Disc brass qty 1
  - 10) Disc brass qty 1
  - 11) Nut, M9 MS qty 2
  - 12) Bush GM qty 1

Q.3	a) b) c)	Draw BIS conventions of diamond knurling and spur gear. Draw free hand sketch of knuckle joint. Represent various fits as per hole basis and shaft basis with reference to zero line.	04 05 06
Q.4	a) b) c)	Draw BIS conventions of splined shaft and torsion spring. Draw free hand sketches of wing nut and hexagonal nut. Calculate working dimensions of hole and shaft and state type of fit for 1) $\Phi 100H_7g_6$ 2) $\Phi 100H_7g_6$	04 05 06
Q.5	a) b) c)	Represent revolved section and removed section with an example. Draw free hand sketch of double riveted double strap chain butt joint. Figure 2 shows views of a machine component. Redraw the given views and represent the following:	04 05 06
		<ol> <li>Φ 40 is circular within 0.02 mm.</li> <li>Surface A is parallel to surface B within 0.01 mm</li> </ol>	

- Surface A is parallel to surface B within 0.01 mm
   Dimension 35 mm has a unilateral tolerance of + 0.02 mm.
- 4) Surface B is milled to get Ra value of 50 microns.

Max. Marks: 56

Set |

Set P



Set P



### Tolerance Charts

		STAD 2	Tholes		NEG 3		201935	S-MAR		NER A
Nominal sizes	C11	N7	P 7	R7	. \$7	Г6	. \$6	t 6	U 6	U6
From 1 Upto 3	+120 + 60	- 4	- 6 -16	- 10 - 20	- 1 - 24	+ 16 + 10	+ 20 + 14	-	+ 24 + 10	+ 28 + 18
Over 3 Upto 6	+145 + 70	- 4 -16	- 8 -20	- 11 - 23	- 15 - 27	+ 23 + 15	+ 27 + 19	-	+ 31 + 23	+ 35 + 23
Over 6 Upto 10	+170 + 80		- 9 -24	-13 - 28	- 17 - 32	+ 28 + 19	+ 32 + 28		+ 37 + 28	+ 33 + 28
Over 10 Upto 18	+205 + 95	- 5 -23	-11 -29	- 16 - 34	- 27 - 39	+ 34 + 23	- 39 + 28		+ 44 + 33	+ 51 + 33
Over 18 Upto 30	+240 +110	- 7 -28	-14 -35	- 20	- 27 - 48	+ 41 + 28	+ 48 + 35	+ 54	+ 67 + 41	+ 62 + 41
Over 30 Upto 40	+280 +120	- 8	-17	- 25	- 34	+ 50	+ 59	+ 64 + 48	+ 76 + 60	+ 85 + 60
Over 40 Upto 50	+290 +130	-33	-42	- 50	- 59	+ 34	+ 43	4 70 + 54	+ 86 + 70	+ 95 + 70
Over 50 Upto 65	+330 +140	- 9	-21	- 30 - 60	- 42 - 72	+ 60 + 41	+ 72 + 53	+ 85 + 66	+106 + 87	+117 + 87
Over 65 Upto 80	+340 +150	-39	-57	- 32 - 62	- 48 ' - 78	+ 62 + 43	+ 78 + 59	+ 94 + 75	+121 +102	+132 +102
Over 80 Upto 100	+390	-10	-24	- 38 - 73	- 58	+ 73 + 51	+ 93 + 21	+113 + 91	+146	+159+124
Over 100 Upto 120	+400+180	-45	-59	- 41 - 76	- 66	+ 76 + 54	+101 + 79	+126	+166 +144	+175
Over 120 Upto 140	+450 +200	-12	-28	- 48	- 77	+ 88 + 63	+117 + 92	+147 +122	+195 +170	+230
Over 140 Upto 180	+480	-52	-68	- 50	- 85	+ 93 + 65	+133 +100	+171+134	+235	+250
Over 180 Upto 250	+570 +240	-14	-33	- 60	-105	+113 + 77	+169	+225	+330	+330
Over 250 Upto 315	+650 +300	-14 -66	-36	- 74	-138 -202	+130 + 94	+202	+272 +218	+ 382	+ 402
Over 315. Upto 400	+760' +360	-76	-41 -98	- 87 -150	-169	+150+108	+244 +790	+330 +268	+471	+492
Over 400 Upto 500	+880 +440	-17 -80	-45 -108	-103 -172	-209 -292	+172 +126	+292 : +232 :	+400 +330	+580 +490	+603 +490



	То	lerance	es of h	oles			Tole	rances	of sha	afts
Nominal sizes	D10	E 9	F 8	G 7	JS7	K 7	j 6	k 6	n 6	р6
From 1 Upto 3	+ 60 + 20	+ 39 + 14	+ 20 + 6	+ + + + 2	+ 5 - 5	0 -10	+ 3 - 3	+ 6 0	+10 + 4	+ 12 + 6
Over 3 Upto 6	+ 78 + 30	+ 50 + 20	+ 28 + 10	+16 + 4	+ 6 - 6	+ 3 - 9	+ 4 - 4	+ 9 + 1	+16 + 8	+ 20 + 12
Over 6	+ 98	+ 61	+ 35	+20	+ 7.5	+ 5	+ 4.5 - 4.5	+10	+19	+ 24
Upto 10	+ 40	+ 25	+ 13	+ 5	- 7.5	-10		+ 1	+10	+ 15
Over 10	+120 + 50	+ 75	+ 43	+24	+ 9	+ 6	+ 5.5	+12	+23	+ 29
Upto 18		+ 32	+ 16	+ 6	- 9	-12	- 5.5	+ 1	+12	+ 18
Over 18	+149	+ 92	+ 53	+28	+10.5	+6	+ 6.5 - 6.5	+15	+28	+ 35
Upto 30	+ 65	+ 40	+ 20	+ 7	-10.5	-15		+ 2	+15	+ 22
Over 30 Upto 50	+180 + 80	+112 + 50	+ 64 + 25	+34 + 9	+12.5 -12.5	+ 7 -18	+ 8 - 8	+18+2	+33 +17	+ 42 + 26
Over 50	+220	+134	+ 76	+40	+15	+ 9	+ 9.5	+21	+39	+ 51
Upto 80	+100	+ 60	+ 30	+10	-15	-21	- 9.5	+ 2	+20	+ 32
Over 80	+260	+159	+ 90	+47	.+17.5	+10	+11	+25	+45	+ 59
Upto 120	+120	+ 72	+ 36	+12	-17.5	-25	-11	+ 3	+23	+ 37
Over 120	+305	+185	+106	+54	+ 2 0	+12	+12.5	+28	+52	+ 68
Upto 180	+145	+ 85	+ 43	+14	- 2 0	-28		+ 3	+27	+ 43
Over 180	+355	+215	+122	+61	+ 2 3	+13	+14.5	+33	+60	+ 79
Upto 250	+170	+100	+ 50	+15	- 2 3	+33	-14.5	+ 4	+31	+ 50
Over 250	+400	+240	+135	+69	+ 2 6	+16	+16	+36	+66	+ 88
Upto 315	+190	+110	+ 55	+17	- 2 6	-36	-16	+ 4	+34	+ 56
Over 315	+440	+265	+151	+75	+28.5	+17	+ 1 8	+40	+73	+ 98
Upto 400	+210	+125	+ 69	+18	-28.5	-40	- 1 8	+ 4	+37	+ 62
Over 400	+480	+290	+165	+83	+31.5	+18	+ 2 0	+45	+80	+108
Upto 500	+230	+135	+ 68	+20	-31.5	-45	- 2 0	+ 5	+40	+ 68

	Toleran	09510	holes				Toleran	ices of	shafts	
Nominal sizes	Н7	Н8	H9	H10	H11	d9	e8	f7	g 6	'h6
From 1 Upto 3	+10 0	+14	+ 25	+ 40	+ 60	- 20	- 14 - 28	- 6 - 16	- 2 ~ 8	0
Over 3 Upto 6	+12 0	+18 0	+ 30	+ 45	+ 75	- 30 - 60	- 20 - 38	- 10 - 22	- 4 -12	0 - 8
Over 6 Upto 10	+15	+22.0	+ 36	+ 58	+ 90	- 40 - 75	- 25 - 47	- 13	- 5 -14	0-9
Over 10 Upto 18	+18 0	+27	+ 43 0	+ 70 0	+110	- 50 - 93	- 32 - 59	- 16	- 6	0
Over 18 Upto 30	+21	+33	+ 52	+ 84	+130	- 65	- 40	- 20	- 7 -20	0
Over 30 Upto 50	+25	+39	+ 62	+100	+160	-80	- 50	- 25	- 9 -25	0
Over 50 Upto 80	+30	+46	+ 76	+120	+190 0	-100	- 60 -105	- 30 - 60	-10	0
Over 80 Upto 120	+35	+54	+ 87	+140	+220	-120	- 72	- 36	-12 -34	0
Over 120 Upto 180	+40	+63	+100	+160	+250	-145	-85	- 43	-14	0
Over 180 Upto 250	+45	+72	+115	+185	+290	-170	-100	- 50	-15	0

S.Y. (B. Tech.) (Part – I) (New) (CBCS) Exami Mechanical Engineering MACHINE DRAWING & CA	nation Nov/Dec-2019
Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM	Max. Marks: 70
<ul> <li>Instructions: 1) Q. No. 1 is compulsory and should be solved</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Assume suitable data if necessary.</li> <li>4) Retain all the constructional details.</li> </ul>	d in first 30 minutes.
MCQ/Objective Type Questi	ons
Duration: 30 Minutes	Marks: 14
Q.1 Type:1 Match the pairs	03
1) Profile of Surface a)	
2) Concentricity b) $\Delta$	
3) Runout c) d) 🗡	
Type: 2 Correct or Incorrect	02
4) is the symbol for external threads.	
5) is the material convention used for	steel and alloys.
Type: 3 Multiple Correct Answers (2 marks each)	04
6) Which of the following represents interference fit?	
a) $\Psi 80H_7S_6$ b) $\Psi 80H_7$ c) $\Phi 80H_2e_2$ d) $\Phi 80H_2$	r <sub>6</sub> f-
7) Which of the following is transition fit?	.,
a) $\Phi 35H_7f_7$ b) $\Phi 35H_7$	Ĵ6
c) $\Phi 35H_7k_6$ d) $\Phi 35H_7$	<b>g</b> <sub>6</sub>
Type: 4 Straight objective questions (1 mark each)	05
a) 0.1 mm b) 1.5 mm	וומנ & סטונ וא ו
c) 1.75 mm d) 0.15 m	m
9) Which of following symbol represents symmetry to	blerance?
a) b) /	
c) d)	-
10) As per BIS, the standard size for A-3 sheet is	
a) 420 X 594 b) 420 X	297
c) 841 X 1189 d) 210 X	297
11) Footstep bearing is used for shafts.	I
	l

### Seat No.

### Page **7** of **24**

SLR-FR-20

Set Q

## SLR-FR-20 Set Q

12) Included angle for Buttress threads is \_\_\_\_\_.

a)	55°	-	b)	29°
c)	45°		d)	60°

Seat	
No.	

### S.Y. (B. Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering MACHINE DRAWING & CAD

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

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- Q.2 Figure 1 shows details of swivel bearing containing. Draw assembly drawing containing front view and top view. Prepare bill of material.Given details include following parts
  - 1) Body CI qty 1
  - 2) Bearing CI- qty 1
  - 3) Fork MS gty 1
  - 4) Spindle MS gty 1
  - 5) Lock nut MS qty 1
  - 6) Set screw MS qty 1
  - 7) Set screw MS qty 1
  - 8) Set screw MS qty 2
  - 9) Disc brass qty 1
  - 10) Disc brass qty 1
  - 11) Nut, M9 MS qty 2
  - 12) Bush GM qty 1

Q.3	a) b) c)	Draw BIS conventions of diamond knurling and spur gear. Draw free hand sketch of knuckle joint. Represent various fits as per hole basis and shaft basis with reference to zero line.	04 05 06					
Q.4	a) b) c)	Draw BIS conventions of splined shaft and torsion spring. Draw free hand sketches of wing nut and hexagonal nut. Calculate working dimensions of hole and shaft and state type of fit for 1) $\Phi 100H_7g_6$ 2) $\Phi 100H_7g_6$	04 05 06					
Q.5	a) b) c)	<ul> <li>Represent revolved section and removed section with an example.</li> <li>Draw free hand sketch of double riveted double strap chain butt joint.</li> <li>Figure 2 shows views of a machine component. Redraw the given vie and represent the following:</li> </ul>						
		<ol> <li>Φ 40 is circular within 0.02 mm.</li> <li>Surface A is parallel to surface B within 0.01 mm</li> </ol>						

- Surface A is parallel to surface B within 0.01 mm
   Dimension 35 mm has a unilateral tolerance of + 0.02 mm.
- 4) Surface B is milled to get Ra value of 50 microns.

Max. Marks: 56

Set C

Set Q



Set Q



### Tolerance Charts

	a promi	STROL	holes	C.	<b>MEAS</b>		29/935	3.444	NG (P	Marge
Nominal sizes	C11	N7	P 7	R7	. \$7	ľ6	. \$6	t6	U 6	U6
From 1 Upto 3	+120 + 60	- 4	- 6 -16	- 10 - 20	- 1 - 24	+ 16 + 10	+ 20 + 14	-	+ 24 + 10	+ 28 + 18
Over 3 Upto 6	+145 + 70	- 4 -16	- 8 -20	- 11	- 15 - 27	+ 23 + 15	+ 27 + 19	-	+ 31 + 23	+ 35 + 23
Over 6 Upto 10	+170 + 80		- 9 -24	- 13 - 28	- 17 - 32	+ 28 + 19	+ 32 + 28		+ 37 + 28	+ 33 + 28
Over 10 Upto 18	+ 205	- 5 -23	-11 -29	- 16 - 34	- 27 - 39	+ 34 + 23	- 39 + 28		+ 44 + 33	+ 51 + 33
Over 18 Upto 30	+240 +110	- 7 -28	-14 -35	- 20	- 27 - 48	+ 41 + 28	+ 48	+ 54	+ 67 + 41	+ 62
Over 30 Upto 40	+280 +120	- 8	-17	- 25	- 34	+ 50	+ 59	+ 64 + 48	+ 76 + 60	+ 85 + 60
Over 40 Upto 50	+290 +130	-33	-42	- 50	- 59	+ 34	+ 43	4 70 + 54	+ 86	+ 95
Over 50 Upto 65	+330 +140	- 9	-21.	- 30 - 60	- 42 - 72	+ 60 + 41	+ 72 + 53	+ 85 + 66	+106	+117 + 87
Over 65 Upto 80	+340	-39	-57	- 32 - 62	- 48 '	+ 62 + 43	+78 + 59	+ 94 + 75	+121 +102	+132
Over 80 Upto 100	+390	-10	-24	- 38	- 58	+ 73 + 51	+ 93	+113 + 91	+146	+159
Over 100 Upto 120	+400	-45	-59	- 41	- 66	+ 76	+101 + 79	+126	+166	+175
Over 120 Upto 140	+450 +200	-12	28	- 48	- 77	+ 88 + 63	+117 + 92	+147 +122	+195	+230
Over 140 Upto 180	+480	-52	-68	- 50	- 85	+ 93 + 65	+133	+171 +134	+235	+250
Over 180 Upto 250	+570 +240	-14	-33	- 60	-105	+113 + 77	+169	+225	+330	+330
Over 250 Upto 315	+650 +300	-14	-36	- 74	-138 -202	+130 + 94	+202	+272 +218	+ 382	+ 402
Over 315 Upto 400	+760° +360	-16 -73	-41 -98	- 87 -150	-169	+150	+244 +790	+330 +268	+471 +390	+492
Over 400 Upto 500	+880 +440	-17	-45 -108	-103 -172	-209 -292	+172 +126	+292 : +232 :	+400 +330	+580 +490	+603 +490

Set	Q
	_

	То	lerance	es of h	oles			Tole	rances	of sha	afts
Nominal sizes	D10	E 9	F 8	G7	JS7	K 7	j 6	k 6	n 6	р6
From 1	+ 60	+ 39	+ 20	- +12	+ 5	0	+ 3	+ 6	+10+4	+ 12
Upto 3	+ 20	+ 14	+ 6	+ 2	- 5	-10	- 3	0		+ 6
Over 3 Upto 6	+ 78 + 30	+ 50 + 20	+ 28 + 10	+16 + 4	+ 6 - 6	+ 3 - 9	+ 4 - 4	+ 9 + 1	+16 + 8	+ 20 + 12
Over 6 Upto 10	+ 98 + 40	+ 61 + 25	+ 35 + 13	+20 + 5	+ 7.5 - 7.5	+ 5 -10	+ 4.5 - 4.5	+10 + 1	+19 +10	+ 24 + 15
Over 10	+120	+ 75	+ 43	+24	+ 9	+ 6	+ 5.5	+12	+23	+ 29
Upto 18	+ 50	+ 32	+ 16	+ 6	- 9	-12	- 5.5	+ 1	+12	+ 18
Over 18	+149	+ 92	+ 53	+28	+10.5	+6	+ 6.5 - 6.5	+15	+28	+ 35
Upto 30	+ 65	+ 40	+ 20	+ 7	-10.5	-15		+ 2	+15	+ 22
Over 30	+180	+112	+ 64 + 25	+34	+12.5	+ 7	+ 8	+18	+33	+ 42
Upto 50	+ 80	+ 50		+ 9	-12.5	-18	- 8	+ 2	+17	+ 26
Over 50	+220	+134	+ 76	+40	+ 1 5	+ 9	+ 9.5	+21	+39	+ 51
Upto 80	+100	+ 60	+ 30	+10	- 1 5	-21	- 9.5	+ 2	+20	+ 32
Over 80	+260	+159	+ 90	+47	+17.5	+10	+11	+25	+45	+ 59
Upto 120	+120	+ 72	+ 36	+12	-17.5	-25	-11	+ 3	+23	+ 37
Over 120	+305	+185	+106	+54	+ 2 0	+12	+12.5	+28	+52	+ 68
Upto 180	+145	+ 85	+ 43	+14	- 2 0	-28	-12.5	+ 3	+27	+ 43
Over 180	+355	+215	+122	+61	+ 2 3	+13	+14.5	+33	+60	+ 79
Upto 250	+170	+100	+ 50	+15	- 2 3	+33	-14.5	+ 4	+31	+ 50
Over 250	+400	+240	+135	+69	+26	+16	+16	+36	+66	+ 88
Upto 315	+190	+110	+ 55	+17	-26	-36	-16	+ 4	+34	+ 56
Over 315	+440	+265	+151	+75	+28.5	+17	+ 1 8	+40	+73	+ 98
Upto 400	+210	+125	+ 69	+18	-28.5	-40	- 1 8	+ 4	+37	+ 62
Over 400	+480	+290	+165	+83	+31.5	+18	+20	+45	+80	+108
Upto 500	+230	+135	+ 68	+20	-31.5	-45	-20	+ 5	+40	+ 68

	Toleran	रवन क	holes.			25	Toleran	ces of	shafts	
Nominal sizes	H7	H8	H9	H10	H11	d9	eð	f7	g6	ĥ6
From 1 Upto 3	+10 0	+14	+ 25	+ 40	+ 60	- 20	- 14 - 28	- 6	- 2 - 8	0
Over 3 Upto 6	+12 0	+18 0	+ 30	+ 45	+ 75	- 30	- 20 - 38	- 10 - 22	- 4 -12	0
Over 6 Upto 10	+15	+22.	+ 36	+ 58	+ 90	- 40 - 75	- 25 - 47	- 13	- 5 -14	0 - 9
Over 10 Upto 18	+18 0	+27	+ 43	+ 70	+110	- 50	- 32 - 59	- 16	- 6	0
Over 18 Upto 30	+21	+33	+ 52	+ 84	+130	- 65	- 40	- 20	- 7	0
Over 30 Upto 50	+25	+39	+ 62	+100	+160	-80	- 50	- 25	- 9	0
Over 50 Upto 80	+30	+46	+ 76	+120	+190 0	-100	- 60 -105	- 30 - 60	-10	0
Over 80 Upto 120	+35	+54	+ 87	+140	+220	-120	- 72	- 36	-12	0
Over 120 Upto 180	+40	+63	+100	+160	+250	-145	-85	- 43	-14	0
Over 180 Upto 250	+45	+72	+115	+185	+290	-170	-100	- 50	-15	0

	S.Y.	(B. Tech	n.) (Part - M	- I) (New) Mechani ACHINE	) (CE cal E DR <i>A</i>	BCS) Engin WIN(	Examinat eering G & CAD	ion Nov/De	ec-2019		
Day & Time:	& Date : 10:00	e: Saturda 0 AM To 0	y, 14-12-20 )1:00 PM	019				٦	Max. Marks: 70		
Instru	uctior	<b>ns:</b> 1) Q. N 2) Figu 3) Ass 4) Reta	No. 1 is cor ures to the ume suitat ain all the o	npulsory a right indica ble data if r constructio	nd sh ate fu ieces nal d	nould b II mark ssary. etails.	e solved in s.	first 30 minut	es.		
			MCO	Q/Object	ive 1	Гуре	Question	S			
Durat	ion: 3	0 Minutes							Marks: 14		
Q.1	<b>Type</b>	:1 Match Column- Profile of	I Match the pairs Column- I Profile of Surface a			Colu	ımn- II		03		
	2)	Concentr	icity		b)	Δ					
	3)	Runout			c) d)						
	Туре	: 2 Corre	ct or Incor			02					
	4)	is	the symbo	l for extern	al th	reads.					
	5)	is the material convention used for steel and alloys.									
	Туре		04								
	6)	ng represe	nts ir	nterfere	ence fit?						
		a) Φ80	$H_7S_6$			d)	Φ80H <sub>7</sub> r <sub>6</sub> ውያስዛ f				
	7)	Which of	the followi	na is transi	tion f	it?	$\Psi 0011_71_7$				
	- /	a) Φ35	$5H_7f_7$			b)	Ф35H <sub>7</sub> j <sub>6</sub>				
		<b>с</b> ) Ф35	5H <sub>7</sub> k <sub>6</sub>			d)	Ф35H <sub>7</sub> g <sub>6</sub>				
	Туре	: 4 Straig	ght objecti	ive questio	ons (	1 mar	k each)		05		
	8)	Footstep	bearing is	used for		shafts					
		a) vori	zontal			b)	vertical				
	•			. <i></i> .1		. u)	none or ac	JUVE			
	9)	Included	angle for E	Buttress thr	eads	IS	 0°				
		a) 55 c) 45°				d)	29 60°				
	10)	, The thick	noon of the	washarta	hai	ined w	ith M10 put	9 holt in			
	10)	a) $0.1$	mm	e washer ic	bet	iseu w h)	1.5 mm		·		
		c) 1.75	5 mm			d)	0.15 mm				
	11)	Which of	following s	symbol repl	reser	nts sym	nmetry tolera	ance?			
	,	a) /	7	· 1		b)	Ń				
		c)	-			d)	, <u> </u>				

### Seat No.

# Set R

## SLR-FR-20 Set R

- 12) As per BIS, the standard size for A-3 sheet is \_\_\_\_\_.
  - a) 420 X 594 b) 420 X 297
  - c) 841 X 1189 d) 210 X 297

Seat	
No.	

### S.Y. (B. Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering MACHINE DRAWING & CAD

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 2 is compulsory.

- 2) Attempt any two questions out of Q.3, Q.4. & Q.5.
- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 5) Retain all the constructional details.
- Q.2 Figure 1 shows details of swivel bearing containing. Draw assembly drawing containing front view and top view. Prepare bill of material. Given details include following parts
  - 1) Body CI qty 1
  - 2) Bearing CI- qty 1
  - 3) Fork MS gty 1
  - 4) Spindle MS gty 1
  - 5) Lock nut MS qty 1
  - 6) Set screw MS qty 1
  - 7) Set screw MS qty 1
  - 8) Set screw MS qty 2
  - 9) Disc brass qty 1
  - 10) Disc brass qty 1
  - 11) Nut, M9 MS qty 2
  - 12) Bush GM qty 1

Q.3	a) b) c)	Draw BIS conventions of diamond knurling and spur gear. Draw free hand sketch of knuckle joint. Represent various fits as per hole basis and shaft basis with reference to zero line.	04 05 06					
Q.4	a) b) c)	Draw BIS conventions of splined shaft and torsion spring. Draw free hand sketches of wing nut and hexagonal nut. Calculate working dimensions of hole and shaft and state type of fit for 1) $\Phi 100H_7g_6$ 2) $\Phi 100H_7g_6$	04 05 06					
Q.5	a) b) c)	Represent revolved section and removed section with an example. Draw free hand sketch of double riveted double strap chain butt joint. Figure 2 shows views of a machine component. Redraw the given view and represent the following:						
		<ol> <li>Φ 40 is circular within 0.02 mm.</li> <li>Surface A is parallel to surface B within 0.01 mm</li> </ol>						

- 3) Dimension 35 mm has a unilateral tolerance of  $\pm$  0.02 mm.
- 4) Surface B is milled to get Ra value of 50 microns.

Max. Marks: 56

Set R

Set R



Set R



### Tolerance Charts

	<b>ED</b> TO	STANZ.	Tholes	<b>PRES</b>	TEL:		294455	3.4478		NER
Nominal sizes	. C11	N7	P 7	R7	. \$7	ľ6	. \$6	t6	U 6	U 6
From 1 Upto 3	+120 + 60	- 4	- 6 -16	- 10 - 20	- 1 - 24	+ 16 + 10	+ 20 + 14	-	+ 24 + 10	+ 28 + 18
Over 3 Upto 6	+145 + 70	- 4 -16	- 8 -20	- 11	- 15 - 27	+ 23 + 15	+ 27 + 19	-	+ 31 + 23	+ 35 + 23
Over 6 Upto 10	+170 + 80	4 19	- 9 -24	-13 - 28	- 17 - 32	+ 28 + 19	+ 32 + 28		+ 37 + 28	+ 33 + 28
Over 10 Upto 18	+205 + 95	- 5 -23	-11 -29	- 16 - 34	- 27 - 39	+ 34 + 23	- 39 + 28		+ 44 + 33	+ 51 + 33
Over 18 Upto 30	+240 +110	- 7 -28	-14 -35	- 20	- 27 - 48	+ 41 + 28	+ 48	+ 54	+ 67 + 41	+ 62
Over 30 Upto 40	+280 +120	- 8	-17	- 25	- 34	+ 50	+ 59	+ 64 + 48	+ 76 + 60	+ 85 + 60
Over 40 Upto 50	+290	-33	-42	- 50	- 59	+ 34	+ 43	4 70 + 54	+ 86	+ 95 + 70
Over 50 Upto 65	+330 +140	- 9	-21	- 30 - 60	- 42 - 72	+ 60 + 41	+ 72 + 53	+ 85 + 66	+106 + 87	+117 + 87
Over 65 Upto 80	+340	-39	-57	- 32 - 62	- 48 ' - 78	+ 62 + 43	+ 78 + 59	+ 94 + 75	+121 +102	+132+102
Over 80 Upto 100	+390	-10	-24	- 38	- 58 - 93	+ 73 + 51	+ 93	+113 + 91	+146	+159
Over 100 Upto 120	+400	-45	-59	- 41	- 66	+ 76 + 54	+101 + 79	+126	+166	+175
Over 120 Upto 140	+450 +200	-12	-28	- 48	- 77	+ 88 + 63	+117 + 92	+147 +122	+195 +170	+230
Over 140 Upto 180	+480	-52	-68	- 50	- 85	+ 93	+133 +100	+171 +134	+235	+250
Over 180 Upto 250	+570 +240	-14	-33	- 60	-105	+113 + 77	+169	+225	+ 330	+330
Over 250 Upto 315	+650 +300	-14 -66	-36 -88	- 74	-138 -202	+130 + 94	+202	+272 +218	+ 382	+ 402
Over 315 Upto 400	+760' +360	-16 -73	-41 -98	- 87 -150	-169	+150+108	+244	+330 +268	+471	+492
Over 400 Upto 500	+880 +440	-17 -80	-45 -108	-103 -172	-209 -292	+172 +126	+292 : +232 :	+400 +330	+580 +490	+603 +490



	То	lerance	es of h	oles			Tole	rances	of sha	afts
Nominal sizes	D10	E 9	F 8	G 7	JS7	K 7	j 6	k 6	n 6	р6
From 1	+ 60	+ 39	+ 20	- +12	+ 5	0	+ 3	+ 6	+10+4	+ 12
Upto 3	+ 20	+ 14	+ 6	+ 2	- 5	-10	- 3	0		+ 6
Over 3 Upto 6	+ 78 + 30	+ 50 + 20	+ 28 + 10	+16 + 4	+ 6 - 6	+ 3 - 9	+ 4 - 4	+ 9 + 1	+16 + 8	+ 20 + 12
Over 6	+ 98	+ 61	+ 35	+20	+ 7.5	+ 5	+ 4.5 - 4.5	+10	+19	+ 24
Upto 10	+ 40	+ 25	+ 13	+ 5	- 7.5	-10		+ 1	+10	+ 15
Over 10	+120	+ 75	+ 43	+24	+ 9	+ 6	+ 5.5	+12	+23	+ 29
Upto 18	+ 50	+ 32	+ 16	+ 6	- 9	-12	- 5.5	+ 1	+12	+ 18
Over 18 Upto 30	+149 + 65	+ 92 + 40	+ 53 + 20	+28 + 7	+10.5 -10.5	+6 -15	+ 6.5 - 6.5	+15 + 2	+28 +15	+ 35 + 22
Over 30	+180	+112	+ 64 + 25	+34	+12.5	+ 7	+ 8	+18	+33	+ 42
Upto 50	+ 80	+ 50		+ 9	-12.5	-18	- 8	+ 2	+17	+ 26
Over 50	+220	+134	+ 76	+40	+ 1 5	+ 9	+ 9.5	+21	+39	+ 51
Upto 80	+100	+ 60	+ 30	+10	- 1 5	-21	- 9.5	+ 2	+20	+ 32
Over 80	+260	+159	+ 90	+47	+17.5	+10	+11	+25	+45	+ 59
Upto 120	+120	+ 72	+ 36	+12	-17.5	-25	-11	+ 3	+23	+ 37
Over 120	+305	+185	+106	+54	+ 2 0	+12	+12.5	+28	+52	+ 68
Upto 180	+145	+ 85	+ 43	+14	- 2 0	-28		+ 3	+27	+ 43
Over 180	+355	+215	+122	+61	+ 2 3	+13	+14.5	+33	+60	+ 79
Upto 250	+170	+100	+ 50	+15	- 2 3	+33	-14.5	+ 4	+31	+ 50
Over 250	+400	+240	+135	+69	+26	+16	+16	+36	+66	+ 88
Upto 315	+190	+110	+ 55	+17	-26	-36	-16	+ 4	+34	+ 56
Over 315	+440	+265	+151	+75	+28.5	+17	+ 1 8	+40	+73	+ 98
Upto 400	+210	+125	+ 69	+18	-28.5	-40	-1 8	+ 4	+37	+ 62
Over 400	+480	+290	+165	+83	+31.5	+18	+20	+45	+80	+108
Upto 500	+230	+135	+ 68	+20	-31.5	-45	-20	+ 5	+40	+ 68

	Toleran	09510	holes				Toleran	ices of	shafts	
Nominal sizes	Н7	Н8	H9	H10	H11	d9	e8	f7	g 6	'h6
From 1 Upto 3	+10 0	+14	+ 25	+ 40	+ 60	- 20	- 14 - 28	- 6 - 16	- 2 ~ 8	0
Over 3 Upto 6	+12 0	+18 0	+ 30	+ 45	+ 75	- 30 - 60	- 20 - 38	- 10 - 22	- 4 -12	0 - 8
Over 6 Upto 10	+15	+22.0	+ 36	+ 58	+ 90	- 40 - 75	- 25 - 47	- 13	- 5 -14	0-9
Over 10 Upto 18	+18 0	+27	+ 43 0	+ 70 0	+110	- 50 - 93	- 32 - 59	- 16	- 6	0
Over 18 Upto 30	+21	+33	+ 52	+ 84	+130	- 65	- 40	- 20	- 7 -20	0
Over 30 Upto 50	+25	+39	+ 62	+100	+160	-80	- 50	- 25	- 9 -25	0
Over 50 Upto 80	+30	+46	+ 76	+120	+190 0	-100	- 60 -105	- 30 - 60	-10	0
Over 80 Upto 120	+35	+54	+ 87	+140	+220	-120	- 72	- 36	-12 -34	0
Over 120 Upto 180	+40	+63	+100	+160	+250	-145	-85	- 43	-14	0
Over 180 Upto 250	+45	+72	+115	+185	+290	-170	-100	- 50	-15	0

	S.Y.	(B. Teo	ch.) (Part – M M∧	l) (New) (C echanical	BCS) Engin	Examination eering	Nov/Dec-2019			
Day Time	& Date : 10:0	e: Saturd 0 AM To	ay, 14-12-201 01:00 PM	9	Avvinv		Max. Marks: 7	0		
Instr	uctio	ns: 1) Q. 2) Fig 3) As 4) Re	No. 1 is comp gures to the rig sume suitable etain all the co	oulsory and s ght indicate f data if nece nstructional	hould b ull mark ssary. details.	e solved in first s.	30 minutes.			
			MCQ	Objective	Туре	Questions				
Dura	tion: 3	30 Minute	es				Marks: 1	4		
Q.1	Туре 1) 2) 3)	e:1 Mato Columi Profile o Concen Runout	<b>the pairs</b> <b>n- I</b> of Surface tricity	a) b) c) d)	Colu ⊚ △	mn- II	0	3		
	<b>Туре</b> 4)	0	2							
	5) is the material convention used for steel and alloys.									
	Туре	0	4							
	6) 7)	Which o a) $\Phi$ c) $\Phi$ Which o	of the following 30H <sub>7</sub> s <sub>6</sub> 30H <sub>7</sub> e <sub>8</sub> of the following	represents is transition	interfere b) d) fit?	ence fit? Φ80H <sub>7</sub> r <sub>6</sub> Φ80H <sub>7</sub> f <sub>7</sub>				
		а) Ф3 с) Ф3	35H <sub>7</sub> f <sub>7</sub> 35H <sub>7</sub> k <sub>6</sub>		b) d)	Ф35H <sub>7</sub> j <sub>6</sub> Ф35H <sub>7</sub> g <sub>6</sub>				
	<b>Туре</b> 8)	e: 4 Stra Which c a) c)	i <b>ght objectiv</b> e of following syn	e questions mbol represe	<b>(1 mar</b> ents sym b) d)	k each) Imetry tolerance	9? 0	5		
	9)	As per l a) 42 c) 84	BIS, the stand 0 X 594 1 X 1189	ard size for A	A-3 shee b) d)	et is 420 X 297 210 X 297				
	10)	Footste a) vo c) Ine	p bearing is us rizontal clined	sed for	_ shafts b) d)	vertical none of above				
	11)	Include a) 55 c) 45	d angle for Bu ;°	ttress thread	s is b) d)	 29° 60°				

### Seat No. S.Y. (B. Tech.) (Part – I) (New) (CBCS) Exan

Page **19** of **24** 

## SLR-FR-20

Set S



- 12) The thickness of the washer to be used with M10 nut & bolt is \_\_\_\_\_.
  - a) 0.1 mm c) 1.75 mm

- b) 1.5 mm
- d)
- 0.15 mm

Seat	
No.	

### S.Y. (B. Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering MACHINE DRAWING & CAD

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 2 is compulsory.

- 2) Attempt any two questions out of Q.3, Q.4. & Q.5.
- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 5) Retain all the constructional details.
- Q.2 Figure 1 shows details of swivel bearing containing. Draw assembly drawing containing front view and top view. Prepare bill of material. Given details include following parts
  - 1) Body CI qty 1
  - 2) Bearing CI- qty 1
  - 3) Fork MS gty 1
  - 4) Spindle MS gty 1
  - 5) Lock nut MS qty 1
  - 6) Set screw MS qty 1
  - 7) Set screw MS qty 1
  - 8) Set screw MS qty 2
  - 9) Disc brass qty 1
  - 10) Disc brass qty 1
  - 11) Nut, M9 MS qty 2
  - 12) Bush GM qty 1

Q.3	a) b) c)	Draw BIS conventions of diamond knurling and spur gear. Draw free hand sketch of knuckle joint. Represent various fits as per hole basis and shaft basis with reference to zero line.	04 05 06
Q.4	a) b) c)	Draw BIS conventions of splined shaft and torsion spring. Draw free hand sketches of wing nut and hexagonal nut. Calculate working dimensions of hole and shaft and state type of fit for 1) $\Phi 100H_7g_6$ 2) $\Phi 100H_7g_6$	04 05 06
Q.5	a) b) c)	Represent revolved section and removed section with an example. Draw free hand sketch of double riveted double strap chain butt joint. Figure 2 shows views of a machine component. Redraw the given views and represent the following:	04 05 06
		<ol> <li>Φ 40 is circular within 0.02 mm.</li> <li>Surface A is parallel to surface B within 0.01 mm</li> </ol>	

- 3) Dimension 35 mm has a unilateral tolerance of  $\pm$  0.02 mm.
- 4) Surface B is milled to get Ra value of 50 microns.

Max. Marks: 56

Set S

Set S



Set S



### Tolerance Charts

		STANZ.	Tholes		NEG 3		201935	S-MAR		NER A
Nominal sizes	C11	N7	P 7	R7	. \$7	Г6	. \$6	t 6	U 6	U6
From 1 Upto 3	+120 + 60	- 4	- 6 -16	- 10 - 20	- 1 - 24	+ 16 + 10	+ 20 + 14	-	+ 24 + 10	+ 28 + 18
Over 3 Upto 6	+145 + 70	- 4 -16	- 8 -20	- 11 - 23	- 15 - 27	+ 23 + 15	+ 27 + 19	-	+ 31 + 23	+ 35 + 23
Over 6 Upto 10	+170 + 80		- 9 -24	-13 - 28	- 17 - 32	+ 28 + 19	+ 32 + 28		+ 37 + 28	+ 33 + 28
Over 10 Upto 18	+205 + 95	- 5 -23	-11 -29	- 16 - 34	- 27 - 39	+ 34 + 23	- 39 + 28		+ 44 + 33	+ 51 + 33
Over 18 Upto 30	+240 +110	- 7 -28	-14 -35	- 20	- 27 - 48	+ 41 + 28	+ 48 + 35	+ 54	+ 67 + 41	+ 62 + 41
Over 30 Upto 40	+280 +120	- 8	-17	- 25	- 34	+ 50	+ 59	+ 64 + 48	+ 76 + 60	+ 85 + 60
Over 40 Upto 50	+290 +130	-33	-42	- 50	- 59	+ 34	+ 43	4 70 + 54	+ 86 + 70	+ 95 + 70
Over 50 Upto 65	+330 +140	- 9	-21	- 30 - 60	- 42 - 72	+ 60 + 41	+ 72 + 53	+ 85 + 66	+106 + 87	+117 + 87
Over 65 Upto 80	+340 +150	-39	-57	- 32 - 62	- 48 ' - 78	+ 62 + 43	+ 78 + 59	+ 94 + 75	+121 +102	+132 +102
Over 80 Upto 100	+390	-10	-24	- 38 - 73	- 58	+ 73 + 51	+ 93 + 21	+113 + 91	+146	+159+124
Over 100 Upto 120	+400+180	-45	-59	- 41 - 76	- 66	+ 76 + 54	+101 + 79	+126	+166 +144	+175
Over 120 Upto 140	+450 +200	-12	-28	- 48	- 77	+ 88 + 63	+117 + 92	+147 +122	+195 +170	+230
Over 140 Upto 180	+480	-52	-68	- 50	- 85	+ 93 + 65	+133 +100	+171+134	+235	+250
Over 180 Upto 250	+570 +240	-14	-33	- 60	-105	+113 + 77	+169	+225	+330	+330
Over 250 Upto 315	+650 +300	-14 -66	-36	- 74	-138 -202	+130 + 94	+202	+272 +218	+ 382	+ 402
Over 315. Upto 400	+760' +360	-76	-41 -98	- 87 -150	-169	+150+108	+244 +790	+330 +268	+471	+492
Over 400 Upto 500	+880 +440	-17 -80	-45 -108	-103 -172	-209 -292	+172 +126	+292 : +232 :	+400 +330	+580 +490	+603 +490



	То	lerance	es of h	oles			Tole	rances	of sha	afts
Nominal sizes	D10	E 9	F 8	G 7	JS7	K 7	j 6	k 6	n 6	р6
From 1 Upto 3	+ 60 + 20	+ 39 + 14	+ 20 + 6	+ + + + 2	+ 5 - 5	0 -10	+ 3 - 3	+ 6 0	+10 + 4	+ 12 + 6
Over 3 Upto 6	+ 78 + 30	+ 50 + 20	+ 28 + 10	+16 + 4	+ 6 - 6	+ 3 - 9	+ 4 - 4	+ 9 + 1	+16 + 8	+ 20 + 12
Over 6	+ 98	+ 61	+ 35	+20	+ 7.5	+ 5	+ 4.5	+10	+19	+ 24
Upto 10	+ 40	+ 25	+ 13	+ 5	- 7.5	-10	- 4.5	+ 1	+10	+ 15
Over 10	+120 + 50	+ 75	+ 43	+24	+ 9	+ 6	+ 5.5	+12	+23	+ 29
Upto 18		+ 32	+ 16	+ 6	- 9	-12	- 5.5	+ 1	+12	+ 18
Over 18	+149	+ 92	+ 53	+28	+10.5	+6	+ 6.5 - 6.5	+15	+28	+ 35
Upto 30	+ 65	+ 40	+ 20	+ 7	-10.5	-15		+ 2	+15	+ 22
Over 30	+180	+112	+ 64 + 25	+34	+12.5	+ 7	+ 8	+18	+33	+ 42
Upto 50	+ 80	+ 50		+ 9	-12.5	-18	- 8	+ 2	+17	+ 26
Over 50	+220	+134	+ 76	+40	+ 1 5	+ 9	+ 9.5	+21	+39	+ 51
Upto 80	+100	+ 60	+ 30	+10	- 1 5	-21	- 9.5	+ 2	+20	+ 32
Over 80	+260	+159	+ 90	+47	.+17.5	+10	+11	+25	+45	+ 59
Upto 120	+120	+ 72	+ 36	+12	-17.5	-25	-11	+ 3	+23	+ 37
Over 120	+305	+185	+106	+54	+ 2 0	+12	+12.5	+28	+52	+ 68
Upto 180	+145	+ 85	+ 43	+14	- 2 0	-28	-12.5	+ 3	+27	+ 43
Over 180	+355	+215	+122	+61	+ 2 3	+13	+14.5	+33	+60	+ 79
Upto 250	+170	+100	+ 50	+15	- 2 3	+33	-14.5	+ 4	+31	+ 50
Over 250	+400	+240	+135	+69	+ 2 6	+16	+16	+36	+66	+ 88
Upto 315	+190	+110	+ 55	+17	- 2 6	-36	-16	+ 4	+34	+ 56
Over 315	+440	+265	+151	+75	+28.5	+17	+ 1 8	+40	+73	+ 98
Upto 400	+210	+125	+ 69	+18	-28.5	-40	- 1 8	+ 4	+37	+ 62
Over 400	+480	+290	+165	+83	+31.5	+18	+ 2 0	+45	+80	+108
Upto 500	+230	+135	+ 68	+20	-31.5	-45	- 2 0	+ 5	+40	+ 68

日本に	tole/an	CESI (I)	holes			200	Toleran	ices of	shafts	
Nominal sizes	H7	Н8	H9	H10	H11	d9	e8	f7	g 6	ĥ6
From 1 Upto 3	+10 0	+14	+ 25	+ 40	+ 60	- 20 - 45	- 14 - 28	- 6 - 16	- 2 ~ 8	0
Over 3 Upto 6	+12 0	+18	+ 30	+ 45	+ 75	- 30 - 60	- 20 - 38	- 10 - 22	- 4 -12	0 - 8
Over 6 Upto 10	+15	+22.	+ 36	+ 58	+ 90	- 40 - 75	- 25 - 47	- 13 - 28	- 5 -14	0-9
Over 10 Upto 18	+18 0	+27	+ 43 0	+ 70 0	+110	- 50 - 93	- 32 - 59	- 16	- 6	0
Over 18 Upto 30	+21	+33	+ 52	+ 84	+130	- 65	- 40	- 20	- 7 -20	0
Over 30 Upto 50	+25	+39	+ 62	+100	+160	-80	- 50	- 25	- 9	0
Over 50 Upto 80	+30	+46	+ 76	+120	+190 0	-100	- 60 -105	- 30 - 60	-10	0
Over 80 Upto 120	+35	+54	+ 87	+140	+220	-120	- 72	- 36	-12	0
Over 120 Upto 180	+40	+63	+100	+160	+250	-145	-85	- 43	-14	0
Over 180 Upto 250	+45	+72	+115	+185	+290	-170	-100	- 50	-15	0

	S.Y.	(B.	Tech) (Part – I) (New) (CB Mechanical E	CS) Engir	Examination Nov/Dec-2019	
			INTERNAL COMBL	JSTI	ON ENGINES	
Day Time	& Date : 10:0	∋: Tu 0 AIV	esday,17-12-2019 1 To 01:00 PM		Max. Marks	: 70
Instr	uctior	<b>ns:</b> 1	) Q. No. 1 is compulsory and sh	nould	be solved in first 30 minutes in answ	ver
		2 3	<ul> <li>Pigures to the right indicate fu</li> <li>Make suitable assumption if n</li> </ul>	ll mai ecess	ks. sary and state them clearly.	
			MCQ/Objective T	уре	Questions	
Dura	tion: 3	80 Mi	nutes		Marks	5: 14
Q.1	<b>Choo</b> 1)	ose t In w a) c)	the correct alternatives from t which of the following engine, su petrol aircraft	h <b>e op</b> perch b) d)	otions. harging is essential Diesel Marine	14
	2)	On a) c)	which of the following cycles an petrol engine carnot engine	e mos b) d)	st high speed engines operated? diesel engine dual engine	
	3)	Wh a) c)	ich of the following compressior 0-5 10-15	n ratio b) d)	range is used in CI engine? 5-10 16-22	
	4)	Wh a) c)	ich of the following is the highes kerosene diesel	st and b) d)	most volatile liquid fuel? Gasoline fuel oil	
	5)	Lea a) c)	n air-fuel mixture is required for idling starting	b) d)	Acceleration Cruising	
	6)	In w a) c)	which of the following engine CR SI engine Steam engine	RDI is b) d)	used? CI engine None of above	
	7)	The a) c)	e compression ratio range for SI 2-3 16-20	engir b) d)	ne is 7-10 20-25	
	8)	Car ratio a) c)	burettor is designed for operation of o of 16:1 1:10	on du b) d)	ring cruising range, at air-fuel 1:16 5:1	
	9)	The a) c)	e engine of two wheelers of 100 air oil	CC a b) d)	re cooled by using Water Petrol	

### Seat No.

SLR-FR-22 Set P

10) The process of increasing density of air before it enters the engine cylinder is known as \_\_\_\_\_.

- a) scavenging b)
  - knocking d) pre-heating
- 11) In a CI engine squish is created \_\_\_\_
  - a) towards the end of compression stroke
  - b) at the end of suction stroke
  - c) at the beginning of suction stroke
  - d) during combustion

C)

- 12) An IC engine develops 20 kW output power. If the efficiency of the engine is 80 percentage, the heat supplied to the engine will be \_\_\_\_\_.
  - a) 15kW b) 20kW
  - c) 25 kW d) 30kW
- 13) Generally, the initiation of knocking in CI engine considering pressure -crank angle diagram in combustion phase occurs \_\_\_\_\_.
  - a) before TDC
    - b) after TDCd) none of above

Supercharging

SLR-FR-22

Set P

- 14) Which of the following is the Internal combustion engine?
  - a) Airplane engine

at BDC

C)

b) Boiler

c) Steam engine

d) None of above

Set

Seat	
No.	

## S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering INTERNAL COMBUSTION ENGINES

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Solve any two questions from each section.

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

### Section – I

a) b) c)	Explain the classification of Internal combustion (I. C.) engines. List down different compensating devices used in complete carburetor. And explain any one in detail. With neat sketch, explain Unit Injector of CLengine	05 05 04
c) a) b) c)	Explain the difference between supercharger and turbocharger with diagram. Write the difference between SI and CI engines. Derive mass of air relation of the simple carburettor considering compressibility of air.	05 05 04
a) b) c)	A single jet simple carburetor is to supply 6.11 kg/min of air and 0.408 kg/min of petrol, density 768 kg/m <sup>3</sup> . The air is initially at 1.027 bar and 15.5 °C. Calculate the throat diameter of the venturi, if the speed of the air is 97.5 m/s, assuming a velocity coefficient of 0.84. Assume adiabatic expansion and specific heat ratio of air to be 1.4. If the drop across fuel metering orifice be 0.8 of the pressure at the throat; calculate the orifice diameter assuming a coefficient as 0.66 Explain factors which limit the use of supercharger in SI engine. Write a note on CRDI in CI engines.	05 05 04
,	Section – II	
a)	A six cylinder petrol engine has a volume compression ratio of 5:1. The clearance volume of each cylinder is 0.00115 m <sup>3</sup> . The engine consumes 10.5 kg of fuel per hour whose calorific value is 41800 kJ/kg. The engine runs at 2500 rpm and the relative efficiency is 65 %. Calculate the average indicated mean effective pressure developed.	05
b)	Explain stages of combustion in CI engines with the help of pressure-crank	05
c)	Write the requirements of a good combustion chamber of a SI engine.	04
c) a) b) c)	<ul> <li>Write the requirements of a good combustion chamber of a SI engine.</li> <li>Explain abnormal combustion in SI engines.</li> <li>Write a note on 'cetane number'.</li> <li>List down the methods to measure Brake power of IC Engine. Explain any one.</li> </ul>	04 05 05 04
	a) b) c) a) b) c) a) b) c) a)	<ul> <li>a) Explain the classification of Internal combustion (I. C.) engines.</li> <li>b) List down different compensating devices used in complete carburetor. And explain any one in detail.</li> <li>c) With neat sketch, explain Unit Injector of CI engine.</li> <li>a) Explain the difference between supercharger and turbocharger with diagram.</li> <li>b) Write the difference between SI and CI engines.</li> <li>c) Derive mass of air relation of the simple carburetor considering compressibility of air.</li> <li>a) A single jet simple carburetor is to supply 6.11 kg/min of air and 0.408 kg/min of petrol, density 768 kg/m<sup>3</sup>. The air is initially at 1.027 bar and 15.5 °C. Calculate the throat diameter of the venturi, if the speed of the air is 97.5 m/s, assuming a velocity coefficient of 0.84. Assume adiabatic expansion and specific heat ratio of air to be 1.4. If the drop across fuel metering orifice be 0.8 of the pressure at the throat; calculate the orifice diameter assuming a coefficient as 0.66</li> <li>b) Explain factors which limit the use of supercharger in SI engine.</li> <li>c) Write a note on CRDI in Cl engines.</li> </ul>

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Max. Marks: 56

Day Time	& Date e: 10:0	9: Τι 0 ΑΝ	uesday,17-12-2019 // To 01:00 PM		Max.	Marks: 70
Instr	ructio	ns: ´	<ol> <li>Q. No. 1 is compulsory and s book.</li> </ol>	hould	be solved in first 30 minutes in	n answer
			<ol> <li>Figures to the right indicate fi</li> <li>Make suitable assumption if r</li> </ol>	ull ma neces	rks. sary and state them clearly.	
_			MCQ/Objective	Гуре	Questions	
Dura	ition: 3	80 M	inutes			Marks: 14
Q.1	<b>Cho</b> 1)	ose Ca rati a) c)	the correct alternatives from rburettor is designed for operati o of 16:1 1:10	t <b>he o</b> on du b) d)	<b>ptions.</b> Iring cruising range, at air-fuel 1:16 5:1	14
	2)	The a) c)	e engine of two wheelers of 100 air oil	b) d)	are cooled by using Water Petrol	
	3)	The cyli a) c)	e process of increasing density inder is known as scavenging knocking	of air b) d)	before it enters the engine Supercharging pre-heating	
	4)	In a a) b) c) d)	a CI engine squish is created towards the end of compression at the end of suction stroke at the beginning of suction stroke during combustion	on str oke	oke	
	5)	An is 8 a) c)	IC engine develops 20 kW outp 30 percentage, the heat supplied 15kW 25 kW	out po d to th b) d)	wer. If the efficiency of the eng ne engine will be 20kW 30kW	gine
	6)	Ge -cra a) c)	nerally, the initiation of knocking ank angle diagram in combustic before TDC at BDC	g in C on pha b) d)	I engine considering pressure ase occurs after TDC none of above	
	7)	Wh a) c)	nich of the following is the Intern Airplane engine Steam engine	al coi b) d)	mbustion engine? Boiler None of above	
	8)	In v a) c)	which of the following engine, so petrol aircraft	uperc b)	harging is essential Diesel Marine	

S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering INTERNAL COMBUSTION ENGINES

Dav & Date: Tuesdav.17-12-2019

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Set

Q

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14

c) aircraft a) Iviarine

Set | Q 9) On which of the following cycles are most high speed engines operated? a) petrol engine b) diesel engine dual engine c) carnot engine d) Which of the following compression ratio range is used in CI engine? 10) a) 0-5 b) 5-10 c) 10-15 d) 16-22 11) Which of the following is the highest and most volatile liquid fuel? a) kerosene Gasoline b) c) diesel fuel oil d) Lean air-fuel mixture is required for 12) Acceleration a) idling b) c) starting d) Cruising In which of the following engine CRDI is used? 13) a) SI engine b) CI engine None of above c) Steam engine d)

- 14) The compression ratio range for SI engine is \_\_\_\_\_.
  - a) 2-3 b) 7-10 c) 16-20 d) 20-25
    - 10-20
- 20 20

Seat	
No.	

## S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering INTERNAL COMBUSTION ENGINES

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Solve any two questions from each section.

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

### Section – I

	b)	List down different compensating devices used in complete carburetor. And explain any one in detail.	05 05
	C)	With neat sketch, explain Unit Injector of CI engine.	04
Q.3	a) b)	Explain the difference between supercharger and turbocharger with diagram. Write the difference between SI and CI engines.	05 05
	c)́	Derive mass of air relation of the simple carburettor considering compressibility of air.	04
Q.4	a)	A single jet simple carburetor is to supply 6.11 kg/min of air and 0.408 kg/min of petrol, density 768 kg/m <sup>3</sup> . The air is initially at 1.027 bar and 15.5 °C. Calculate the throat diameter of the venturi, if the speed of the air is 97.5 m/s, assuming a velocity coefficient of 0.84. Assume adiabatic expansion and specific heat ratio of air to be 1.4. If the drop across fuel metering orifice be 0.8 of the pressure at the throat; calculate the orifice diameter assuming a coefficient as 0.66	05
	b) c)	Explain factors which limit the use of supercharger in SI engine. Write a note on CRDI in CI engines.	05 04
		Section – II	
Q.5	a)	A six cylinder petrol engine has a volume compression ratio of 5:1. The	05
		clearance volume of each cylinder is 0.00115 m <sup>3</sup> . The engine consumes 10.5 kg of fuel per hour whose calorific value is 41800 kJ/kg. The engine runs at 2500 rpm and the relative efficiency is 65 %. Calculate the average indicated mean effective pressure developed.	
	b)	clearance volume of each cylinder is 0.00115 m <sup>3</sup> . The engine consumes 10.5 kg of fuel per hour whose calorific value is 41800 kJ/kg. The engine runs at 2500 rpm and the relative efficiency is 65 %. Calculate the average indicated mean effective pressure developed. Explain stages of combustion in CI engines with the help of pressure-crank angle diagram	05
	b) c)	clearance volume of each cylinder is 0.00115 m <sup>3</sup> . The engine consumes 10.5 kg of fuel per hour whose calorific value is 41800 kJ/kg. The engine runs at 2500 rpm and the relative efficiency is 65 %. Calculate the average indicated mean effective pressure developed. Explain stages of combustion in CI engines with the help of pressure-crank angle diagram. Write the requirements of a good combustion chamber of a SI engine.	05 04
Q.6	b) c) a) b) c)	<ul> <li>clearance volume of each cylinder is 0.00115 m<sup>3</sup>. The engine consumes 10.5 kg of fuel per hour whose calorific value is 41800 kJ/kg. The engine runs at 2500 rpm and the relative efficiency is 65 %. Calculate the average indicated mean effective pressure developed.</li> <li>Explain stages of combustion in Cl engines with the help of pressure-crank angle diagram.</li> <li>Write the requirements of a good combustion chamber of a SI engine.</li> <li>Explain abnormal combustion in SI engines.</li> <li>Write a note on 'cetane number'.</li> <li>List down the methods to measure Brake power of IC Engine. Explain any one.</li> </ul>	05 04 05 05 04

Max. Marks: 56

Set Q

110.									
S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering INTERNAL COMBUSTION ENGINES									
Day & Da Time: 10	ate: Tu :00 AN	iesday,17-12-2019 / To 01:00 PM		Max	. Marks: 70				
Instructi	i <b>ons:</b> 1 2	) Q. No. 1 is compulsory and sh book. 2) Figures to the right indicate fu	nould II mai	be solved in first 30 minutes rks.	in answer				
	3	3) Make suitable assumption if n	eces:	sary and state them clearly.					
Duration	· 30 Mi		уре	Questions	Marks: 1/				
		the correct alternatives from t	ho o	ations	11 11				
<b>u.i</b> Cii 1)	Lea	an air-fuel mixture is required for	ne ol		14				
.,	a) c)	idling starting	b) d)	Acceleration Cruising					
2)	In v a) c)	vhich of the following engine CR SI engine Steam engine	RDI is b) d)	used? CI engine None of above					
3)	The a) c)	e compression ratio range for SI 2-3 16-20	engii b) d)	ne is 7-10 20-25					
4)	Cai rati a) c)	rburettor is designed for operation o of 16:1 1:10	on du b) d)	ring cruising range, at air-fue 1:16 5:1	91				
5)	The a) c)	e engine of two wheelers of 100 air oil	CC a b) d)	re cooled by using Water Petrol					
6)	The cyli a) c)	e process of increasing density on nder is known as scavenging knocking	bf air b) d)	before it enters the engine Supercharging pre-heating					
7)	In a a) b) c) d)	a CI engine squish is created towards the end of compression at the end of suction stroke at the beginning of suction stroke during combustion	on stro oke	oke					
8)	An is 8 a) c)	IC engine develops 20 kW outp 0 percentage, the heat supplied 15kW 25 kW	ut po <sup>r</sup> I to th b) d)	wer. If the efficiency of the en e engine will be 20kW 30kW	ngine				

Set R



- before TDC a) b)
  - after TDC

Set R

- at BDC d) c) none of above
- 10) Which of the following is the Internal combustion engine?
  - Airplane engine a) b) Boiler C)
    - d) Steam engine None of above
- 11) In which of the following engine, supercharging is essential \_\_\_\_\_.
  - petrol b) Diesel a)
  - c) aircraft d) Marine
- On which of the following cycles are most high speed engines operated? 12)
  - a) petrol engine diesel engine b)
  - c) carnot engine dual engine d)
- 13) Which of the following compression ratio range is used in CI engine?
  - a) 0-5 5-10 b)
  - c) 10-15 d) 16-22
- Which of the following is the highest and most volatile liquid fuel? 14)
  - a) kerosene Gasoline b)
  - diesel d) fuel oil c)
# SLR-FR-22

Seat	
No.	

## S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering INTERNAL COMBUSTION ENGINES

Day & Date: Tuesday,17-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Solve any two questions from each section.

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

#### Section – I

Q.2	a) b) c)	Explain the classification of Internal combustion (I. C.) engines. List down different compensating devices used in complete carburetor. And explain any one in detail. With neat sketch, explain Unit Injector of CI engine.	05 05 04
Q.3	a)	Explain the difference between supercharger and turbocharger with diagram.	05
	b) c)	Derive mass of air relation of the simple carburettor considering compressibility of air.	05 04
Q.4	a) b) c)	A single jet simple carburetor is to supply 6.11 kg/min of air and 0.408 kg/min of petrol, density 768 kg/m <sup>3</sup> . The air is initially at 1.027 bar and 15.5 °C. Calculate the throat diameter of the venturi, if the speed of the air is 97.5 m/s, assuming a velocity coefficient of 0.84. Assume adiabatic expansion and specific heat ratio of air to be 1.4. If the drop across fuel metering orifice be 0.8 of the pressure at the throat; calculate the orifice diameter assuming a coefficient as 0.66 Explain factors which limit the use of supercharger in SI engine. Write a note on CRDI in CI engines.	05 05 04
		Section – II	
Q.5	a)	A six cylinder petrol engine has a volume compression ratio of 5:1. The clearance volume of each cylinder is 0.00115 m <sup>3</sup> . The engine consumes 10.5 kg of fuel per hour whose calorific value is 41800 kJ/kg. The engine runs at 2500 rpm and the relative efficiency is 65 %. Calculate the average indicated mean effective pressure developed	05
	b) c)	Explain stages of combustion in CI engines with the help of pressure-crank angle diagram. Write the requirements of a good combustion chamber of a SI engine.	05 04
Q.6	a) b) c)	Explain abnormal combustion in SI engines. Write a note on 'cetane number'. List down the methods to measure Brake power of IC Engine. Explain any one.	05 05 04
Q.7	a) b) c)	Explain alternative fuels of SI engines. Explain 'heat balance sheet' of IC Engines. Explain highest useful compression ratio (HUCR).	05 05 04

# Set R

Max. Marks: 56

str	uction	ns: 1) Q. No. 1 is compulsory and sl	hould	be solved in first 30 minutes in answ
		2) Figures to the right indicate fu	ull ma	rks.
		3) Make suitable assumption if r		Sary and state them clearly.
ra	tion: 3	30 Minutes	iype	Marks
1	Choo	ose the correct alternatives from	the o	otions.
	1)	The process of increasing density	of air	before it enters the engine
		a) scavenging	b)	Supercharging
		c) knocking	d)	pre-heating
	2)	In a CI engine squish is created		
		a) towards the end of compression	on stro	oke
		c) at the beginning of suction stroke	oke	
		d) during combustion		
	3)	An IC engine develops 20 kW outputs 80 percentage the heat supplier	out po to th	wer. If the efficiency of the engine
		a) 15kW	b)	20kW
		c) 25 kW	d)	30kW
	4)	Generally, the initiation of knocking	g in Cl n nha	engine considering pressure
		a) before TDC	b)	after TDC
		c) at BDC	d)	none of above
	5)	Which of the following is the Intern	al cor	nbustion engine? Boiler
		c) Steam engine	d)	None of above
	6)	In which of the following engine, su	uperch	narging is essential
		a) petrol c) aircraft	b) d)	Diesel Marine
	7)	On which of the following cycles ar	e mo	st high speed engines operated?
	,	a) petrol engine	b)	diesel engine
	0)	c) carnot engine	d)	dual engine
	0)	a) 0-5	b)	5-10
		c) 10-15	d)	16-22
	9)	Which of the following is the higher	st and	I most volatile liquid fuel?
		a) keiuselle c) diasal	d)	

# S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering **INTERNAL COMBUSTION ENGINES**

Day & Date: Tuesday,17-12-2019 Time: 10:00 AM To 01:00 PM

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#### Q.

c) diesei a) tuel oil

# SLR-FR-22



Max. Marks: 70

: 14

14

				SLR-FR	-22
				Set	S
10)	Lean air-fuel mixture is required for a) idling c) starting	b) d)	Acceleration Cruising		
11)	In which of the following engine CF a) SI engine c) Steam engine	RDI is b) d)	used? CI engine None of above		
12)	The compression ratio range for SI a) 2-3 c) 16-20	engii b) d)	ne is 7-10 20-25		
13)	Carburettor is designed for operation ratio of	on du	ring cruising range, a	t air-fuel	
	a) 16:1	b)	1:16		

a) b) c) 1:10 d) 5:1

14) The engine of two wheelers of 100 CC are cooled by using \_\_\_\_\_.

- b) d) Water a) air
- Petrol c) oil

# SLR-FR-22

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No.	

## S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering INTERNAL COMBUSTION ENGINES

Day & Date: Tuesday,17-12-2019 Time: 10:00 AM To 01:00 PM Max. Marks: 56

**Instructions:** 1) Solve any two questions from each section.

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

#### Section – I

a) b) c)	Explain the classification of Internal combustion (I. C.) engines. List down different compensating devices used in complete carburetor. And explain any one in detail. With neat sketch, explain Unit Injector of CI engine.	05 05 04					
a) b) c)	Explain the difference between supercharger and turbocharger with diagram.CWrite the difference between SI and CI engines.CDerive mass of air relation of the simple carburettor considering compressibility of air.C						
a) b) c)	A single jet simple carburetor is to supply 6.11 kg/min of air and 0.408 kg/min of petrol, density 768 kg/m <sup>3</sup> . The air is initially at 1.027 bar and 15.5 °C. Calculate the throat diameter of the venturi, if the speed of the air is 97.5 m/s, assuming a velocity coefficient of 0.84. Assume adiabatic expansion and specific heat ratio of air to be 1.4. If the drop across fuel metering orifice be 0.8 of the pressure at the throat; calculate the orifice diameter assuming a coefficient as 0.66 Explain factors which limit the use of supercharger in SI engine. Write a note on CRDI in CI engines.	05 05 04					
	Section – II						
a)	A six cylinder petrol engine has a volume compression ratio of 5:1. The clearance volume of each cylinder is 0.00115 m <sup>3</sup> . The engine consumes 10.5 kg of fuel per hour whose calorific value is 41800 kJ/kg. The engine runs at 2500 rpm and the relative efficiency is 65 %. Calculate the average indicated mean effective pressure developed.	05					
b)	Explain stages of combustion in CI engines with the help of pressure-crank angle diagram.	05					
c)	Write the requirements of a good combustion chamber of a SI engine.	04					
a) b) c)	Explain abnormal combustion in SI engines. Write a note on 'cetane number'. List down the methods to measure Brake power of IC Engine. Explain any	05 05 04					
	one.						
	a) b) c)	<ul> <li>a) Explain the classification of Internal combustion (I. C.) engines.</li> <li>b) List down different compensating devices used in complete carburetor. And explain any one in detail.</li> <li>c) With neat sketch, explain Unit Injector of CI engine.</li> <li>a) Explain the difference between supercharger and turbocharger with diagram.</li> <li>b) Write the difference between SI and CI engines.</li> <li>c) Derive mass of air relation of the simple carburetor considering compressibility of air.</li> <li>a) A single jet simple carburetor is to supply 6.11 kg/min of air and 0.408 kg/min of petrol, density 768 kg/m<sup>3</sup>. The air is initially at 1.027 bar and 15.5 °C. Calculate the throat diameter of the venturi, if the speed of the air is 97.5 m/s, assuming a velocity coefficient of 0.84. Assume adiabatic expansion and specific heat ratio of air to be 1.4. If the drop across fuel metering orifice be 0.8 of the pressure at the throat; calculate the orifice diameter assuming a coefficient as 0.66</li> <li>b) Explain factors which limit the use of supercharger in SI engine.</li> <li>c) Write a note on CRDI in CI engines.</li> <li>a) A six cylinder petrol engine has a volume compression ratio of 5:1. The clearance volume of each cylinder is 0.00115 m<sup>3</sup>. The engine consumes 10.5 kg of fuel per hour whose calorific value is 41800 kJ/kg. The engine runs at 2500 rpm and the relative efficiency is 65 %. Calculate the average indicated mean effective pressure developed.</li> <li>b) Explain stages of combustion in CI engines with the help of pressure-crank angle diagram.</li> <li>c) Write the requirements of a good combustion chamber of a SI engine.</li> <li>d) Write the requirements of a good combustion chamber of a SI engine.</li> <li>e) Write the requirements of a good combustion chamber of a SI engine.</li> <li>e) Write the requirements of a good combustion chamber of a SI engine.</li> </ul>					

Set S

	S.Y.	. (B.	Tech) (Part - I) (New) (CE Mechanical COMPOSITE	BCS) Ex Engine MATE	kamination Nov/Dec-2019 eering RIALS
Day Time	& Date : 10:0	e: Tu 0 AM	esday, 17-12-2019 To 01:00 PM		Max. Marks: 70
Instr	uctio	n <b>s:</b> 1)	) Q. No. 1 is compulsory and s book. ) Figures to the right indicate f	hould be	e solved in first 30 minutes in answer
		<b>~</b>	MCQ/Objective	Tvne Q	uestions
Dura	tion: 3	80 Mir	nutes	1900 0	Marks: 14
Q.1	Choo 1)	ose t A1-a a) c)	<b>he correct alternatives from</b> alloys for engine/automobile pa Strength Wear resistance	the opti arts are i b) d)	ions. 14 reinforced to increase their Elastic modulus Density
	2)	a) c)	is not an example for lamin Wood Bimetallic	ar comp b) d)	osite. Coatings/Paints Claddings
	3)	Whi mat a) c)	ch of the following is used as r rix composite? Carbon-fiber reinforced Wood-fiber reinforced	einforce b) d)	ment in advanced polymer Glass-fiber reinforced Unidirectional-fiber reinforced
	4)	Asp a) c)	ect ratio is Diameter to length ratio Depth to length ratio	b) d)	Length to depth ratio Length to diameter ratio
	5)	a) c)	can not be used as matrix Metals Non-metals	to comb b) d)	bine with fiber to give composites. Ceramics Polymers
	6)	One a) c)	of the most popular types of a Metal foam Glass	core mat b) d)	erial used is Honeycomb Plastic
	7)	The core a) c)	flexural stiffness of the sandw thickness. Square Inverse	ich pane b) d)	el is proportional to theof Square root Cube
	8)	Whi a) b) c) d)	ch of the following is not an ap Fabrication of wings of aircra Design of ships, boat hulls Conveyor belts Fabrication of roofs, floors ar	plication fts nd walls	of sandwich panel? of buildings

Seat No.

SLR-FR-23

Set P

- 9) Which of the following is an application of glass-fiber reinforced composites?
  - a) Adhesives

c)

b) Conveyor belts

SLR-FR-23

Set P

- Design of ships d) Automotive parts
- 10) \_\_\_\_\_ is not an example of thermoplastic polymer.
  - a) Polyethylene b) Epoxy
  - c) Polyvinyl chloride d) Nylons
- 11) In Fiber reinforced composites, fiber act as \_\_\_\_\_
  - a) Matrix b) Base Material
  - c) Reinforcement d) None of these
- 12) \_\_\_\_\_ is not desirable property of matrix in case of composites.
  - a) Low Moisture absorption
  - b) High Strength at elevated temperature
  - c) Low temperature capability
  - d) High shrinkage

#### 13) \_\_\_\_\_ is not example of natural fiber.

- a) Jute b) Coconut
- c) Carbon d) Sisal
- 14) Size range of dispersoids used in dispersion strengthened composites
  - \_\_\_\_\_. a) 0.01-0.1 μm
  - c) 0.01-0.1 mm

b) 0.01-0.1 nmd) none of these

Page **2** of **12** 

## No. S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering

# **COMPOSITE MATERIALS**

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Seat

**Instructions:** 1) Attempt any two questions from each section.

2) Figures to the right indicate full marks.

#### Section – I

Q.2	a)	Define Composite material and explain how composites are classified?	07
	b)	What are various theories of failure? Explain maximum stress theory.	07
Q.3	a)	Explain Tsai-Hill Failure Theory.	07
	b)	How polymer composites are classified explain in detail.	07
Q.4	a)	What are the different applications of Composite materials?	07
	b)	Explain characteristics and selection criteria for fiber reinforced composites.	07
		Section – II	
Q.5	a)	Explain Hand lay-up techniques with neat sketch	07
	b)	What are the different steps involved in structural design process?	07
Q.6	a)	What are the different elements in structural design?	07
	b)	Write a short note on filament winding process.	07
Q.7	a) b)	How concept of fracture mechanics can be applied to composite material? Elaborate the importance of material selection in design of composite structure.	07 07

SLR-FR-23

Set

Max. Marks: 56

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			Mechanical E COMPOSITE N	ngine IATE	ering RIALS	
Day Time	& Date : 10:00	e: Tue 0 AM	esday, 17-12-2019 To 01:00 PM			Max. Marks: 70
Instr	uctior	<b>15:</b> 1)	Q. No. 1 is compulsory and she book.	ould be	e solved in first 30 mir	utes in answer
		2)	Figures to the right indicate fill	marks		
			MCQ/Objective T	ype C	luestions	
Dura	tion: 3	0 Mir	nutes			Marks: 14
Q.1	<b>Choo</b> 1)	bse tl Whie a) b) c) d)	he correct alternatives from the ch of the following is not an app Fabrication of wings of aircrafts Design of ships, boat hulls Conveyor belts Fabrication of roofs, floors and	<b>ne opt</b> licatior s walls	ions. n of sandwich panel? of buildings	14
	2)	Whie com a)	ch of the following is an applicat posites? Adhesives Design of ships	ion of b) d)	glass-fiber reinforced Conveyor belts	
	3)	a) c)	is not an example of thermop Polyethylene Polyvinyl chloride	blastic b) d)	polymer. Epoxy Nylons	
	4)	In Fi a) c)	ber reinforced composites, fiber Matrix Reinforcement	· act a: b) d)	s Base Material None of these	
	5)	a) b) c) d)	is not desirable property of m Low Moisture absorption High Strength at elevated temp Low temperature capability High shrinkage	atrix ir peratu	n case of composites. re	
	6)	a) c)	is not example of natural fibe Jute Carbon	r. b) d)	Coconut Sisal	
	7)	Size	range of dispersoids used in di	spersi	on strengthened comp	osites
		a) c)	 0.01-0.1 μm 0.01-0.1 mm	b) d)	0.01-0.1 nm none of these	
	8)	A1-a a) c)	alloys for engine/automobile par Strength Wear resistance	ts are b) d)	reinforced to increase Elastic modulus Density	their
	9)	a) c)	is not an example for laminar Wood Bimetallic	r comp b) d)	osite. Coatings/Paints Claddings	

# S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

SLR-FR-23

Seat No.

Set Q

- Carbon-fiber reinforced a)
- Wood-fiber reinforced C)
- 11) Aspect ratio is \_\_\_\_\_.
  - a) Diameter to length ratio
  - c) Depth to length ratio
- Glass-fiber reinforced b)
- Unidirectional-fiber reinforced d)

SLR-FR-23

Set | Q

- b) Length to depth ratio
- Length to diameter ratio d)
- can not be used as matrix to combine with fiber to give composites. 12)
  - Metals a)

C)

- b) Ceramics
- Polymers Non-metals d)
- 13) One of the most popular types of core material used is \_\_\_\_\_.
  - Metal foam Honeycomb b) a) C) Glass
    - Plastic d)
- 14) The flexural stiffness of the sandwich panel is proportional to the \_\_\_\_\_\_of core thickness.
  - Square a)
  - Inverse c)

- b) Square root
- d) Cube

## No. S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering

# COMPOSITE MĂTERIALS

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Attempt any two questions from each section.

2) Figures to the right indicate full marks.

#### Section – I

Q.2	a)	Define Composite material and explain how composites are classified?	07
	b)	What are various theories of failure? Explain maximum stress theory.	07
Q.3	a)	Explain Tsai-Hill Failure Theory.	07
	b)	How polymer composites are classified explain in detail.	07
Q.4	a)	What are the different applications of Composite materials?	07
	b)	Explain characteristics and selection criteria for fiber reinforced composites.	07
		Section – II	
Q.5	a)	Explain Hand lay-up techniques with neat sketch	07
	b)	What are the different steps involved in structural design process?	07
Q.6	a)	What are the different elements in structural design?	07
	b)	Write a short note on filament winding process.	07
Q.7	a) b)	How concept of fracture mechanics can be applied to composite material? Elaborate the importance of material selection in design of composite structure.	07 07

Seat

SLR-FR-23

Max. Marks: 56

Set Q

Day Time	& Dat : 10:0	e: Tue 00 AM	esday, 17-12-2019 To 01:00 PM			Max. Marks: 70
Instr	uctio	<b>ns:</b> 1) 2)	) Q. No. 1 is compulso book. ) Figures to the right i	ory and should b ndicate fill mark	be solved in first 30 m s.	inutes in answer
			MCQ/Obj	ective Type	Questions	
Dura	tion: 3	30 Mir	nutes			Marks: 14
Q.1	Cho	ose t	he correct alternativ	es from the op	tions.	14
	1)	a) c)	can not be used a Metals Non-metals	as matrix to com b) d)	Ceramics Polymers	composites.
	2)	One a) c)	of the most popular t Metal foam Glass	types of core ma b) d)	aterial used is Honeycomb Plastic	
	3)	The core a) c)	flexural stiffness of the thickness. Square Inverse	ne sandwich par b) d)	nel is proportional to th Square root Cube	neof
	4)	Whi a) b) c) d)	ch of the following is r Fabrication of wings Design of ships, boa Conveyor belts Fabrication of roofs,	not an application of aircrafts at hulls floors and walls	on of sandwich panel?	
	5)	Whi com a) c)	ch of the following is a posites? Adhesives Design of ships	an application of b) d)	f glass-fiber reinforced Conveyor belts Automotive parts	t
	6)	a) c)	is not an example Polyethylene Polyvinyl chloride	of thermoplastic b) d)	polymer. Epoxy Nylons	
	7)	In F a) c)	iber reinforced compo Matrix Reinforcement	osites, fiber act a b) d)	as Base Material None of these	
	8)	a) b) c) d)	is not desirable pro Low Moisture absorp High Strength at ele Low temperature ca High shrinkage	operty of matrix ption vated temperatu pability	in case of composites	;.
	9)	a) c)	is not example of r Jute Carbon	natural fiber. b) d)	Coconut Sisal	

# S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering COMPOSITE MATERIALS

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No.

- 4

1)

Set R

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- 10) Size range of dispersoids used in dispersion strengthened composites
  - 0.01-0.1 μm a)

- 0.01-0.1 nm b)
- C) 0.01-0.1 mm
- d) none of these
- A1-alloys for engine/automobile parts are reinforced to increase their \_\_\_\_\_. 11)
  - Strength b) Elastic modulus a) Density
  - Wear resistance d) C)
- 12) is not an example for laminar composite.
  - Wood a)

C)

- Coatings/Paints b)
- Bimetallic d) Claddings
- Which of the following is used as reinforcement in advanced polymer 13) matrix composite?
  - Carbon-fiber reinforced a)
  - Wood-fiber reinforced C)
- Aspect ratio is \_ 14)
  - Diameter to length ratio a)
  - Depth to length ratio C)

- Glass-fiber reinforced b)
- Unidirectional-fiber reinforced d)

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Set | R

- Length to depth ratio b)
- Length to diameter ratio d)

## No. S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering

## COMPOSITE MATERIALS

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Attempt any two questions from each section.

2) Figures to the right indicate full marks.

#### Section – I

Q.2	a)	Define Composite material and explain how composites are classified?	07
	b)	What are various theories of failure? Explain maximum stress theory.	07
Q.3	a)	Explain Tsai-Hill Failure Theory.	07
	b)	How polymer composites are classified explain in detail.	07
Q.4	a)	What are the different applications of Composite materials?	07
	b)	Explain characteristics and selection criteria for fiber reinforced composites.	07
		Section – II	
Q.5	a)	Explain Hand lay-up techniques with neat sketch	07
	b)	What are the different steps involved in structural design process?	07
Q.6	a)	What are the different elements in structural design?	07
	b)	Write a short note on filament winding process.	07
Q.7	a) b)	How concept of fracture mechanics can be applied to composite material? Elaborate the importance of material selection in design of composite structure.	07 07

Seat

SLR-FR-23

Max. Marks: 56

Set R

	S.Y	. (B.	Tech) (Part - I) (New) ( Mechanic COMPOSI <sup>-</sup>	CBCS) Ex al Engine TE MATE	amination Nov/Dec-2019 ering RIALS					
Day Time	& Dat e: 10:0	e: Tu 0 AM	esday, 17-12-2019 To 01:00 PM		Max. Marks: 7	'0				
Insti	ructio	<b>ns:</b> 1	) Q. No. 1 is compulsory an book.	id should be	solved in first 30 minutes in answe	r				
		2	) Figures to the right indicat	te fill marks.						
D		00 M.	MCQ/Objectiv	/e Type Q	uestions					
Dura	ation: 3				Marks: 1	4				
Q.1	<b>Cho</b> 1)	ose t a) c)	he correct alternatives fro is not an example of the Polyethylene Polyvinyl chloride	om the option rmoplastic p b) d)	ons. 1 polymer. Epoxy Nylons	4				
	2)	In F a) c)	iber reinforced composites, Matrix Reinforcement	, fiber act as b) d)	Base Material None of these					
	3)	a) b) c) d)	<ul> <li>is not desirable property</li> <li>Low Moisture absorption</li> <li>High Strength at elevated</li> <li>Low temperature capabilit</li> <li>High shrinkage</li> </ul>	of matrix in temperature ty	case of composites.					
	4)	a) c)	is not example of natura Jute Carbon	ll fiber. b) d)	Coconut Sisal					
	5)	Size range of dispersoids used in dispersion strengthened composites								
		a) c)	 0.01-0.1 μm 0.01-0.1 mm	b) d)	0.01-0.1 nm none of these					
	6)	A1-a a) c)	alloys for engine/automobile Strength Wear resistance	e parts are r b) d)	einforced to increase their Elastic modulus Density					
	7)	a) c)	is not an example for lar Wood Bimetallic	minar compo b) d)	osite. Coatings/Paints Claddings					
	8)	Whi mat a) c)	ch of the following is used a rix composite? Carbon-fiber reinforced Wood-fiber reinforced	as reinforcei b) d)	ment in advanced polymer Glass-fiber reinforced Unidirectional-fiber reinforced					
	9)	Asp a) c)	ect ratio is Diameter to length ratio Depth to length ratio	b) d)	Length to depth ratio Length to diameter ratio					

#### Seat No. L) /D C **\**/ . .

SLR-FR-23

Set

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10) can not be used as matrix to combine with fiber to give composites.

Metals a)

a)

- Ceramics b)
- Non-metals C)

Metal foam

Polymers d)

SLR-FR-23

Set

S

- 11) One of the most popular types of core material used is \_\_\_\_\_.
  - Honeycomb b)
  - C) Glass
- d) Plastic
- 12) The flexural stiffness of the sandwich panel is proportional to the \_\_\_\_\_\_of core thickness.
  - a) Square

- b) Square root
- C) Inverse
- d) Cube
- 13) Which of the following is not an application of sandwich panel?
  - Fabrication of wings of aircrafts a)
  - b) Design of ships, boat hulls
  - Conveyor belts c)
  - Fabrication of roofs, floors and walls of buildings d)
- 14) Which of the following is an application of glass-fiber reinforced composites?
  - Adhesives a)

- b) Conveyor belts
- c) Design of ships
- d) Automotive parts

# S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Mechanical Engineering

## **COMPOSITE MĂTERIALS**

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Attempt any two questions from each section.

2) Figures to the right indicate full marks.

#### Section – I

Q.2	a)	Define Composite material and explain how composites are classified?	07					
	b)	What are various theories of failure? Explain maximum stress theory.	07					
Q.3	a)	Explain Tsai-Hill Failure Theory.	07					
	b)	How polymer composites are classified explain in detail.	07					
Q.4	a) b)	hat are the different applications of Composite materials? <b>0</b> (plain characteristics and selection criteria for fiber reinforced composites. <b>0</b>						
		Section – II						
Q.5	a)	Explain Hand lay-up techniques with neat sketch	07					
	b)	What are the different steps involved in structural design process?	07					
Q.6	a)	What are the different elements in structural design?	07					
	b)	Write a short note on filament winding process.	07					
Q.7	a) b)	How concept of fracture mechanics can be applied to composite material? Elaborate the importance of material selection in design of composite structure.	07 07					

Seat No. SLR-FR-23

Max. Marks: 56

Set S

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering** 

**ENGINEERING MATHEMATICS – III** 

Day & Date: Saturday, 07-12-2019

c)  $\int X e^{mx} dx$ 

a)  $x^3$ 

z+1

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

MCQ/Objective Type Questions

**Duration: 30 Minutes** 

#### Choose the correct alternatives from the options and rewrite the sentence. Q.1 14

The general solution of  $(D^3 - 2D^2 + D)y = 0$  is \_\_\_\_\_. a)  $y = C_1 + (C_2 + C_3 x)e^{-x}$  b)  $y = (C_1 + C_2 x)e^{-x}$ c)  $y = c_1 + c_2 e^x + c_3 e^x$  d)  $y = c_1 + (c_2 + c_3 x)e^x$ 1) The Particular Integral of  $(D^2 + 9)y = \cos 3x$  is \_\_\_\_\_ a)  $\frac{1}{10}\cos 3x$  b)  $\frac{x}{6}\sin 3x$ 2) c)  $\frac{1}{6}\sin 3x$ d)  $\frac{x}{6}\cos 3x$  $\frac{1}{D+M}X = \underline{\qquad}.$ a)  $e^{mx} \int e^{-mx} X dx$ 3) b)  $e^{-mx} \int e^{mx} X dx$ 

The value of the Fourier coefficient  $a_0$  of the function  $f(x) = x^2$  in  $(-\pi, \pi)$ 4) is

d)  $\int X e^{-mx} dx$ 

_				
a)	$\pi^2$	b	)	$\pi^3$
	3			3
c)	$\pi^2$	d	)	0
-	2		-	

Which of the following functions cannot be expanded as fourier series in 5) the interval  $(-\pi, \pi)$ 

b) |x|

Z-1

	c) cosec x	d)	$e^{-x}$
6)	If $z\{f(k)\} = F(z)$ , then $z\{k f(k)\} = 1$		·
	a) $dF(z)$	b)	-dF(z)
	c) $\frac{dz}{-z\frac{dF(z)}{dz}}$	d)	$z \frac{\frac{dz}{dF(z)}}{\frac{dz}{dz}}$
7)	$Z\{1\} = \$ a) $\frac{1}{z^{-1}}$ .	b)	$\frac{1}{z+1}$
	c) $\frac{z}{z}$	d)	Ζ

Set

Max. Marks: 70

SLR-FR-24

Marks: 14

Seat

No.

Set 8)  $L^{-1}\left[\frac{1}{(s-3)^2+16}\right]$  \_\_\_\_\_. a)  $\frac{e^{3t}}{4}\sin 4t$ b)  $\frac{e^{-3t}}{4}\sin 4t$ c)  $e^{3t}\cos 4t$ d)  $e^{-3t}\cos 4t$  $L\{\delta(t-3)\} = \_\__.$ 9) b)  $\frac{e^{-3s}}{e^{-3s}}$ a)  $e^{3s}$ C)  $e^{3s}$ d) For a binomial distribution the mean is 12 and the variance is 4 the n, p, q 10) are \_\_ are \_\_\_\_\_ a)  $18, \frac{2}{3}, \frac{1}{3}$ c)  $18, \frac{1}{3}, \frac{2}{3}$ b) 16,  $\frac{1}{3}$ ,  $\frac{2}{3}$ d) None If by  $x = \frac{5}{18}$ ,  $bxy = \frac{8}{5}$  then r =\_\_\_\_. 11) a) 2/5 b) 1/2 c) 2/3 d) 3/2 Gauss Seidal method converges only if the coefficient matrix A of the 12) system of simultaneous equation AX = B is \_\_\_\_\_. a) Diagonally dominant b) Upper triangular c) Singular d) Non Singular matrix The positive real root of the equation  $x^3 - x - 11 = 0$  lies between 13) a) 0 and 1 b) 2 and 3 d) 3 and 4 c) 1 and 2 If  $L\{y(t)\} = \bar{y}(s)$  then  $L\left[\frac{d^2y}{dt^2}\right] =$ \_\_\_\_\_. a)  $s \bar{y}(s) - y(o)$  b)  $s^2 \bar{y}(s) + sy(o) + y'(o)$ c)  $s^2 \bar{y}(s) - sy'(o) - y''(o)$  d)  $s^2 \bar{y}(s) - s y(o) - y'(o)$ 14)

SLR-FR-24

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## S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering ENGINEERING MATHEMATICS – III**

Day & Date: Saturday,07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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

#### Section – I

#### Q.2 Solve any three of the following questions.

- a) Solve  $(D^2 + 4D + 4)y = e^{3x} + \cos 5x$
- **b)** Solve  $(D^2 + 1)y = \sin x \sin 2x$
- c) Find the Fourier series of  $f(x) = 1 x^2$  in the interval (-1,1).
- d) Find the half range sine service of

$$f(x) = \frac{2x}{3}, 0 \le x \le \frac{\pi}{3} \\ = \frac{\pi - x}{3}, \frac{\pi}{3} \le x \le \pi$$

**e)** Find  $Z\{K 5^k\}, k \ge 0$ 

#### Solve any three of the following questions. Q.3

- a) Solve  $(D^3 + 3D)y = \cosh 2x$ .
- **b)** Solve  $(D^2 + 4)y = x \sin x$ .
- c) Find the Fourier series of f(x) = -1,  $0 < x < \pi$ = 2,  $\pi < x < 2\pi$

$$= 2, \quad n < x <$$
  
ind z(sinh  $\alpha k$ )  $k > 0$ 

- **d)** Find  $z\{\sinh \alpha k\}, k \ge 0.$  **e)** Find  $Z^{-1}\left\{\frac{1}{(z-3)^2}\right\}, |z| > 3.$

#### Q.4 Solve any two of the following questions.

- a) An electric circuit consists of an inductance L, a condenser of capacity C and an e.m.f  $E = E_o \cos wt$ , so that the charge Q statisfies the diff. equation  $\frac{d^2Q}{dt^2} + \frac{Q}{CL} = \frac{E_o}{L}\cos wt.$ If  $W^2 = \frac{1}{CL}$  and initially  $Q = Q_0$  at t = 0 and the current  $i = i_0$  at t = 0Find the charge Q at time t
- b) Find the Fourier series of

$$f(x) = x, \quad -1 < x < 0$$
  
= x + 2,  $0 < x < 1$   
$$f(x) = x + 2, \quad 0 < x < 1$$

C Find  $Z^{-1}\left\{\frac{z}{(z-2)(z-3)}\right\}$ , |z| > 3 Max. Marks: 56

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SLR-FR-24

#### Section – II

#### Q.5 Solve any three of the following questions.

- **a)** Find  $L[e^{-2t}\sqrt{1 + \sin 4t}]$
- b) Solve the system of equation by using Gauss- Elimination method x + 4y - z = -5, x + y - 6z = -12, -3x - y - z = 4
- c) Given y series x series Mean 18 100 14 20 S.D.

Coefficient of correlation between x and y is 0.8. Find the equation of line of regression of x on y. Also find out the most probable value of x if y is 90.

d) A random variable x has the following probability distribution.

	x	1	2	2	3	4	6	6	7			
	P(x)	k	2	k 3	3k	$k^2$	$k^{2} + k$	$2k^{2}$	$4k^{2}$			
e)	Find th	ne coe	fficient	of co	rrelati	on (K	arl Peai	rson's)	from the	follo	<i>w</i> ing da	ita.
	x	28	45	40	38	35	33	40	32	36	33	
	ν	23	34	33	34	30	26	28	31	36	35	

#### Solve any three of the following questions. Q.6

- A firm has two cars which it hires out day by day. The number of demands a) for a car on each day is distributed as a poisson variate with mean 1.5. Calculate the probable number of days in a year on which
  - 1) neither car is in demand
  - 2) a demand is refused
- **b)** Find by Newton's method, the real root of the equation  $3x = \cos x + 1$ correct to the four decimal places.
- c) Solve the following system of linear equations by Gauss Seidal method. 28x + 4y - z = 32

x + 3y + 10z = 24

2x + 17y + 4z = 35 (perform 3 iterations)

Find  $L^{-1}\left[\frac{2s+3}{s^2+2s+2}\right]$ d)

y

Find Laplace transform of  $\frac{d}{dt} \left( \frac{\sin t}{t} \right)$ e)

#### Q.7 Solve any two of the following questions.

a) Find the Laplace transform of

$$f(t) = \frac{t}{a} \qquad 0 < t \le a$$
$$= \frac{1}{a}(2a - t) \quad a \le t < 2a \text{ and } f(t) = f(t + 2a)$$

b) Seven coins are tossed at a time 256 times. Number of heads obtained in each toss are recorded below. Fit a binomial distribution under the hypothesis that the coins are unbiased.

No of heads	0	1	2	3	4	5	6	7	
requency	14	12	38	70	60	46	14	2	

c) Solve the following system of equations by Gauss- Jacobi's method. (Perform 4 iterations) 8x - 3y + 2z = 20

4x + 11y - z = 33

6x + 3y + 12z = 35

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SLR-FR-24

Set

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electronics Engineering ENGINEERING MATHEMATICS – III

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

### **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

## Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

 $L^{-1}\left[\frac{1}{(s-3)^2+16}\right]$  \_\_\_\_\_\_. 1) b)  $\frac{e^{-3t}}{4}\sin 4t$ a)  $\frac{e^{3t}}{4}\sin 4t$ d)  $e^{-3t}\cos 4t$ c)  $e^{3t} \cos 4t$ 2)  $L\{\delta(t-3)\} = \____.$  $\frac{e^{-3s}}{e^{-3s}}$ a)  $e^{3s}$ b) C)  $\frac{e^{3s}}{s}$ d) For a binomial distribution the mean is 12 and the variance is 4 the n, p, q 3) are a)  $18, \frac{2}{3}, \frac{1}{3}$ c)  $18, \frac{1}{3}, \frac{2}{3}$ b) 16,  $\frac{1}{3}$ ,  $\frac{2}{3}$ d) None If by  $x = \frac{5}{18}$ ,  $bxy = \frac{8}{5}$  then r =\_\_\_\_\_ 4) b) 1/2 a) 2/5 c) 2/3 d) 3/2 5) Gauss Seidal method converges only if the coefficient matrix A of the system of simultaneous equation AX = B is \_\_\_\_\_ a) Diagonally dominant b) Upper triangular d) Non Singular matrix c) Singular The positive real root of the equation  $x^3 - x - 11 = 0$  lies between 6) a) 0 and 1 b) 2 and 3 c) 1 and 2 d) 3 and 4 If  $L\{y(t)\} = \bar{y}(s)$  then  $L\left[\frac{d^2y}{dt^2}\right] =$ \_\_\_\_\_. a)  $s \bar{y}(s) - y(o)$  b)  $s^2 \bar{y}(s) + sy(o) + y'(o)$ c)  $s^2 \bar{y}(s) - sy'(o) - y''(o)$  d)  $s^2 \bar{y}(s) - s y(o) - y'(o)$ 7) The general solution of  $(D^3 - 2D^2 + D)y = 0$  is \_\_\_\_\_. a)  $y = C_1 + (C_2 + C_3 x)e^{-x}$  b)  $y = (C_1 + C_2 x)e^{-x}$ c)  $y = c_1 + c_2 e^x + c_3 e^x$  d)  $y = c_1 + (c_2 + c_3 x)e^{-x}$ 8) d)  $y = c_1 + (c_2 + c_3 x)e^x$ 

# SLR-FR-24



Max. Marks: 70

Marks: 14

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Set The Particular Integral of  $(D^2 + 9)y = \cos 3x$  is \_\_\_\_\_. 9) a)  $\frac{1}{18}\cos 3x$ b)  $\frac{x}{6}\sin 3x$ d)  $\frac{x}{6}\cos 3x$ c)  $\frac{1}{6}\sin 3x$  $\frac{1}{D+M}X = \underline{\qquad}.$ a)  $e^{mx} \int e^{-mx} X dx$ 10) b)  $e^{-mx}\int e^{mx}Xdx$ c)  $\int X e^{mx} dx$ d)  $\int X e^{-mx} dx$ The value of the Fourier coefficient  $a_0$  of the function  $f(x) = x^2$  in  $(-\pi, \pi)$ 11) is \_\_\_\_\_ a)  $\pi^2$ b)  $\frac{\pi^3}{3}$ 3 c) π<sup>2</sup> d) 0 Which of the following functions cannot be expanded as fourier series in 12) the interval  $(-\pi, \pi)$ a)  $x^{3}$ b) |x|c) cosec xIf  $z\{f(k)\} = F(z)$ , then  $z\{k f(k)\} =$ \_\_\_\_\_. dF(z)b)  $\frac{-dF(z)}{dz}$ 13) c)  $\frac{dz}{-z\frac{dF(z)}{dz}}$ d)  $z \frac{dF(z)}{dz}$ 1

4) 
$$Z\{1\} =$$
\_\_\_\_\_.  
a)  $\frac{1}{\frac{z-1}{z+1}}$  b)  $\frac{1}{\frac{z+1}{z+1}}$   
c)  $\frac{\frac{z}{z+1}}{\frac{z}{z+1}}$  d)  $\frac{z}{\frac{z}{z-1}}$ 

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## S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering ENGINEERING MATHEMATICS – III**

Day & Date: Saturday,07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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

#### Section – I

#### Q.2 Solve any three of the following questions.

- a) Solve  $(D^2 + 4D + 4)y = e^{3x} + \cos 5x$
- **b)** Solve  $(D^2 + 1)y = \sin x \sin 2x$
- c) Find the Fourier series of  $f(x) = 1 x^2$  in the interval (-1,1).
- d) Find the half range sine service of

$$f(x) = \frac{2x}{3}, 0 \le x \le \frac{\pi}{3} \\ = \frac{\pi - x}{3}, \frac{\pi}{3} \le x \le \pi$$

**e)** Find  $Z\{K 5^k\}, k \ge 0$ 

#### Solve any three of the following questions. Q.3

- a) Solve  $(D^3 + 3D)y = \cosh 2x$ .
- **b)** Solve  $(D^2 + 4)y = x \sin x$ .
- c) Find the Fourier series of f(x) = -1,  $0 < x < \pi$ = 2,  $\pi < x < 2\pi$

- **d)** Find  $z\{\sinh \alpha k\}, k \ge 0.$  **e)** Find  $Z^{-1}\left\{\frac{1}{(z-3)^2}\right\}, |z| > 3.$

#### Q.4 Solve any two of the following questions.

- a) An electric circuit consists of an inductance L, a condenser of capacity C and an e.m.f  $E = E_o \cos wt$ , so that the charge Q statisfies the diff. equation  $\frac{d^2Q}{dt^2} + \frac{Q}{CL} = \frac{E_o}{L}\cos wt.$ If  $W^2 = \frac{1}{CL}$  and initially  $Q = Q_0$  at t = 0 and the current  $i = i_0$  at t = 0Find the charge Q at time t
- b) Find the Fourier series of

$$f(x) = x, \quad -1 < x < 0$$
  
= x + 2,  $0 < x < 1$   
(c) Find  $Z^{-1} \left\{ \frac{z}{z} \right\}$  |z| >

C Find  $Z^{-1}\left\{\frac{z}{(z-2)(z-3)}\right\}$ , |z| > 3 Max. Marks: 56

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SLR-FR-24

#### Section – II

b) Solve the system of equation by using Gauss- Elimination method x + 4y - z = -5, x + y - 6z = -12, -3x - y - z = 4

y series

Solve any three of the following questions.

x series

**a)** Find  $L[e^{-2t}\sqrt{1 + \sin 4t}]$ 

c) Given

7

 $4k^2$ 

32

31

36

36

33

35

#### 18 Mean 100 S.D. 14 20 Coefficient of correlation between x and y is 0.8. Find the equation of line of regression of x on y. Also find out the most probable value of x if y is 90. d) A random variable x has the following probability distribution. 2 1 3 4 6 х 6 P(x)k 2k3*k* $k^2$ $k^{2} + k$ $2k^2$ e) Find the coefficient of correlation (Karl Pearson's) from the following data. 28 45 40 38 35 33 40 х 23 34 33 34 28 30 26 y Solve any three of the following questions. A firm has two cars which it hires out day by day. The number of demands for a car on each day is distributed as a poisson variate with mean 1.5. Calculate the probable number of days in a year on which neither car is in demand 1) 2) a demand is refused **b)** Find by Newton's method, the real root of the equation $3x = \cos x + 1$ correct to the four decimal places. c) Solve the following system of linear equations by Gauss Seidal method. 28x + 4y - z = 32x + 3y + 10z = 242x + 17y + 4z = 35 (perform 3 iterations) Find $L^{-1}\left[\frac{2s+3}{s^2+2s+2}\right]$ Find Laplace transform of $\frac{d}{dt} \left( \frac{\sin t}{t} \right)$ Solve any two of the following questions. a) Find the Laplace transform of $f(t) = \frac{t}{t}$ $0 < t \le a$ $=\frac{1}{a}(2a-t)$ $a \le t < 2a$ and f(t) = f(t+2a)

Seven coins are tossed at a time 256 times. Number of heads obtained in b) each toss are recorded below. Fit a binomial distribution under the hypothesis that the coins are unbiased.

No of heads	0	1	2	3	4	5	6	7
Frequency	14	12	38	70	60	46	14	2
<u> </u>	-		-	-	-	-	-	

c) Solve the following system of equations by Gauss- Jacobi's method. (Perform 4 iterations) 8x - 3y + 2z = 204x + 11y - z = 33

6x + 3y + 12z = 35

Q.5

Q.6

a)

d)

e)

Q.7

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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

**Electronics Engineering ENGINEERING MATHEMATICS – III** 

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

## MCQ/Objective Type Questions

**Duration: 30 Minutes** 

#### Choose the correct alternatives from the options and rewrite the sentence. Q.1 14

- Which of the following functions cannot be expanded as fourier series in 1) the interval  $(-\pi, \pi)$
- a)  $x^{3}$ b) |x|c) cosec xd)  $e^{-x}$ If  $z\{f(k)\} = F(z)$ , then  $z\{k f(k)\} = _______$ 2) b) -dF(z)a) dF(z)dzdz  $-z\frac{dF(z)}{dz}$ d)  $z \frac{dF(z)}{dz}$ c)  $Z\{1\} = \_$ 3)
- a) b) d) c)  $L^{-1}\left[\frac{1}{(s-3)^2+16}\right]$ 4) a)  $\frac{e^{3t}}{4}\sin 4t$ b)  $\frac{e^{-3t}}{4}\sin 4t$ c)  $e^{3t} \cos 4t$ d)  $e^{-3t}\cos 4t$

 $L\{\delta(t-3)\} = \____.$ 5)  $\frac{e^{-3s}}{e^{-3s}}$ a)  $e^{3s}$ b) е <sup>3</sup> d) C)

6) For a binomial distribution the mean is 12 and the variance is 4 the n, p, q are \_\_\_  $18, \frac{2}{3}, \frac{1}{3}$  $18, \frac{1}{2}$ 16,  $\frac{1}{3}$ ,  $\frac{2}{3}$ b) a)

C) $18, \frac{1}{3}, \frac{2}{3}$			d)	None
If by $x = \frac{5}{18}$ ,	$bxy = \frac{8}{5}$	then $r = $	·	
a) 2/5	-		b)	1/2
c) 2/3			d)	3/2
	c) $18, \frac{1}{3}, \frac{2}{3}$ If by $x = \frac{5}{18}$ , a) 2/5 c) 2/3	c) $18, \frac{1}{3}, \frac{2}{3}$ If $byx = \frac{5}{18},  bxy = \frac{8}{5}$ a) 2/5 c) 2/3	c) $18, \frac{1}{3}, \frac{2}{3}$ If $byx = \frac{5}{18}$ , $bxy = \frac{8}{5}$ then $r = \frac{1}{5}$ a) $\frac{2}{5}$ c) $\frac{2}{3}$	c) $18, \frac{1}{3}, \frac{2}{3}$ d) If $byx = \frac{5}{18}$ , $bxy = \frac{8}{5}$ then $r = $ a) $2/5$ b) c) $2/3$ d)

# SLR-FR-24



Max. Marks: 70

Marks: 14

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SLR-FR-24 Set | R 8) Gauss Seidal method converges only if the coefficient matrix A of the system of simultaneous equation AX = B is \_\_\_\_\_ b) Upper triangular a) Diagonally dominant d) Non Singular matrix c) Singular 9) The positive real root of the equation  $x^3 - x - 11 = 0$  lies between a) 0 and 1 b) 2 and 3 c) 1 and 2 d) 3 and 4  $\begin{aligned} &\text{If } L\{y(t)\} = \bar{y}(s) \text{ then } L\left[\frac{d^2y}{dt^2}\right] = \underline{\qquad}, \\ &\text{a) } s \,\bar{y}(s) - y(o) &\text{b) } s^2 \bar{y}(s) + sy(o) + y'(o) \\ &\text{c) } s^2 \bar{y}(s) - sy'(o) - y''(o) &\text{d) } s^2 \bar{y}(s) - s \, y(o) - y'(o) \end{aligned}$ 10) The general solution of  $(D^3 - 2D^2 + D)y = 0$  is \_\_\_\_\_. a)  $y = C_1 + (C_2 + C_3 x)e^{-x}$  b)  $y = (C_1 + C_2 x)e^{-x}$ c)  $y = c_1 + c_2 e^x + c_3 e^x$  d)  $y = c_1 + (c_2 + c_3 x)e^x$ 11) The Particular Integral of  $(D^2 + 9)y = \cos 3x$  is \_\_\_\_\_. 12) b)  $\frac{x}{6} \sin 3x$ d)  $\frac{x}{6} \cos 3x$ a)  $\frac{1}{18}\cos 3x$ c)  $\frac{1}{6}\sin 3x$  $\frac{1}{D+M}X = \underline{\qquad}.$ a)  $e^{mx} \int e^{-mx} X dx$ 13) b)  $e^{-mx}\int e^{mx}Xdx$ c)  $\int X e^{mx} dx$ d)  $\int X e^{-mx} dx$ The value of the Fourier coefficient  $a_0$  of the function  $f(x) = x^2$  in  $(-\pi, \pi)$ 14) a)  $\frac{\pi^2}{3}$ b)  $\frac{\pi^3}{3}$ c)  $\frac{\pi^2}{2}$ d) 0

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## S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering ENGINEERING MATHEMATICS – III**

Day & Date: Saturday,07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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

#### Section – I

#### Q.2 Solve any three of the following questions.

- a) Solve  $(D^2 + 4D + 4)y = e^{3x} + \cos 5x$
- **b)** Solve  $(D^2 + 1)y = \sin x \sin 2x$
- c) Find the Fourier series of  $f(x) = 1 x^2$  in the interval (-1,1).
- d) Find the half range sine service of

$$f(x) = \frac{2x}{3}, 0 \le x \le \frac{\pi}{3} \\ = \frac{\pi - x}{3}, \frac{\pi}{3} \le x \le \pi$$

**e)** Find  $Z\{K 5^k\}, k \ge 0$ 

#### Solve any three of the following questions. Q.3

- **a)** Solve  $(D^3 + 3D)y = \cosh 2x$ .
- **b)** Solve  $(D^2 + 4)y = x \sin x$ .
- c) Find the Fourier series of  $f(x) = -1, \qquad 0 < x < \pi$ = 2.  $\pi < x < 2\pi$

$$= 2, \quad n < x <$$
  
ind z(sinh  $\alpha k$ )  $k > 0$ 

- **d)** Find  $z\{\sinh \alpha k\}, k \ge 0.$  **e)** Find  $Z^{-1}\left\{\frac{1}{(z-3)^2}\right\}, |z| > 3.$

#### Q.4 Solve any two of the following questions.

- a) An electric circuit consists of an inductance L, a condenser of capacity C and an e.m.f  $E = E_o \cos wt$ , so that the charge Q statisfies the diff. equation  $\frac{d^2Q}{dt^2} + \frac{Q}{CL} = \frac{E_o}{L}\cos wt.$ If  $W^2 = \frac{1}{CL}$  and initially  $Q = Q_0$  at t = 0 and the current  $i = i_0$  at t = 0Find the charge Q at time t
- b) Find the Fourier series of

$$f(x) = x, \quad -1 < x < 0$$
  
= x + 2,  $0 < x < 1$   
$$Find Z^{-1} \left\{ \frac{z}{z} \right\} |z| > 2$$

C Find  $Z^{-1}\left\{\frac{z}{(z-2)(z-3)}\right\}$ , |z| > 3 Max. Marks: 56

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SLR-FR-24

#### Section – II

- **a)** Find  $L[e^{-2t}\sqrt{1 + \sin 4t}]$
- b) Solve the system of equation by using Gauss- Elimination method x + 4y - z = -5, x + y - 6z = -12, -3x - y - z = 4
- c) Given x series v series Mean 18 100 S.D. 14 20

Coefficient of correlation between x and y is 0.8. Find the equation of line of regression of x on y. Also find out the most probable value of x if y is 90.

d) A random variable *x* has the following probability distribution. ٨

	x	1	4	<u> </u>	3	4	0	0	1			
	P(x)	) k	: 2	k 3	3k	$k^2$	$k^{2} + k$	$2k^{2}$	$4k^{2}$			
e)	Find	the coe	efficien	t of coi	rrelatio	on (Ka	rl Pears	son's)	from the	follov	wing data	ł.
	x	28	45	40	38	35	33	40	32	36	33	
	ν	23	34	33	34	30	26	28	31	36	35	

#### Q.6 Solve any three of the following questions.

- a) A firm has two cars which it hires out day by day. The number of demands for a car on each day is distributed as a poisson variate with mean 1.5. Calculate the probable number of days in a year on which
  - 1) neither car is in demand
  - 2) a demand is refused
- **b)** Find by Newton's method, the real root of the equation  $3x = \cos x + 1$ correct to the four decimal places.
- c) Solve the following system of linear equations by Gauss Seidal method. 28x + 4y - z = 32

x + 3y + 10z = 24

2x + 17y + 4z = 35 (perform 3 iterations)

- Find  $L^{-1}\left[\frac{2s+3}{s^2+2s+2}\right]$ d)
- Find Laplace transform of  $\frac{d}{dt} \left( \frac{\sin t}{t} \right)$ e)

#### Q.7 Solve any two of the following questions.

a) Find the Laplace transform of

$$f(t) = \frac{t}{a} \qquad 0 < t \le a$$
$$= \frac{1}{a}(2a - t) \quad a \le t < 2a \text{ and } f(t) = f(t + 2a)$$

Seven coins are tossed at a time 256 times. Number of heads obtained in b) each toss are recorded below. Fit a binomial distribution under the hypothesis that the coins are unbiased.

No of heads	0	1	2	3	4	5	6	7
Frequency	14	12	38	70	60	46	14	2

c) Solve the following system of equations by Gauss- Jacobi's method. (Perform 4 iterations) 8x - 3y + 2z = 20

4x + 11y - z = 336x + 3y + 12z = 35 10

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SLR-FR-24

Set

09

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering** 

**ENGINEERING MATHEMATICS – III** 

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- Figures to the right indicate full marks.
- 4) Use of non-programmable calculator is allowed.

**Duration: 30 Minutes** 

#### Choose the correct alternatives from the options and rewrite the sentence. Q.1 14

MCQ/Objective Type Questions

- For a binomial distribution the mean is 12 and the variance is 4 the n, p, q 1)
- are  $18, \frac{2}{3}, \frac{1}{3} \\
   18, \frac{1}{3}, \frac{2}{3}
   18, \frac{1}{3}, \frac{2}{3}$ b) 16,  $\frac{1}{3}$ ,  $\frac{2}{3}$ a) d) None c) If  $byx = \frac{5}{18}$ ,  $bxy = \frac{8}{5}$  then r =\_\_\_\_\_. 2) a) 2/5 b) 1/2 c) 2/3 d) 3/2 3) Gauss Seidal method converges only if the coefficient matrix A of the system of simultaneous equation AX = B is \_\_\_\_\_ b) Upper triangular a) Diagonally dominant d) Non Singular matrix Singular c) The positive real root of the equation  $x^3 - x - 11 = 0$  lies between 4) a) 0 and 1 b) 2 and 3 c) 1 and 2 d) 3 and 4 If  $L\{y(t)\} = \bar{y}(s)$  then  $L\left[\frac{d^2y}{dt^2}\right] =$ \_\_\_\_\_. a)  $s \bar{y}(s) - y(o)$  b)  $s^2 \bar{y}(s) + sy(o) + y'(o)$ c)  $s^2 \bar{y}(s) - sy'(o) - y''(o)$  d)  $s^2 \bar{y}(s) - s y(o) - y'(o)$ 5) The general solution of  $(D^3 - 2D^2 + D)y = 0$  is \_\_\_\_\_. a)  $y = C_1 + (C_2 + C_3 x)e^{-x}$  b)  $y = (C_1 + C_2 x)e^{-x}$ c)  $y = c_1 + c_2 e^x + c_2 e^x$  d)  $y = c_1 + (c_2 + c_2 x)e^{-x}$ 6) d)  $y = c_1 + (c_2 + c_3 x)e^x$ c)  $y = c_1 + c_2 e^x + c_3 e^x$ The Particular Integral of  $(D^2 + 9)y = \cos 3x$  is \_\_\_\_\_. 7) b)  $\frac{x}{6}\sin 3x$ a)  $\frac{1}{18}\cos 3x$ c)  $\frac{1}{6} \sin 3x$ d)  $\frac{x}{6}\cos 3x$ 8)
  - $\frac{1}{D+M}X = \underline{\qquad}.$ a)  $e^{mx} \int e^{-mx} X dx$ b)  $e^{-mx} \int e^{mx} X dx$ d)  $\int X e^{-mx} dx$ c)  $\int X e^{mx} dx$

Seat No.

# SLR-FR-24

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Max. Marks: 70

Marks: 14

# SLR-FR-24

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9)	The value of the Fourier coefficient is	$a_0$ of	f the function $f(x) = x^2$ in $(-\pi, \pi)$
	a) $\pi^2$	b)	$\pi^3$
	3		3
	c) $\pi^{2}$	d)	0
	2		
10)	Which of the following functions can the interval $(-\pi, \pi)$	nnot	be expanded as fourier series in
	a) $x^3$	b)	<i>x</i>
	c) $cosec x$	d)	$e^{-x}$
11)	$ f_{z}\{f(k)\} = F(z)$ , then $z\{k f(k)\} =$		
,	a) $dF(z)$	b)	-dF(z)
	dz		dz
	c) $-z \frac{dF(z)}{dF(z)}$	d)	$z \frac{dF(z)}{dF(z)}$
	<sup>2</sup> dz		<sup>2</sup> dz
12)	$Z\{1\} = \$		1
	a) $\frac{1}{z-1}$	b)	$\frac{1}{z+1}$
	C) $\frac{z}{z+1}$	d)	$\frac{Z}{Z}$
12)			2-1
13)	$L^{-1}\left[\frac{1}{(s-3)^2+16}\right]$		
	a) $e^{3t}$ sin $4t$	b)	$e^{-3t}$ sin $4t$
	$\frac{1}{4}\sin 4\iota$	,	$\frac{1}{4}$ SIII 4t
	c) $e^{3t}\cos 4t$	d)	$e^{-3t}\cos 4t$
14)	$L\{\delta(t-3)\} = \underline{\qquad}.$		
	a) $e^{3s}$	b)	$e^{-3s}$
	<b>c)</b> $e^{3s}$	d)	$e^{-3s}$
	-, <u> </u>		-

Seat No.

## S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering ENGINEERING MATHEMATICS – III**

Day & Date: Saturday,07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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

#### Section – I

#### Q.2 Solve any three of the following questions.

- a) Solve  $(D^2 + 4D + 4)y = e^{3x} + \cos 5x$
- **b)** Solve  $(D^2 + 1)y = \sin x \sin 2x$
- c) Find the Fourier series of  $f(x) = 1 x^2$  in the interval (-1,1).
- d) Find the half range sine service of

$$f(x) = \frac{2x}{3}, 0 \le x \le \frac{\pi}{3} \\ = \frac{\pi - x}{3}, \frac{\pi}{3} \le x \le \pi$$

e) Find  $Z\{K, 5^k\}, k \ge 0$ 

#### Solve any three of the following questions. Q.3

- a) Solve  $(D^3 + 3D)y = \cosh 2x$ .
- **b)** Solve  $(D^2 + 4)y = x \sin x$ .
- c) Find the Fourier series of f(x) = -1,  $0 < x < \pi$ = 2,  $\pi < x < 2\pi$

$$= 2, \quad 1 < x <$$

- **d)** Find  $z\{\sinh \alpha k\}, k \ge 0.$  **e)** Find  $Z^{-1}\left\{\frac{1}{(z-3)^2}\right\}, |z| > 3.$

#### Q.4 Solve any two of the following questions.

- a) An electric circuit consists of an inductance L, a condenser of capacity C and an e.m.f  $E = E_o \cos wt$ , so that the charge Q statisfies the diff. equation  $\frac{d^2Q}{dt^2} + \frac{Q}{CL} = \frac{E_o}{L}\cos wt.$ If  $W^2 = \frac{1}{CL}$  and initially  $Q = Q_0$  at t = 0 and the current  $i = i_0$  at t = 0Find the charge Q at time t
- b) Find the Fourier series of

$$f(x) = x, \quad -1 < x < 0$$
  
= x + 2,  $0 < x < 1$   
$$Find Z^{-1} \left\{ \frac{z}{z} \right\} |z| > 2$$

C Find  $Z^{-1}\left\{\frac{z}{(z-2)(z-3)}\right\}$ , |z| > 3 Max. Marks: 56

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SLR-FR-24

#### Section – II

- **a)** Find  $L[e^{-2t}\sqrt{1+\sin 4t}]$
- b) Solve the system of equation by using Gauss- Elimination method x + 4y z = -5, x + y 6z = -12, -3x y z = 4
- c) Given x series y series Mean 18 100 S.D. 14 20

Coefficient of correlation between x and y is 0.8. Find the equation of line of regression of x on y. Also find out the most probable value of x if y is 90.

d) A random variable *x* has the following probability distribution.

	x	1	4	<u> </u>	3	4	0	0	1			
	P(x)	) k	2	<i>k</i> 3	3k	$k^2$	$k^{2} + k$	$2k^{2}$	$4k^{2}$			
e)	Find t	he coe	efficien	t of co	rrelatio	on (Ka	rl Pears	son's)	from the	follo	wing data	э.
	x	28	45	40	38	35	33	40	32	36	33	
	v	23	34	33	34	30	26	28	31	36	35	

#### Q.6 Solve any three of the following questions.

- a) A firm has two cars which it hires out day by day. The number of demands for a car on each day is distributed as a poisson variate with mean 1.5. Calculate the probable number of days in a year on which
  - 1) neither car is in demand
  - 2) a demand is refused
- **b)** Find by Newton's method, the real root of the equation  $3x = \cos x + 1$  correct to the four decimal places.
- c) Solve the following system of linear equations by Gauss Seidal method. 28x + 4y - z = 32

x + 3y + 10z = 24

2x + 17y + 4z = 35 (perform 3 iterations)

- **d)** Find  $L^{-1}\left[\frac{2s+3}{s^2+2s+2}\right]$
- e) Find Laplace transform of  $\frac{d}{dt} \left( \frac{\sin t}{t} \right)$

#### **Q.7** Solve any two of the following questions.

a) Find the Laplace transform of

$$f(t) = \frac{t}{a} \qquad 0 < t \le a$$
$$= \frac{1}{a}(2a - t) \quad a \le t < 2a \text{ and } f(t) = f(t + 2a)$$

**b)** Seven coins are tossed at a time 256 times. Number of heads obtained in each toss are recorded below. Fit a binomial distribution under the hypothesis that the coins are unbiased.

No of heads	0	1	2	3	4	5	6	7
Frequency	14	12	38	70	60	46	14	2

c) Solve the following system of equations by Gauss- Jacobi's method. (Perform 4 iterations) 8x - 3y + 2z = 20

4x + 11y - z = 336x + 3y + 12z = 35

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# SLR-FR-25

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## Seat No.

#### S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering** ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019

Time: 10:00 AM To 01:00 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
  - 2) Figures to the right indicate full marks.
  - 3) Assume suitable data if necessary and state it clearly.

### **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

Marks: 14

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
  - If the line frequency is 50 Hz, the output frequency of bridge rectifier is 1)
    - a) 25 Hz b) 50 Hz
    - 200 Hz 100 Hz d) C)
  - 2) The basic purpose of filter is to \_\_\_\_\_
    - minimize variations in ac input signal a)
    - suppress harmonics in rectified output b)
    - remove ripples from the rectified output c)
    - stabilize dc output voltage d)
  - 3) A half wave rectifier is equivalent to \_\_\_\_\_.
    - a) clamper circuit
    - a clipper circuit b)
    - a clamper circuit with negative bias c)
    - a clamper circuit with positive bias d)
  - 4) In a LC filter, the ripple factor \_\_\_\_
    - increases with the load current a)
    - increases with the load resistance b)
    - c) remains constant with the load current
    - has the lowest value d)
  - 5) Early effect in BJT refers to
    - a) avalanche breakdown thermal breakdown b)
    - c) base narrowing d) zener breakdown
  - In CE configuration the output V-I characteristics are drawn by taking \_\_\_\_\_. 6)
    - VCE vs. IC for constant value of IE a)
    - VCE vs. IC for constant value of IB b)
    - VCE vs. IC for constant value of VCB C)
    - None of these d)

Max. Marks: 70





Set | P 7) The CE amplifier circuit are preferred over CB amplifier circuit because they have . a) lower amplification factor b) larger amplification factor high input resistance and low output resistance c) none of these d) 8) Input impedance of JFET amplifier is \_ Very low Same as transistor a) b) C) Very High d) Both a & b The region in which JFET works as an amplifier is called as \_\_\_\_\_. 9) pinchoff region ohmic region a) b) cutoff region both b & c C) d) The FET configuration used in the unity gain buffers is \_ 10) \_. Common Gate Common Drain a) b) **Common Source** d) All above c) The negative feedback in amplifier \_ 11) increases voltage gain b) decreases voltage gain a) stabilizes the voltage gain C) d) both b & c An emitter follower is widely used circuit because \_\_\_\_\_ 12) its voltage gain in very high a) its voltage gain is "1" b) C) its input impedance is high and output impedance is low it employs no bypass capacitor d) A feedback circuit usually employs \_\_\_\_\_ network. 13) b) Capacitive a) Resistive Inductive d) None of the above C) 14) The frequency response of transistor coupling is \_\_\_\_\_

- a) Good
- b) very good
- c) Excellent
- d) Bad

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# SLR-FR-25

S	Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019
	Electronics Engineering

## ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday,10-12-2019 Time: 10:00 AM To 01:00 PM

Seat No.

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

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

#### Section – I

#### Q.2 Attempt any four of the following question.

- a) List different applications of diode. Draw circuit diagram of full wave voltage doubler and example its working in detail.
- **b)** Draw circuit diagram of LC filter with FWR and example its functioning in detail.
- c) Determine output of following clipper circuit and draw output waveform. Assume ideal diode in circuit.



- d) Describe Early effect in case of BJT in detail.
- e) What is necessity of biasing in transistor? Example different working regions of transistor.

#### Q.3 Attempt any two of the following question.

- a) Draw diagram of FWR capacitor filter and derive an expression of ripple factor for the same.
- **b)** Why clampers are necessary? Described working of positive and negative clampers with suitable example in detail.
- c) Define h-parameters for 2 port network. Draw equivalent hybrid circuit for CB, CE, and CC configuration. Define h-parameters for each configuration.

#### Section – II

#### Q.4 Attempt any four of the following question.

- a) Describe BJT application as a switch.
- **b)** What is the need of multistage amplifiers? List different type of amplifier coupling. Describe any one in brief.
- c) Draw block diagram of amplifier with negative feedback network and derive generalized expression of its voltage gain with feedback. List few benefits of negative feedback.
- **d)** Define the terms drain resistance, trans- conductance, amplification factor related to JFET. What is the relation between them?
- e) Compare between FET and BJT.

Max. Marks: 56

16

12

16

### Q.5 Attempt any two of the following questions.

- a) A potential divider biasing circuit uses Ge transistor. The Q-point is  $I_{CQ} = 2mA$ ,  $V_{ECQ} = 4V$ . If  $R_c = 2K$ ,  $V_{CC} = 10 V$ ,  $\beta = 50$ , determine values of  $R_1$ ,  $R_2$  and  $R_E$ . Assume current in  $R_1$  is 10 times the current in base ( $I_1$ =10 $I_B$ )
- **b)** Draw circuit diagram of emitter follower, What kind of feedback is used in the emitter follower? Find expression of feedback factor, current gain, input impedance with feedback voltage gain for the same.
- c) Explain construction and working of depletion type MOSFET.

# SLR-FR-25 Set P
		_	Electronics E	ngin	eering	
				NAL'	YSIS AND DESIGN	
Day & Time	& Date : 10:00	e: Tue D AM	esday,10-12-2019 To 01:00 PM		Max. Marks:	70
Instr	uction	<b>is:</b> 1)	Q. No. 1 is compulsory and sho	ould k	be solved in first 30 minutes in answ	er
		2) 3)	Figures to the right indicate full Assume suitable data if necess	l marl sary a	ks. and state it clearly.	
_			MCQ/Objective Ty	/pe C	luestions	
Durat	tion: 3	0 Min	nutes		Marks:	14
Q.1	<b>Choc</b> 1)	nse ti Inpu a) c)	t impedance of JFET amplifier i Very low Very High	ne op s b) d)	Same as transistor Both a & b	14
	2)	The a) c)	region in which JFET works as pinchoff region cutoff region	an ar b) d)	nplifier is called as ohmic region both b & c	
	3)	The a) c)	FET configuration used in the u Common Gate Common Source	nity ( b) d)	gain buffers is Common Drain All above	
	4)	The a) c)	negative feedback in amplifier _ increases voltage gain stabilizes the voltage gain	b) d)	decreases voltage gain both b & c	
	5)	An e a) b) c) d)	emitter follower is widely used ci its voltage gain in very high its voltage gain is "1" its input impedance is high and it employs no bypass capacitor	rcuit I outp -	because	
	6)	A fe a) c)	edback circuit usually employs <sub>-</sub> Resistive Inductive	b) d)	network. Capacitive None of the above	
	7)	The a) b) c) d)	frequency response of transisto Good very good Excellent Bad	or cou	ipling is	
8) If the line			e line frequency is 50 Hz, the ou	Itput	frequency of bridge rectifier is	
		a) c)	25 Hz 100 Hz	b) d)	50 Hz 200 Hz	

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S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

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- 9) The basic purpose of filter is to \_\_\_\_\_.
  - a) minimize variations in ac input signal
  - b) suppress harmonics in rectified output
  - c) remove ripples from the rectified output
  - d) stabilize dc output voltage
- 10) A half wave rectifier is equivalent to \_\_\_\_\_.
  - a) clamper circuit
  - b) a clipper circuit
  - c) a clamper circuit with negative bias
  - d) a clamper circuit with positive bias
- 11) In a LC filter, the ripple factor \_\_\_\_\_
  - a) increases with the load current
  - b) increases with the load resistance
  - c) remains constant with the load current
  - d) has the lowest value
- 12) Early effect in BJT refers to \_\_\_\_\_
  - a) avalanche breakdown b) thermal breakdown
  - c) base narrowing d) zener breakdown
- 13) In CE configuration the output V-I characteristics are drawn by taking \_\_\_\_\_.
  - a) VCE vs. IC for constant value of IE
  - b) VCE vs. IC for constant value of IB
  - c) VCE vs. IC for constant value of VCB
  - d) None of these
- 14) The CE amplifier circuit are preferred over CB amplifier circuit because they have \_\_\_\_\_.
  - a) lower amplification factor
  - b) larger amplification factor
  - c) high input resistance and low output resistance
  - d) none of these

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# S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electronics Engineering

## ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday,10-12-2019 Time: 10:00 AM To 01:00 PM

Seat

No.

Instructions: 1) All questions are compulsory.

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

### Section – I

### Q.2 Attempt any four of the following question.

- a) List different applications of diode. Draw circuit diagram of full wave voltage doubler and example its working in detail.
- **b)** Draw circuit diagram of LC filter with FWR and example its functioning in detail.
- c) Determine output of following clipper circuit and draw output waveform. Assume ideal diode in circuit.



- d) Describe Early effect in case of BJT in detail.
- e) What is necessity of biasing in transistor? Example different working regions of transistor.

### Q.3 Attempt any two of the following question.

- a) Draw diagram of FWR capacitor filter and derive an expression of ripple factor for the same.
- **b)** Why clampers are necessary? Described working of positive and negative clampers with suitable example in detail.
- c) Define h-parameters for 2 port network. Draw equivalent hybrid circuit for CB, CE, and CC configuration. Define h-parameters for each configuration.

### Section – II

### Q.4 Attempt any four of the following question.

- a) Describe BJT application as a switch.
- **b)** What is the need of multistage amplifiers? List different type of amplifier coupling. Describe any one in brief.
- c) Draw block diagram of amplifier with negative feedback network and derive generalized expression of its voltage gain with feedback. List few benefits of negative feedback.
- **d)** Define the terms drain resistance, trans- conductance, amplification factor related to JFET. What is the relation between them?
- e) Compare between FET and BJT.

Max. Marks: 56

Q

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## Q.5 Attempt any two of the following questions.

- a) A potential divider biasing circuit uses Ge transistor. The Q-point is  $I_{CQ} = 2mA$ ,  $V_{ECQ} = 4V$ . If  $R_c = 2K$ ,  $V_{CC} = 10 V$ ,  $\beta = 50$ , determine values of  $R_1$ ,  $R_2$  and  $R_E$ . Assume current in  $R_1$  is 10 times the current in base ( $I_1$ =10 $I_B$ )
- **b)** Draw circuit diagram of emitter follower, What kind of feedback is used in the emitter follower? Find expression of feedback factor, current gain, input impedance with feedback voltage gain for the same.
- c) Explain construction and working of depletion type MOSFET.

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## S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering** ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019

Time: 10:00 AM To 01:00 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
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## **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

Marks: 14

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
  - Early effect in BJT refers to \_\_\_\_\_ 1)
    - a) avalanche breakdown b) thermal breakdown
    - c) base narrowing d) zener breakdown
  - In CE configuration the output V-I characteristics are drawn by taking \_\_\_\_\_. 2)
    - VCE vs. IC for constant value of IE a)
    - VCE vs. IC for constant value of IB b)
    - VCE vs. IC for constant value of VCB C)
    - None of these d)
  - 3) The CE amplifier circuit are preferred over CB amplifier circuit because they have
    - lower amplification factor a)
    - larger amplification factor b)
    - c) high input resistance and low output resistance
    - none of these d)

c)

- 4) Input impedance of JFET amplifier is \_
  - Very low Same as transistor a) b)
  - Very High d) Both a & b c)
- The region in which JFET works as an amplifier is called as \_\_\_\_\_. 5) ohmic region b)
  - pinchoff region a) C)
    - cutoff region both b & c d)
- 6) The FET configuration used in the unity gain buffers is
  - Common Gate a) **Common Source** 
    - Common Drain b) d) All above

both b & c

decreases voltage gain

- The negative feedback in amplifier \_ 7)
  - increases voltage gain b) a) C) stabilizes the voltage gain d)
- 8) An emitter follower is widely used circuit because \_\_\_\_\_
  - its voltage gain in very high a)
  - its voltage gain is "1" b)
  - its input impedance is high and output impedance is low c)
  - it employs no bypass capacitor d)

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Max. Marks: 70

- 9) A feedback circuit usually employs \_\_\_\_\_ network.
  - a) Resistive

b) Capacitive

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Set R

- c) Inductive d) None of the above
- 10) The frequency response of transistor coupling is \_\_\_\_\_
  - a) Good
  - b) very good
  - c) Excellent
  - d) Bad
- 11) If the line frequency is 50 Hz, the output frequency of bridge rectifier is
  - a) 25 Hz b) 50 Hz
  - c) 100 Hz d) 200 Hz
- 12) The basic purpose of filter is to \_\_\_\_\_
  - a) minimize variations in ac input signal
  - b) suppress harmonics in rectified output
  - c) remove ripples from the rectified output
  - d) stabilize dc output voltage
- 13) A half wave rectifier is equivalent to \_\_\_\_\_.
  - a) clamper circuit
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- 14) In a LC filter, the ripple factor \_\_\_\_
  - a) increases with the load current
  - b) increases with the load resistance
  - c) remains constant with the load current
  - d) has the lowest value

Set R

# S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electronics Engineering

## ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday,10-12-2019 Time: 10:00 AM To 01:00 PM

Seat

No.

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

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

## Section – I

## Q.2 Attempt any four of the following question.

- a) List different applications of diode. Draw circuit diagram of full wave voltage doubler and example its working in detail.
- **b)** Draw circuit diagram of LC filter with FWR and example its functioning in detail.
- c) Determine output of following clipper circuit and draw output waveform. Assume ideal diode in circuit.

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- d) Describe Early effect in case of BJT in detail.
- e) What is necessity of biasing in transistor? Example different working regions of transistor.

### Q.3 Attempt any two of the following question.

- a) Draw diagram of FWR capacitor filter and derive an expression of ripple factor for the same.
- **b)** Why clampers are necessary? Described working of positive and negative clampers with suitable example in detail.
- c) Define h-parameters for 2 port network. Draw equivalent hybrid circuit for CB, CE, and CC configuration. Define h-parameters for each configuration.

### Section – II

## Q.4 Attempt any four of the following question.

- a) Describe BJT application as a switch.
- **b)** What is the need of multistage amplifiers? List different type of amplifier coupling. Describe any one in brief.
- c) Draw block diagram of amplifier with negative feedback network and derive generalized expression of its voltage gain with feedback. List few benefits of negative feedback.
- **d)** Define the terms drain resistance, trans- conductance, amplification factor related to JFET. What is the relation between them?
- e) Compare between FET and BJT.

Max. Marks: 56

16

12

## Q.5 Attempt any two of the following questions.

- a) A potential divider biasing circuit uses Ge transistor. The Q-point is  $I_{CQ} = 2mA$ ,  $V_{ECQ} = 4V$ . If  $R_c = 2K$ ,  $V_{CC} = 10 V$ ,  $\beta = 50$ , determine values of  $R_1$ ,  $R_2$  and  $R_E$ . Assume current in  $R_1$  is 10 times the current in base ( $I_1$ =10 $I_B$ )
- **b)** Draw circuit diagram of emitter follower, What kind of feedback is used in the emitter follower? Find expression of feedback factor, current gain, input impedance with feedback voltage gain for the same.
- c) Explain construction and working of depletion type MOSFET.

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# S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering**

## ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019

Time: 10:00 AM To 01:00 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
  - 2) Figures to the right indicate full marks.
  - 3) Assume suitable data if necessary and state it clearly.

## **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

d)

All above

decreases voltage gain

- The FET configuration used in the unity gain buffers is 1)
  - Common Gate b) Common Drain a)
  - **Common Source** c)
- 2) The negative feedback in amplifier \_\_\_\_\_ b)
  - increases voltage gain a)
  - stabilizes the voltage gain c) d) both b & c

#### 3) An emitter follower is widely used circuit because \_\_\_\_\_

- its voltage gain in very high a)
- its voltage gain is "1" b)
- its input impedance is high and output impedance is low c)
- d) it employs no bypass capacitor
- 4) A feedback circuit usually employs \_\_\_\_ \_ network.
  - Resistive b) Capacitive a)
  - d) None of the above Inductive c)
- The frequency response of transistor coupling is 5)
  - Good a)
  - b) very good
  - Excellent C)
  - d) Bad
- 6) If the line frequency is 50 Hz, the output frequency of bridge rectifier is
  - 25 Hz a) 50 Hz b)
  - 100 Hz 200 Hz d) c)
- The basic purpose of filter is to \_\_\_\_\_ 7)
  - minimize variations in ac input signal a)
  - b) suppress harmonics in rectified output
  - remove ripples from the rectified output c)
  - stabilize dc output voltage d)
- A half wave rectifier is equivalent to \_\_\_\_\_. 8)
  - clamper circuit a)
  - a clipper circuit b)
  - a clamper circuit with negative bias c)
  - a clamper circuit with positive bias d)

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Max. Marks: 70



Marks: 14

- 9) In a LC filter, the ripple factor \_\_\_\_\_.
  - a) increases with the load current
  - b) increases with the load resistance
  - c) remains constant with the load current
  - d) has the lowest value
- 10) Early effect in BJT refers to \_\_\_\_\_
  - a) avalanche breakdown b) thermal breakdown
  - c) base narrowing d) zener breakdown
- 11) In CE configuration the output V-I characteristics are drawn by taking \_\_\_\_\_.
  - a) VCE vs. IC for constant value of IE
  - b) VCE vs. IC for constant value of IB
  - c) VCE vs. IC for constant value of VCB
  - d) None of these
- 12) The CE amplifier circuit are preferred over CB amplifier circuit because they have \_\_\_\_\_.
  - a) lower amplification factor
  - b) larger amplification factor
  - c) high input resistance and low output resistance
  - d) none of these
- 13) Input impedance of JFET amplifier is \_
  - a) Very lowc) Very High

- b) Same as transistord) Both a & b
- 14) The region in which JFET works as an amplifier is called as \_\_\_\_\_.
  - a) pinchoff region
- b) ohmic region

c) cutoff region

d) both b & c

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination No	ov/Dec-2019
Electronics Engineering	

## ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday,10-12-2019 Time: 10:00 AM To 01:00 PM

Seat No.

Instructions: 1) All questions are compulsory.

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

### Section – I

### Q.2 Attempt any four of the following question.

- a) List different applications of diode. Draw circuit diagram of full wave voltage doubler and example its working in detail.
- **b)** Draw circuit diagram of LC filter with FWR and example its functioning in detail.
- c) Determine output of following clipper circuit and draw output waveform. Assume ideal diode in circuit.



- d) Describe Early effect in case of BJT in detail.
- e) What is necessity of biasing in transistor? Example different working regions of transistor.

### Q.3 Attempt any two of the following question.

- a) Draw diagram of FWR capacitor filter and derive an expression of ripple factor for the same.
- **b)** Why clampers are necessary? Described working of positive and negative clampers with suitable example in detail.
- c) Define h-parameters for 2 port network. Draw equivalent hybrid circuit for CB, CE, and CC configuration. Define h-parameters for each configuration.

### Section – II

### Q.4 Attempt any four of the following question.

- a) Describe BJT application as a switch.
- **b)** What is the need of multistage amplifiers? List different type of amplifier coupling. Describe any one in brief.
- c) Draw block diagram of amplifier with negative feedback network and derive generalized expression of its voltage gain with feedback. List few benefits of negative feedback.
- **d)** Define the terms drain resistance, trans- conductance, amplification factor related to JFET. What is the relation between them?
- e) Compare between FET and BJT.

16

12

Max. Marks: 56

Set S

## Q.5 Attempt any two of the following questions.

- a) A potential divider biasing circuit uses Ge transistor. The Q-point is  $I_{CQ} = 2mA$ ,  $V_{ECQ} = 4V$ . If  $R_c = 2K$ ,  $V_{CC} = 10 V$ ,  $\beta = 50$ , determine values of  $R_1$ ,  $R_2$  and  $R_E$ . Assume current in  $R_1$  is 10 times the current in base ( $I_1$ =10 $I_B$ )
- **b)** Draw circuit diagram of emitter follower, What kind of feedback is used in the emitter follower? Find expression of feedback factor, current gain, input impedance with feedback voltage gain for the same.
- c) Explain construction and working of depletion type MOSFET.

# SLR-FR-25 Set S

# S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering**

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

NETWORK THEORY AND ANALYSIS

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

## MCQ/Objective Type Questions

**Duration: 30 Minutes** 

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence.

- 1) Mesh Analysis is based on \_
  - a) Kirchhoff' s Voltage Law
  - c) Circuit condition d) None
- If Z11=2 ohm, Z 12=1 ohm and Z21 = 1 ohm and Z22=3 ohm, what is the 2) determinant of matrix?
  - 1 a) b)
  - c) 5

When two port networks are connected in series the resultant \_\_\_\_\_? 3)

- a) Z parameters are a sum of individual parameters
- b) Y parameters are a sum of individual parameters
- c) h parameters are a sum of individual parameters
- d) ABCD parameters are a sum of individual parameters
- 4) Example of a two port network is \_\_\_\_\_.
  - a) Transformer
  - b) transmission line
  - c) bridge circuit and transistor circuit
  - d) all of the above
- 5) If a series circuit RLC circuit, the quality factor is defined as \_\_\_\_\_.
  - С b) ωRC a)
  - C) ωC d) 1/ωRC

6) In the parallel RLC circuit the impedance at resonance is .

- Maximum Minimum a) b)
- Zero Infinity C) d)
- Norton's equivalent circuit consists of 7)
  - a) Voltage Source in parallel with resistance
  - b) Voltage Source in series with resistance
  - c) Current Source in parallel with resistance
  - d) Current Source in series with resistance
- 8) The system is said to be stable if and only if \_
  - a) All the poles lie on right half of the *s*-plane
  - b) Some of the poles lie on right half of the *s*-plane
  - c) All the poles lie on the left half of the *s*-plane
  - None d)

SLR-FR-26



Seat No.

Max. Marks: 70

Ρ Set

- a) real and positive
- b) Complex
- c) real and negative d) none of these
- 10) In the M derived low pass filter the resonant frequency is to be chosen so that it is .
- b) Above cut off frequency

Set P

- a) Below cut off frequencyb) Above cut off fc) Equal to cut off frequencyd) None of these
- 11) A Low pass filter is one which \_\_\_\_\_.
  - a) Passes all low frequencies
  - b) Attenuates all high frequencies
  - c) Passes all low frequencies up to cut-off frequencies and attenuates all other frequencies
  - d) None

#### 12) Transient behavior occurs in any circuit when \_\_\_\_\_.

- a) there is sudden change in applied voltage
- b) the voltage source is suddenly shorted
- c) the circuit is connected or disconnected from supply
- d) all of the above
- 13) When a series RC circuit is connected to a constant voltage at t=0, the current passing through the circuit is at  $t=0^+$  is \_\_\_\_\_.
  - a) Infinite b) Zero
  - $\frac{V}{R}$  $\frac{V}{\omega C}$ C) d)
- The function is said to be having simple poles and zeros only if \_\_\_\_\_. 14)
  - a) The poles are not repeated
  - b) The zeros are not repeated
  - c) The poles and zeros are not repeated
  - d) None of the above

Seat	
No.	

## S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electronics Engineering NETWORK THEORY AND ANALYSIS

Day & Date: Thursday,12-12-2019 Time: 10:00 AM To 01:00 PM

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

- 2) Figures to the right indicate full marks.
- 4) Assume suitable data if required.

## Section – I

## Q.2 Attempt any four.

a) In the circuit shown above a maximum current of 0.1 A flows through the circuit when capacitor is at 5µF with fixed frequency and voltage of 5V. Determine frequency at which the circuit resonates, bandwidth, quality factor and resistance R.



- b) State and prove Maximum power transfer theorem.
- c) Determine Norton's equivalent circuit for above circuit.



- d) Express Z parameters in terms of Y parameter.
- e) For above circuit an inductance of 0.1H having quality factor of 5 is in parallel with capacitor. Determine value of C and coil resistance at resonant frequency 500 rad/sec.

## Q.3 Attempt any two.

**a)** Prove that bandwidth of series RLC circuit is  $BW = \frac{R}{2\pi L}$  and  $Q = \frac{fr}{BW}$ .

12

Max. Marks: 56

Set

b) Find the ABCD parameters of the above two port network.



c) Find current in various branches using superposition theorem



Section – II

### Q.4 Attempt any four.

- **a)** Prove that cut off frequency for constant K low pass filter is  $F_c = \frac{1}{\pi \sqrt{LC}}$
- **b)** Design a T pad attenuator to give an attenuation of 60dB & to work in line of 500Ω impedance.
- c) Check stability of following polynomial by applying Routh criteria  $Q(S) = S^3 + S^2 + 3S + 8$
- **d)** For above network obtain transfer function  $G_{21(S)}, Z_{21(S)} \& Z_{11(S)}$



e) A series RL circuit with R =  $30 \Omega \& L = 15H$  has constant voltage of V=60V applied at t=0 as shown in above figure. Find Current I & Voltage across R & L.



### Q.5 Attempt any two.

- a) Derive an expression of current, V<sub>R</sub> & V<sub>c</sub> for dc response of series RC circuit.
- **b)** Draw the pole-zero plot for the given network function and hence obtain V(t).

V

$$f(s) = \frac{4 s(s+2)}{(s+1)(s+3)}$$

c) Design an M derived T section &  $\pi$  section high pass filter having cutoff frequency of 5KHz with design impedance of 600 $\Omega$  and m= 0.35. Find also frequency of infinite attenuation.

16

SLR-FR-26

Set

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S	Y. (B.Tech.) (Pa	rt – I) (New) (C

- I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering** NETWORK THEORY AND ANALYSIS

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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## MCQ/Objective Type Questions

**Duration: 30 Minutes** 

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The system is said to be stable if and only if \_ 1)
  - a) All the poles lie on right half of the *s*-plane
  - b) Some of the poles lie on right half of the *s*-plane
  - c) All the poles lie on the left half of the *s*-plane
  - d) None
- 2) For driving point function N(s)=P(s)/Q(s), coefficients of P(s) and Q(s)must be .
  - a) real and positive b) Complex
  - c) real and negative d) none of these
- 3) In the M derived low pass filter the resonant frequency is to be chosen so that it is
  - Below cut off frequency a) Equal to cut off frequency
- b) Above cut off frequency
- d) None of these
- A Low pass filter is one which \_\_\_\_\_. 4)
  - a) Passes all low frequencies
  - b) Attenuates all high frequencies
  - c) Passes all low frequencies up to cut-off frequencies and attenuates all other frequencies
  - d) None

c)

- Transient behavior occurs in any circuit when \_\_\_\_\_ 5)
  - a) there is sudden change in applied voltage
  - b) the voltage source is suddenly shorted
  - c) the circuit is connected or disconnected from supply
  - d) all of the above
- 6) When a series RC circuit is connected to a constant voltage at t=0, the current passing through the circuit is at t=0<sup>+</sup> is .
  - Infinite a) b) Zero
  - V Vd) c) R ωC

Max. Marks: 70

Marks: 14

Set Q 7) The function is said to be having simple poles and zeros only if \_\_\_\_\_. a) The poles are not repeated b) The zeros are not repeated c) The poles and zeros are not repeated d) None of the above 8) Mesh Analysis is based on \_\_\_\_ b) Kirchhoff's Current Law a) Kirchhoff's Voltage Law c) Circuit condition d) None 9) If Z11=2 ohm, Z 12=1 ohm and Z21 = 1 ohm and Z22=3 ohm, what is the determinant of matrix? a) 1 b) 1/5 5 d) 2 c) 10) When two port networks are connected in series the resultant \_\_\_\_\_? a) Z parameters are a sum of individual parameters b) Y parameters are a sum of individual parameters c) h parameters are a sum of individual parameters d) ABCD parameters are a sum of individual parameters 11) Example of a two port network is \_\_\_\_\_. a) Transformer b) transmission line c) bridge circuit and transistor circuit d) all of the above If a series circuit RLC circuit, the quality factor is defined as \_\_\_\_\_. 12) b) ωRC a) C c) ωC d) 1/ωRC In the parallel RLC circuit the impedance at resonance is \_\_\_\_\_. 13) a) Maximum b) Minimum c) Zero d) Infinity 14) Norton's equivalent circuit consists of \_\_\_\_\_ a) Voltage Source in parallel with resistance b) Voltage Source in series with resistance c) Current Source in parallel with resistance

d) Current Source in series with resistance

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## S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering** NETWORK THEORY AND ANALYSIS

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

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

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## Section – I

#### Q.2 Attempt any four.

In the circuit shown above a maximum current of 0.1 A flows through the a) circuit when capacitor is at 5µF with fixed frequency and voltage of 5V. Determine frequency at which the circuit resonates, bandwidth, guality factor and resistance R.



- b) State and prove Maximum power transfer theorem.
- c) Determine Norton's equivalent circuit for above circuit.



- d) Express Z parameters in terms of Y parameter.
- e) For above circuit an inductance of 0.1H having quality factor of 5 is in parallel with capacitor. Determine value of C and coil resistance at resonant frequency 500 rad/sec.

## Q.3 Attempt any two.

**a)** Prove that bandwidth of series RLC circuit is  $BW = \frac{R}{2\pi L}$  and  $Q = \frac{fr}{BW}$ .

12



Max. Marks: 56

b) Find the ABCD parameters of the above two port network.



c) Find current in various branches using superposition theorem



Section – II

### Q.4 Attempt any four.

- **a)** Prove that cut off frequency for constant K low pass filter is  $F_c = \frac{1}{\pi \sqrt{LC}}$
- **b)** Design a T pad attenuator to give an attenuation of 60dB & to work in line of 500Ω impedance.
- c) Check stability of following polynomial by applying Routh criteria  $Q(S) = S^3 + S^2 + 3S + 8$
- **d)** For above network obtain transfer function  $G_{21(S)}, Z_{21(S)} \& Z_{11(S)}$



e) A series RL circuit with R =  $30 \Omega \& L = 15H$  has constant voltage of V=60V applied at t=0 as shown in above figure. Find Current I & Voltage across R & L.



### Q.5 Attempt any two.

- a) Derive an expression of current, V<sub>R</sub> & V<sub>c</sub> for dc response of series RC circuit.
- **b)** Draw the pole-zero plot for the given network function and hence obtain V(t).

V

$$f(s) = \frac{4 s(s+2)}{(s+1)(s+3)}$$

c) Design an M derived T section &  $\pi$  section high pass filter having cutoff frequency of 5KHz with design impedance of 600 $\Omega$  and m= 0.35. Find also frequency of infinite attenuation.

16

SLR-FR-26

Set

## No. S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering**

## NETWORK THEORY AND ANALYSIS

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## MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Seat

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- If a series circuit RLC circuit, the quality factor is defined as \_\_\_\_\_. 1)
  - С b) ωRC a)
  - C) ωC d) 1/ωRC
- In the parallel RLC circuit the impedance at resonance is . 2)
  - a) Maximum
  - c) Zero
- 3) Norton's equivalent circuit consists of
  - a) Voltage Source in parallel with resistance
  - b) Voltage Source in series with resistance
  - c) Current Source in parallel with resistance
  - d) Current Source in series with resistance
- 4) The system is said to be stable if and only if
  - All the poles lie on right half of the *s*-plane a)
  - Some of the poles lie on right half of the *s*-plane b)
  - All the poles lie on the left half of the s-plane c)
  - d) None

c)

- 5) For driving point function N(s)=P(s)/Q(s), coefficients of P(s) and Q(s)must be \_\_\_\_\_.
  - a) real and positive Complex b)
    - real and negative d) none of these
- In the M derived low pass filter the resonant frequency is to be chosen so 6) that it is
  - Below cut off frequency a)
- b) Above cut off frequency d) None of these
- c) Equal to cut off frequency
- A Low pass filter is one which . 7)
  - a) Passes all low frequencies
  - b) Attenuates all high frequencies
  - c) Passes all low frequencies up to cut-off frequencies and attenuates all other frequencies
  - d) None

SLR-FR-26



Max. Marks: 70

Marks: 14

- Infinity

- b) Minimum
- d)

Set 8) Transient behavior occurs in any circuit when \_\_\_\_\_. a) there is sudden change in applied voltage b) the voltage source is suddenly shorted c) the circuit is connected or disconnected from supply d) all of the above When a series RC circuit is connected to a constant voltage at t=0, the 9) current passing through the circuit is at  $t=0^+$  is \_\_\_\_\_. a) Infinite b) Zero  $\frac{V}{R}$  $\frac{V}{\omega C}$ d) c) 10) The function is said to be having simple poles and zeros only if \_\_\_\_\_. a) The poles are not repeated b) The zeros are not repeated c) The poles and zeros are not repeated d) None of the above 11) Mesh Analysis is based on \_\_\_\_ a) Kirchhoff's Voltage Law b) Kirchhoff's Current Law c) Circuit condition d) None 12) If Z11=2 ohm, Z 12=1 ohm and Z21 = 1 ohm and Z22=3 ohm, what is the determinant of matrix? a) 1 b) 1/5 c) 5 d) 2 When two port networks are connected in series the resultant \_\_\_\_\_? 13) a) Z parameters are a sum of individual parameters b) Y parameters are a sum of individual parameters c) h parameters are a sum of individual parameters d) ABCD parameters are a sum of individual parameters 14) Example of a two port network is \_\_\_\_\_. a) Transformer b) transmission line

- b) transmission line
- c) bridge circuit and transistor circuit
- d) all of the above

SLR-FR-26

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## S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electronics Engineering NETWORK THEORY AND ANALYSIS

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Instructions: 1) All questions are compulsory.

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## Section – I

## Q.2 Attempt any four.

a) In the circuit shown above a maximum current of 0.1 A flows through the circuit when capacitor is at 5µF with fixed frequency and voltage of 5V. Determine frequency at which the circuit resonates, bandwidth, quality factor and resistance R.



- b) State and prove Maximum power transfer theorem.
- c) Determine Norton's equivalent circuit for above circuit.



- d) Express Z parameters in terms of Y parameter.
- e) For above circuit an inductance of 0.1H having quality factor of 5 is in parallel with capacitor. Determine value of C and coil resistance at resonant frequency 500 rad/sec.

## Q.3 Attempt any two.

**a)** Prove that bandwidth of series RLC circuit is  $BW = \frac{R}{2\pi L}$  and  $Q = \frac{fr}{BW}$ .

12

Max. Marks: 56

Set R

b) Find the ABCD parameters of the above two port network.



c) Find current in various branches using superposition theorem



Section – II

### Q.4 Attempt any four.

- **a)** Prove that cut off frequency for constant K low pass filter is  $F_c = \frac{1}{\pi \sqrt{LC}}$
- b) Design a T pad attenuator to give an attenuation of 60dB & to work in line of 500Ω impedance.
- c) Check stability of following polynomial by applying Routh criteria  $Q(S) = S^3 + S^2 + 3S + 8$
- **d)** For above network obtain transfer function  $G_{21(S)}, Z_{21(S)} \& Z_{11(S)}$



e) A series RL circuit with R =  $30 \Omega \& L = 15H$  has constant voltage of V=60V applied at t=0 as shown in above figure. Find Current I & Voltage across R & L.



### Q.5 Attempt any two.

- a) Derive an expression of current,  $V_R \& V_c$  for dc response of series RC circuit.
- **b)** Draw the pole-zero plot for the given network function and hence obtain V(t).

V

$$f(s) = \frac{4 s(s+2)}{(s+1)(s+3)}$$

c) Design an M derived T section &  $\pi$  section high pass filter having cutoff frequency of 5KHz with design impedance of 600 $\Omega$  and m= 0.35. Find also frequency of infinite attenuation.

16

SLR-FR-26

Set

Seat	
No.	

## S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electronics Engineering NETWORK THEORY AND ANALYSIS

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## MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) In the M derived low pass filter the resonant frequency is to be chosen so that it is \_\_\_\_\_.
  - a) Below cut off frequency
  - c) Equal to cut off frequency
- b) Above cut off frequency

.

- d) None of these
- A Low pass filter is one which \_\_\_\_
  - a) Passes all low frequencies
  - b) Attenuates all high frequencies
  - c) Passes all low frequencies up to cut-off frequencies and attenuates all other frequencies
  - d) None

## 3) Transient behavior occurs in any circuit when \_\_\_\_\_

- a) there is sudden change in applied voltage
- b) the voltage source is suddenly shorted
- c) the circuit is connected or disconnected from supply
- d) all of the above
- 4) When a series RC circuit is connected to a constant voltage at t=0, the current passing through the circuit is at t= $0^+$  is \_\_\_\_\_.
  - a) Infinite b) Zero
  - c)  $\frac{V}{R}$  d)  $\frac{V}{\omega C}$

5) The function is said to be having simple poles and zeros only if \_\_\_\_\_.

- a) The poles are not repeated
- b) The zeros are not repeated
- c) The poles and zeros are not repeated
- d) None of the above

## 6) Mesh Analysis is based on \_\_\_\_\_.

- a) Kirchhoff's Voltage Law b) Kirchhoff's Current Law
- c) Circuit condition d) None
- 7) If Z11=2 ohm, Z 12=1 ohm and Z21 = 1 ohm and Z22=3 ohm, what is the determinant of matrix?
  - a) 1 b) 1/5
  - c) 5 d) 2

Set S



Marks: 14

Max. Marks: 70

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8)	Wh a) b) c) d)	en two port networks are connec Z parameters are a sum of indi Y parameters are a sum of indi h parameters are a sum of indi ABCD parameters are a sum of	cted i vidua vidua vidua f indi	in series the resultant Il parameters Il parameters Il parameters vidual parameters		?	
9)	Exa a) b) c) d)	mple of a two port network is Transformer transmission line bridge circuit and transistor circ all of the above	uit				
10)	lf a a) c)	series circuit RLC circuit, the qu C ωC	ality b) d)	factor is defined as ωRC 1/ωRC	·		
11)	In tl a) c)	ne parallel RLC circuit the imped Maximum Zero	lance b) d)	e at resonance is Minimum Infinity			
12)	Nor a) b) c) d)	ton's equivalent circuit consists Voltage Source in parallel with Voltage Source in series with re Current Source in parallel with Current Source in series with re	of resis esista resis esista	tance ance tance ance			
13)	The a) b) c) d)	e system is said to be stable if an All the poles lie on right half of Some of the poles lie on right h All the poles lie on the left half of None	nd on the <i>s</i> - alf of of the	ly if -plane the <i>s</i> -plane e <i>s</i> -plane			
14)	For mus	driving point function N(s)=P(s), st be	/Q(s)	, coefficients of P(s) a	nd Q(s	S)	
	a)	real and positive	b)	Complex			

- c) real and negative d)
- ) none of these

Seat	
No.	

## S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering** NETWORK THEORY AND ANALYSIS

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## Section – I

#### Q.2 Attempt any four.

In the circuit shown above a maximum current of 0.1 A flows through the 16 a) circuit when capacitor is at 5µF with fixed frequency and voltage of 5V. Determine frequency at which the circuit resonates, bandwidth, guality factor and resistance R.



- b) State and prove Maximum power transfer theorem.
- c) Determine Norton's equivalent circuit for above circuit.



- d) Express Z parameters in terms of Y parameter.
- e) For above circuit an inductance of 0.1H having quality factor of 5 is in parallel with capacitor. Determine value of C and coil resistance at resonant frequency 500 rad/sec.

## Q.3 Attempt any two.

**a)** Prove that bandwidth of series RLC circuit is  $BW = \frac{R}{2\pi L}$  and  $Q = \frac{fr}{BW}$ .

12

Max. Marks: 56



b) Find the ABCD parameters of the above two port network.



c) Find current in various branches using superposition theorem



Section – II

### Q.4 Attempt any four.

- **a)** Prove that cut off frequency for constant K low pass filter is  $F_c = \frac{1}{\pi \sqrt{LC}}$
- b) Design a T pad attenuator to give an attenuation of 60dB & to work in line of 500Ω impedance.
- c) Check stability of following polynomial by applying Routh criteria  $Q(S) = S^3 + S^2 + 3S + 8$
- **d)** For above network obtain transfer function  $G_{21(S)}, Z_{21(S)} \& Z_{11(S)}$



e) A series RL circuit with R =  $30 \Omega \& L = 15H$  has constant voltage of V=60V applied at t=0 as shown in above figure. Find Current I & Voltage across R & L.



### Q.5 Attempt any two.

- a) Derive an expression of current, V<sub>R</sub> & V<sub>c</sub> for dc response of series RC circuit.
- **b)** Draw the pole-zero plot for the given network function and hence obtain V(t).

V

$$f(s) = \frac{4 s(s+2)}{(s+1)(s+3)}$$

c) Design an M derived T section &  $\pi$  section high pass filter having cutoff frequency of 5KHz with design impedance of 600 $\Omega$  and m= 0.35. Find also frequency of infinite attenuation.

16

SLR-FR-26

Set

nstr	uctior	<b>ns:</b> 1) Q. No. 1 is compulsory and sh book.	nould	be solved in first 30 minutes			
		<ul><li>2) Figures to the right indicate fu</li><li>3) Assume suitable data wherev</li></ul>	ill ma er ne	rks. ecessary.			
		MCQ/Objective 1	уре	Questions			
Dura	tion: 3	30 Minutes					
<b>Q.1</b>	Choo	ose the correct alternatives from t	he o	ptions and rewrite the sent			
	1)	The logical Expression F=AB+BC+ a) SOP form c) Standard SOP form	AC is b) d)	s in POP Form Standard POS form			
	2)	Grav code is	- /				
	_,	<ul> <li>a) Non weighted code</li> <li>c) Alphanumeric Code</li> </ul>	b) d)	Weighted code None of these			
	3)	The SOP form is most suitable for a) NOR Gates c) AND gates	desig b) d)	ning logic circuit using only _ NAND gates EX-OR gates			
	4)	The NOR-NOR realization is equivalent to realization.					
		a) AND-NOT c) OR-AND	b) d)	AND-OR NOT-OR			
	5)	Multiplexer is represented by	 b)	2 <sup>n</sup> x 1			
		c) $1 \times 2^{n}$	d)	$n \times 2^{n}$			
	6)	The slowest logic family is a) TTL c) MOS	b) d)	IIL CMOS			
	7)	In a k-map, if two cells are said to b number of variables.	be ac	ljacent, they are differentiated			
		a) 1 c) n	b) d)	2 2 <sup>n</sup>			

## Seat No.

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering DIGITAL LOGIC DESIGN** 

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

h in answer

#### C 14 tence.

d by

- C) n a)
- 8) A flip flop has two outputs which are \_
  - a) always zero always complimentary b) in one of the above states c) always one d)
- 9) A flip-flop can be used to realize a \_ a) Counter b)
  - Shift register c) FSM d) all above the above

# SLR-FR-27



Max. Marks: 70

Marks: 14

- 10) The MOD number of counter is \_\_\_\_\_.
  - a) the max. possible number of states
  - b) the actual number of states in sequence
  - c) the number of flip-flops

\_.

- d) none of these
- 11) A PLA is a) a LSI device

b) a MSI device

c) a SSI Device

d) a discrete Device

SLR-FR-27

Set P

- A combinational PLD with a fixed AND array and programmable OR array 12) is called \_\_\_\_\_.
  - a) PLD b) PROM
  - c) PAL d) PLA
- 13) The output of the Moore machine is the function of \_\_\_\_\_.
  - a) next state
  - b) present inputs
  - c) present state and present inputs
  - d) present state
- 14) A flip-flop can store \_\_\_\_\_.
  - a) 1 bit data
  - c) 3 bits of data

- b) 2 bit of data
- d) 4 bit of data

16

Seat No.

## S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering** DIGITAL LOGIC DESIGN

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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

## Section – I

#### Q.2 Attempt any four.

- a) Tabulate the code tables for 2421 BCD codes which satisfy self complementary property.
- **b)** Subtract (1010)<sub>2</sub> from (1000)<sub>2</sub> using r's complement and (r-1)'s complement arithmetic.
- c) Optimize the following Boolean functions by means of a k-map.  $F(W, X, Y, Z) = \Pi M(3, 11, 13, 15)$
- d) Prove that a full subtractor can be designed using two half- subtractor s and one OR gate.
- e) Design a 14:1 multiplexer using only 4:1 multiplexers. Explain the operation with truth table.

#### Q.3 Attempt any two.

- a) Design a combinational circuit with three inputs and one output using only NAND gates. The output is '1' when the binary value of the inputs is large than 4. The output is '0' otherwise.
- **b)** Design and implement combinational circuit that converts a 4-bit gray code to binary code.
- c) Consider the combinational circuit shown. Analyze the circuit to obtain the simplified Boolean expressions for output x in terms of the input variables.



#### Q.4 Attempt any Four.

- a) Construct a T flip-flop using NAND gates. Derive the characteristic equation for SR flip-flop.
- **b)** Implement the Boolean function F (x, y, z) =  $\sum m (0, 3, 5, 6)$  using PLA.
- c) What are different types of shift register? Explain PIPO shift register.
- d) Discuss a 3 bit twisted ring counter using JK flip-flop with neat sketch. What is the mod of this counter?
- f) Develop Melay state diagrams to detect sequence..101..(overlapped & nonoverlapped).

Max. Marks: 70

Set

12





## Q.5 Attempt any Two.

- a) A toggle (T) flip -flop has two operations no change, and complement, when input T is '0' and '1' respectively. Design a T flip-flop using JK flip-flop. Also derive the characteristic equation, tabulate the characteristic table, and the excitation table for the T flip-flop.
- b) Design a mod 4 synchronous counter using JK flip-flop. Draw neat circuit diagram and waveforms.
- c) A sequential circuit has two JK flip-flops A and B and one input x. The circuit is described by the following flip-flop input equations:

$$JA = x, KA = B$$

$$JB = x, KB = A'$$

- 1) Derive the state equations  $A^+$  and  $B^+$  by substituting the input equations for the J and K variables.
- 2) Draw the state diagram of the circuit.

Ρ 12

# SLR-FR-27 Set

# S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering** DIGITAL LOGIC DESIGN

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Seat

No.

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

MCQ/Objective Type Questions **Duration: 30 Minutes** 

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

d)

1) A flip flop has two outputs which are

A flip-flop can be used to realize a

- a) always zero
- always one C)

a) Counter

c) FSM

- 3) The MOD number of counter is \_\_\_\_\_
  - a) the max. possible number of states
  - b) the actual number of states in sequence
  - c) the number of flip-flops
  - d) none of these
- A PLA is 4)

2)

- a) a LSI device
- a SSI Device c)
- d) a discrete Device

b) a MSI device

- A combinational PLD with a fixed AND array and programmable OR array 5) is called
  - a) PLD PROM b)
  - c) PAL d) PLA
- 6) The output of the Moore machine is the function of \_\_\_\_\_.
  - a) next state
  - b) present inputs
  - present state and present inputs c)
  - d) present state
- 7) A flip-flop can store \_\_\_\_\_.
  - 1 bit data b) 2 bit of data a)
  - d) 4 bit of data C) 3 bits of data
- The logical Expression F=AB+BC+AC is in 8) a) SOP form
  - b) POP Form

b) Weighted code

d) None of these

d) Standard POS form

9) Gray code is \_\_\_\_\_

c)

a) Non weighted code

Standard SOP form

c) Alphanumeric Code

Set





Max. Marks: 70

Marks: 14

b) always complimentary

in one of the above states

- b) Shift register
- all above the above d)

The SOP form is most suitable for designing logic circuit using only \_\_\_\_\_. 10) b) NAND gates a) NOR Gates d) EX-OR gates c) AND gates The NOR-NOR realization is equivalent to \_\_\_\_\_ realization. 11) a) AND-NOT b) AND-OR c) OR-AND d) NOT-OR Multiplexer is represented by \_\_\_\_\_ 12) . b) 2<sup>n</sup> x 1 a) 2<sup>n</sup> x n c)  $1 \times 2^{n}$ d)  $n \times 2^{n}$ The slowest logic family is \_\_\_\_\_. 13) b) IIL a) TTL d) CMOS c) MOS In a k-map, if two cells are said to be adjacent, they are differentiated by 14) \_\_\_\_\_ number of variables.

SLR-FR-27

Set Q

Seat No.

## S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electronics Engineering DIGITAL LOGIC DESIGN

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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

## Section – I

## Q.2 Attempt any four.

- a) Tabulate the code tables for 2421 BCD codes which satisfy self complementary property.
- **b)** Subtract (1010)<sub>2</sub> from (1000)<sub>2</sub> using r's complement and (r-1)'s complement arithmetic.
- c) Optimize the following Boolean functions by means of a k-map.  $F(W, X, Y, Z) = \Pi M(3, 11, 13, 15)$
- d) Prove that a full subtractor can be designed using two half- subtractor s and one OR gate.
- e) Design a 14:1 multiplexer using only 4:1 multiplexers. Explain the operation with truth table.

## Q.3 Attempt any two.

- a) Design a combinational circuit with three inputs and one output using only NAND gates. The output is '1' when the binary value of the inputs is large than 4. The output is '0' otherwise.
- **b)** Design and implement combinational circuit that converts a 4-bit gray code to binary code.
- c) Consider the combinational circuit shown. Analyze the circuit to obtain the simplified Boolean expressions for output *x* in terms of the input variables.



Q.4

- a) Construct a T flip-flop using NAND gates. Derive the characteristic equation for SR flip-flop.
- **b)** Implement the Boolean function F (x, y, z) =  $\sum m (0, 3, 5, 6)$  using PLA.
- c) What are different types of shift register? Explain PIPO shift register.
- d) Discuss a 3 bit twisted ring counter using JK flip-flop with neat sketch. What is the mod of this counter?
- f) Develop Melay state diagrams to detect sequence..101..(overlapped & non-overlapped).

16

Max. Marks: 70



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12

### Page **8** of **16**

### Q.5 Attempt any Two.

- a) A toggle (T) flip -flop has two operations no change, and complement, when input T is '0' and '1' respectively. Design a T flip-flop using JK flip-flop. Also derive the characteristic equation, tabulate the characteristic table, and the excitation table for the T flip-flop.
- **b)** Design a mod 4 synchronous counter using JK flip-flop. Draw neat circuit diagram and waveforms.
- c) A sequential circuit has two JK flip-flops A and B and one input x. The circuit is described by the following flip-flop input equations:

$$JA = x, KA = B$$

$$JB = x, KB = A'$$

- Derive the state equations A<sup>+</sup> and B<sup>+</sup> by substituting the input equations for the J and K variables.
- 2) Draw the state diagram of the circuit.

12

SLR-FR-27 Set Q
b) a MSI device

Time: 10:00 AM To 01:00 PM Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book. Figures to the right indicate full marks. 3) Assume suitable data wherever necessary. MCQ/Objective Type Questions **Duration: 30 Minutes** Marks: 14 Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14 1) Multiplexer is represented by \_\_\_\_ a) 2<sup>n</sup> x n b) 2<sup>n</sup> x 1 c) 1 x 2<sup>n</sup> d) n x 2<sup>n</sup> The slowest logic family is 2) a) TTL b) IIL c) MOS d) CMOS 3) In a k-map, if two cells are said to be adjacent, they are differentiated by number of variables. 1 b) 2 a) d)  $2^n$ c) n 4) A flip flop has two outputs which are a) always zero always complimentary b) in one of the above states always one d) c)

A flip-flop can be used to realize a 5)

a) Counter Shift register b) c) FSM d) all above the above

6) The MOD number of counter is

- a) the max. possible number of states
- the actual number of states in sequence b)
- the number of flip-flops c)
- d) none of these
- 7) A PLA is
  - a) a LSI device
    - c) a SSI Device d) a discrete Device
- 8) A combinational PLD with a fixed AND array and programmable OR array is called
  - a) PLD
  - c) PAL

No. S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering** 

## SLR-FR-27

Set

R

Page 9 of 16

Max. Marks: 70

Day & Date: Saturday, 14-12-2019

DIGITAL LOGIC DESIGN



SLR-FR-27 Set R

- 9) The output of the Moore machine is the function of \_\_\_\_\_.
  - a) next state
  - b) present inputs
  - c) present state and present inputs
  - d) present state

c) 3 bits of data

- 10) A flip-flop can store \_\_\_\_\_.
  - a) 1 bit data

- b) 2 bit of data
- d) 4 bit of data
- 11) The logical Expression F=AB+BC+AC is in \_\_\_\_\_.
  - a) SOP form

- b) POP Form
- 01 (0 ct2 (b
- c) Standard SOP form
- d) Standard POS form
- 12) Gray code is \_\_\_\_\_.
  - a) Non weighted code
  - c) Alphanumeric Code
- b) Weighted code
- d) None of these
- 13) The SOP form is most suitable for designing logic circuit using only \_\_\_\_\_.
  - a) NOR Gates b) NAND gates
  - c) AND gates
- d) EX-OR gates
- 14) The NOR-NOR realization is equivalent to \_\_\_\_\_ realization.
  - a) AND-NOT c) OR-AND

- b) AND-OR
- d) NOT-OR

Seat No.

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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

#### Section – I

#### Q.2 Attempt any four.

- a) Tabulate the code tables for 2421 BCD codes which satisfy self complementary property.
- **b)** Subtract (1010)<sub>2</sub> from (1000)<sub>2</sub> using r's complement and (r-1)'s complement arithmetic.
- c) Optimize the following Boolean functions by means of a k-map.  $F(W, X, Y, Z) = \Pi M(3, 11, 13, 15)$
- d) Prove that a full subtractor can be designed using two half- subtractor s and one OR gate.
- e) Design a 14:1 multiplexer using only 4:1 multiplexers. Explain the operation with truth table.

#### Q.3 Attempt any two.

Q.4

- a) Design a combinational circuit with three inputs and one output using only NAND gates. The output is '1' when the binary value of the inputs is large than 4. The output is '0' otherwise.
- **b)** Design and implement combinational circuit that converts a 4-bit gray code to binary code.
- c) Consider the combinational circuit shown. Analyze the circuit to obtain the simplified Boolean expressions for output *x* in terms of the input variables.



- a) Construct a T flip-flop using NAND gates. Derive the characteristic equation for SR flip-flop.
- **b)** Implement the Boolean function F (x, y, z) =  $\sum m (0, 3, 5, 6)$  using PLA.
- c) What are different types of shift register? Explain PIPO shift register.
- d) Discuss a 3 bit twisted ring counter using JK flip-flop with neat sketch. What is the mod of this counter?
- f) Develop Melay state diagrams to detect sequence..101..(overlapped & non-overlapped).

12

4:1 Mux

- 8

Section – II

12

10

R

Set R

Max. Marks: 70



#### Page **12** of **16**

#### Q.5 Attempt any Two.

- a) A toggle (T) flip -flop has two operations no change, and complement, when input T is '0' and '1' respectively. Design a T flip-flop using JK flip-flop. Also derive the characteristic equation, tabulate the characteristic table, and the excitation table for the T flip-flop.
- **b)** Design a mod 4 synchronous counter using JK flip-flop. Draw neat circuit diagram and waveforms.
- c) A sequential circuit has two JK flip-flops A and B and one input x. The circuit is described by the following flip-flop input equations:

$$JA = x, KA = B$$

$$JB = x, KB = A'$$

- Derive the state equations A<sup>+</sup> and B<sup>+</sup> by substituting the input equations for the J and K variables.
- 2) Draw the state diagram of the circuit.

12

SLR-FR-27 Set R

## S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering**

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Seat

No.

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

DIGITAL LOGIC DESIGN

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

**Duration: 30 Minutes** 

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

MCQ/Objective Type Questions

- The MOD number of counter is 1)
  - a) the max. possible number of states
  - b) the actual number of states in sequence
  - c) the number of flip-flops
  - d) none of these
- A PLA is 2)
  - a) a LSI device
    - c) a SSI Device d) a discrete Device
- A combinational PLD with a fixed AND array and programmable OR array 3) is called .
  - a) PLD b) PROM
  - c) PAL d) PLA
- The output of the Moore machine is the function of \_\_\_\_\_. 4)
  - a) next state
  - b) present inputs
  - c) present state and present inputs
  - d) present state
- 5) A flip-flop can store \_\_\_\_\_.
  - a) 1 bit data b) 2 bit of data
  - c) 3 bits of data d) 4 bit of data

6) The logical Expression F=AB+BC+AC is in \_

a) SOP form c) Standard SOP form

Grav code is

a) NOR Gates

c) AND gates

- b) POP Form d) Standard POS form

b) Weighted code

d) None of these

b) a MSI device

- a) Non weighted code
- c) Alphanumeric Code
- The SOP form is most suitable for designing logic circuit using only \_\_\_\_\_.
  - b) NAND gates
    - d) EX-OR gates
- 9) The NOR-NOR realization is equivalent to \_\_\_\_\_ realization.
  - AND-NOT a)
  - c) **OR-AND**

7)

8)

- b) AND-OR
- d) NOT-OR

SLR-FR-27



Max. Marks: 70

Marks: 14

			SLR-FR-27	
			Set S	
10)	Multiplexer is represented by a) 2 <sup>n</sup> x n c) 1 x 2 <sup>n</sup>	 b) d)	2 <sup>n</sup> x 1 n x 2 <sup>n</sup>	
11)	The slowest logic family is a) TTL c) MOS	b) d)	IIL CMOS	
12)	In a k-map, if two cells are said to b number of variables. a) 1 c) n	e ad b) d)	jacent, they are differentiated by 2 2 <sup>n</sup>	
13)	A flip flop has two outputs which are a) always zero c) always one	; b) d)	 always complimentary in one of the above states	
14)	A flip-flop can be used to realize a _ a) Counter c) FSM	b) d)	 Shift register all above the above	

Page **14** of **16** 

Seat No.

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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

#### Section – I

#### Q.2 Attempt any four.

- a) Tabulate the code tables for 2421 BCD codes which satisfy self complementary property.
- **b)** Subtract (1010)<sub>2</sub> from (1000)<sub>2</sub> using r's complement and (r-1)'s complement arithmetic.
- c) Optimize the following Boolean functions by means of a k-map.  $F(W, X, Y, Z) = \Pi M(3, 11, 13, 15)$
- d) Prove that a full subtractor can be designed using two half- subtractor s and one OR gate.
- e) Design a 14:1 multiplexer using only 4:1 multiplexers. Explain the operation with truth table.

#### Q.3 Attempt any two.

- a) Design a combinational circuit with three inputs and one output using only NAND gates. The output is '1' when the binary value of the inputs is large than 4. The output is '0' otherwise.
- **b)** Design and implement combinational circuit that converts a 4-bit gray code to binary code.
- c) Consider the combinational circuit shown. Analyze the circuit to obtain the simplified Boolean expressions for output x in terms of the input variables.



Q.4

- a) Construct a T flip-flop using NAND gates. Derive the characteristic equation for SR flip-flop.
- **b)** Implement the Boolean function F (x, y, z) =  $\sum m (0, 3, 5, 6)$  using PLA.
- c) What are different types of shift register? Explain PIPO shift register.
- d) Discuss a 3 bit twisted ring counter using JK flip-flop with neat sketch. What is the mod of this counter?
- f) Develop Melay state diagrams to detect sequence..101..(overlapped & nonoverlapped).

12

16

RSection – II SLR-FR-27

Max. Marks: 70



#### Q.5 Attempt any Two.

- a) A toggle (T) flip -flop has two operations no change, and complement, when input T is '0' and '1' respectively. Design a T flip-flop using JK flip-flop. Also derive the characteristic equation, tabulate the characteristic table, and the excitation table for the T flip-flop.
- **b)** Design a mod 4 synchronous counter using JK flip-flop. Draw neat circuit diagram and waveforms.
- c) A sequential circuit has two JK flip-flops A and B and one input x. The circuit is described by the following flip-flop input equations:

$$JA = x, KA = B$$
  
 $JB = x, KB = A'$ 

- 1) Derive the state equations A<sup>+</sup> and B<sup>+</sup> by substituting the input equations for the J and K variables.
- 2) Draw the state diagram of the circuit.

12

## SLR-FR-27 Set S

No. S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM Instructions: 1) Q. No.1 is compulsory and should be solved in first 30 minutes in answer book.

**Duration: 30 Minutes** 

Seat

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

#### **MCQ/Objective Type Questions**

**Electronics Engineering** ANALOG COMMUNICATION

Q.1 Choose the correct alternatives from the options.

You have 5 information signals and only one transmitter. What technique 1) will help in transmitting all the 5 signals? Multiplexing

b)

b)

False

- a) Frequency modulation
- Amplitude Modulation Amplification C) d)
- The process of making the signal more compatible with the medium is 2) called as
  - Modulation Transmission b) a) Multiplexing
  - c) Encrypting d)
- 3) Noise introduces a frequency variation into the signal.
  - a) True
  - None of above c)
- What is the technique in which the high frequency components are 4) amplified more than the low frequency components in FM?
  - Garble Pre-emphasis a) b) None of above
  - Selective amplification c) d)
- 5) Shot noise is produced by, \_\_\_\_\_.
  - b) Photons Electrons a)
  - Electrons & Photons None of above c) d)
- 6) The ratio of transmitted power which contains the information to the total transmitted power is, known as \_\_\_\_
  - Modulation Index Total power a) b)
  - Transmission efficiency Sideband power C) d)
- The total antenna current of an AM transmitter is 5A. If modulation index is 7) 0.06, Calculate the antenna current when only carrier is sent \_\_\_\_\_.
  - 5A 4.6A a) b)
  - C) 3A d) 2A
- 8) In FM for a given frequency deviation the modulation index varies \_\_\_\_\_.
  - inversely as the modulating frequency a)
  - directly as the modulating frequency b)
  - independent of the changes in modulating signal c)
  - none of above d)

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Set



Max. Marks: 70

Marks: 14

- 9) A pre-emphasis circuit provides extra noise immunity by \_\_\_\_\_.
  - a) boosting the bass frequencies
  - b) amplifying the higher audio frequencies
  - c) preamplifying the whole audio band
  - d) converting the phase modulation to FM
- 10) In PM, the modulation index is proportional to \_\_\_\_\_.
  - a) only modulating frequency
  - b) both amplitude and frequency
  - c) only amplitude of modulating signal
  - d) antenna height
- 11) A signal of maximum frequency of 8 KHz is sampled at Nyquist rate. The time intervals between the two successive samples will be \_\_\_\_\_.
  - a) 62.5 µsec b) 125 µsec
  - c) 1250 µsec d) 62.5 sec
- 12) Which of the following pulse system is most efficient?
  - a) PPM b) PWM
  - c) PAM d) None of these
- 13) All broadcast radio signals received in daytime propagate by means of \_\_\_\_\_.
  - a) tropospheric waves
- b) Troposcatter
- c) surface waves
- d) none of above
- 14) The ionosphere plays a significant role in radio wave propagation at \_\_\_\_\_.
  - a) high frequency
- b) ultra high frequency

SLR-FR-28

Set

- c) microwaves frequencies
- d) optical frequencies

Seat No.

> S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electronics Engineering ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate fill marks.

#### Section – I

#### Q.2 Attempt any Four questions.

- a) Discuss the term modulation & how the antenna height can be reduced in communication.
- **b)** Illustrate & discuss in detail the equation in detail m=1, m<1, & m>1.
- c) Discuss the term noise & state different sources of noise?
- **d)** A broadcast AM transmitter radiates 50 kW of carrier power what will be radiated power at 85% modulation?
- e) Define SNR and derive the equation for the same?

#### Q.3 Attempt any Two questions.

- a) With suitable block diagram explain the Independent Sideband Transmission Systems.
- **b)** Discuss the characteristics of AM Radio Receiver with their respective curve responses.
- c) Discuss how noise is calculated for several amplifiers connected in cascade?

#### Section – II

#### Q.4 Attempt any Four questions.

- a) Explain pre-emphasis and de-emphasis in FM modulation.
- b) Explain PM modulation with mathematical analysis.
- c) State and explain Sampling theorem. What are its types?
- d) With neat diagram explain Yagi antenna.
- e) In an FM system, when the audio frequency is 500 Hz and the AF voltage is 2.4 V, the deviation is 4.8 KHz. If the AF voltage is raised to 10 V while the AF is dropped to 200 Hz, what is the new deviation and also find the modulation index in this case.

#### Q.5 Attempt any two questions:

- a) Explain working of Foster-Seeley discriminator with suitable diagram.
- **b)** With circuit diagram explain working of a PWM modulator and demodulator. Also draw the waveforms.
- c) What are the three basic paths that a radio signal can take through space? Explain each one in detail.

Max. Marks: 56

12

16

16

12



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Time	e: 10:00	) AM	To 01:00 PM			
Instr	ruction	i <b>s:</b> 1)	Q. No.1 is compulsory and shou book.	ld be	solved in first 30 minutes in answe	۶r
		2) 3)	Figures to the right indicate full Assume suitable data if necessa	marks ary.	S.	
			MCQ/Objective Ty	be Qu	lestions	
Dura	tion: 3	0 Min	utes		Marks:	14
Q.1	Choc 1)	se th In Fl a) b) c) d)	Me correct alternatives from the M for a given frequency deviation inversely as the modulating frequencies directly as the modulating frequent independent of the changes in r none of above	the r uenc ency nodul	<b>ons.</b> nodulation index varies y ating signal	14
	2)	A pro a) b) c) d)	e-emphasis circuit provides extra boosting the bass frequencies amplifying the higher audio freq preamplifying the whole audio b converting the phase modulation	noise uenci and n to F	e immunity by es M	
	3)	In Pl a) b) c) d)	M, the modulation index is propo only modulating frequency both amplitude and frequency only amplitude of modulating sig antenna height	rtiona gnal	l to	
	4)	A sig time a) c)	gnal of maximum frequency of 8 intervals between the two succe 62.5 μsec 1250 μsec	KHz is ssive b) d)	s sampled at Nyquist rate. The samples will be 125 µsec 62.5 sec	
	5)	Whio a) c)	ch of the following pulse system i PPM PAM	s mos b) d)	st efficient? PWM None of these	
	6)	All b a) c)	roadcast radio signals received i tropospheric waves surface waves	n day b) d)	time propagate by means of Troposcatter none of above	_•
	7)	The a) c)	ionosphere plays a significant ro high frequency microwaves frequencies	le in r b) d)	adio wave propagation at ultra high frequency optical frequencies	
	8)	You will ł a) c)	have 5 information signals and c nelp in transmitting all the 5 signa Frequency modulation Amplification	nly o lls? b) d)	ne transmitter. What technique Multiplexing Amplitude Modulation	

Seat No.

### S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering** ANALOG COMMUNICATION

Ti

Day & Date: Tuesday, 17-12-2019

Set Q

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Max. Marks: 70

- 9) The process of making the signal more compatible with the medium is called as . Transmission
  - a) Modulation C) Encrypting

True

a)

a)

C)

- b)
  - d) Multiplexing

False

SLR-FR-28

Set | Q

- Noise introduces a frequency variation into the signal. 10)
  - b)
  - None of above C)
- 11) What is the technique in which the high frequency components are amplified more than the low frequency components in FM?
  - Garble Pre-emphasis a) b)
  - Selective amplification None of above C) d)
- 12) Shot noise is produced by, \_\_\_\_
  - Electrons b) Photons
  - **Electrons & Photons** None of above d)
- The ratio of transmitted power which contains the information to the total 13) transmitted power is, known as \_\_\_\_
  - Modulation Index a)
- b) Total power
- Sideband power c) Transmission efficiency d)
- 14) The total antenna current of an AM transmitter is 5A. If modulation index is 0.06, Calculate the antenna current when only carrier is sent \_\_\_\_\_.
  - 5A a)
  - c) ЗA

4.6A b) d) 2A

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Seat No.

> S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics Engineering** ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate fill marks.

#### Section – I

#### Q.2 Attempt any Four questions.

- a) Discuss the term modulation & how the antenna height can be reduced in communication.
- **b)** Illustrate & discuss in detail the equation in detail m=1, m<1, & m>1.
- c) Discuss the term noise & state different sources of noise?
- d) A broadcast AM transmitter radiates 50 kW of carrier power what will be radiated power at 85% modulation?
- e) Define SNR and derive the equation for the same?

#### Q.3 Attempt any Two questions.

- a) With suitable block diagram explain the Independent Sideband Transmission Systems.
- b) Discuss the characteristics of AM Radio Receiver with their respective curve responses.
- c) Discuss how noise is calculated for several amplifiers connected in cascade?

#### Section – II

#### Q.4 Attempt any Four questions.

- a) Explain pre-emphasis and de-emphasis in FM modulation.
- b) Explain PM modulation with mathematical analysis.
- c) State and explain Sampling theorem. What are its types?
- d) With neat diagram explain Yagi antenna.
- e) In an FM system, when the audio frequency is 500 Hz and the AF voltage is 2.4 V, the deviation is 4.8 KHz. If the AF voltage is raised to 10 V while the AF is dropped to 200 Hz, what is the new deviation and also find the modulation index in this case.

#### Q.5 Attempt any two questions:

- a) Explain working of Foster-Seeley discriminator with suitable diagram.
- b) With circuit diagram explain working of a PWM modulator and demodulator. Also draw the waveforms.
- c) What are the three basic paths that a radio signal can take through space? Explain each one in detail.

Max. Marks: 56

12

12



SLR-FR-28

16

			Electronics Eng ANALOG COMM	gine JNIC	ering CATION
Day & Time	& Date : 10:00	e: Tue D AM	esday, 17-12-2019 To 01:00 PM		Max. Marks: 70
Instr	uctior	<b>is:</b> 1)	Q. No.1 is compulsory and shou	ld be	solved in first 30 minutes in answer
		2) 3)	book. Figures to the right indicate full r Assume suitable data if necessa	narks ry.	).
Duna		0.14	MCQ/Objective Typ	e Qu	estions
Duration: 30 Minutes N				Marks: 14	
Q.1	1)	Shot Shot a) c)	t noise is produced by, Electrons Electrons & Photons	b) d)	Photons None of above
	2)	The trans a) c)	ratio of transmitted power which o smitted power is, known as Modulation Index Transmission efficiency	conta  b) d)	ins the information to the total Total power Sideband power
	3)	The 0.06 a) c)	total antenna current of an AM tra , Calculate the antenna current w 5A 3A	ansm hen d b) d)	itter is 5A. If modulation index is only carrier is sent 4.6A 2A
	4)	In Fl a) b) c) d)	M for a given frequency deviation inversely as the modulating frequent directly as the modulating frequent independent of the changes in mone of above	the n uency ency nodula	nodulation index varies / ating signal
	5)	A pro a) b) c) d)	e-emphasis circuit provides extra boosting the bass frequencies amplifying the higher audio frequ preamplifying the whole audio ba converting the phase modulation	noise uencie and 1 to Fl	e immunity by es M
	6)	In Pl a) b) c) d)	M, the modulation index is propor only modulating frequency both amplitude and frequency only amplitude of modulating sig antenna height	tional nal	l to
	7)	A się time a) c)	gnal of maximum frequency of 8 k intervals between the two succes 62.5 μsec 1250 μsec	(Hz is ssive b) d)	s sampled at Nyquist rate. The samples will be 125 µsec 62.5 sec
	8)	Whio a) c)	ch of the following pulse system is PPM PAM	s mos b) d)	st efficient? PWM None of these

# S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Seat No.

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Page **7** of **12** 

Set R

- 9) All broadcast radio signals received in daytime propagate by means of .
  - a) tropospheric waves
- b) Troposcatter d) none of above
- surface waves C)
- 10) The ionosphere plays a significant role in radio wave propagation at \_\_\_\_\_.
  - high frequency a) c) microwaves frequencies
- d) optical frequencies
- 11) You have 5 information signals and only one transmitter. What technique will help in transmitting all the 5 signals?
  - Frequency modulation a)
    - Multiplexing b) Amplitude Modulation Amplification d)
- 12) The process of making the signal more compatible with the medium is called as
  - a) Modulation b) Transmission
  - Multiplexing C) Encrypting d)
- Noise introduces a frequency variation into the signal. 13)
  - True a)

C)

14)

- None of above c)
- What is the technique in which the high frequency components are amplified more than the low frequency components in FM?
- Garble a)
- Selective amplification c)
- Pre-emphasis b)
- None of above d)

- SLR-FR-28 Set | R

b) False

ultra high frequency b)

Seat No.

> S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electronics Engineering ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate fill marks.

#### Section – I

#### Q.2 Attempt any Four questions.

- a) Discuss the term modulation & how the antenna height can be reduced in communication.
- **b)** Illustrate & discuss in detail the equation in detail m=1, m<1, & m>1.
- c) Discuss the term noise & state different sources of noise?
- d) A broadcast AM transmitter radiates 50 kW of carrier power what will be radiated power at 85% modulation?
- e) Define SNR and derive the equation for the same?

#### Q.3 Attempt any Two questions.

- a) With suitable block diagram explain the Independent Sideband Transmission Systems.
- **b)** Discuss the characteristics of AM Radio Receiver with their respective curve responses.
- c) Discuss how noise is calculated for several amplifiers connected in cascade?

#### Section – II

#### Q.4 Attempt any Four questions.

- a) Explain pre-emphasis and de-emphasis in FM modulation.
- **b)** Explain PM modulation with mathematical analysis.
- c) State and explain Sampling theorem. What are its types?
- d) With neat diagram explain Yagi antenna.
- e) In an FM system, when the audio frequency is 500 Hz and the AF voltage is 2.4 V, the deviation is 4.8 KHz. If the AF voltage is raised to 10 V while the AF is dropped to 200 Hz, what is the new deviation and also find the modulation index in this case.

#### Q.5 Attempt any two questions:

- a) Explain working of Foster-Seeley discriminator with suitable diagram.
- **b)** With circuit diagram explain working of a PWM modulator and demodulator. Also draw the waveforms.
- c) What are the three basic paths that a radio signal can take through space? Explain each one in detail.

Max. Marks: 56

12

16

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R

	S.Y.	(B.1	Fech) (Part - I) (New) (CBC Electronics En ANAL OG COMM	S) Ex gine	camination Nov/Dec-2019 Pering
Day	& Date	e: Tue	esday, 17-12-2019		Max. Marks: 70
Time	2: 10:00		To 01:00 PM	uld ha	colved in first 20 minutes in answer
instr	uction	15: 1)	book.		solved in first 30 minutes in answer
		2) 3)	) Figures to the right indicate full ) Assume suitable data if necess	marks ary.	5.
			MCQ/Objective Ty	be Qu	lestions
Dura	tion: 3	0 Mir	nutes		Marks: 14
Q.1	<b>Choo</b> 1)	bse tl In P a) b) c) d)	he correct alternatives from the M, the modulation index is propo only modulating frequency both amplitude and frequency only amplitude of modulating sig antenna height	<b>e opti</b> rtiona gnal	ons. 14 I to
	2)	A sig time a) c)	gnal of maximum frequency of 8 intervals between the two succe 62.5 µsec 1250 µsec	KHz is ssive b) d)	s sampled at Nyquist rate. The samples will be 125 µsec 62.5 sec
	3)	Whi a) c)	ch of the following pulse system i PPM PAM	s mos b) d)	st efficient? PWM None of these
	4)	All b a) c)	roadcast radio signals received i tropospheric waves surface waves	n day b) d)	time propagate by means of Troposcatter none of above
	5)	The a) c)	ionosphere plays a significant ro high frequency microwaves frequencies	le in r b) d)	adio wave propagation at ultra high frequency optical frequencies
	6)	You will I a) c)	have 5 information signals and one of the formation signals and one of the formation and the formation	only o als? b) d)	ne transmitter. What technique Multiplexing Amplitude Modulation
	7)	The calle a) c)	process of making the signal mo ed as Modulation Encrypting	b) d)	mpatible with the medium is Transmission Multiplexing
	8)	Nois a) c)	e introduces a frequency variation True None of above	bn into b)	o the signal. False
	9)	Wha amp a) c)	at is the technique in which the hi lified more than the low frequenc Garble Selective amplification	gh fre y con b) d)	equency components are nponents in FM? Pre-emphasis None of above

Seat No.

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Set S

- 10) Shot noise is produced by, \_\_\_\_\_.
  - a) Electrons

a)

b) Photons

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Set S

- c) Electrons & Photons
- d) None of above
- 11) The ratio of transmitted power which contains the information to the total transmitted power is, known as \_\_\_\_\_.
  - Modulation Index b) Total power
  - c) Transmission efficiency d) Sideband power
- 12) The total antenna current of an AM transmitter is 5A. If modulation index is 0.06, Calculate the antenna current when only carrier is sent \_\_\_\_\_.
  - a) 5A b) 4.6A
  - c) 3A d) 2A
- 13) In FM for a given frequency deviation the modulation index varies \_\_\_\_\_.
  - a) inversely as the modulating frequency
  - b) directly as the modulating frequency
  - c) independent of the changes in modulating signal
  - d) none of above
- 14) A pre-emphasis circuit provides extra noise immunity by \_\_\_\_\_.
  - a) boosting the bass frequencies
  - b) amplifying the higher audio frequencies
  - c) preamplifying the whole audio band
  - d) converting the phase modulation to FM

Seat No.

#### S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electronics Engineering ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate fill marks.

#### Section – I

#### Q.2 Attempt any Four questions.

- a) Discuss the term modulation & how the antenna height can be reduced in communication.
- **b)** Illustrate & discuss in detail the equation in detail m=1, m<1, & m>1.
- c) Discuss the term noise & state different sources of noise?
- d) A broadcast AM transmitter radiates 50 kW of carrier power what will be radiated power at 85% modulation?
- e) Define SNR and derive the equation for the same?

#### Q.3 Attempt any Two questions.

- a) With suitable block diagram explain the Independent Sideband Transmission Systems.
- **b)** Discuss the characteristics of AM Radio Receiver with their respective curve responses.
- c) Discuss how noise is calculated for several amplifiers connected in cascade?

#### Section – II

#### Q.4 Attempt any Four questions.

- a) Explain pre-emphasis and de-emphasis in FM modulation.
- b) Explain PM modulation with mathematical analysis.
- c) State and explain Sampling theorem. What are its types?
- d) With neat diagram explain Yagi antenna.
- e) In an FM system, when the audio frequency is 500 Hz and the AF voltage is 2.4 V, the deviation is 4.8 KHz. If the AF voltage is raised to 10 V while the AF is dropped to 200 Hz, what is the new deviation and also find the modulation index in this case.

#### Q.5 Attempt any two questions:

- a) Explain working of Foster-Seeley discriminator with suitable diagram.
- **b)** With circuit diagram explain working of a PWM modulator and demodulator. Also draw the waveforms.
- c) What are the three basic paths that a radio signal can take through space? Explain each one in detail.

Max. Marks: 56

12

16

16

12



Set

## S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics and Telecommunication Engineering**

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

**ENGINEERING MATHEMATICS – III** 

2) Figures to the right indicate full marks.

### **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

1)

Seat

No.

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
  - $\frac{1}{D^2+9} \{\sin 3x\}$  is equal to \_\_\_\_\_. a)  $\frac{x}{\frac{6}{6}}\cos(3x)$ c)  $\frac{-x}{\frac{6}{6}}\cos(3x)$ b)  $\frac{-x}{6}\sin(3x)$ d)  $\frac{-x}{3}\cos(3x)$
  - The general solution of differential equation  $(D^2 1)^2 y = 0$  is \_\_\_\_\_. 2)
    - a)  $y = (c_1 + c_2 x)e^x + (c_3 + c_4 x)e^{-x}$
    - b)  $y = (c_1 + c_2 x + c_3 x^2 + c_4 x^3)e^{-x}$
    - c)  $y = e^{-x} \{ (c_1 + c_2 x) \cos x + (c_3 + c_4 x) \sin x \}$
    - d)  $v = (c_1 + c_2 x + c_3 x^2 + c_4 x^3)e^x$

A continuous random variable has the probability density function 3)  $f(x) = kx^2$  for  $0 \le x \le 2$ , then k = \_\_\_\_ 3 2 8 b) a) 3

- $\frac{3}{8}$ 5 d) c) If a random variable X has a Poisson distribution with mean 6, then 4) P(x = 1) is equal to \_\_\_\_\_.
  - a) 0.015 b) 0.055 c) 0.15 d) 0.25
- 5) The lines of regressions equations are given by -x = -10y + 17 and x - 5y = -7, then the mean  $\bar{x}$  and mean  $\bar{y}$  are a) 1 and 10 b) 1 and 5
  - c) 4 and 3 d) 3 and 2
- In the interval  $(0, \pi)$  the constant term in the half range cosine series of 6) f(x) = x is .
  - $\frac{\pi}{2}$ a) π b) π d) 0 c) 4
- The Fourier series of  $f(x) = 1 x^2$  interval (-1, 1) contains \_\_\_\_\_ 7) a) Only sine terms b) Only cosine terms
  - c) Both sine and cosine terms d) None of these

Max. Marks: 70

Marks: 14



SLR-FR-29 Set P

8) The Laplace transform of 
$$e^{2t} + \cos 2t$$
 is \_\_\_\_\_.  
a)  $\frac{s}{s^{2}+4} + \frac{1}{s-2}$  b)  $\frac{2}{s^{2}+4} + \frac{1}{s-2}$   
c)  $\frac{s}{s^{2}+4} + \frac{1}{s+2}$  d) None of these  
9) If  $L\{f(t)\} = \frac{1}{s}e^{-\frac{1}{s}}$ , then  $L\{f(4t)\}$  is \_\_\_\_\_.  
a)  $\frac{1}{4}e^{-4/s}$  b)  $\frac{1}{4}e^{-s/4}$   
c) None of these d)  $\frac{1}{s}e^{-4/s}$   
10)  $L^{-1}\{\frac{s^{2}+s}{s^{3}}\} =$  \_\_\_\_\_.  
a)  $t^{2} + t$  b)  $t + 1$   
c)  $t^{2} + 1$  d)  $t$   
11) If  $U(k) = \{1, k \ge 0 \\ 0, otherwise}$  the  $z\{U(k)\} =$  \_\_\_\_\_.  
a)  $\frac{1}{z-1}$  b)  $\frac{-1}{z-1}$   
c)  $\frac{z}{z-1}$  d)  $\frac{-z}{z-1}$   
12) If  $z\{f(k)\} = F(z)$ , then  $z\{kf(k)\} =$  \_\_\_\_\_.  
a)  $-z\frac{d}{dz}F(z)$  b)  $z\frac{d}{dz}F(z)$   
c)  $\frac{d}{dz}F(z)$  d) None of these  
13) The Fourier cosine integral form of  $f(x)$  is \_\_\_\_\_.

b) 
$$\int_{0}^{0} \cos wx \left[ \int_{0}^{\infty} f(s) \cos ws ds \right] dw$$
  
c) 
$$\frac{2}{\pi} \int_{0}^{\infty} \cos wx \left[ \int_{0}^{\infty} f(s) \cos ws ds \right] dw$$
  
d) None of these

14) The Fourier sine transform of  $f(x) = e^{-x}, x \ge 0$  is \_\_\_\_\_. a)  $\frac{s}{s^2+1}$  b)  $\frac{2}{\pi} \frac{s}{1+s^2}$ c)  $\frac{s}{1-s^2}$  d)  $\sqrt{\frac{2}{\pi}} \frac{s}{1+s^2}$ 

10

#### No. S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics and Telecommunication Engineering ENGINEERING MATHEMATICS – III**

Day & Date: Saturday, 07-12-2019

Time: 10:00 AM To 01:00 PM

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

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

#### Section – I

#### Q.2 Solve any three of the following questions.

- a) Solve:  $(D^2 + 9)y = e^{-x} + \sin(3x)$ .
- **b)** Solve:  $(D^2 6D + 9)y = e^{3x}(1 + x)$ .
- c) Obtain the Fourier series of the function  $f(x) = x^3$  in interval  $(-\pi, \pi)$ .
- d) Find the coefficient of correlation between x and y from the following data  $N = 20, \Sigma x = 80, \Sigma x^2 = 900, \Sigma y = 70, \Sigma y^2 = 800, \Sigma xy = 700.$
- e) If on an average one candidate out of 10 fails in a certain examination, find the chance that out of 5 candidates that have appeared for the examination at least 4 will be successful.

#### Q.3 Solve any three of the following questions.

- a) Solve:  $(D^2 1)y = \frac{2}{1 + e^x}$
- **b)** Expand  $f(x) = x x^2$  as half range cosine series in  $0 \le x \le 1$ .
- c) Expand  $f(x) = a^2 x^2$  as Fourier series in (-a, a).
- d) If 3% of bulbs manufactured by a company are defective assuming Poisson distribution, find the probability that in a pack of 100 bulbs.
  - zero i)
  - two bulbs are defective ii)
- e) Given the following results of weights 'x' and heights 'y' of 1000 men.

vveig	nt 'x'(in lbs)	Height 'y (inches)
Mean:	150	68
Standard deviation	20	2.5
and coefficient of correlation is $r =$	0.6, find the e	equations of the lines of

regression.

#### Q.4 Solve any two of the following questions.

a) An electric circuit consists of an inductance L, a condenser of capacity C and an e.m.f of  $E_0 \cos(wt)$ , so that the charge q satisfies the differential equation.

$$\frac{d^2q}{dt^2} + \frac{1}{LC}q = \frac{E_0}{L}\cos(wt)$$

If  $w^2 = \frac{1}{L}$  and  $q = q_0$ ,  $i = i_0$  at t = 0 then find the charge q at any time t.

- b) Find the Fourier series of the function
  - $0 < x \leq \pi$ f(x)= x,  $= 2\pi - x, \quad \pi < x < 2\pi$

Max. Marks: 56

09

#### 09

SLR-FR-29



- c) If the mean life time and standard deviation of battery cells are 12 hrs and 3 hrs, then find the percentage of batteries will have life time
  - i) between 10 and 14 hrs ii) more than 15 hrs. (Given S N V of z area from z = 0 to z = 0.6667 is 0.2486

(Given S.N.V of z, area from z = 0 to z = 0.6667 is 0.2486, that from z = 0 to z = 1 is 0.3413)

#### Section – II

### Q.5 Solve any three of the following questions.

- a) Find  $L\{te^{-3t} \sin t\}$
- b) Evaluate  $\int_{0}^{\infty} \frac{e^{-2t} e^{-3t}}{t} dt$
- **c)** Find the z-transform and its region of convergence of  $f(k) = \frac{5^k}{k!}$ ,  $k \ge 0$ .
- **d)** Find  $Z\left\{\sin\left(\alpha k+\frac{\pi}{2}\right)\right\}$  for  $k \ge 0$ .
- e) Find the Fourier cosine transform of  $f(x) = e^{-2x} + 4e^{-3x}$

### Q.6 Solve any three of the following questions.

- **a)** Find z-transform of  $f(k) = \left\{\frac{2^k}{k} + \frac{3^k}{k}\right\}, k \ge 1.$
- **b)** Find inverse Laplace transform of  $\log \left[\frac{s^2-4}{(s-3)^2}\right]$
- **c)** Using convolution theorem find the inverse Laplace transform of  $\frac{1}{(s-3)(s+4)^2}$
- **d)** Find f(x) if its Fourier sine transform is  $e^{-as}$  \_\_\_\_\_.
- e) Find the Fourier Transform of  $f(x) = e^{-x^2/2}$

#### Q.7 Solve any two of the following questions.

- a) Express the function  $f(x) = \begin{cases} 1, & when |x| \le 1 \\ 0, & when |x| > 1 \\ as a Fourier integral. Hence evaluate \\ \int_{0}^{\infty} \frac{\sin \lambda \cos \lambda x}{\lambda} d\lambda \end{cases}$
- **b)** Using Laplace transform solve the following differential equation with the given conditions  $\frac{d^2x}{dt^2} + 4\frac{dx}{dt} = -8t$ , x(0) = 0, x'(0) = 0.

**c)** Find the inverse z-transform of 
$$F(z) = \frac{1}{(z-3)(z-2)}$$
 is ROC is  $|z| > 3$ .

09

09

Set P

SLR-FR-29

# Set

### S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics and Telecommunication Engineering ENGINEERING MATHEMATICS – III**

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

### **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

Seat

No.

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1)	The Laplace transform of $e^{2t} + \cos t$	2t is	•
	a) $\frac{s}{s^2+4} + \frac{1}{s-2}$	b)	$\frac{2}{s^2+4} + \frac{1}{s-2}$
	c) $\frac{s}{s^2+4} + \frac{1}{s+2}$	d)	None of these
2)	If $L\{f(t)\} = \frac{1}{s}e^{-\frac{1}{s}}$ , then $L\{f(4t)\}$ is _		
	a) $\frac{1}{4} e^{-4/s}$	b)	$\frac{1}{4}e^{-s/4}$
	c) None of these	d)	$\frac{1}{s}e^{-4/s}$
3)	$L^{-1}\left\{\frac{s^2+s}{s^3}\right\} = \underline{\qquad}.$		
	a) $t^2 + t$	b)	t + 1
	c) $t^2 + 1$	d)	t
4)	If $U(k) = \begin{cases} 1, & k \ge 0\\ 0, & otherwise \end{cases}$ the $z\{U(k)\}$	)} = _	·
	a) $\frac{1}{z-1}$	b)	$\frac{-1}{z-1}$
	c) $\frac{z}{z-1}$	d)	$\frac{-z}{z-1}$
5)	If $z\{f(k)\} = F(z)$ , then $z\{kf(k)\} ={k \in \mathbb{N}}$		·
	a) $-z\frac{d}{dz}F(z)$	b)	$Z\frac{d}{dz}F(Z)$
	c) $\frac{d}{dz}F(z)$	d)	None of these

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Max. Marks: 70

Marks: 14

Set 6) The Fourier cosine integral form of f(x) is \_\_\_\_\_.  $f(s)\cos wsds$ a) b)  $\int_{0}^{\infty} \cos wx \left[ \int_{0}^{\infty} f(s) \cos ws ds \right] dw$ c)  $\frac{2}{\pi} \int_{-\infty}^{\infty} \cos wx \left[ \int_{-\infty}^{\infty} f(s) \cos ws ds \right] dw$ d) None of these The Fourier sine transform of  $f(x) = e^{-x}$ ,  $x \ge 0$  is \_\_\_\_\_. 7) b)  $\frac{2}{\pi} \frac{s}{1+s^2}$ d)  $\sqrt{\frac{2}{\pi}} \frac{s}{1+s^2}$ c)  $\frac{s}{1-s^2}$  $\begin{array}{c} \frac{1}{D^{2}+9} \{\sin 3x\} \text{ is equal to } \_\_\_. \\ \text{a)} \quad \frac{x}{6} \cos(3x) & \text{b)} \quad \frac{-x}{6} \sin(3x) \\ \text{c)} \quad \frac{-x}{6} \cos(3x) & \text{d)} \quad \frac{-x}{3} \cos(3x) \end{array}$ 8) a)  $\frac{x}{\frac{6}{6}\cos(3x)}$ c)  $\frac{-x}{\frac{6}{6}\cos(3x)}$ The general solution of differential equation  $(D^2 - 1)^2 y = 0$  is \_\_\_\_\_. 9) a)  $\tilde{y} = (c_1 + c_2 x)e^x + (c_3 + c_4 x)e^{-x}$ b)  $y = (c_1 + c_2 x + c_3 x^2 + c_4 x^3)e^{-x}$ c)  $y = e^{-x} \{ (c_1 + c_2 x) \cos x + (c_3 + c_4 x) \sin x \}$ d)  $y = (c_1 + c_2 x + c_3 x^2 + c_4 x^3)e^x$ A continuous random variable has the probability density function 10)  $f(x) = kx^2$  for  $0 \le x \le 2$ , then k = \_\_\_\_\_ b)  $\frac{3}{2}$ a)  $\frac{3}{8}$ d) c) If a random variable X has a Poisson distribution with mean 6, then 11) P(x = 1) is equal to \_\_\_\_\_. a) 0.015 b) 0.055 d) 0.25 c) 0.15 12) The lines of regressions equations are given by -x = -10y + 17 and x - 5y = -7, then the mean  $\bar{x}$  and mean  $\bar{y}$  are \_ a) 1 and 10 b) 1 and 5 c) 4 and 3 d) 3 and 2 13) In the interval  $(0,\pi)$  the constant term in the half range cosine series of f(x) = x is \_\_\_\_\_. b)  $\frac{\pi}{2}$ a) π π d) 0 C) The Fourier series of  $f(x) = 1 - x^2$  interval (-1, 1) contains \_\_\_\_\_. 14) a) Only sine terms b) Only cosine terms

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Instructions: 1) All questions are compulsory.

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

#### Section – I

#### Q.2 Solve any three of the following questions.

- **a)** Solve:  $(D^2 + 9)y = e^{-x} + \sin(3x)$ .
- **b)** Solve:  $(D^2 6D + 9)y = e^{3x}(1 + x)$ .
- **c)** Obtain the Fourier series of the function  $f(x) = x^3$  in interval  $(-\pi, \pi)$ .
- d) Find the coefficient of correlation between x and y from the following data  $N = 20, \Sigma x = 80, \Sigma x^2 = 900, \Sigma y = 70, \Sigma y^2 = 800, \Sigma xy = 700.$
- e) If on an average one candidate out of 10 fails in a certain examination, find the chance that out of 5 candidates that have appeared for the examination at least 4 will be successful.

#### **Q.3** Solve any three of the following questions.

- a) Solve:  $(D^2 1)y = \frac{2}{1 + e^x}$
- **b)** Expand  $f(x) = x x^2$  as half range cosine series in  $0 \le x \le 1$ .
- **c)** Expand  $f(x) = a^2 x^2$  as Fourier series in (-a, a).
- d) If 3% of bulbs manufactured by a company are defective assuming Poisson distribution, find the probability that in a pack of 100 bulbs.
  - i) zero
  - ii) two bulbs are defective
- e) Given the following results of weights 'x' and heights 'y' of 1000 men.

	Weight 'x'(in lbs)	Height 'y'(inches)
Mean:	150	68
Standard deviation	20	2.5
(*************************************		

and coefficient of correlation is r = 0.6, find the equations of the lines of regression.

#### Q.4 Solve any two of the following questions.

a) An electric circuit consists of an inductance L, a condenser of capacity C and an e.m.f of  $E_0 \cos(wt)$ , so that the charge q satisfies the differential equation.

$$\frac{d^2q}{dt^2} + \frac{1}{LC}q = \frac{E_0}{L}\cos(wt)$$

If  $w^2 = \frac{1}{LC}$  and  $q = q_0$ ,  $i = i_0$  at t = 0 then find the charge q at any time t.

- b) Find the Fourier series of the function
  - $\begin{array}{ll} f(x) &= x, & 0 < x \le \pi \\ &= 2\pi x, & \pi < x < 2\pi \end{array}$

Max. Marks: 56

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- c) If the mean life time and standard deviation of battery cells are 12 hrs and 3 hrs, then find the percentage of batteries will have life time
  - i) between 10 and 14 hrs ii) more than 15 hrs. (Given S.N.V of z, area from z = 0 to z = 0.6667 is 0.2486, that from z = 0 to z = 1 is 0.3413)

#### Section – II

#### Q.5 Solve any three of the following questions.

- a) Find  $L\{te^{-3t} \sin t\}$
- b) Evaluate  $\int_{0}^{\infty} \frac{e^{-2t} e^{-3t}}{t} dt$
- **c)** Find the z-transform and its region of convergence of  $f(k) = \frac{5^k}{k!}$ ,  $k \ge 0$ .
- **d)** Find  $Z\left\{\sin\left(\alpha k+\frac{\pi}{2}\right)\right\}$  for  $k \ge 0$ .
- e) Find the Fourier cosine transform of  $f(x) = e^{-2x} + 4e^{-3x}$

#### Q.6 Solve any three of the following questions.

- **a)** Find z-transform of  $f(k) = \left\{\frac{2^k}{k} + \frac{3^k}{k}\right\}, k \ge 1.$
- **b)** Find inverse Laplace transform of  $\log \left[\frac{s^2-4}{(s-3)^2}\right]$
- **c)** Using convolution theorem find the inverse Laplace transform of  $\frac{1}{(s-3)(s+4)^2}$
- **d)** Find f(x) if its Fourier sine transform is  $e^{-as}$  \_\_\_\_\_.
- **e)** Find the Fourier Transform of  $f(x) = e^{-x^2/2}$

#### Q.7 Solve any two of the following questions.

- a) Express the function  $f(x) = \begin{cases} 1, & when |x| \le 1 \\ 0, & when |x| > 1 \\ as a Fourier integral. Hence evaluate \\ \int_{0}^{\infty} \frac{\sin \lambda \cos \lambda x}{\lambda} d\lambda \end{cases}$
- **b)** Using Laplace transform solve the following differential equation with the given conditions  $\frac{d^2x}{dt^2} + 4\frac{dx}{dt} = -8t$ , x(0) = 0, x'(0) = 0.

**c)** Find the inverse z-transform of  $F(z) = \frac{1}{(z-3)(z-2)}$  is ROC is |z| > 3.

## SLR-FR-29

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:	S.Y.	(B.1	Fech.) (Part – I) (New) (CBC Electronics and Telecomm ENGINEERING MAT	CS) nun FHE	Examination Nov/Dec-2019 ication Engineering MATICS – III	
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Instru	iction	<b>is:</b> 1	) Q. No. 1 is compulsory and sho book.	buld	be solved in first 30 minutes in ans	wer
		2	<ol> <li>Figures to the right indicate full</li> </ol>	ma	rks.	
			MCQ/Objective Ty	уре	Questions	
Durati	on: 3	0 Mi	nutes		Marks	s: 14
Q.1	Choc 1)	The The x – a) c)	the correct alternatives from the lines of regressions equations a $5y = -7$ , then the mean $\bar{x}$ and n 1 and 10 4 and 3	ne oj are g near b) d)	ptions and rewrite the sentence. given by $-x = -10y + 17$ and $\overline{y}$ are 1 and 5 3 and 2	14
	2)	In tl <i>f</i> (x a) c)	the interval $(0, \pi)$ the constant ter x = x is $\frac{\pi}{4}$	m in b) d)	the half range cosine series of $\frac{\pi}{2}$	
	3)	The a) c)	Fourier series of $f(x) = 1 - x^2$ Only sine terms Both sine and cosine terms	inter b) d)	val (–1,1) contains Only cosine terms None of these	
	4)	The a) c)	E Laplace transform of $e^{2t} + \cos 2t$ $\frac{s}{s^2+4} + \frac{1}{s-2}$	2 <i>t</i> is b) d)	$\frac{\frac{2}{s^2+4} + \frac{1}{s-2}}{\frac{1}{s-2}}$	
	5)	lf <i>L</i> { a)	$\frac{1}{s^2+4} + \frac{1}{s+2}$ $\{f(t)\} = \frac{1}{s}e^{-\frac{1}{s}}, \text{ then } L\{f(4t)\} \text{ is } \_$ $\frac{1}{4}e^{-4/s}$ None of these	b)	$\frac{1}{4}e^{-s/4}$	
	6)	$L^{-1}$ a)	$\begin{cases} \frac{s^2 + s}{s^3} \end{cases} = \underline{\qquad}.$ $t^2 + t$ $t^2 + 1$	b)	$\frac{1}{s}e^{-ts}$	
	7)	lf <i>U</i> a) c)	$k = \begin{cases} 1, & k \ge 0\\ 0, & otherwise \end{cases} \text{ the } z\{U(k) \\ \frac{1}{z-1} \\ \frac{z}{z-1} \end{cases}$	d) } = _ b) d)	$\frac{-1}{z-1}$	
			<i>u</i> <b>1</b>		<i>4</i> <b>1</b>	

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## SLR-FR-29

# Set R

Set If  $z\{f(k)\} = F(z)$ , then  $z\{kf(k)\} =$ \_\_\_\_\_. a)  $-z\frac{d}{dz}F(z)$  b)  $z\frac{d}{dz}F(z)$ . 8) c)  $\frac{d}{dz}F(z)$ d) None of these The Fourier cosine integral form of f(x) is \_\_\_\_\_. 9) a)  $\int_{0} f(s) \cos ws ds$ b)  $\int_{-\infty}^{\infty} \cos wx \left[ \int_{0}^{\infty} f(s) \cos ws ds \right] dw$ c)  $\frac{2}{\pi} \int_{0}^{\infty} \cos wx \left[ \int_{0}^{\infty} f(s) \cos ws ds \right] dw$ d) None of these 10) The Fourier sine transform of  $f(x) = e^{-x}, x \ge 0$  is \_\_\_\_\_. b)  $\frac{2}{\pi} \frac{s}{1+s^2}$ d)  $\sqrt{\frac{2}{\pi}} \frac{s}{1+s^2}$ a)  $\frac{s}{s^2+1}$ c)  $\frac{s}{1-s^2}$  $\frac{1}{D^{2}+9} \{\sin 3x\} \text{ is equal to } \_\_\_.$ a)  $\frac{x}{6} \cos(3x)$ b)  $\frac{-x}{6} \sin(3x)$ c)  $\frac{-x}{6} \cos(3x)$ d)  $\frac{-x}{3} \cos(3x)$ 11) The general solution of differential equation  $(D^2 - 1)^2 y = 0$  is \_\_\_\_\_. 12) a)  $y = (c_1 + c_2 x)e^x + (c_3 + c_4 x)e^{-x}$ b)  $y = (c_1 + c_2 x + c_3 x^2 + c_4 x^3)e^{-x}$ c)  $y = e^{-x} \{ (c_1 + c_2 x) \cos x + (c_3 + c_4 x) \sin x \}$ d)  $y = (c_1 + c_2 x + c_3 x^2 + c_4 x^3)e^x$ A continuous random variable has the probability density function 13)  $f(x) = kx^2$  for  $0 \le x \le 2$ , then k = \_ b)  $\frac{3}{2}$ a) 3 5 3 d) C) 14) If a random variable X has a Poisson distribution with mean 6, then P(x = 1) is equal to \_\_\_\_\_.

a) 0.015 b) 0.055 c) 0.15 d) 0.25 SLR-FR-29

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#### Section – I

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If  $w^2 = \frac{1}{L}$  and  $q = q_0$ ,  $i = i_0$  at t = 0 then find the charge q at any time t.

- **b)** Find the Fourier series of the function
  - $f(x) = x, \qquad 0 < x \le \pi$ =  $2\pi - x, \qquad \pi < x < 2\pi$

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Max. Marks: 56

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- c) If the mean life time and standard deviation of battery cells are 12 hrs and 3 hrs, then find the percentage of batteries will have life time
  - i) between 10 and 14 hrs
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(Given S.N.V of z, area from z = 0 to z = 0.6667 is 0.2486, that from z = 0 to z = 1 is 0.3413)

#### Section – II

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- **c)** Find the z-transform and its region of convergence of  $f(k) = \frac{5^k}{k!}, k \ge 0$ .
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- **a)** Find z-transform of  $f(k) = \left\{\frac{2^k}{k} + \frac{3^k}{k}\right\}, k \ge 1.$
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- **b)** Using Laplace transform solve the following differential equation with the given conditions  $\frac{d^2x}{dt^2} + 4\frac{dx}{dt} = -8t$ , x(0) = 0, x'(0) = 0.

**c)** Find the inverse z-transform of 
$$F(z) = \frac{1}{(z-3)(z-2)}$$
 is ROC is  $|z| > 3$ .

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## SLR-FR-29 S

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### S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics and Telecommunication Engineering ENGINEERING MATHEMATICS – III**

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## **MCQ/Objective Type Questions**

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Marks: 14

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Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14  $r_{-1}(s^2+s)$ 1)

$$L^{-1}\left\{\frac{1}{s^{3}}\right\} = \underline{\qquad}$$
a)  $t^{2} + t$  b)  $t + 1$   
c)  $t^{2} + 1$  d)  $t$ 
2) If  $U(k) = \begin{cases} 1, & k \ge 0\\ 0, & otherwise \\ 0, & otherwise \\ 0 & therwise \\ 0 & thermitian \\ 0 & therwise \\ 0 & therwise \\ 0 & thermitian \\$ 

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				Set
6)	$\frac{1}{D^2+9}$ {sin 3x	} is equal to		
	a) $\frac{x}{6}\cos(3x)$	x)	b)	$\frac{-x}{6}\sin(3x)$
	c) $\frac{-x}{6}\cos(2\pi i t)$	3 <i>x</i> )	d)	$\frac{-x}{3}\cos(3x)$
7)	The generation $y = (c_1$	al solution of differential e $(+ c_2 x)e^x + (c_3 + c_4 x)e^{-1}$	equa x	tion $(D^2 - 1)^2 y = 0$ is
	b) $y = (c_1)$	$+ c_2 x + c_3 x^2 + c_4 x^3) e^{-x}$		
	c) $y = e^{-x}$	$x_{1}^{x}\{(c_{1}+c_{2}x)\cos x+(c_{3}+c_{3})+(c_{3}+c_{3})\}$	$c_4 x$	sin x
	d) $y = (c_1)$	$+ c_2 x + c_3 x^2 + c_4 x^3) e^x$		
8)	A continuou $f(x) = kx^2$	us random variable has t for $0 < x < 2$ then k –	he p	robability density function
	a) $\frac{8}{2}$	$1010 \leq x \leq 2, \text{ then } \mathbf{x} = $	b)	$\frac{3}{2}$ .
	c) $\frac{5}{5}$		d)	<u>2</u> <u>3</u>
0)	<sup>'</sup> 8	wariahla V haa a Daiaaa	n dia	8 Atribution with moon 6 than
9)	P(x = 1) is	equal to	nus	
	a) 0.015		b)	0.055
10)	C $U.15$	f regressions equations	u)	0.20
10)	x - 5y = -	7, then the mean $\bar{x}$ and r	near	$\bar{y}$ are
	a) 1 and 1	10	b)	1 and 5
11)	C) 4 and 3	$(0, \pi)$ the constant to	u) min	3 and 2
11)	f(x) = x is			The name range cosine series of
	a) π		b)	$\frac{\pi}{2}$
	c) $\frac{\pi}{4}$		d)	0
12)	The Fourier	r series of $f(x) = 1 - x^2$	inter	rval $(-1, 1)$ contains
	c) Both si	ne and cosine terms	d)	None of these
13)	The Laplac a) $\frac{s}{s}$	e transform of $e^{2t} + \cos 2$	2 <i>t</i> is b)	$\frac{2}{1}$
	s <sup>2</sup> +4	s-2	Ņ	$s^2 + 4 + s - 2$
	c) $\frac{s}{s^2+4} +$	$\frac{1}{s+2}$	d)	None of these
14)	$ f L{f(t)} =$	$\frac{1}{2}e^{-\frac{1}{s}}$ , then $L\{f(4t)\}$ is		
	a) $\frac{1}{4}e^{-4/s}$	s , O(C), C _	b)	$\frac{1}{4}e^{-s/4}$
	c) None c	of these	d)	$\frac{1}{s}e^{-4/s}$

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S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019

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  - $f(x) = x, \qquad 0 < x \le \pi$ =  $2\pi - x, \qquad \pi < x < 2\pi$

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No.

- c) If the mean life time and standard deviation of battery cells are 12 hrs and 3 hrs, then find the percentage of batteries will have life time
  - i) between 10 and 14 hrs
  - ii) more than 15 hrs.

(Given S.N.V of z, area from z = 0 to z = 0.6667 is 0.2486, that from z = 0 to z = 1 is 0.3413)

#### Section – II

#### Q.5 Solve any three of the following questions.

- a) Find  $L\{te^{-3t} \sin t\}$
- b) Evaluate  $\int_{0}^{\infty} \frac{e^{-2t} e^{-3t}}{t} dt$
- **c)** Find the z-transform and its region of convergence of  $f(k) = \frac{5^k}{k!}, k \ge 0$ .
- **d)** Find  $Z\left\{\sin\left(\alpha k+\frac{\pi}{2}\right)\right\}$  for  $k \ge 0$ .
- e) Find the Fourier cosine transform of  $f(x) = e^{-2x} + 4e^{-3x}$

### Q.6 Solve any three of the following questions.

- **a)** Find z-transform of  $f(k) = \left\{\frac{2^k}{k} + \frac{3^k}{k}\right\}, k \ge 1.$
- **b)** Find inverse Laplace transform of  $\log \left[\frac{s^2-4}{(s-3)^2}\right]$
- **c)** Using convolution theorem find the inverse Laplace transform of  $\frac{1}{(s-3)(s+4)^2}$
- **d)** Find f(x) if its Fourier sine transform is  $e^{-as}$  \_\_\_\_\_.
- e) Find the Fourier Transform of  $f(x) = e^{-x^2/2}$

#### Q.7 Solve any two of the following questions.

- a) Express the function  $f(x) = \begin{cases} 1, & when |x| \le 1 \\ 0, & when |x| > 1 \\ as a Fourier integral. Hence evaluate \\ \int_{0}^{\infty} \frac{\sin \lambda \cos \lambda x}{\lambda} d\lambda \end{cases}$
- **b)** Using Laplace transform solve the following differential equation with the given conditions  $\frac{d^2x}{dt^2} + 4\frac{dx}{dt} = -8t$ , x(0) = 0, x'(0) = 0.

**c)** Find the inverse z-transform of 
$$F(z) = \frac{1}{(z-3)(z-2)}$$
 is ROC is  $|z| > 3$ .

09

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09

Set S

SLR-FR-29
No.					Set	Ρ
F.`	Y. (B	.Tech.) (Seme BASIC ELEC	ster - I) (New) (CI TRICAL & ELEC <sup>-</sup>	BCS TRC	6) Examination Nov/Dec-2019 DNICS ENGINEERING	
Day 8 Time:	Date 10:00	: Wednesday, 11 AM To 01:00 PM	-12-2019 И		Max. Marks:	70
Instru	uction	<b>is:</b> 1) Q. No. 1 is book.	compulsory and shou	uld b	e solved in first 30 minutes in answe	r
				nar		
Durat	ion: 3	0 Minutes		he	Marks:	14
Q.1	<b>Choc</b> 1)	Se the correct a Coefficient of co a) $L /\sqrt{M_1 M_2}$ c) $M\sqrt{L_1 L_2}$	Iternatives from the upling K for magnetic	<b>e op</b> circ b) d)	tions and rewrite the sentence. cuit is given by L/M M/√L <sub>1</sub> L <sub>2</sub>	14
	2)	RMS value of the a) 200 X Form c) 200 X powe	e supply voltage is 20 factor r factor	00V b) d)	then the maximum value is 200 X peak factor none of the above	
	3)	A 2 cm long coil magnetizing forc a) 225 AT/m c) 450 AT/m	has 10 turns and car e of the coil is	ries b) d)	a current of 750 mA The 675 AT/m 375 AT/m	
	4)	In a balanced dephase currents b a) $30^{\circ}$ c) $120^{\circ}$	elta-connected system by	n, lir b) d)	ne currents lag their respective 60 <sup>0</sup> 45 <sup>0</sup>	
	5)	A transformer h supply. For a se should be a) 1600 c) 400	aving 1000 primary condary voltage of 4 	turi 100 ' b) d)	ns is connected to a 250 V a.c V, the number of secondary turns 250 1250	
	6)	If $e_1 = A \sin \omega t$ a a) $e_1$ lags $e_2$ by	and $e_2 = B \sin(\omega t - \theta)$	θ), b)	then $e_2$ lags $e_1$ by $\theta$	
	7)	<ul> <li>c) e<sub>2</sub> leads e<sub>2</sub> k</li> <li>Pure inductive ci</li> <li>a) consumes s</li> <li>b) does not tak</li> <li>c) takes power returns back</li> <li>d) none of the s</li> </ul>	by $\theta$ frcuit ome power on avera- te power at all from a from the line during to it during other para above	d) ge line som rt of	$e_1$ is in phase with $e_2$ be part of the cycle and then the cycle	
	8)	How many entrie a) 3 c) 8	es will be in the truth	table b) d)	e of a 3 input NAND gate? 6 9	
	9)	A Nibble is equa a) 1 c) 4	I to bit(s).	b) d)	2 8	

Γ

# Seat



- Convert the binary number (1101000011110000) to hexadecimal number \_\_\_\_\_. 10)
  - a) 1010 b) F0F0
    - c) D0F0 d) 7070
- The forward voltage drop across a silicon diode is about \_\_\_\_\_. 11)
  - a) 2.5 V b) 3 V
  - c) 10 V d) 0.7 V
- Which of following represent active transducer? 12)
  - b) Thermistor
  - a) Strain gauge c) LVDT d) Thermocouple
- A transistor has a  $\beta_{DC}$  of 250 and a base current, I<sub>B.</sub> of 20 $\mu$  A. The collector 13) current, I<sub>c</sub>, equals \_\_\_\_\_.
  - a) 500 μA b) 5 mA
  - c) 50 mA d) 5A
- Gauge factor of Strain gauge is \_\_\_\_\_ 14)
  - a)  $\frac{\bar{R}/\Delta R}{2}$ b) l/∆l l/∆l  $R/\Delta R$  $\Delta R/R$
  - C) ∆l/l

 $R/\Delta R$ d) ∆l/l

Set

F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 **BASIC ELECTRICAL & ELECTRONICS ENGINEERING** 

Day & Date: Wednesday, 11-12-2019 Time: 10:00 AM To 01:00 PM

Seat

No.

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

# Section - I

#### Attempt any four of the following. Q.2

- Define the following terms. a)
  - 1) MMF
  - 2) Reluctance
  - 3) Permeability
  - magnetic field strength 4)
- The voltage of 400 V is applied to three phase star connected load of b) impedance  $Z = (4 + i3) \Omega$ /phase. Find:
  - 1) Phase voltage
  - 2) Line current
  - 3) Total power consumed
- Derive emf equation for 1 phase transformer. Write emf equation in terms of c) Bm.
- State and explain Kirchhoff's laws with sign conventions. d)
- An iron ring of mean length 50 cms has an air gap of 1 mm and a winding of e) 200 turns. If the permeability of iron is 300 when a current of 1 A flows through the coil, find the flux density.
- Define Average value of alternating quantity and derive its expression. **f**)

#### Q.3 Attempt the following questions.

Find the resistance at the A-B terminals in the electric circuit of Figure. a, a) using  $\Delta$ -Y transformations.

C

 $100 \Omega$ 



# OR

Figure (a)

Derive the relationship between line and phase guantities in balanced Delta b) connected 3-phase load.

Max. Marks: 56

16

#### Section – II

### Q.4 Attempt any four of the following.

- a) What is universal gate? Derive basic gates using NAND gates.
- **b)** With neat diagram Explain "Solar cell".
- **c)** Convert  $(EF)_{16}$  to decimal and binary.
- **d)** Perform the subtraction by using 2's complement method  $(8E)_{16}$   $(78)_{16}$ .
- e) Explain half wave rectifier with necessary diagrams.
- f) What is BJT? Compare CB,CC,CE Configurations of transistor.

### Q.5 Attempt any two of the following questions.

- a) Explain in detail 'Linear variable differential transducer' as transducer and its working. Give its advantages and applications.
- **b)** Explain the working of bridge rectifier. Define the terms:
  - 1) Rectification efficiency
  - 2) Ripple Factor
- c) Explain the working of transistor in CE configurations. Explain the input and output characteristics of CE configuration.

16

SLR-FR-3

Set P

Seat No.					Set	Q			
F.\	F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 BASIC ELECTRICAL & ELECTRONICS ENGINEERING								
Day & Time:	Date 10:00	: Wednesday, 11 ) AM To 01:00 PM	-12-2019 ⁄I		Max. Marks:	: 70			
Instru	iction	s: 1) Q. No. 1 is book. 2) Figures to t	compulsory and sho	uld b mark	e solved in first 30 minutes in answe	ər			
		_,g	ICO/Objective Ty	ne	Questions				
Durati	ion: 3	0 Minutes		ρc	Marks:	: 14			
Q.1	<b>Choc</b> 1)	bese the correct a How many entrie a) 3 c) 8	<b>Iternatives from th</b> es will be in the truth	e op table b) d)	tions and rewrite the sentence. e of a 3 input NAND gate? 6 9	14			
	2)	A Nibble is equa a) 1 c) 4	l to bit(s).	b) d)	2 8				
	3)	Convert the bina a) 1010 c) D0F0	nry number (1101000	011 <sup>°</sup> b) d)	110000) to hexadecimal number F0F0 7070				
	4)	The forward volt a) 2.5 V c) 10 V	age drop across a si	licon b) d)	diode is about 3 V 0.7 V				
	5)	Which of followin a) Strain gauge c) LVDT	ng represent active t e	ranso b) d)	ducer? Thermistor Thermocouple				
	6)	A transistor has current, $I_c$ , equal a) 500 $\mu$ A c) 50 mA	a $\beta_{DC}$ of 250 and a bis	ase d b) d)	current,I <sub>B</sub> , of 20 $\mu$ A. The collector 5 mA 5A				
	7)	Gauge factor of a) $\frac{R/\Delta R}{l/\Delta l}$ c) $\frac{\Delta R/R}{\Delta l/l}$	Strain gauge is	 b) d)	$\frac{l/\Delta l}{R/\Delta R}$ $\frac{R/\Delta R}{\Delta l/l}$				
	8)	Coefficient of co a) $L / \sqrt{M_1 M_2}$ c) $M \sqrt{L_1 L_2}$	upling K for magneti	c ciro b) d)	cuit is given by L/M M/√L₁ L₂				
	9)	RMS value of th a) 200 X Form c) 200 X powe	e supply voltage is 2 factor r factor	00V b) d)	then the maximum value is 200 X peak factor none of the above				

# Set Q

SLR-FR-3

magnetizing force of the coil is \_\_\_\_ a) 225 AT/m b) 675 AT/m c) 450 AT/m d) 375 AT/m 11) In a balanced delta-connected system, line currents lag their respective phase currents by \_\_\_\_\_. a) 30<sup>0</sup> b) 60<sup>0</sup> d) 45<sup>0</sup> c)  $120^{\circ}$ 12) 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 1250 c) 400 d) If  $e_1 = A \sin \omega t$  and  $e_2 = B \sin(\omega t - \theta)$ , then \_\_\_\_\_. 13) b)  $e_2$  lags  $e_1$  by  $\theta$ a)  $e_1 \log e_2$  by  $\theta$ c)  $e_2$  leads  $e_2$  by  $\theta$ d)  $e_1$  is in phase with  $e_2$ 14) Pure inductive circuit a) consumes some power on average b) does not take power at all from a line c) takes power from the line during some part of the cycle and then

A 2 cm long coil has 10 turns and carries a current of 750 mA The

- returns back to it during other part of the cycle
- d) none of the above

10)

SLR-FR-3

Set Q

Seat	
No.	

# F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 **BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

Day & Date: Wednesday, 11-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

# Section - I

#### Attempt any four of the following. Q.2

- Define the following terms. a)
  - 1) MMF
  - 2) Reluctance
  - 3) Permeability
  - magnetic field strength 4)
- The voltage of 400 V is applied to three phase star connected load of b) impedance  $Z = (4 + i3) \Omega$ /phase. Find:
  - 1) Phase voltage
  - 2) Line current
  - 3) Total power consumed
- Derive emf equation for 1 phase transformer. Write emf equation in terms of c) Bm.
- State and explain Kirchhoff's laws with sign conventions. d)
- An iron ring of mean length 50 cms has an air gap of 1 mm and a winding of e) 200 turns. If the permeability of iron is 300 when a current of 1 A flows through the coil, find the flux density.
- Define Average value of alternating quantity and derive its expression. **f**)

#### Q.3 Attempt the following questions.

Find the resistance at the A-B terminals in the electric circuit of Figure. a, a) using  $\Delta$ -Y transformations.

C

 $100 \Omega$ 



# OR

Derive the relationship between line and phase guantities in balanced Delta b) connected 3-phase load.

Max. Marks: 56

16

#### Section – II

### Q.4 Attempt any four of the following.

- a) What is universal gate? Derive basic gates using NAND gates.
- **b)** With neat diagram Explain "Solar cell".
- **c)** Convert  $(EF)_{16}$  to decimal and binary.
- **d)** Perform the subtraction by using 2's complement method  $(8E)_{16}$   $(78)_{16}$ .
- e) Explain half wave rectifier with necessary diagrams.
- f) What is BJT? Compare CB,CC,CE Configurations of transistor.

### Q.5 Attempt any two of the following questions.

- a) Explain in detail 'Linear variable differential transducer' as transducer and its working. Give its advantages and applications.
- **b)** Explain the working of bridge rectifier. Define the terms:
  - 1) Rectification efficiency
  - 2) Ripple Factor
- c) Explain the working of transistor in CE configurations. Explain the input and output characteristics of CE configuration.

16

12

SLR-FR-3

# Set Q

Seat	
No.	

# F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 **BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

Day & Date: Wednesday, 11-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

# MCQ/Objective Type Questions

### **Duration: 30 Minutes**

Q.1

#### Choose the correct alternatives from the options and rewrite the sentence. A transformer having 1000 primary turns is connected to a 250 V a.c. 1) supply. For a secondary voltage of 400 V, the number of secondary turns should be \_\_\_\_\_.

- a) 1600 b) 250 d) 1250 c) 400
- 2) If  $e_1 = A \sin \omega t$  and  $e_2 = B \sin(\omega t - \theta)$ , then \_\_\_\_\_. b)  $e_2 \log e_1 \log \theta$ a)  $e_1$  lags  $e_2$  by  $\theta$ 
  - c)  $e_2$  leads  $e_2$  by  $\theta$ d)  $e_1$  is in phase with  $e_2$
- 3) Pure inductive circuit \_\_\_\_\_.

# a) consumes some power on average

- b) does not take power at all from a line
- c) takes power from the line during some part of the cycle and then returns back to it during other part of the cycle
- d) none of the above

#### 4) How many entries will be in the truth table of a 3 input NAND gate?

- a) 3 b) 6
- c) 8 d) 9
- 5) A Nibble is equal to \_\_\_\_\_ bit(s).
  - b) 2 a) 1 c) 4 d) 8

Convert the binary number (1101000011110000) to hexadecimal number \_\_\_\_\_. 6) b) F0F0 a) 1010

- c) D0F0 d) 7070
- 7) The forward voltage drop across a silicon diode is about \_\_\_\_\_.
  - a) 2.5 V b) 3 V
  - c) 10 V d) 0.7 V
- Which of following represent active transducer? 8)
  - a) Strain gauge Thermistor b)
  - c) LVDT d) Thermocouple
- 9) A transistor has a  $\beta_{DC}$  of 250 and a base current, I<sub>B.</sub> of 20 $\mu$  A. The collector current, I<sub>c</sub>, equals
  - a) 500 μA b) 5 mA c) 50 mA d) 5A

SLR-FR-3

Marks: 14

14

Max. Marks: 70

**SLR-FR-3** Set R

10)	Gauge factor of Strain gauge is	•
	a) $R/\Delta R$	b)

a)	$R/\Delta R$	Ŭ	U	b)	l/∆l
,	$l/\Delta l$			,	$R/\Delta R$
C)	$\Delta R/R$			d)	R/∆R
-)	$\Delta l/l$				$\Delta l/l$

11) Coefficient of coupling K for magnetic circuit is given by \_\_\_\_\_.

a)	L /√M₁ M₂	b)	L/M
c)	M√L₁ L₂	d)	<b>M</b> /√

d)  $M/\sqrt{L_1 L_2}$ 

#### 12) RMS value of the supply voltage is 200V then the maximum value is \_\_\_\_\_.

- a) 200 X Form factor
- b) 200 X peak factor
- d) none of the above
- c) 200 X power factor
- 13) A 2 cm long coil has 10 turns and carries a current of 750 mA The magnetizing force of the coil is \_\_\_\_\_.
  - b) 675 AT/m a) 225 AT/m
  - c) 450 AT/m d) 375 AT/m
- In a balanced delta-connected system, line currents lag their respective 14) phase currents by \_\_\_\_\_.
  - a) 30<sup>0</sup> b) 60<sup>0</sup> c) 120<sup>0</sup> d) 45<sup>0</sup>

Seat	
No.	

# F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 **BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

Day & Date: Wednesday, 11-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

# Section - I

#### Attempt any four of the following. Q.2

- Define the following terms. a)
  - MMF 1)
  - 2) Reluctance
  - 3) Permeability
  - magnetic field strength 4)
- The voltage of 400 V is applied to three phase star connected load of b) impedance  $Z = (4 + i3) \Omega$ /phase. Find:
  - 1) Phase voltage
  - 2) Line current
  - 3) Total power consumed
- Derive emf equation for 1 phase transformer. Write emf equation in terms of c) Bm.
- State and explain Kirchhoff's laws with sign conventions. d)
- An iron ring of mean length 50 cms has an air gap of 1 mm and a winding of e) 200 turns. If the permeability of iron is 300 when a current of 1 A flows through the coil, find the flux density.
- Define Average value of alternating quantity and derive its expression. **f**)

40Ω - MAR

#### Q.3 Attempt the following questions.

Find the resistance at the A-B terminals in the electric circuit of Figure. a, a) using  $\Delta$ -Y transformations.

C

 $100 \Omega$ 



# OR

Derive the relationship between line and phase guantities in balanced Delta b) connected 3-phase load.

Max. Marks: 56

16

### Section – II

#### Q.4 Attempt any four of the following.

- a) What is universal gate? Derive basic gates using NAND gates.
- **b)** With neat diagram Explain "Solar cell".
- **c)** Convert  $(EF)_{16}$  to decimal and binary.
- **d)** Perform the subtraction by using 2's complement method  $(8E)_{16}$   $(78)_{16}$ .
- e) Explain half wave rectifier with necessary diagrams.
- f) What is BJT? Compare CB,CC,CE Configurations of transistor.

### Q.5 Attempt any two of the following questions.

- a) Explain in detail 'Linear variable differential transducer' as transducer and its working. Give its advantages and applications.
- **b)** Explain the working of bridge rectifier. Define the terms:
  - 1) Rectification efficiency
  - 2) Ripple Factor
- c) Explain the working of transistor in CE configurations. Explain the input and output characteristics of CE configuration.

16

12

# SLR-FR-3 Set R

Seat No.		Set S							
F.\	F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 BASIC ELECTRICAL & ELECTRONICS ENGINEERING								
Day & Time:	Date 10:00	: Wednesday, 11-12-2019 Max. Marks: 70 0 AM To 01:00 PM							
Instru	iction	<ul> <li>s: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.</li> <li>2) Figures to the right indicate full marks</li> </ul>							
		2) Figures to the right indicate full marks.							
Durati	ion: 3(	) Minutes Marks: 14							
Q.1	Choo	se the correct alternatives from the options and rewrite the sentence. 14							
	1)	Convert the binary number (1101000011110000) to hexadecimal number           a) 1010         b) F0F0           c) D0F0         d) 7070							
	2)	The forward voltage drop across a silicon diode is abouta) 2.5 Vb) 3 Vc) 10 Vd) 0.7 V							
	3)	Which of following represent active transducer?a) Strain gaugeb) Thermistorc) LVDTd) Thermocouple							
	4)	A transistor has a $\beta_{DC}$ of 250 and a base current, $I_{B_i}$ of $20\mu$ A. The collector current, $I_c$ , equals a) 500 $\mu$ A b) 5 mA c) 50 mA d) 5A							
	5)	Gauge factor of Strain gauge isa) $\frac{R/\Delta R}{l/\Delta l}$ b) $\frac{l/\Delta l}{R/\Delta R}$ c) $\frac{\Delta R/R}{\Delta l/l}$ d) $\frac{R/\Delta R}{\Delta l/l}$							
	6)	Coefficient of coupling K for magnetic circuit is given by a) L $/\sqrt{M_1 M_2}$ b) L/M c) M $\sqrt{L_1 L_2}$ d) M $/\sqrt{L_1 L_2}$							
	7)	RMS value of the supply voltage is 200V then the maximum value isa) 200 X Form factorb) 200 X peak factorc) 200 X power factord) none of the above							
	8)	A 2 cm long coil has 10 turns and carries a current of 750 mA The magnetizing force of the coil is a) 225 AT/m b) 675 AT/m c) 450 AT/m d) 375 AT/m							
	9)	In a balanced delta-connected system, line currents lag their respective phase currents by a) $30^{0}$ b) $60^{0}$ c) $120^{0}$ d) $45^{0}$							

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# SLR-FR-3

- 10) 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
- 11) If  $e_1 = A \sin \omega t$  and  $e_2 = B \sin(\omega t - \theta)$ , then \_\_\_\_\_. a)  $e_1 \log e_2$  by  $\theta$ 
  - c)  $e_2$  leads  $e_2$  by  $\theta$ d)  $e_1$  is in phase with  $e_2$
- 12) Pure inductive circuit
  - a) consumes some power on average
  - b) does not take power at all from a line
  - c) takes power from the line during some part of the cycle and then returns back to it during other part of the cycle
  - d) none of the above

#### How many entries will be in the truth table of a 3 input NAND gate? 13)

- a) 3 b) 6
- c) 8 d) 9
- A Nibble is equal to \_\_\_\_\_ bit(s). 14)
  - b) 2 a) 1 c) 4 d) 8

SLR-FR-3

# Set S

- d) 1250
  - b)  $e_2 \log e_1 \log \theta$

Seat No.

# F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 BASIC ELECTRICAL & ELECTRONICS ENGINEERING

Day & Date: Wednesday, 11-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

# Section - I

# Q.2 Attempt any four of the following.

- a) Define the following terms.
  - 1) MMF
  - 2) Reluctance
  - 3) Permeability
  - 4) magnetic field strength
- **b)** The voltage of 400 V is applied to three phase star connected load of impedance  $Z = (4 + j3) \Omega$ /phase. Find:
  - 1) Phase voltage
  - 2) Line current
  - 3) Total power consumed
- c) Derive emf equation for 1 phase transformer. Write emf equation in terms of Bm.
- d) State and explain Kirchhoff's laws with sign conventions.
- e) An iron ring of mean length 50 cms has an air gap of 1 mm and a winding of 200 turns. If the permeability of iron is 300 when a current of 1 A flows through the coil, find the flux density.
- f) Define Average value of alternating quantity and derive its expression.

# Q.3 Attempt the following questions.

a) Find the resistance at the A-B terminals in the electric circuit of Figure. a, using  $\Delta$ -Y transformations.

C

 $100 \Omega$ 



# OR

**b)** Derive the relationship between line and phase quantities in balanced Delta connected 3-phase load.

Max. Marks: 56

16

### Section – II

#### Q.4 Attempt any four of the following.

- a) What is universal gate? Derive basic gates using NAND gates.
- **b)** With neat diagram Explain "Solar cell".
- **c)** Convert  $(EF)_{16}$  to decimal and binary.
- **d)** Perform the subtraction by using 2's complement method  $(8E)_{16}$   $(78)_{16}$ .
- e) Explain half wave rectifier with necessary diagrams.
- f) What is BJT? Compare CB,CC,CE Configurations of transistor.

### Q.5 Attempt any two of the following questions.

- a) Explain in detail 'Linear variable differential transducer' as transducer and its working. Give its advantages and applications.
- **b)** Explain the working of bridge rectifier. Define the terms:
  - 1) Rectification efficiency
  - 2) Ripple Factor
- c) Explain the working of transistor in CE configurations. Explain the input and output characteristics of CE configuration.

16

SLR-FR-3

Set S

Set

Seat

# S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to right indicate full marks.
- 3) Use of datasheet and non-programmable calculator is allowed.
- 4) Assume suitable data wherever required.

# MCQ/Objective Type Questions

Duration: 30 Minutes

# Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) A JFET always operates with
  - a) gate to source reverse biased b) gate conned to source
  - c) gate to source forward biased d) drain conned to ground
- The drain current will always be one-fourth of IDSS as long as the gate-tosource voltage is \_\_\_\_\_ the pinch-off value
  - a) one-fourth b) one-half
  - c) three-fourths d) None
- 3) Which of the following ratings appear(s) in the specification sheet for an FET?
  - a) Voltages between specific terminals
  - b) Current levels
  - c) Power dissipation
  - d) All of the above
- 4) Which of the following describe(s) the difference(s) between JFETs and depletion type MOSFETs?
  - a) V only negative for GS the depletion type
  - b) IDSS can exceed ID for the depletion type
  - c) The depletion type can operate in the enhancement mode
  - d) All of the above
- 5) For the FET, the relationship between the input and output quantities is \_\_\_\_\_ due to the \_\_\_\_\_ term in Shockley's equation.
  - a) Nonlinear, cubed b) Nonlinear, squared
  - c) linear Proportion d) Nonlinear, Proportional
- 6) A cascaded amplifier comprises N identical non interacting stages, each having a upper 3 dB frequency of  $f_H$ . If  $f_H(n)$  is the upper 3 dB frequency of the cascaded amplifier, then which one of the following is correct?

a) 
$$f_{H}(n) = 0.707 f_{H}$$
  
b)  $f_{H}(n) = \sqrt{(2^{\frac{1}{N}} - 1)} f_{H}$   
c)  $f_{H} = \sqrt{(2^{\frac{1}{N}} - 1)} f_{H}(n)$   
d)  $f_{H}(n) = \frac{fH}{\sqrt{(2^{\frac{1}{N}} - 1)}}$ 

Max. Marks: 70

Marks: 14

SLR-FR-30 Set P

- 7) Drift is the serious problem in \_\_\_\_\_.
  - a) RC coupled amplifier
  - b) Direct couple amplifier
  - c) Complementary symm. Power amplifier
  - d) Transformer coupled amplifier
- 8) An emitter follower circuit is an example of \_\_\_\_\_.
  - a) Voltage series negative feed back
  - b) Current series negative feedback
  - c) Both voltage and current
  - d) None of the above
- 9) Gain Stability equation in Negative feedback is given by following

a)	dAvf	1	dAv	b)	dAv_	1	dÄvf
	Avf	$-\frac{1}{(1+Av\beta)}$	Αv		Av	$\frac{1}{(1 + Av \beta)}$	Avf
c)	dAvf	1	dAv	d)	dAv_	1	dAvf
	Avf -	$=\overline{(1-Av\beta)}$	Av		Av	$\overline{(1-Av\beta)}$	Avf

- 10) When current series negative feedback is applied to an amplifier, its input impedance and output impedance \_\_\_\_\_.
  - a) Increases, decreases b) Decreases, increase
  - c) Remains the same d) Increases, increases
- 11) Wien bridge oscillator is most often used whenever \_\_\_\_
  - a) Wide range of high purity sign waves is to be generated
  - b) High feedback ratio is needed
  - c) Square wave output waves are required
  - d) Extremely high resonant frequencies are required
- 12) Condition to get sustained oscillation is \_\_\_\_
  - a) A Loop gain is greater than or equal to unity
  - b) gain around the feedback loop of one-third
  - c) A phase shift around the Amplifier & feedback loop of 0°
  - d) Both a & c
- 13) In Colppits oscillator minimum condition on gain to get sustained oscillation.

a)	$h_{fe} = \frac{L1}{L2}$	b)	$Av = \frac{C1}{C2}$
c)	$h_{fe} = \frac{C2}{C1}$	d)	$h_{fe} = \frac{L2}{L1}$

- 14) Class AB operation is often used in large signal amplifiers in order to \_\_\_\_\_.
  - a) get maximum efficiency
- b) remove even harmonics
- c) overcome crossover distortion d) reduce collector dissipation

### Seat No. S.V. (B. Tech) (Part - I) (Ne

# S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to right indicate full marks.
- 3) Assume suitable data wherever required.
- 4) Use of datasheet and non-programmable calculator is allowed.

# Section – I

# Q.2 Solve any four of the following questions.

- a) Why we need multistage amplifier? Prove that overall voltage gain in dB is sum of individual stage voltage gain expressed in dB.
- **b)** Explain important parameter of JFET and prove that  $\mu = rd^* gm$ .
- c) Explain CMOS structure & CMOS as Inverter.
- d) Compare all coupling scheme in multistage amplifier.
- e) Design JFET as CS amplifier to provide voltage gain of 25 at peak o/p voltage of 3.5 V to give ID=IDss/2 with JFET 2N3822 having Specification, IDss=2 mA Vp= -6 V rd=50KΩ gmo=3m mho.
- f) Derive expression for voltage divider baising of JFET with mathematical and Graphical approach.

# Q.3 Solve any two of the following questions.

- a) Explain Construction & working of n-channel JFET with drain & transfer characteristics along with experimental set-up.
- Explain Hybrid parameters of Transistor and Derive the expression for Av, A<sub>i</sub>, Ri, Ro for two stage RC couple amplifier using voltage divider Bias method.
- c) Explain Construction & working of n-channel D-MOSFET with drain & transfer characteristics along with experimental set-up.

# Section – II

# Q.4 Solve any four of the following questions.

- a) What is the effect of negative feedback on gain stability of amplifier? Explain.
- **b)** Explain the need of negative feedback in an amplifier. With suitable block diagram calculate input resistance and output resistance of voltage series negative feedback.
- c) Explain principal of crystal oscillator and Derive the equations for resonant frequencies with equivalent circuit.
- d) Explain the essential conditions to have sustained oscillations with frequency of oscillation of Colpitts oscillator.
- e) Explain transformerless Class A power amplifier.
- f) Explain Cross-over distortion in power amplifer. Explain method to eliminate this Distortion.

Max. Marks: 70

12

16

16

Set F

# SLR-FR-30

# Q.5 Solve any two of the following questions.

- a) Design RC phase shift oscillator for output frequency of oscillations of 20 KHz with load impedance of 5 K  $\Omega$  and peak to peak output of 6 V. Use Vcc = 12 V.
- **b)** Explain the operation of class B push-pull power amplifier. Derive the equation for conversion efficiency for Class B push pull power amplifier.
- c) Design Voltage series feedback amplifier for rms voltage 5V and O/P freq. 10 KHz using transistor. Transistor used is having following specifications Vcc=12V hfe = 110, hie =  $1.5 \text{ k}\Omega$ . VCE max = 45 V, Stability factor = 10, VBE = 0.7 V.



# SLR-FR-30 Set P

# Set S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to right indicate full marks.
- 3) Use of datasheet and non-programmable calculator is allowed.
- 4) Assume suitable data wherever required.

# MCQ/Objective Type Questions

Duration: 30 Minutes

1)

Seat

No.

# Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- An emitter follower circuit is an example of \_\_\_\_\_
  - a) Voltage series negative feed back
  - b) Current series negative feedback
  - c) Both voltage and current
  - d) None of the above
- 2) Gain Stability equation in Negative feedback is given by following a)  $\frac{dAvf}{Avf} = \frac{1}{(1 + Av\beta)} \frac{dAv}{Av}$  b)  $\frac{dAv}{Av} = \frac{1}{(1 + Av\beta)} \frac{dAvf}{Avf}$

c) 
$$\frac{dAvf}{Avf} = \frac{1}{(1 - Av\beta)} \frac{dAv}{Av}$$
 d)  $\frac{dAv}{Av} = \frac{1}{(1 - Av\beta)} \frac{dAvf}{Avf}$ 

- 3) When current series negative feedback is applied to an amplifier, its input impedance and output impedance \_\_\_\_\_.
  - a) Increases, decreases b) Decreases, increase
  - c) Remains the same d) Increases, increases
- 4) Wien bridge oscillator is most often used whenever \_
  - a) Wide range of high purity sign waves is to be generated
  - b) High feedback ratio is needed
  - c) Square wave output waves are required
  - d) Extremely high resonant frequencies are required
- 5) Condition to get sustained oscillation is \_\_\_\_
  - a) A Loop gain is greater than or equal to unity
  - b) gain around the feedback loop of one-third
  - c) A phase shift around the Amplifier & feedback loop of 0°
  - d) Both a & c

c)

# 6) In Colppits oscillator minimum condition on gain to get sustained oscillation.

a)	$h_{fe} = \frac{LT}{L2}$	5)	$Av = \frac{CT}{C2}$
c)	$h_{fe} = \frac{C2}{C1}$	d)	$h_{fe} = \frac{L2}{L1}$

- 7) Class AB operation is often used in large signal amplifiers in order to \_\_\_\_\_
  - a) get maximum efficiency

overcome crossover distortion

b) remove even harmonicsd) reduce collector dissipation

Q



Marks: 14

8) A JFET always operates with \_\_\_\_

C)

- a) gate to source reverse biased b) gate conned to source
  - gate to source forward biased d) drain conned to ground
- 9) The drain current will always be one-fourth of IDSS as long as the gate-tosource voltage is \_\_\_\_\_ the pinch-off value
  - a) one-fourth b) one-half
  - c) three-fourths d) None
- 10) Which of the following ratings appear(s) in the specification sheet for an FET?
  - a) Voltages between specific terminals
  - b) Current levels
  - c) Power dissipation
  - d) All of the above
- 11) Which of the following describe(s) the difference(s) between JFETs and depletion type MOSFETs?
  - a) V only negative for GS the depletion type
  - b) IDSS can exceed ID for the depletion type
  - c) The depletion type can operate in the enhancement mode
  - d) All of the above
- 12) For the FET, the relationship between the input and output quantities is \_\_\_\_\_ due to the \_\_\_\_\_ term in Shockley's equation.
  - a) Nonlinear, cubed
- b) Nonlinear, squared

SLR-FR-30

Set

- c) linear, Proportion d) Nonlinear, Proportional
- 13) A cascaded amplifier comprises N identical non interacting stages, each having a upper 3 dB frequency of  $f_{H}$ . If  $f_{H}(n)$  is the upper 3 dB frequency of the cascaded amplifier, then which one of the following is correct?

a) 
$$f_{\rm H}({\rm II}) = 0.707 f_{\rm H}$$
  
c)  $f_{\rm H} = \sqrt{(2^{\frac{1}{\rm N}} - 1)} f_{\rm H}({\rm n})$ 

b) 
$$f_{H}(n) = \sqrt{(2^{\frac{1}{N}} - 1)} f_{H}$$
  
d)  $f_{H}(n) = \frac{fH}{\sqrt{(2^{\frac{1}{N}} - 1)}}$ 

- 14) Drift is the serious problem in \_\_\_\_\_.
  - a) RC coupled amplifier
  - b) Direct couple amplifier
  - c) Complementary symm. Power amplifier
  - d) Transformer coupled amplifier

# Seat No.

# S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to right indicate full marks.
- 3) Assume suitable data wherever required.
- 4) Use of datasheet and non-programmable calculator is allowed.

# Section – I

# Q.2 Solve any four of the following questions.

- a) Why we need multistage amplifier? Prove that overall voltage gain in dB is sum of individual stage voltage gain expressed in dB.
- **b)** Explain important parameter of JFET and prove that  $\mu = rd^* gm$ .
- c) Explain CMOS structure & CMOS as Inverter.
- d) Compare all coupling scheme in multistage amplifier.
- e) Design JFET as CS amplifier to provide voltage gain of 25 at peak o/p voltage of 3.5 V to give ID=IDss/2 with JFET 2N3822 having Specification, IDss=2 mA Vp= -6 V rd=50KΩ gmo=3m mho.
- f) Derive expression for voltage divider baising of JFET with mathematical and Graphical approach.

# **Q.3** Solve any two of the following questions.

- a) Explain Construction & working of n-channel JFET with drain & transfer characteristics along with experimental set-up.
- Explain Hybrid parameters of Transistor and Derive the expression for Av, A<sub>i</sub>, Ri, Ro for two stage RC couple amplifier using voltage divider Bias method.
- c) Explain Construction & working of n-channel D-MOSFET with drain & transfer characteristics along with experimental set-up.

# Section – II

# Q.4 Solve any four of the following questions.

- a) What is the effect of negative feedback on gain stability of amplifier? Explain.
- **b)** Explain the need of negative feedback in an amplifier. With suitable block diagram calculate input resistance and output resistance of voltage series negative feedback.
- c) Explain principal of crystal oscillator and Derive the equations for resonant frequencies with equivalent circuit.
- d) Explain the essential conditions to have sustained oscillations with frequency of oscillation of Colpitts oscillator.
- e) Explain transformerless Class A power amplifier.
- f) Explain Cross-over distortion in power amplifer. Explain method to eliminate this Distortion.

Max. Marks: 70

12

16

16

Set Q



# Q.5 Solve any two of the following questions.

- a) Design RC phase shift oscillator for output frequency of oscillations of 20 KHz with load impedance of 5 K  $\Omega$  and peak to peak output of 6 V. Use Vcc = 12 V.
- **b)** Explain the operation of class B push-pull power amplifier. Derive the equation for conversion efficiency for Class B push pull power amplifier.
- c) Design Voltage series feedback amplifier for rms voltage 5V and O/P freq. 10 KHz using transistor. Transistor used is having following specifications Vcc=12V hfe = 110, hie =  $1.5 \text{ k}\Omega$ . VCE max = 45 V, Stability factor = 10, VBE = 0.7 V.



# SLR-FR-30 Set Q

# Seat No. S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

# **Electronics and Telecommunication Engineering** ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

# Instructions: 1) Q. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to right indicate full marks.
- 3) Use of datasheet and non-programmable calculator is allowed.
- 4) Assume suitable data wherever required.

# **Duration: 30 Minutes**

c)

#### Choose the correct alternatives from the options and rewrite the sentence. Q.1 14

**MCQ/Objective Type Questions** 

- 1) For the FET, the relationship between the input and output quantities is \_ due to the \_\_\_\_\_ term in Shockley's equation.
  - a)
    - Nonlinear, cubed linear Proportion
- Nonlinear, squared b)
- d) Nonlinear, Proportional
- A cascaded amplifier comprises N identical non interacting stages, each 2) having a upper 3 dB frequency of  $f_{H}$ . If  $f_{H}(n)$  is the upper 3 dB frequency of the cascaded amplifier, then which one of the following is correct?
  - $f_{\rm H}(n) = 0.707 f_{\rm H}$ a)

c) 
$$f_{\rm H} = \sqrt{(2^{\frac{1}{N}} - 1)} f_{\rm H}(n)$$

b) 
$$f_{H}(n) = \sqrt{(2^{\frac{1}{N}} - 1)} f_{H}$$
  
d)  $f_{H}(n) = \frac{fH}{\sqrt{(2^{\frac{1}{N}} - 1)}}$ 

- 3) Drift is the serious problem in \_\_\_\_\_.
  - RC coupled amplifier a)
  - Direct couple amplifier b)
  - Complementary symm. Power amplifier c)
  - Transformer coupled amplifier d)
- An emitter follower circuit is an example of \_\_\_\_\_. 4)
  - Voltage series negative feed back a)
  - Current series negative feedback b)
  - Both voltage and current c)
  - None of the above d)

#### Gain Stability equation in Negative feedback is given by following 5)

- $\frac{dAvf}{Avf} = \frac{1}{(1+Av\beta)} \frac{dAv}{Av}$  $\frac{dAv}{Av} = \frac{1}{(1+Av\beta)} \frac{dAvf}{Avf}$ dAvf b) a)  $\frac{dAvf}{Avf} = \frac{1}{(1 - Av\beta)} \frac{dAv}{Av} \qquad \qquad d) \qquad \frac{dAv}{Av} = \frac{1}{(1 - Av\beta)} \frac{dAvf}{Avf}$ c)
- When current series negative feedback is applied to an amplifier, its input 6) impedance and output impedance \_\_\_\_
  - Increases, decreases Decreases, increase a) b) Remains the same c)
    - d) Increases, increases

SLR-FR-30 R

Set

Marks: 14

Max. Marks: 70

Page **10** of **16** 

- 7) Wien bridge oscillator is most often used whenever \_\_\_\_
  - a) Wide range of high purity sign waves is to be generated
  - b) High feedback ratio is needed
  - c) Square wave output waves are required
  - d) Extremely high resonant frequencies are required
- 8) Condition to get sustained oscillation is \_\_\_\_
  - a) A Loop gain is greater than or equal to unity
  - b) gain around the feedback loop of one-third
  - c) A phase shift around the Amplifier & feedback loop of 0°
  - d) Both a & c
- 9) In Colppits oscillator minimum condition on gain to get sustained oscillation.

a)	$h_{fe} = \frac{L1}{L2}$	b)	$Av = \frac{C1}{C2}$
c)	$h_{fe} = \frac{C2}{C1}$	d)	$h_{fe} = \frac{L2}{L1}$

10) Class AB operation is often used in large signal amplifiers in order to \_\_\_\_\_.

- a) get maximum efficiency
- b) remove even harmonics
- c) overcome crossover distortion
- d) reduce collector dissipation

gate conned to source

SLR-FR-30

Set R

- 11) A JFET always operates with \_\_\_\_
  - a) gate to source reverse biased b)
  - c) gate to source forward biased d) drain conned to ground
- 12) The drain current will always be one-fourth of IDSS as long as the gate-tosource voltage is \_\_\_\_\_ the pinch-off value
  - a) one-fourth b) one-half
  - c) three-fourths d) None
- 13) Which of the following ratings appear(s) in the specification sheet for an FET?
  - a) Voltages between specific terminals
  - b) Current levels
  - c) Power dissipation
  - d) All of the above
- 14) Which of the following describe(s) the difference(s) between JFETs and depletion type MOSFETs?
  - a) V only negative for GS the depletion type
  - b) IDSS can exceed ID for the depletion type
  - c) The depletion type can operate in the enhancement mode
  - d) All of the above

# Seat No.

# S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to right indicate full marks.
- 3) Assume suitable data wherever required.
- 4) Use of datasheet and non-programmable calculator is allowed.

# Section – I

# Q.2 Solve any four of the following questions.

- a) Why we need multistage amplifier? Prove that overall voltage gain in dB is sum of individual stage voltage gain expressed in dB.
- **b)** Explain important parameter of JFET and prove that  $\mu = rd^* gm$ .
- c) Explain CMOS structure & CMOS as Inverter.
- d) Compare all coupling scheme in multistage amplifier.
- e) Design JFET as CS amplifier to provide voltage gain of 25 at peak o/p voltage of 3.5 V to give ID=IDss/2 with JFET 2N3822 having Specification, IDss=2 mA Vp= -6 V rd=50KΩ gmo=3m mho.
- f) Derive expression for voltage divider baising of JFET with mathematical and Graphical approach.

# Q.3 Solve any two of the following questions.

- a) Explain Construction & working of n-channel JFET with drain & transfer characteristics along with experimental set-up.
- Explain Hybrid parameters of Transistor and Derive the expression for Av, A<sub>i</sub>, Ri, Ro for two stage RC couple amplifier using voltage divider Bias method.
- c) Explain Construction & working of n-channel D-MOSFET with drain & transfer characteristics along with experimental set-up.

# Section – II

# Q.4 Solve any four of the following questions.

- a) What is the effect of negative feedback on gain stability of amplifier? Explain.
- **b)** Explain the need of negative feedback in an amplifier. With suitable block diagram calculate input resistance and output resistance of voltage series negative feedback.
- c) Explain principal of crystal oscillator and Derive the equations for resonant frequencies with equivalent circuit.
- d) Explain the essential conditions to have sustained oscillations with frequency of oscillation of Colpitts oscillator.
- e) Explain transformerless Class A power amplifier.
- f) Explain Cross-over distortion in power amplifer. Explain method to eliminate this Distortion.

Max. Marks: 70

12

16

Set R

SLR-FR-30

# Q.5 Solve any two of the following questions.

- a) Design RC phase shift oscillator for output frequency of oscillations of 20 KHz with load impedance of 5 K  $\Omega$  and peak to peak output of 6 V. Use Vcc = 12 V.
- **b)** Explain the operation of class B push-pull power amplifier. Derive the equation for conversion efficiency for Class B push pull power amplifier.
- c) Design Voltage series feedback amplifier for rms voltage 5V and O/P freq. 10 KHz using transistor. Transistor used is having following specifications Vcc=12V hfe = 110, hie =  $1.5 \text{ k}\Omega$ . VCE max = 45 V, Stability factor = 10, VBE = 0.7 V.



# SLR-FR-30 Set R

Set

Max. Marks: 70

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	-

No.

# S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics and Telecommunication Engineering** ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

**Duration: 30 Minutes** 

# Instructions: 1) Q. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to right indicate full marks.
- 3) Use of datasheet and non-programmable calculator is allowed.
- 4) Assume suitable data wherever required.

# **MCQ/Objective Type Questions**

Marks: 14

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) When current series negative feedback is applied to an amplifier, its input impedance and output impedance \_\_\_\_
  - b) Increases, decreases Decreases, increase a)
  - Remains the same c) d) Increases, increases
- 2) Wien bridge oscillator is most often used whenever
  - Wide range of high purity sign waves is to be generated a)
  - High feedback ratio is needed b)
  - Square wave output waves are required c)
  - d) Extremely high resonant frequencies are required
- Condition to get sustained oscillation is 3)
  - A Loop gain is greater than or equal to unity a)
  - gain around the feedback loop of one-third b)
  - A phase shift around the Amplifier & feedback loop of 0° c)
  - d) Both a & c
- In Colppits oscillator minimum condition on gain to get sustained oscillation. 4)

a)	$h_{c_1} = \frac{L1}{L}$	b)	$Av = \frac{C1}{-}$
	L2		C2
c)	L C2	d)	L2
	$n_{fe} = \frac{1}{C1}$	·	$n_{fe} = \frac{1}{L1}$

5) Class AB operation is often used in large signal amplifiers in order to . remove even harmonics

- get maximum efficiency a)
- overcome crossover distortion c)
- d) reduce collector dissipation

b)

- 6) A JFET always operates with
  - gate to source reverse biased b) gate conned to source a) drain conned to ground
  - gate to source forward biased d) C)
- 7) The drain current will always be one-fourth of IDSS as long as the gate-tosource voltage is \_\_\_\_\_ the pinch-off value
  - a) one-fourth b) one-half
  - three-fourths c)
- - d) None

- 8) Which of the following ratings appear(s) in the specification sheet for an FET?
  - a) Voltages between specific terminals
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- b) Nonlinear, squared
- c) linear, Proportion
- d) Nonlinear, Proportional

Set

11) A cascaded amplifier comprises N identical non interacting stages, each having a upper 3 dB frequency of  $f_{H}$ . If  $f_{H}(n)$  is the upper 3 dB frequency of the cascaded amplifier, then which one of the following is correct?

a) 
$$f_{\rm H}(n) = 0.707 f_{\rm H}$$

c) 
$$f_{\rm H} = \sqrt{(2^{\frac{1}{N}} - 1)} f_{\rm H}(n)$$

b) 
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- 12) Drift is the serious problem in \_\_\_\_\_.
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  - c) Complementary symm. Power amplifier
  - d) Transformer coupled amplifier
- 13) An emitter follower circuit is an example of \_\_\_\_\_.
  - a) Voltage series negative feed back
  - b) Current series negative feedback
  - c) Both voltage and current

c)  $\frac{dAvf}{Avf} = \frac{1}{(1 - Av\beta)} \frac{dAv}{Av}$ 

- d) None of the above
- 14) Gain Stability equation in Negative feedback is given by following a) dAvf 1 dAv b) dAv 1 dAvf

a) 
$$\frac{dAvf}{Avf} = \frac{1}{(1+Av\beta)} \frac{dAv}{Av}$$

$$\frac{Av}{Av} = \frac{1}{(1 + Av\beta)} \frac{Avf}{Avf}$$

$$\frac{dAv}{Av} = \frac{1}{(1 - Av\beta)} \frac{dAvf}{Avf}$$

# Seat No.

# S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering ELECTRONIC CIRCUIT ANALYSIS AND DESIGN

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to right indicate full marks.
- 3) Assume suitable data wherever required.
- 4) Use of datasheet and non-programmable calculator is allowed.

# Section – I

# Q.2 Solve any four of the following questions.

- a) Why we need multistage amplifier? Prove that overall voltage gain in dB is sum of individual stage voltage gain expressed in dB.
- **b)** Explain important parameter of JFET and prove that  $\mu = rd^* gm$ .
- c) Explain CMOS structure & CMOS as Inverter.
- d) Compare all coupling scheme in multistage amplifier.
- e) Design JFET as CS amplifier to provide voltage gain of 25 at peak o/p voltage of 3.5 V to give ID=IDss/2 with JFET 2N3822 having Specification, IDss=2 mA Vp= -6 V rd=50KΩ gmo=3m mho.
- f) Derive expression for voltage divider baising of JFET with mathematical and Graphical approach.

# **Q.3** Solve any two of the following questions.

- a) Explain Construction & working of n-channel JFET with drain & transfer characteristics along with experimental set-up.
- Explain Hybrid parameters of Transistor and Derive the expression for Av, A<sub>i</sub>, Ri, Ro for two stage RC couple amplifier using voltage divider Bias method.
- c) Explain Construction & working of n-channel D-MOSFET with drain & transfer characteristics along with experimental set-up.

# Section – II

# Q.4 Solve any four of the following questions.

- a) What is the effect of negative feedback on gain stability of amplifier? Explain.
- **b)** Explain the need of negative feedback in an amplifier. With suitable block diagram calculate input resistance and output resistance of voltage series negative feedback.
- c) Explain principal of crystal oscillator and Derive the equations for resonant frequencies with equivalent circuit.
- d) Explain the essential conditions to have sustained oscillations with frequency of oscillation of Colpitts oscillator.
- e) Explain transformerless Class A power amplifier.
- f) Explain Cross-over distortion in power amplifer. Explain method to eliminate this Distortion.

Max. Marks: 70

12

16

16

# SLR-FR-30

Set

# **Q.5** Solve any two of the following questions.

- a) Design RC phase shift oscillator for output frequency of oscillations of 20 KHz with load impedance of 5 K  $\Omega$  and peak to peak output of 6 V. Use Vcc = 12 V.
- **b)** Explain the operation of class B push-pull power amplifier. Derive the equation for conversion efficiency for Class B push pull power amplifier.
- c) Design Voltage series feedback amplifier for rms voltage 5V and O/P freq. 10 KHz using transistor. Transistor used is having following specifications Vcc=12V hfe = 110, hie =  $1.5 \text{ k}\Omega$ . VCE max = 45 V, Stability factor = 10, VBE = 0.7 V.

12

SLR-FR-30 Set S

Set

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Seat	
No.	

# S.Y. B. Tech (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics and Telecommunication Engineering** NETWORK THEORY AND ANALYSIS

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

# **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

Marks: 14

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The transient response occurs
  - a) Only in resistive circuits
  - b) Only in inductive circuits
  - c) Only in capacitive circuits
  - d) Both in inductive and capacitive
- 2) The time constant of a series RL circuit is \_
  - a) LR L/R b)
  - c) R/L d) e-R/L
- 3) The function is said to be having simple poles and zeros only if \_\_\_\_\_.
  - a) The poles are not repeated
  - b) The zeros are not repeated
  - Both poles and zeros are not repeated c)
  - d) None of the above
- The characteristic equation of a network function F(s) has roots denoted 4) by s1=s2=-a. How is the root categorized?
  - a) A zero at -a b) A double zero at –a
  - c) A simple pole at -a d) A double pole at -a
- A one-port network is made up of an inductor only. Which of the following 5) is not a correct depiction of the poles and zeros? Zero at s=0
  - a) Pole at s=0 b)
  - d) c) Pole at  $s=\infty$ None of these
- 6) In the m-derived high pass filter, the resonant frequency is to be chosen so that it is .
  - a) Above the cut-off frequency
- b) Below the cut-off frequency None of the above
- c) Random frequency d)
- A filter is formed by reverse type of reactances. What should be the range 7) of variation of Z1/4Z2 for the filter to have a pass band?
  - a)  $+\infty$  to 0 c)  $-1 \text{ to } -\infty$
- b) 0 to -1 d) None of these

Max. Marks: 70

Set P 8) In parallel resonance, resonance occurs when susceptance part of admittance is \_\_\_\_\_. a) infinite XL>XC b) c) XC>XL d) Zero 9) In a series RLC circuit, the resonant frequency \_\_\_\_\_ if C is increased. Increases b) Decreases a) Becomes zero c) Remains unchanged d) For a two port network to be reciprocal \_ 10) Y<sub>21</sub>=Y<sub>22</sub> a)  $Z_{11}=Z_{22}$ b) c)  $h_{21} = - h_{12}$ d) AD - BC=0 For a two-port bilateral network, the three transmission parameters are 11) given by A=6/5, B=17/5 and C=1/5, what is the value of D? a) 7/5 1/5 b) c) 1 d) 3 12) Superposition theorem is not valid for \_\_\_\_\_ a) Voltage responses b) Current responses d) All of above c) Power responses 13) Norton's equivalent circuit consists of . a) Voltage source in parallel with impedance b) Voltage source in series with impedance

- c) Current source in parallel with impedance
- d) Current source in series with impedance
- 14) Superposition theorem is not applicable to networks containing
  - a) Non-linear elements
- b) Dependent voltage sources

SLR-FR-31

- c) Dependent current sources
- d) Transformers

Set

# Seat No.

# S.Y. B. Tech (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics and Telecommunication Engineering** NETWORK THEORY AND ANALYSIS

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

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

2) Figures to the right indicate full marks.

3) Assume suitable data if necessary.

# Section – I

#### Q.2 Attempt any four.

a) Determine the Norton's equivalent circuit for the network shown below.



**b)** Find i<sub>0</sub> and i using Superposition theorem for the network shown below.



- c) Explain Bandwidth and Selectivity w. r. t. series resonant circuit.
- d) Find the short circuit parameters for the circuit shown below.



Draw and explain cascade connection of a two port network. e)

#### Q.3 Attempt any two.

- a) Derive an expression of frequencies at which  $V_L$  and  $V_c$  are maximum for a series resonant circuit.
- b) Express driving point impedance at input port of a load terminated two port networks.

12

Max. Marks: 56

16

Ρ

c) State Maximum Power Transfer Theorem and also find maximum power delivered to the load for the network shown below.



### Section – II

# Q.4 Attempt any four

- a) Design a K-type low pass filter (T and  $\pi$ ) for having a cut-off frequency of 2 KHz for a load impedance of 500 Ohms.
- **b)** Draw the pole zero plot for the given network function below and obtain the time domain response

$$V(s) = \frac{4(s+2)s}{(s+1)(s+3)}$$

c) Determine the current i(t) for the circuit shown below with a rectangular pulse of unit height and T seconds duration as an input when switch is closed at t=0. Assume the capacitor to be initially uncharged.



- d) Explain the significance of poles and zeros w. r. t transfer function of a network.
- e) Compute parameters of a  $\pi$  configuration attenuator with load resistance of 150 Ohms to cause an attenuation of 24 dB.

# Q.5 Attempt any two.

12

- a) Explain what is forced and natural response. Also derive and expression for i(t) then Vu(t) is applied to a series RLC circuit.
- **b)** Obtain the design equations for m-derived high pass filter.
- c) For the two-port network shown below, calculate the input impedance  $Z_{11}(s)$ .


Time	e: 10:0	0 AN	и То 01:00 PM			
Inst	ructio	าร: ^ 	<ol> <li>Q. No. 1 is compute book.</li> <li>Figures to the right</li> <li>Assume suitable data</li> </ol>	sory and should indicate full ma ata if necessary	d be solved in first arks. 7.	30
			MCQ/Ob	jective Type	e Questions	
Dura	ation: 3	IVI U	Inutes			
Q.1	<b>Cho</b> 1)	ose In p adr	the correct alternation barallel resonance, re mittance is	ves from the c sonance occur	s when susceptar	ite t nce p
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	2)	In a a) c)	a series RLC circuit, t Increases Remains unchange	he resonant fre b) d d)	equency if Decreases Becomes zero	C is
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# S.Y. B. Tech (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics and Telecommunication Engineering NETWORK THEORY AND ANALYSIS** Max. Marks: 70

Day & Date: Thursday 12-12-2019 Tim

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## Q.1 the sentence. e part of

- is increased.
- ameters are

- 7) Superposition theorem is not applicable to networks containing

Dependent voltage sources

Transformers

- Non-linear elements b) a)
- Dependent current sources c) d)
- 8) The transient response occurs \_\_\_\_ .
  - a) Only in resistive circuits
  - b) Only in inductive circuits
  - c) Only in capacitive circuits
  - d) Both in inductive and capacitive
- The time constant of a series RL circuit is 9)
  - a) LR L/R b)
  - c) R/L e-R/L d)

Seat No.

SLR-FR-31



Marks: 14

- 10) The function is said to be having simple poles and zeros only if \_\_\_\_\_.
  - The poles are not repeated a)
  - b) The zeros are not repeated
  - Both poles and zeros are not repeated c)
  - d) None of the above
- 11) The characteristic equation of a network function F(s) has roots denoted by s1=s2=-a. How is the root categorized?
  - a) A zero at -a
- A double zero at –a b)

Set Q

- c) A simple pole at -a d) A double pole at -a
- 12) A one-port network is made up of an inductor only. Which of the following is not a correct depiction of the poles and zeros?
  - a) Pole at s=0 b) Zero at s=0 c) Pole at  $s=\infty$ 
    - d) None of these
- In the m-derived high pass filter, the resonant frequency is to be chosen 13) so that it is
  - a) Above the cut-off frequency
- b) Below the cut-off frequency
- c) Random frequency
- None of the above d)
- 14) A filter is formed by reverse type of reactances. What should be the range of variation of Z1/4Z2 for the filter to have a pass band?
  - a)  $+\infty$  to 0
  - c)  $-1 \text{ to } -\infty$

- b) 0 to −1
- d) None of these

Set

Max. Marks: 56

Q

# Seat No.

# S.Y. B. Tech (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering NETWORK THEORY AND ANALYSIS

Day & Date: Thursday,12-12-2019 Time: 10:00 AM To 01:00 PM

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

2) Figures to the right indicate full marks.

3) Assume suitable data if necessary.

# Section – I

# Q.2 Attempt any four.

a) Determine the Norton's equivalent circuit for the network shown below.



**b)** Find  $i_0$  and i using Superposition theorem for the network shown below.



- c) Explain Bandwidth and Selectivity w. r. t. series resonant circuit.
- d) Find the short circuit parameters for the circuit shown below.



e) Draw and explain cascade connection of a two port network.

# Q.3 Attempt any two.

- a) Derive an expression of frequencies at which  $V_{\rm L}$  and  $V_{\rm c}$  are maximum for a series resonant circuit.
- **b)** Express driving point impedance at input port of a load terminated two port networks.

12

c) State Maximum Power Transfer Theorem and also find maximum power delivered to the load for the network shown below.



## Section – II

# Q.4 Attempt any four

- a) Design a K-type low pass filter (T and  $\pi$ ) for having a cut-off frequency of 2 KHz for a load impedance of 500 Ohms.
- **b)** Draw the pole zero plot for the given network function below and obtain the time domain response

$$V(s) = \frac{\frac{4(s+2)s}{(s+1)(s+3)}}{\frac{4(s+2)s}{(s+1)(s+3)}}$$

c) Determine the current i(t) for the circuit shown below with a rectangular pulse of unit height and T seconds duration as an input when switch is closed at t=0. Assume the capacitor to be initially uncharged.



- d) Explain the significance of poles and zeros w. r. t transfer function of a network.
- e) Compute parameters of a  $\pi$  configuration attenuator with load resistance of 150 Ohms to cause an attenuation of 24 dB.

# Q.5 Attempt any two.

12

- a) Explain what is forced and natural response. Also derive and expression for i(t) then Vu(t) is applied to a series RLC circuit.
- **b)** Obtain the design equations for m-derived high pass filter.
- c) For the two-port network shown below, calculate the input impedance  $Z_{11}(s)$ .



# Set S.Y. B. Tech (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics and Telecommunication Engineering**

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

NETWORK THEORY AND ANALYSIS

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

# MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Seat

No.

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) A one-port network is made up of an inductor only. Which of the following is not a correct depiction of the poles and zeros?
  - a) Pole at s=0 c) Pole at s=∞
- Zero at s=0 b) d) None of these

Below the cut-off frequency

None of the above

- 2) In the m-derived high pass filter, the resonant frequency is to be chosen so that it is
  - a) Above the cut-off frequency
  - c) Random frequency
- 3) A filter is formed by reverse type of reactances. What should be the range of variation of Z1/4Z2 for the filter to have a pass band?

b)

d)

- a)  $+\infty$  to 0 b)
- c)  $-1 \text{ to } -\infty$ d) None of these
- 4) In parallel resonance, resonance occurs when susceptance part of admittance is \_\_\_\_\_.
  - b) XL>XC a) infinite
  - c) XC>XL d)
- 5) In a series RLC circuit, the resonant frequency \_\_\_\_\_ if C is increased.
  - a) Increases Decreases b)
  - c) Remains unchanged d) Becomes zero

6) For a two port network to be reciprocal

- a)  $Z_{11}=Z_{22}$ b)  $Y_{21}=Y_{22}$
- c)  $h_{21} = h_{12}$ d) AD - BC=0
- 7) For a two-port bilateral network, the three transmission parameters are given by A=6/5, B=17/5 and C=1/5, what is the value of D?
  - 1/5 a) 7/5 b)
  - c) 1 d) 3

8) Superposition theorem is not valid for \_

- a) Voltage responses Current responses b)
- d) All of above c) Power responses

R



Marks: 14

SLR-FR-31

- Zero
- 0 to -1



- 9) Norton's equivalent circuit consists of \_\_\_\_\_.
  - a) Voltage source in parallel with impedance
  - b) Voltage source in series with impedance
  - c) Current source in parallel with impedance
  - d) Current source in series with impedance
- 10) Superposition theorem is not applicable to networks containing
  - a) Non-linear elementsc) Dependent current sources
- b) Dependent voltage sourcesd) Transformers

Set R

- 11) The transient response occurs \_\_\_\_\_
  - a) Only in resistive circuits
  - b) Only in inductive circuits
  - c) Only in capacitive circuits
  - d) Both in inductive and capacitive
- 12) The time constant of a series RL circuit is \_\_\_\_\_.
  - a) LR b) L/R
  - c) R/L d) e-R/L
- 13) The function is said to be having simple poles and zeros only if \_\_\_\_\_.

.

- a) The poles are not repeated
- b) The zeros are not repeated
- c) Both poles and zeros are not repeated
- d) None of the above

c) A simple pole at -a

- 14) The characteristic equation of a network function F(s) has roots denoted by s1=s2=-a. How is the root categorized?
  - a) A zero at -a

- b) A double zero at –a
- d) A double pole at -a

Set

R

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S	S.Y. B. Tech (Part	t – I) (New)	(CBCS)

# S.Y. B. Tech (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering NETWORK THEORY AND ANALYSIS

Day & Date: Thursday,12-12-2019 Time: 10:00 AM To 01:00 PM

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

2) Figures to the right indicate full marks.

3) Assume suitable data if necessary.

# Section – I

# Q.2 Attempt any four.

a) Determine the Norton's equivalent circuit for the network shown below.



**b)** Find  $i_0$  and i using Superposition theorem for the network shown below.



- c) Explain Bandwidth and Selectivity w. r. t. series resonant circuit.
- d) Find the short circuit parameters for the circuit shown below.



e) Draw and explain cascade connection of a two port network.

# Q.3 Attempt any two.

- a) Derive an expression of frequencies at which  $V_{\rm L}$  and  $V_{\rm c}$  are maximum for a series resonant circuit.
- **b)** Express driving point impedance at input port of a load terminated two port networks.

12

Max. Marks: 56

c) State Maximum Power Transfer Theorem and also find maximum power delivered to the load for the network shown below.



## Section – II

# Q.4 Attempt any four

- a) Design a K-type low pass filter (T and  $\pi$ ) for having a cut-off frequency of 2 KHz for a load impedance of 500 Ohms.
- **b)** Draw the pole zero plot for the given network function below and obtain the time domain response

$$V(s) = \frac{\frac{4(s+2)s}{(s+1)(s+3)}}{\frac{4(s+2)s}{(s+1)(s+3)}}$$

c) Determine the current i(t) for the circuit shown below with a rectangular pulse of unit height and T seconds duration as an input when switch is closed at t=0. Assume the capacitor to be initially uncharged.



- d) Explain the significance of poles and zeros w. r. t transfer function of a network.
- e) Compute parameters of a  $\pi$  configuration attenuator with load resistance of 150 Ohms to cause an attenuation of 24 dB.

# Q.5 Attempt any two.

- 12
- a) Explain what is forced and natural response. Also derive and expression for i(t) then Vu(t) is applied to a series RLC circuit.
- **b)** Obtain the design equations for m-derived high pass filter.
- c) For the two-port network shown below, calculate the input impedance  $Z_{11}(s)$ .



Seat	
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# S.Y. B. Tech (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics and Telecommunication Engineering** NETWORK THEORY AND ANALYSIS

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

# MCQ/Objective Type Questions

**Duration: 30 Minutes** 

#### Choose the correct alternatives from the options and rewrite the sentence. Q.1 14

- 1) For a two port network to be reciprocal
  - a)  $Z_{11}=Z_{22}$  $Y_{21} = Y_{22}$ b)
  - c)  $h_{21} = h_{12}$ d) AD - BC=0
- For a two-port bilateral network, the three transmission parameters are 2) given by A=6/5, B=17/5 and C=1/5, what is the value of D? 1/5
  - a) 7/5 b) c) 1 d) 3

3) Superposition theorem is not valid for \_

- a) Voltage responses b) Current responses
- c) Power responses d) All of above
- 4) Norton's equivalent circuit consists of \_\_\_\_\_.
  - a) Voltage source in parallel with impedance
  - b) Voltage source in series with impedance
  - c) Current source in parallel with impedance
  - d) Current source in series with impedance
- Superposition theorem is not applicable to networks containing 5)
  - Non-linear elements a) Dependent current sources
- Dependent voltage sources b) Transformers d)

### 6) The transient response occurs \_\_\_\_\_.

c)

- a) Only in resistive circuits
- b) Only in inductive circuits
- c) Only in capacitive circuits
- d) Both in inductive and capacitive
- 7) The time constant of a series RL circuit is
  - a) LR L/R b) c) R/L d) e-R/L
- The function is said to be having simple poles and zeros only if \_\_\_\_\_. 8)
  - a) The poles are not repeated
  - b) The zeros are not repeated
  - c) Both poles and zeros are not repeated
  - d) None of the above

Max. Marks: 70

Marks: 14

S Set

- 9) The characteristic equation of a network function F(s) has roots denoted by s1=s2=-a. How is the root categorized? b) A double zero at –a
  - a) A zero at -a
  - c) A simple pole at -a
- 10) A one-port network is made up of an inductor only. Which of the following is not a correct depiction of the poles and zeros?
  - a) Pole at s=0 b) Zero at s=0
  - c) Pole at  $s=\infty$ d) None of these
- In the m-derived high pass filter, the resonant frequency is to be chosen 11) so that it is
  - a) Above the cut-off frequency
- b) Below the cut-off frequency
- c) Random frequency
- None of the above d)
- A filter is formed by reverse type of reactances. What should be the range 12) of variation of Z1/4Z2 for the filter to have a pass band?
  - b) a)  $+\infty$  to 0 0 to −1
  - c)  $-1 \text{ to } -\infty$ d) None of these
- 13) In parallel resonance, resonance occurs when susceptance part of admittance is \_\_\_\_\_.
  - a) infinite b)
  - c) XC>XL d) Zero
- In a series RLC circuit, the resonant frequency \_\_\_\_\_ if C is increased. 14)
  - a) Increases
  - c) Remains unchanged
- b) Decreases d) Becomes zero



- XL>XC

d) A double pole at –a

Set

S

Seat	
No.	

# S.Y. B. Tech (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering NETWORK THEORY AND ANALYSIS

Day & Date: Thursday,12-12-2019 Time: 10:00 AM To 01:00 PM

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

2) Figures to the right indicate full marks.

3) Assume suitable data if necessary.

# Section – I

# Q.2 Attempt any four.

a) Determine the Norton's equivalent circuit for the network shown below.



**b)** Find  $i_0$  and i using Superposition theorem for the network shown below.



- c) Explain Bandwidth and Selectivity w. r. t. series resonant circuit.
- d) Find the short circuit parameters for the circuit shown below.



e) Draw and explain cascade connection of a two port network.

# Q.3 Attempt any two.

- a) Derive an expression of frequencies at which  $V_{\rm L}$  and  $V_{\rm c}$  are maximum for a series resonant circuit.
- **b)** Express driving point impedance at input port of a load terminated two port networks.

12

Max. Marks: 56

c) State Maximum Power Transfer Theorem and also find maximum power delivered to the load for the network shown below.



## Section – II

# Q.4 Attempt any four

- a) Design a K-type low pass filter (T and  $\pi$ ) for having a cut-off frequency of 2 KHz for a load impedance of 500 Ohms.
- **b)** Draw the pole zero plot for the given network function below and obtain the time domain response

$$V(s) = \frac{4(s+2)s}{(s+1)(s+3)}$$

c) Determine the current i(t) for the circuit shown below with a rectangular pulse of unit height and T seconds duration as an input when switch is closed at t=0. Assume the capacitor to be initially uncharged.



- d) Explain the significance of poles and zeros w. r. t transfer function of a network.
- e) Compute parameters of a  $\pi$  configuration attenuator with load resistance of 150 Ohms to cause an attenuation of 24 dB.

## Q.5 Attempt any two.

- 12
- a) Explain what is forced and natural response. Also derive and expression for i(t) then Vu(t) is applied to a series RLC circuit.
- **b)** Obtain the design equations for m-derived high pass filter.
- c) For the two-port network shown below, calculate the input impedance  $Z_{11}(s)$ .



		DIGITAL TE	ECHN	IQUES
Day Time	& Date : 10:0	e: Saturday,14-12-2019 0 AM To 01:00 PM		Max. Marks: 70
Instr	uctio	ns: 1) Q. No. 1 is compulsory and s Book.	should	be solved in first 30 minutes in answer
		2) Figures to the right indicate the second se	full ma	rks.
_		MCQ/Objective	Туре	Questions
Dura	tion: 3	30 Minutes	_	Marks: 14
Q.1	<b>Cho</b> 1)	ose the correct alternatives from For each cell, no. of adjacent cell a) 2 c) 3	the o on a 4 b) d)	ptions and rewrite the sentence. 14 -variable K-map is 4 8
	2)	In 4-variable k-map, the function of expression is,	contair	ns all min-terms then the minimal
		a) A c) 0	b) d)	1 Don't care
	3)	A Multiplexer is also known as a) Counter c) Data selector	 b) d)	Data distributor None of these
	4)	The following IC works as parallel a) IC 7483 c) IC 7490	l adder b) d)	r IC 7485 IC 7495
	5)	The given gray number 1011, its ( a) 1101 c) 1110	equiva b) d)	lent binary number is 1000 1011
	6)	A flip-flop has two outputs which a a) always zero c) always one	are b) d)	 always complementary in one of the above states
	7)	What is the long form of TTL? a) Transistor-transistor logic c) Transducer-transistor logic	b) d)	Time-to-live Transistor Transducer-logic
	8)	The bit sequence 0010 is serially out shift register that initially clear pulses? a) 0000 c) 1000	entere . What b) d)	ed (right-most) into a 4-bit parallel t are the Q outputs after two clock 0010 1111
	9)	The number of flip-flops required a) 6 c) 2	to impl b) d)	lement mod-6 counter is 3 5

No.

# S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering



Page  ${\bf 1}$  of  ${\bf 12}$ 

- 10) In PLA \_\_\_\_\_.
  - a) Both AND and OR matrix are programmable
  - b) AND array is fixed and OR is programmable
  - c) AND is programmable OR is fixed
  - d) None of these
- 11) The output of the Melay machine is the function of \_\_\_\_\_.
  - a) next state
  - b) present inputs
  - c) present state and present inputs
  - d) present state
- 12) What is a shift register that will accept a parallel input, or bi-directional serial load and internal shift features?
  - a) tristate
  - c) universal d) Conversion
- 13) Which of the following is an invalid name in VHDL?
  - a) DECODE8 b) \_What\_4
  - c) Invalid d) All are valid
- The output of a mod-2 counter given as a clock input of a MOD-5 counter gives a \_\_\_\_\_.
  - a) Mod-5 counter
- b) MOD-10 counter

b) end around

- c) MOD-25 counter
- d) None of these

**SLR-FR-32** 

Set P

# Seat No.

# S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering DIGITAL TECHNIQUES

Day & Date: Saturday,14-12-2019 Time: 10:00 AM To 01:00 PM

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

2) Figures to the right indicate full marks.

# Section – I

# Q.2 Solve any four of the following.

- a) Design and explain full adder.
- **b)** Implement the following function using single 8:1 MUX  $F(P,Q,R,S) = \sum m(0,1,3,5,8,10,15)$
- c) Explain the race around condition. How it is eliminated?
- d) Reduce the following logical expression using K-map and implement reduced expression by using NOR Gate  $F = \Pi M (0,2,5,7,8,10,13,15)$
- e) Explain Static Hazard and Dynamic Hazard.

# Q.3 Solve any two of the following.

- a) Design gray to binary code converter.
- b) Explain the design of 2-bit magnitude comparator.
- c) Explain general model of flip-flop convert & conversion of SR flip-flop into D flip-flop.

# Section – II

# Q.4 Solve any four of the following.

- a) What are different modes of operation of shift register? Explain any one of it.
- b) Write a note on Moore & Mealy machines.
- c) Design MOD-7 counter using IC7490.
- d) Draw and Explain twisted ring counter.
- e) Write VHDL code for full adder.

# Q.5 Solve any two of the following.

- a) Design 3-bit synchronous up counter using T flip-flop.
- b) Explain universal shift register using IC 7495.
- c) Implement the following function using PLA.
  - $F1(A,B,C) = \Sigma m(0,4,7)$  $F2(A,B,C) = \Sigma m(1,3,6)$

Max. Marks: 56

12

16

12

16

Set P



# Set

# S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics and Telecommunication Engineering DIGITAL TECHNIQUES**

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

2) Figures to the right indicate full marks.

# **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

Seat

No.

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The bit sequence 0010 is serially entered (right-most) into a 4-bit parallel 1) out shift register that initially clear. What are the Q outputs after two clock pulses?
  - a) 0000 b) 0010 1000 d) 1111 c)
- 2) The number of flip-flops required to implement mod-6 counter is \_\_\_\_\_.
  - 6 b) 3 a) 5
  - c) 2 d)
- In PLA 3)
  - Both AND and OR matrix are programmable a)
  - b) AND array is fixed and OR is programmable
  - AND is programmable OR is fixed c)
  - d) None of these
- The output of the Melay machine is the function of . 4)
  - a) next state
  - b) present inputs
  - c) present state and present inputs
  - d) present state

## 5) What is a shift register that will accept a parallel input, or bi-directional serial load and internal shift features?

- tristate b) end around a)
- universal d) Conversion c)
- Which of the following is an invalid name in VHDL? 6)
  - DECODE8 b) What 4 a)
  - d) All are valid c) Invalid
- The output of a mod-2 counter given as a clock input of a MOD-5 counter 7) gives a .
  - Mod-5 counter b) MOD-10 counter a) c)
    - MOD-25 counter d) None of these
- 8) For each cell, no. of adjacent cell on a 4-variable K-map is \_\_\_\_\_.
  - 2 b) 4 a)
  - 3 c) d) 8

SLR-FR-32

Max. Marks: 70



Marks: 14



- 9) In 4-variable k-map, the function contains all min-terms then the minimal expression is, \_\_\_\_\_.
  - a) A

10)

- b) 1 d) Don't care c) 0
- A Multiplexer is also known as \_\_\_\_
- b) Data distributor a) Counter c) Data selector d) None of these
- The following IC works as parallel adder \_\_\_\_\_. 11)
  - IC 7485 a) IC 7483 b)
  - c) IC 7490 d) IC 7495

The given gray number 1011, its equivalent binary number is \_\_\_\_\_. 12)

- a) 1101 1000 b)
- c) 1110 d) 1011
- A flip-flop has two outputs which are \_\_\_\_ 13)
  - a) always zero c) always one

- b) always complementary
- d) in one of the above states
- 14) What is the long form of TTL?
  - a) Transistor-transistor logic
  - c) Transducer-transistor logic
- Time-to-live b)
- **Transistor Transducer-logic** d)

# No. S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering

**DIGITAL TECHNIQUES** 

Day & Date: Saturday,14-12-2019 Time: 10:00 AM To 01:00 PM

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

2) Figures to the right indicate full marks.

# Section – I

# Q.2 Solve any four of the following.

- a) Design and explain full adder.
- **b)** Implement the following function using single 8:1 MUX  $F(P,Q,R,S) = \sum m(0,1,3,5,8,10,15)$
- c) Explain the race around condition. How it is eliminated?
- **d**) Reduce the following logical expression using K-map and implement reduced expression by using NOR Gate  $F = \Pi M (0,2,5,7,8,10,13,15)$
- e) Explain Static Hazard and Dynamic Hazard.

# Q.3 Solve any two of the following.

- a) Design gray to binary code converter.
- b) Explain the design of 2-bit magnitude comparator.
- c) Explain general model of flip-flop convert & conversion of SR flip-flop into D flip-flop.

# Section – II

# Q.4 Solve any four of the following.

- a) What are different modes of operation of shift register? Explain any one of it.
- b) Write a note on Moore & Mealy machines.
- c) Design MOD-7 counter using IC7490.
- d) Draw and Explain twisted ring counter.
- e) Write VHDL code for full adder.

# Q.5 Solve any two of the following.

- a) Design 3-bit synchronous up counter using T flip-flop.
- b) Explain universal shift register using IC 7495.
- c) Implement the following function using PLA. (2, 4, 7)
  - $F1(A,B,C) = \Sigma m(0,4,7)$  $F2(A,B,C) = \Sigma m(1,3,6)$

Max. Marks: 56

12

16

12

16



SLR-FR-32

Seat

a) b) c) d)	Both AND and OR matrix are pr AND array is fixed and OR is p AND is programmable OR is fixed None of these	rogra rogra ed	ammable ammable
The a) b) c) d)	output of the Melay machine is next state present inputs present state and present inputs present state	the f	unction of
Wha seria a) c)	at is a shift register that will acce al load and internal shift features tristate universal	pt a ;? b) d)	parallel input, or bi-directional end around Conversion

3

5

- 0000 a) 1000 C)
- d)
- 1111
- 0010 b)

- The number of flip-flops required to implement mod-6 counter is \_\_\_\_\_. 5)

  - a) 6 b)
  - 2 c) d)
- 6) In PLA \_\_

C)

pulses?

- Both AND a)
- AND arra b)
- c) AND is pr
- d) None of th
- 7) The output of
  - next state a)
  - b) present in
  - c) present st
  - d) present st

c) always one d) 3) What is the long form of TTL?

Transducer-transistor logic

a) Transistor-transistor logic

2) Figures to the right indicate full marks.

## 2) A flip-flop has two outputs which are \_ a) always zero

b)

d)

The bit sequence 0010 is serially entered (right-most) into a 4-bit parallel

out shift register that initially clear. What are the Q outputs after two clock

b)

d)

1000

1011

- always complementary b)

Transistor Transducer-logic

- in one of the above states

Time-to-live

# S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics and Telecommunication Engineering DIGITAL TECHNIQUES**

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer

MCQ/Objective Type Questions

The given gray number 1011, its equivalent binary number is \_\_\_\_\_.

Day & Date: Saturday, 14-12-2019

Book.

Time: 10:00 AM To 01:00 PM

a) 1101

c) 1110

**Duration: 30 Minutes** 

1)

4)

8)

Q.1

Seat No.

# SLR-FR-32



Max. Marks: 70

- Choose the correct alternatives from the options and rewrite the sentence.
- Marks: 14

			Set	R
9)	Which of the following is an invalid a) DECODE8 c) Invalid	nam b) d)	e in VHDL? _What_4 All are valid	
10)	The output of a mod-2 counter give gives a a) Mod-5 counter c) MOD-25 counter	en as b) d)	a clock input of a MOD-5 counter MOD-10 counter None of these	
11)	For each cell, no. of adjacent cell of a) 2 c) 3	n a 4 b) d)	-variable K-map is 4 8	
12)	In 4-variable k-map, the function contended expression is,	ontair	ns all min-terms then the minimal	
	a) A c) 0	b) d)	1 Don't care	
13)	A Multiplexer is also known as a) Counter c) Data selector	 b) d)	Data distributor None of these	
14)	The following IC works as parallel a a) IC 7483 c) IC 7490	addei b) d)	IC 7485 IC 7495	

Page **8** of **12** 

SLR-FR-32

# No. S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering

**DIGITAL TECHNIQUES** 

Day & Date: Saturday,14-12-2019 Time: 10:00 AM To 01:00 PM

Seat

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

2) Figures to the right indicate full marks.

# Section – I

# Q.2 Solve any four of the following.

- a) Design and explain full adder.
- **b)** Implement the following function using single 8:1 MUX  $F(P,Q,R,S) = \sum m(0,1,3,5,8,10,15)$
- c) Explain the race around condition. How it is eliminated?
- d) Reduce the following logical expression using K-map and implement reduced expression by using NOR Gate  $F = \Pi M (0,2,5,7,8,10,13,15)$
- e) Explain Static Hazard and Dynamic Hazard.

# Q.3 Solve any two of the following.

- a) Design gray to binary code converter.
- b) Explain the design of 2-bit magnitude comparator.
- c) Explain general model of flip-flop convert & conversion of SR flip-flop into D flip-flop.

# Section – II

# Q.4 Solve any four of the following.

- a) What are different modes of operation of shift register? Explain any one of it.
- b) Write a note on Moore & Mealy machines.
- c) Design MOD-7 counter using IC7490.
- d) Draw and Explain twisted ring counter.
- e) Write VHDL code for full adder.

# Q.5 Solve any two of the following.

- a) Design 3-bit synchronous up counter using T flip-flop.
- b) Explain universal shift register using IC 7495.
- c) Implement the following function using PLA. (2, 4, 7)
  - $F1(A,B,C) = \Sigma m(0,4,7)$  $F2(A,B,C) = \Sigma m(1,3,6)$

Max. Marks: 56

12

16

12

16



SLR-FR-32

Seat No.

# S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering DIGITAL TECHNIQUES

Day & Date: Saturday,14-12-2019 Time: 10:00 AM To 01:00 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
  - 2) Figures to the right indicate full marks.

# MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Marks: 14

# Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) In PLA \_\_\_\_\_
  - a) Both AND and OR matrix are programmable
  - b) AND array is fixed and OR is programmable
  - c) AND is programmable OR is fixed
  - d) None of these
- 2) The output of the Melay machine is the function of \_\_\_\_\_.
  - a) next state
  - b) present inputs
  - c) present state and present inputs
  - d) present state
- 3) What is a shift register that will accept a parallel input, or bi-directional serial load and internal shift features?
  - a) tristate b) end around
  - c) universal d) Conversion
- 4) Which of the following is an invalid name in VHDL?
  - a) DECODE8 b) \_What\_4
  - c) Invalid d) All are valid
- The output of a mod-2 counter given as a clock input of a MOD-5 counter gives a \_\_\_\_\_.
  - a) Mod-5 counter b) MOD-10 counter
  - c) MOD-25 counter d) None of these
- 6) For each cell, no. of adjacent cell on a 4-variable K-map is \_\_\_\_\_.
  - a) 2 b) 4
  - c) 3 d) 8
- 7) In 4-variable k-map, the function contains all min-terms then the minimal expression is, \_\_\_\_\_.
  - a) A b) 1
  - c) 0 d) Don't care
- 8) A Multiplexer is also known as \_\_\_\_\_.
  - a) Counter b) Data distributor
  - c) Data selector d) None of these

Set S

Max. Marks: 70

Set S

- 9) The following IC works as parallel adder
  - IC 7485 a) IC 7483 b) c) IC 7490 d) IC 7495
- The given gray number 1011, its equivalent binary number is \_\_\_\_\_. 10)
  - a) 1101 b) 1000
  - c) 1110 d) 1011
- 11) A flip-flop has two outputs which are
  - always complementary b)
  - c) always one
- in one of the above states d)

Transistor Transducer-logic

## What is the long form of TTL? 12) a) Transistor-transistor logic

a) always zero

- Time-to-live b)
- c) Transducer-transistor logic d)
- The bit sequence 0010 is serially entered (right-most) into a 4-bit parallel 13) out shift register that initially clear. What are the Q outputs after two clock pulses?
  - 0000 b) 0010 a)
  - 1000 d) 1111 C)
- 14) The number of flip-flops required to implement mod-6 counter is \_\_\_\_\_.
  - 3 a) 6 b) c) 2 5
    - d)

# Seat No. S.Y. (B. Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electronics and Telecommunication Engineering**

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

# Section – I

**DIGITAL TECHNIQUES** 

### Solve any four of the following. Q.2

- a) Design and explain full adder.
- **b)** Implement the following function using single 8:1 MUX  $F(P,Q,R,S) = \sum m(0,1,3,5,8,10,15)$
- c) Explain the race around condition. How it is eliminated?
- d) Reduce the following logical expression using K-map and implement reduced expression by using NOR Gate  $F = \Pi M (0, 2, 5, 7, 8, 10, 13, 15)$
- e) Explain Static Hazard and Dynamic Hazard.

### Solve any two of the following. Q.3

- a) Design gray to binary code converter.
- b) Explain the design of 2-bit magnitude comparator.
- c) Explain general model of flip-flop convert & conversion of SR flip-flop into D flip-flop.

# Section – II

### Solve any four of the following. Q.4

- a) What are different modes of operation of shift register? Explain any one of it.
- **b)** Write a note on Moore & Mealy machines.
- c) Design MOD-7 counter using IC7490.
- d) Draw and Explain twisted ring counter.
- e) Write VHDL code for full adder.

### Solve any two of the following. Q.5

- a) Design 3-bit synchronous up counter using T flip-flop.
- b) Explain universal shift register using IC 7495.
- c) Implement the following function using PLA.
  - $F1(A,B,C) = \Sigma m(0,4,7)$  $F2(A,B,C) = \Sigma m(1,3,6)$

SLR-FR-32



Max. Marks: 56

16

12

12

Seat No.					Set P	)	
	S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019						
		Electronic	s and Telecomn	nunic AUNIA	ation Engineering		
Day &	& Date	e: Tuesday, 17-12	2-2019		Max. Marks: 7	0	
Time	: 10:0	0 AM To 01:00 P	M				
Instru	uctio	<b>1s:</b> 1) Q. No. 1 is book.	compulsory. It shou	ld be :	solved in first 30 minutes in answer		
		2) Figures to	the right indicate full	l mark	S.		
Durat	tion: 3	0 Minutes	MCQ/Objective Ty	/pe Qi	uestions Marks: 1/	4	
Q.1	Choo	ose the correct a	alternatives from th	ne opt	ions. 1	4	
	1)	Wideband FM u	ses a frequency dev	viation	of		
		a) 75kHz		b)	10kHz		
	-	c) 180kHz		d)	100KHZ		
	2)	The bandwidth (	of AM system	 	2f		
		c) $0.5f_{\rm m}$		d)	4f <sub>m</sub>		
	3)	In a communica	tion receiver, the no	ise is I	most likely to affect the signal		
		a) At the trans	smitter	b)	In the Channel		
		c) In the infor	mation source	d)	At the signal receiver		
	4)	A 100 MHz carrindex is	er is deviated 50kH	z by 4	kHz signal. The modulation		
		a) 5		b)	8		
	<b>C</b> )	C I2.5	und in some of fam turner	a)	20		
	5)	a) Point to po	ind is used for transi	missio h)	n or Stereo broadcasting		
		c) Monaural k	proadcasting	d)	TV broadcasting		
	6)	If modulation inc	lex of an AM wave i	s char	nged from 0 to 1 the transmitted		
		a) Increases	oy 50%	b)	Increases by 33.33%		
		c) Increases	oy 75%	d)	Increases by 100%		
	7)	An amplifier has input SNR is db	an output SNR of 1	6db a	nd noise figure of 5.4 db. Its		
		a) 10.4		b)	21.4		
	0)	C) IO	airculit in a	u)	5.4		
	0)	a) Low pass f	ilter	b) d)	High pass filter		
	0)	What is the offe	nici et on the deviation d		FM signal when it is passed		
	9)	through a mixer		i ui an	i w signal when it is passed		
		a) Doubled		b)	Halved		
		c) Remains s	ame	d)	Not predictable		

10) A Superhetrodyne receiver with an IF of 450 kHz is tuned to a signal at 1200 kHz \_\_-a) 750 kHz b) 900 kHz 1650 kHz 2100 kHz c) d) One of the following cannot be used to remove unwanted sideband in 11) SSB Filter system b) **Balanced modulator** a) Third method d) Phase shift method c) Over modulation occurs when \_\_\_\_\_. 12) b)  $V_m = V_c = 0$  $V_m < V_c$  $V_m = V_c$  $V_{\rm m} > V_{\rm c}$ d) c) Power in one of the sideband \_\_\_\_\_. 13) b)  $M^2Pc/8$  $M^2Pc/4$ a)  $M^2Pc/16$  $M^2Pc/2$ d) C) The audio frequency range is \_\_\_\_\_. 14) b) 20Hz to 20kHz 10Hz to 1kHz a) 80MHz to 108MHz 1kHz to 100kHz C) d)

SLR-FR-33

Set P

No. S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Electronics and Telecommunication Engineering ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Seat

Instructions: 1) All questions are compulsory.

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

## Section – I

## Q.2 Solve any four questions.

- a) Explain different types of modulation techniques with diagram?
- b) Define noise figure and derive its expression.
- c) A broadcast transmitter radiates 20KW when the modulation percentage is 75. How much is carrier power? Also calculate the power of each sideband?
- d) Define noise. Explain white noise?
- e) What are the advantages of SSB over DSB and AM?

## Q.3 Solve any two questions.

- a) The output current of 60 percent modulated AM generator is 1.5A. To what value will this current rise if the generator is modulated additionally by another audio wave, whose modulation index is 0.7? what will be the percentage power saving if the carrier and one of the sidebands are now suppressed.
- **b)** Derive an equation of AM signal.
- c) Explain with the help of neat diagram working of Balanced modulator.

## Section – II

# Q.4 Solve any four questions.

- a) Explain the working of envelop detection with neat diagram.
- **b)** Explain the characteristics of radio receivers.
- c) Explain the need for pre-emphasis and de-emphasis.
- d) Write the difference between FM and AM.
- e) Write a note on natural sampling and flat top sampling.

## Q.5 Solve any two questions.

- a) Explain with the help of neat diagram, working of Superhetrodyne Receiver.
- **b)** With the help of diagram explain the working of Frequency modulation using Armstrong method.
- c) Explain the modulation of PWM signal with necessary diagram.

SLR-FR-33

Set

Max. Marks: 56

16

12

16

No.							Set	Q
	S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering ANALOG COMMUNICATION							
Day 8 Time:	& Date 10:00	e: Tue D AM	esday, 17-1 To 01:00 P	2-2019 M			Max. Marks	3: 70
Instru	uctior	<b>is:</b> 1)	Q. No. 1 is book.	compulsory. It s	should be	solved in first 30 minu	tes in answe	эr
		2)	) Figures to	the right indicate	e full mark	κs.		
_				MCQ/Objectiv	e Type Q	uestions		
Durat	ion: 3	0 Mir	nutes				Marks	3: 14
Q.1	Choc	ose tl	he correct a	alternatives fro	m the opt	tions.		14
	1)	A pr a)	e-emphasis	ilter	 _)	High pass filter		
		c)	Band pass	filter	d)	None of the above		
	2)	Wha	at is the effe	ct on the deviation	on d of an	r FM signal when it is p	assed	
		a)	Doubled		b)	Halved		
		c)	Remains s	ame	d)	Not predictable		
	3)	A Su 1200	uperhetrody 0 kHz	ne receiver with	an IF of 4	50 kHz is tuned to a s	ignal at	
		a) c)	750 kHz 1650 kHz		b) d)	900 kHz 2100 kHz		
	4)	One SSE	of the follow	wing cannot be ι	used to re	move unwanted sideba	and in	
		a)	Filter syste	m	b)	Balanced modulator		
		c)	Third meth	od	d)	Phase shift method		
	5)	Ove	r modulatio	n occurs when _		W W O		
		a) c)	$v_{\rm m} < v_{\rm c}$ $V_{\rm m} > V_{\rm c}$		(a (b	$V_{\rm m} \equiv V_{\rm c} \equiv 0$ $V_{\rm m} \equiv V_{\rm c}$		
	6)	Pow	ver in one of	the sideband		· m · c		
	0)	a)	$M^2 Pc/4$		 b)	M <sup>2</sup> Pc/8		
		c)	$M^2Pc/2$		d)	M <sup>2</sup> Pc/16		
	7)	The	audio frequ	ency range is	·			
		a)	10Hz to 1k	Hz	b)	20Hz to 20kHz		
		C)	80MHz to	108MHz	d)	1kHz to 100kHz		
	8)	Wid	eband FM u	ses a frequency	deviation	of		
		a) c)	75KHZ 180kHz		(a (b	10KHZ 100kHz		
	<u>0</u> )	∼) The	handwidth	of AM system	u)			
	3)	a)	f <sub>m</sub>		 b)	2f <sub>m</sub>		
		c)	0.5f <sub>m</sub>		d)	4f <sub>m</sub>		

SLR-FR-33

Set Q

- 10) In a communication receiver, the noise is most likely to affect the signal
  - a) At the transmitter

Increases by 50%

a)

b) In the Channel

SLR-FR-33

Set Q

- c) In the information source d) At the signal receiver
- 11) A 100 MHz carrier is deviated 50kHz by 4kHz signal. The modulation index is \_\_\_\_\_.
  - a) 5 b) 8 c) 12.5 d) 20
- 12) Vestigial Sideband is used for transmission of \_\_\_\_\_.
  - a) Point to point communication b) Stereo broadcasting
  - c) Monaural broadcasting d) TV broadcasting
- 13) If modulation index of an AM wave is changed from 0 to 1 the transmitted power \_\_\_\_\_.
  - b) Increases by 33.33%
  - c) Increases by 75% d) Increases by 100%
- 14) An amplifier has an output SNR of 16db and noise figure of 5.4 db. Its input SNR is db \_\_\_\_\_.
  - a) 10.4 b) 21.4 c) 16 d) 5.4

Seat <u>No.</u> S.Y. (B.Tech) (Part - I) (New

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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

# Section – I

# Q.2 Solve any four questions.

- a) Explain different types of modulation techniques with diagram?
- **b)** Define noise figure and derive its expression.
- c) A broadcast transmitter radiates 20KW when the modulation percentage is 75. How much is carrier power? Also calculate the power of each sideband?
- d) Define noise. Explain white noise?
- e) What are the advantages of SSB over DSB and AM?

# Q.3 Solve any two questions.

- a) The output current of 60 percent modulated AM generator is 1.5A. To what value will this current rise if the generator is modulated additionally by another audio wave, whose modulation index is 0.7? what will be the percentage power saving if the carrier and one of the sidebands are now suppressed.
- **b)** Derive an equation of AM signal.
- c) Explain with the help of neat diagram working of Balanced modulator.

# Section – II

# Q.4 Solve any four questions.

- a) Explain the working of envelop detection with neat diagram.
- **b)** Explain the characteristics of radio receivers.
- c) Explain the need for pre-emphasis and de-emphasis.
- d) Write the difference between FM and AM.
- e) Write a note on natural sampling and flat top sampling.

# Q.5 Solve any two questions.

- a) Explain with the help of neat diagram, working of Superhetrodyne Receiver.
- **b)** With the help of diagram explain the working of Frequency modulation using Armstrong method.
- c) Explain the modulation of PWM signal with necessary diagram.

Max. Marks: 56

12

16

12



No.							
S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering ANALOG COMMUNICATION							
Day & Time:	& Date : 10:00	e: Tuesday, 17-12-2019 0 AM To 01:00 PM		Max. Marks: 70			
Instru	<b>nstructions:</b> 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book.						
	2) Figures to the right indicate full marks.						
Dung		MCQ/Objective Typ	be Qu	lestions			
Dura	:ion: 3			Marks: 14			
Q.1	Choo 1)	Dise the correct alternatives from the Vestigial Sideband is used for transm	e opti Dission	ons. 14			
	')	<ul><li>a) Point to point communication</li><li>c) Monaural broadcasting</li></ul>	b) d)	Stereo broadcasting TV broadcasting			
	2)	If modulation index of an AM wave is	chan	ged from 0 to 1 the transmitted			
		<ul> <li>a) Increases by 50%</li> <li>c) Increases by 75%</li> </ul>	b) d)	Increases by 33.33% Increases by 100%			
	3)	An amplifier has an output SNR of 16 input SNR is db	idb ar	nd noise figure of 5.4 db. Its			
		a) 10.4 c) 16	b) d)	21.4 5.4			
	4)	A pre-emphasis circuit is a a) Low pass filter	b)	High pass filter			
		C) Band pass line	u)				
	5)	through a mixer?	of an	Fixi signal when it is passed			
		a) Doubled	b)	Halved			
		c) Remains same	d)	Not predictable			
	6)	A Superhetrodyne receiver with an IF 1200 kHz	of 45	50 kHz is tuned to a signal at			
		a) 750 kHz c) 1650 kHz	b) d)	900 kHz 2100 kHz			
	7)	One of the following cannot be used t SSB	o ren	nove unwanted sideband in			
		<ul><li>a) Filter system</li><li>c) Third method</li></ul>	b) d)	Balanced modulator Phase shift method			
	8)	Over modulation occurs when a) $V_m < V_c$	b)	$V_m = V_c = 0$			
		$c)  V_{\rm m}^{\rm m} > V_{\rm c}^{\rm c}$	d)	$V_m = V_c$			
	9)	Power in one of the sideband					
		a) $M^2 Pc/4$ c) $M^2 Pc/2$	d)	M <sup>2</sup> Pc/8 M <sup>2</sup> Pc/16			
			u)	MI I U/ IU			

				Set R
10)	The a) c)	audio frequency range is 10Hz to 1kHz 80MHz to 108MHz	b) d)	20Hz to 20kHz 1kHz to 100kHz
11)	Wide a) c)	eband FM uses a frequency devia 75kHz 180kHz	ation d b) d)	of 10kHz 100kHz
12)	The a) c)	bandwidth of AM system f <sub>m</sub> 0.5f <sub>m</sub>	b) d)	2f <sub>m</sub> 4f <sub>m</sub>
13)	In a a)	communication receiver, the nois  At the transmitter	e is n b) d)	nost likely to affect the signal In the Channel At the signal receiver
14)	A 10 inde a) c)	00 MHz carrier is deviated 50kHz x is 5 12.5	by 4k b) d)	Hz signal. The modulation 8 20

# S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

**Electronics and Telecommunication Engineering** ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Seat

No.

Instructions: 1) All questions are compulsory.

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

# Section – I

#### Q.2 Solve any four questions.

- Explain different types of modulation techniques with diagram? a)
- Define noise figure and derive its expression. b)
- A broadcast transmitter radiates 20KW when the modulation percentage is c) 75. How much is carrier power? Also calculate the power of each sideband?
- d) Define noise. Explain white noise?
- What are the advantages of SSB over DSB and AM? e)

#### Q.3 Solve any two questions.

- The output current of 60 percent modulated AM generator is 1.5A. To a) what value will this current rise if the generator is modulated additionally by another audio wave, whose modulation index is 0.7? what will be the percentage power saving if the carrier and one of the sidebands are now suppressed.
- Derive an equation of AM signal. b)
- Explain with the help of neat diagram working of Balanced modulator. c)

# Section – II

#### Q.4 Solve any four questions.

- Explain the working of envelop detection with neat diagram. a)
- b) Explain the characteristics of radio receivers.
- Explain the need for pre-emphasis and de-emphasis. c)
- Write the difference between FM and AM. d)
- Write a note on natural sampling and flat top sampling. e)

#### Q.5 Solve any two questions.

- Explain with the help of neat diagram, working of Superhetrodyne a) Receiver.
- With the help of diagram explain the working of Frequency modulation b) using Armstrong method.
- Explain the modulation of PWM signal with necessary diagram. C)

SLR-FR-33

Set

Max. Marks: 56

R

12

16

12

<b>O</b> =								Г	
Seat No.							Se	t	S
S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electronics and Telecommunication Engineering ANALOG COMMUNICATION									
Day & Date: Tuesday, 17-12-2019 Ma Time: 10:00 AM To 01:00 PM								ks	: 70
<ul> <li>Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book.</li> <li>2) Figures to the right indicate full marks</li> </ul>									
Duration: 30 Minutes									
O 1 Chapped the connect alternatives from the antices									
Q.1	<b>Choc</b> 1)	A Superhetrodyne receiver with an IF of 450 kHz is tuned to a signal at 1200 kHz							
		a) c)	750 kHz 1650 kHz			b) d)	900 kHz 2100 kHz		
:	2)	One of the following cannot be used to remove unwanted sideband in SSB							
		a) c)	Filter syste Third meth	em nod		b) d)	Balanced modulator Phase shift method		
;	3)	Ove a)	r modulation $V_m < V_c$	n occurs when		b)	$V_{\rm m} = V_{\rm c} = 0$		
		C)	$v_{\rm m} > v_{\rm c}$			u)	$v_{\rm m} \equiv v_{\rm c}$		
	4)	Pow	er in one of	the sideband	•	Ь)	$M^2 D_{\sigma} / \Omega$		
		a) C)	$M^{2}Pc/4$ $M^{2}Pc/2$			d)	$M^2Pc/16$		
	5)	U) Tha		ionov rongo io		ч)			
	5)	a)	10Hz to 1k	Hz	•	b)	20Hz to 20kHz		
		c)	80MHz to	108MHz		d)	1kHz to 100kHz		
	6) Wideband FM uses a frequency deviation of								
	-,	a)	75kHz		<b>,</b>	b)	10kHz		
		c)	180kHz			d)	100kHz		
	7)	The	bandwidth	of AM system _	·				
		a)	f <sub>m</sub>			b)	2fm		
	-	C) 0.51 <sub>m</sub>				a)	41 <sub>m</sub>		
	8) In a communication receiver, the noise is most likely to affect the signal								
		a)	 At the tran	smitter		b)	In the Channel		
		c)	In the info	rmation source		d)	At the signal receiver		
9	<ol> <li>A 100 MHz carrier is deviated 50kHz by 4kHz signal. The modulation index is</li> </ol>								
		a)	5			b)	8		
		c)	12.5			d)	20		

# Seat No.

Page **10** of **12** 

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- SLR-FR-33 Set S
- 10) Vestigial Sideband is used for transmission of \_\_\_\_\_.
  - Point to point communication a) b)
    - Monaural broadcasting
- Stereo broadcasting d) TV broadcasting
- 11) If modulation index of an AM wave is changed from 0 to 1 the transmitted power \_\_\_\_\_.
  - a) Increases by 50%

C)

a)

C)

- b) Increases by 33.33%
- Increases by 75% d) Increases by 100% c)
- An amplifier has an output SNR of 16db and noise figure of 5.4 db. Its 12) input SNR is db \_\_\_\_\_.
  - 10.4 21.4 a) b) 5.4
  - 16 C) d)
- A pre-emphasis circuit is a \_\_\_\_\_. 13)
  - Low pass filter b) High pass filter
    - Band pass filter None of the above d)
- 14) What is the effect on the deviation d of an FM signal when it is passed through a mixer?
  - Doubled a)
  - c) Remains same

- Halved b)
- d) Not predictable

No. S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Electronics and Telecommunication Engineering ANALOG COMMUNICATION

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Seat

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

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

# Section – I

# Q.2 Solve any four questions.

- a) Explain different types of modulation techniques with diagram?
- b) Define noise figure and derive its expression.
- c) A broadcast transmitter radiates 20KW when the modulation percentage is 75. How much is carrier power? Also calculate the power of each sideband?
- d) Define noise. Explain white noise?
- e) What are the advantages of SSB over DSB and AM?

## Q.3 Solve any two questions.

- a) The output current of 60 percent modulated AM generator is 1.5A. To what value will this current rise if the generator is modulated additionally by another audio wave, whose modulation index is 0.7? what will be the percentage power saving if the carrier and one of the sidebands are now suppressed.
- **b)** Derive an equation of AM signal.
- c) Explain with the help of neat diagram working of Balanced modulator.

# Section – II

# Q.4 Solve any four questions.

- a) Explain the working of envelop detection with neat diagram.
- **b)** Explain the characteristics of radio receivers.
- c) Explain the need for pre-emphasis and de-emphasis.
- d) Write the difference between FM and AM.
- e) Write a note on natural sampling and flat top sampling.

## Q.5 Solve any two questions.

- a) Explain with the help of neat diagram, working of Superhetrodyne Receiver.
- **b)** With the help of diagram explain the working of Frequency modulation using Armstrong method.
- c) Explain the modulation of PWM signal with necessary diagram.

SLR-FR-33

Set S

Max. Marks: 56

16

12

12
Seat No.

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Computer Science & Engineering APPLIED MATHEMATICS - I** 

Day & Date: Saturday, 07-12-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory should be solved in first 30 minutes in answer book.

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

MCQ/Objective Type Questions

**Duration: 30 Minutes** 

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- $(c_1 + c_2 x)e^{2x} + (c_3 + c_4 x)e^{-2x}$  is a general solution of \_\_\_\_\_ 1)
- b)  $(D^2 + 4)^2 y = 0$ a)  $(D^2 - 4)^2 v = 0$ c)  $(D^2 - 2)^2 v = 0$ d)  $(D^2 + 2)^2 v = 0$ The particular Integral of  $(D^2 - 2D + 1)y = -4e^x$  is \_\_\_\_\_. 2) a)  $-2x^2e^x$ b)  $-4x^2e^x$ d)  $x^2 e^x$ C)  $(c_1 + c_2 x)e^x$ If a Poisson Distribution is such that P(x = 2) = P(x = 3) then the mean 3) is \_\_\_\_ a) 2 b) 4 c) 3 d) 9

4)	$L^{-1}\left[\frac{1}{s^2+4s+13}\right] = $		
	a) $e^{-2t}\cos 3t$	b)	$\frac{1}{2}e^{2t}\sin 3t$
	C) $\frac{1}{3}e^{-2t}\sin 3t$	d)	$e^{-2t}$ sin 3t

Idle time of the queuing system is \_\_\_\_\_ 5)

a)	λ	b)	$1-\frac{\lambda}{-1}$
c)	$\frac{\mu}{\lambda}$	d)	$1-\frac{\mu}{\lambda}$

If mean of x = 70 mean of y = 149 and  $b_{yx} = 0.7$  then the line of 6) regression of y on x is \_\_\_\_\_.

a)	y = 0.8x + 120	b)	y = 0.6x + 80
c)	y = 0.5x + 60	d)	y = 0.7x + 100

- 7) The number of defective ballot papers follows a Poisson distribution with mean 2. The probability that there will be no defective ballot paper in a box is
  - a) 0.101 b) 0.113 c) 0.124 d) 0.135
- 8) In  $M|M|1|\infty$  system with  $\lambda = 12$  hrs and  $\mu = 16$  hrs the average number of customers in the system is \_\_\_\_\_
  - b) 4 5 a) 3 d) 2 C)

SLR-FR-34



Marks: 14

Max. Marks: 70

# SLR-FR-34

Set P

9) The half range sine series of f(x) defined in the interval (0, 2) is \_\_\_\_\_ a)  $f(x) = \sum_{n=1}^{\infty} b_n \sin nx$  b)  $f(x) = \sum_{n=1}^{\infty} b_n \sin(2n\pi x)$ c)  $f(x) = \sum_{n=1}^{\infty} b_n \sin\left(\frac{n\pi x}{2}\right)$  d)  $f(x) = \sum_{n=1}^{\infty} a_n \cos\left(\frac{n\pi x}{2}\right)$ Laplace transform of  $\int_{0}^{t} u^{3} du =$ a)  $\frac{3}{s^{5}}$ b)  $\frac{6}{s^{5}}$ d)  $\frac{6}{s^{4}}$ 10) 11) The two regression equations of the variables are x = 19.13 - 0.87y and y = 11.64 - 0.5x then coefficient of correlation is \_\_\_\_\_. a) 0.659 b) -0.649 c) 0.569 d) -0.659 12)  $Lf(t)\,\delta(t-a) = \_$ b)  $e^{-as}f(a)$ d)  $e^{-as}f(t-a)$ a)  $e^{-as}f(t)$ c)  $e^{as}f(a)$ c)  $e^{as} f(a)$ If  $z\{f(k)\} = F(z)$ , then  $z\{a^k f(k)\} =$ \_\_\_\_\_. b)  $f\left(\frac{z}{a}\right)$ 13) C)  $\frac{1}{a}f\left(\frac{z}{a}\right)$ d) None 14)  $z\{k\} = \_____ \text{ for } |z| > 1$ a)  $\frac{z}{z-1}$ b)  $\frac{1}{(z-1)^2}$ d)  $\frac{z}{(z+1)^2}$ **c)**  $\frac{z}{(z-1)^2}$ 

	S.Y	'. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/I Computer Science & Engineering APPLIED MATHEMATICS - I	Dec-2019
Day Time	& Da : 10:	ate: Saturday, 07-12-2019 :00 AM To 01:00 PM	Max. Marks: 56
Instr	ucti	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Use of calculator is allowed.</li> </ul>	
		Section - I	
Q.2	Sol a) b) c) d)	Ive any three of the following questions. Solve $(D^3 + 2D^2 + D)y = x^2 + x$ Solve $(D^2 + 5D + 6)y = e^{-2x} \sin 2x$ Find $z \left\{ 2^k \cos\left(\frac{k\pi}{3} + \alpha\right) \right\}, k \ge 0$ Find $L \left[ \int_0^t u e^{-2u} \sin 3u  du \right]$	09
	e)	Find inverse laplace transform of $\log \sqrt{1 + \frac{4}{s^2}}$	
Q.3	So	lve any three of the following questions.	09
	a)	Solve $\frac{d^3y}{dt^3} + y = \cos 2t$	
	b)	If $f(t) = \begin{cases} 1 & 0 \le t \le 1\\ 0 & 1 < t < 2 \end{cases}$ and $f(t) = f(t+2)$ then show that $L[f(t)] = \frac{1}{e^{(1+e^{-5})}}$	
	c)	$\frac{S(1+e^{-3})}{[\frac{s+29}{s}]}$	
	d)	$= \left[ (s+4)(s^2+9) \right]$	
	,	Find z-transform of $\left\{ \left(\frac{2}{3}\right) \right\}$	
_	e)	Find $z\{k\alpha^{\kappa} + k\beta^{\kappa}\}, k \ge 0$	
Q.4	Sol	Ive any two of the following questions.	10
	, h)	Solve $\frac{1}{dx^2} + y = \sin x \sin 2x + 3^x$ Find inverse z-transform of	
	5)	$f(z) = \frac{z}{(z)(z)}  z  < 2,  z  > 3$	
	c)	Use Laplace transform to solve	
		$\frac{dy}{dt} + 3y(t) + 2\int_{0}^{t} y(t)dt = t  y = 0 \text{ when } t = 0$	

Seat

No.

# SLR-FR-34

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Set

#### Section – II

### Q.5 Solve any three of the following questions.

- a) Obtain half range cosine series for
  - $f(x) = (x-1)^2, \qquad 0 \le x \le 1$
- **b)** For a certain data the regression equations are 3x + 2y 26 = 0 and 6x + y 31 = 0 find the following.
  - 1) Mean of x & y
  - 2) Coefficient of correlation
  - 3) Most probable value of x when y = 15
- c) Assuming that 20% the population is literate so that the change of an individual being literate is  $\frac{1}{5}$  and assuming that 100 investigators can take a sample of 10 individuals to see whether they are literates, how many investigators would you except to report that three people or less were literate?
- d) The following mistakes per page were observed in a book.

•	•						
No. of mistakes:	0	1	2	3	4	Total	
No. of pages:	211	90	19	5	0	325	
Fit a Daisson distribution							

Fit a Poisson distribution.

- e) A xerox machine owner earns by giving xeroxing service. The time required to complete xeroxing of one customer has an exponential distribution with the mean of 5 minutes. The arrival of customers is a Poisson process with mean rate of 6 customers per hour. If the machine owner works 8 hours a day, find
  - 1) The average idle time
  - 2) The average time a customer has to remain in the shop.

### **Q.6** Solve any three of the following questions.

- a) Find fourier series for  $f(x) = \frac{x(\pi^2 x^2)}{12}$  in  $(-\pi, \pi)$
- **b)** from the following data find the line of regression y on x

	У	x
Mean	508.4	26.7
SD	36.8	4.6

- r=0.52
- c) Calculate the coefficient of correlation from the following data.

<i>x</i> :	42	44	58	55	89	98	66
<i>y</i> :	56	59	53	58	65	78	58

d) Assuming that the diameter of 1000 plugs taken consecutively from a machine, form a normal distribution with mean 0.7515 and standard deviation 0.002, How many plugs are likely to be rejected if the approved diameter is  $0.752 \pm 0.004$ 

(Given: for a SNV z area between z=0 and z=1.75 is 0.4599 and that between z=0 and z=2.25 is 0.4878)

- e) Customers arrive at a petrol pump at the rate of 5 persons per hour. It takes on an average 4 minutes to serve a customer. Assuming this to be  $M|M|1|\infty$  system.
  - 1) Find the average number of persons waiting at the petrol pump i.e. in the system.
  - 2) What is the probability that a customer arriving at the petrol pump will have to wait in the Queue?

SLR-FR-34

Set

09

# SLR-FR-34 Set P

#### Q.7 Solve any two of the following questions.

a) From the following data obtain the two lines of regression.

<i>x</i> :	91	97	108	121	67	124	51	73	111	57
<i>y</i> :	71	75	69	97	70	91	39	61	80	47

**b)** Find the fourier series for f(x) in  $(0,2\pi)$ 

$$f(x) = \begin{cases} x & , 0 < x \le \pi \\ 2\pi - x & , \pi < x < 2\pi \end{cases}$$

- c) Customers arrive at a clinic according to a Poisson process with a mean interval of 25 minutes. The physician needs on an average 20 minutes for a patient to examine.
  - 1) Find the expected number of patients at the clinic and in the queue?
  - 2) Find the percentage of patients who are not required to wait?
  - 3) Find the percentage of patients who have to wait?
  - 4) Find Average time spent by a patient at the clinic?

## S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Computer Science & Engineering APPLIED MATHEMATICS - I**

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory should be solved in first 30 minutes in answer book.

- Figures to the right indicate full marks.
- Use of non programmable calculator is allowed.

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Seat

No.

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) In  $M|M|1|\infty$  system with  $\lambda = 12$  hrs and  $\mu = 16$  hrs the average number of customers in the system is \_\_\_\_\_
  - 5 b) 4 a) 3 C) d) 2
- The half range sine series of f(x) defined in the interval (0, 2) is \_\_\_\_\_. 2)
  - a)  $f(x) = \sum_{n=1}^{\infty} b_n \sin nx$  b)  $f(x) = \sum_{n=1}^{\infty} b_n \sin(2n\pi x)$ c)  $f(x) = \sum_{n=1}^{\infty} b_n \sin\left(\frac{n\pi x}{2}\right)$  d)  $f(x) = \sum_{n=1}^{\infty} a_n \cos\left(\frac{n\pi x}{2}\right)$

Laplace transform of  $\int_{0}^{t} u^{3} du =$ a)  $\frac{3}{s^{5}}$ b)  $\frac{6}{s^{5}}$ d)  $\frac{6}{s^{4}}$ 3)

c) 
$$\frac{1}{s^5}$$
 d)

4) The two regression equations of the variables are x = 19.13 - 0.87y and y = 11.64 - 0.5x then coefficient of correlation is .

- a) 0.659 b) -0.649 c) 0.569 d) -0.659 5)  $Lf(t)\,\delta(t-a) = \underline{\qquad}.$ a)  $e^{-as}f(t)$ b)  $e^{-as}f(a)$ d)  $e^{-as}f(t-a)$ c)  $e^{as}f(a)$ 6)
  - If  $z\{f(k)\} = F(z)$ , then  $z\{a^k f(k)\} =$ \_\_\_\_\_. a)  $f\left(\frac{a}{z}\right)$  b)  $f\left(\frac{z}{a}\right)$ c)  $\frac{1}{z} f(z)$  d) None C)  $\frac{1}{z}f\left(\frac{z}{z}\right)$

SLR-FR-34

Max. Marks: 70



Marks: 14

Set  $z\{k\} =$ \_\_\_\_\_ for |z| > 1a)  $\frac{z}{z-1}$ c)  $\frac{z}{(z-1)^2}$ 7) b)  $\frac{1}{(z-1)^2}$ d)  $\frac{z}{(z+1)^2}$  $(c_1 + c_2 x)e^{2x} + (c_3 + c_4 x)e^{-2x}$  is a general solution of \_\_\_\_\_. a)  $(D^2 - 4)^2 y = 0$  b)  $(D^2 + 4)^2 y = 0$ c)  $(D^2 - 2)^2 y = 0$  d)  $(D^2 + 2)^2 y = 0$ 8) The particular Integral of  $(D^2 - 2D + 1)y = -4e^x$  is \_\_\_\_\_. 9) b)  $-4x^2e^x$ d)  $x^2e^x$ a)  $-2x^2e^x$ C)  $(c_1 + c_2 x)e^x$ 10) If a Poisson Distribution is such that P(x = 2) = P(x = 3) then the mean is \_\_ a) 2 b) 4 c) 3 d) 9 11)  $L^{-1}\left[\frac{1}{s^2+4s+13}\right] =$ \_\_\_\_\_. a)  $e^{-2t}\cos 3t$ b)  $\frac{1}{3}e^{2t}\sin 3t$ d)  $e^{-2t}\sin 3t$ c)  $\frac{1}{2}e^{-2t}\sin 3t$ Idle time of the queuing system is \_ 12) b)  $1 - \frac{\lambda}{\mu}$ d)  $1 - \frac{\mu}{\lambda}$ a) <u>λ</u> c)  $\frac{\mu}{\lambda}$ If mean of x = 70 mean of y = 149 and  $b_{yx} = 0.7$  then the line of 13) regression of y on x is \_\_\_\_\_. a) y = 0.8x + 120b) y = 0.6x + 80c) y = 0.5x + 60d) v = 0.7x + 100The number of defective ballot papers follows a Poisson distribution with 14) mean 2. The probability that there will be no defective ballot paper in a

- box is \_\_\_\_\_. a) 0.101 b) 0.113
  - c) 0.124 d) 0.135

	S.Y	'. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/I Computer Science & Engineering APPLIED MATHEMATICS - I	Dec-2019
Day Time	& Da : 10:	ate: Saturday, 07-12-2019 :00 AM To 01:00 PM	Max. Marks: 56
Instr	ucti	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Use of calculator is allowed.</li> </ul>	
		Section - I	
Q.2	Sol a) b) c) d)	Ive any three of the following questions. Solve $(D^3 + 2D^2 + D)y = x^2 + x$ Solve $(D^2 + 5D + 6)y = e^{-2x} \sin 2x$ Find $z \left\{ 2^k \cos\left(\frac{k\pi}{3} + \alpha\right) \right\}, k \ge 0$ Find $L \left[ \int_0^t u e^{-2u} \sin 3u  du \right]$	09
	e)	Find inverse laplace transform of $\log \sqrt{1 + \frac{4}{s^2}}$	
Q.3	Sol a) b)	Ive any three of the following questions. Solve $\frac{d^3y}{dt^3} + y = \cos 2t$ If $f(t) = \begin{cases} 1 & 0 \le t \le 1 \\ 0 & 1 < t < 2 \end{cases}$ and $f(t) = f(t+2)$ then show that $L[f(t)] = \frac{1}{s(1+e^{-s})}$	09
	c)	Find $L^{-1}\left[\frac{s+29}{(s+4)(s^2+9)}\right]$	
	d) e)	Find z-transform of $\left\{ \left(\frac{1}{3}\right)^{ k } \right\}$ Find $z\{k\alpha^k + k\beta^k\}, k \ge 0$	
Q.4	So	lve any two of the following questions.	10
	a)	Solve $\frac{d^2y}{dx^2} + y = \sin x \sin 2x + 3^x$	
	b) c)	Find inverse z-transform of $f(z) = \frac{z}{(z-2)(z-3)}$ $ z  < 2$ , $ z  > 3$ Use Laplace transform to solve $\frac{dy}{dt} + 3y(t) + 2 \int_{0}^{t} y(t)dt = t$ , $y = 0$ when $t = 0$	
		$dt = \int_{0}^{0} \int_{0}^{0} f(t) dt = 0$ when $t = 0$	

Seat

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Set Q

#### Section – II

### Q.5 Solve any three of the following questions.

- a) Obtain half range cosine series for
  - $f(x) = (x 1)^2, \qquad 0 \le x \le 1$
- **b)** For a certain data the regression equations are 3x + 2y 26 = 0 and 6x + y 31 = 0 find the following.
  - 1) Mean of x & y
  - 2) Coefficient of correlation
  - 3) Most probable value of x when y = 15
- c) Assuming that 20% the population is literate so that the change of an individual being literate is  $\frac{1}{5}$  and assuming that 100 investigators can take a sample of 10 individuals to see whether they are literates, how many investigators would you except to report that three people or less were literate?
- d) The following mistakes per page were observed in a book.

•	•						
No. of mistakes:	0	1	2	3	4	Total	
No. of pages:	211	90	19	5	0	325	
Fit a Daisson distribution							

Fit a Poisson distribution.

- e) A xerox machine owner earns by giving xeroxing service. The time required to complete xeroxing of one customer has an exponential distribution with the mean of 5 minutes. The arrival of customers is a Poisson process with mean rate of 6 customers per hour. If the machine owner works 8 hours a day, find
  - 1) The average idle time
  - 2) The average time a customer has to remain in the shop.

### **Q.6** Solve any three of the following questions.

- a) Find fourier series for  $f(x) = \frac{x(\pi^2 x^2)}{12}$  in  $(-\pi, \pi)$
- **b)** from the following data find the line of regression y on x

	У	x
Mean	508.4	26.7
SD	36.8	4.6

- r=0.52
- c) Calculate the coefficient of correlation from the following data.

<i>x</i> :	42	44	58	55	89	98	66
<i>y</i> :	56	59	53	58	65	78	58

d) Assuming that the diameter of 1000 plugs taken consecutively from a machine, form a normal distribution with mean 0.7515 and standard deviation 0.002, How many plugs are likely to be rejected if the approved diameter is  $0.752 \pm 0.004$ 

(Given: for a SNV z area between z=0 and z=1.75 is 0.4599 and that between z=0 and z=2.25 is 0.4878)

- e) Customers arrive at a petrol pump at the rate of 5 persons per hour. It takes on an average 4 minutes to serve a customer. Assuming this to be  $M|M|1|\infty$  system.
  - 1) Find the average number of persons waiting at the petrol pump i.e. in the system.
  - 2) What is the probability that a customer arriving at the petrol pump will have to wait in the Queue?

SLR-FR-34

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# SLR-FR-34 Set Q

#### Q.7 Solve any two of the following questions.

a) From the following data obtain the two lines of regression.

<i>x</i> :	91	97	108	121	67	124	51	73	111	57
<i>y</i> :	71	75	69	97	70	91	39	61	80	47

**b)** Find the fourier series for f(x) in  $(0,2\pi)$ 

$$f(x) = \begin{cases} x & , 0 < x \le \pi \\ 2\pi - x & , \pi < x < 2\pi \end{cases}$$

- c) Customers arrive at a clinic according to a Poisson process with a mean interval of 25 minutes. The physician needs on an average 20 minutes for a patient to examine.
  - 1) Find the expected number of patients at the clinic and in the queue?
  - 2) Find the percentage of patients who are not required to wait?
  - 3) Find the percentage of patients who have to wait?
  - 4) Find Average time spent by a patient at the clinic?

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Computer Science & Engineering** 

# **APPLIED MATHEMATICS - I**

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory should be solved in first 30 minutes in answer book.

- Figures to the right indicate full marks.
- Use of non programmable calculator is allowed.

MCQ/Objective Type Questions

**Duration: 30 Minutes** 

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Idle time of the queuing system is
  - b)  $1 \frac{\lambda}{\mu}$ d)  $1 \frac{\mu}{\lambda}$ a) <u>λ</u> μ μ c)
- If mean of x = 70 mean of y = 149 and  $b_{yx} = 0.7$  then the line of 2) regression of y on x is \_\_\_\_\_
  - a) v = 0.8x + 120b) v = 0.6x + 80d) v = 0.7x + 100c) y = 0.5x + 60
- The number of defective ballot papers follows a Poisson distribution with 3) mean 2. The probability that there will be no defective ballot paper in a box is
  - a) 0.101 b) 0.113 0.124 d) 0.135 C)
- 4) In  $M|M|1|\infty$  system with  $\lambda = 12$  hrs and  $\mu = 16$  hrs the average number of customers in the system is \_\_\_\_
  - 4 a) 5 b) c) 3 d) 2

The half range sine series of f(x) defined in the interval (0, 2) is \_\_\_\_\_. 5)

- a)  $f(x) = \sum_{n=1}^{\infty} b_n \sin nx$  b)  $f(x) = \sum_{n=1}^{\infty} b_n \sin(2n\pi x)$ c)  $f(x) = \sum_{n=1}^{\infty} b_n \sin\left(\frac{n\pi x}{2}\right)$  d)  $f(x) = \sum_{n=1}^{\infty} a_n \cos\left(\frac{n\pi x}{2}\right)$
- 6) Laplace transform of  $\int u^3 du =$ a)  $\frac{3}{s^5}$ 
  - b)  $\frac{6}{s^5}$ d)  $\frac{6}{s^4}$ c)

SLR-FR-34

Max. Marks: 70

Marks: 14

R Set



#### Set | R 7) The two regression equations of the variables are x = 19.13 - 0.87y and y = 11.64 - 0.5x then coefficient of correlation is \_\_\_\_\_. a) 0.659 b) -0.649 c) 0.569 d) -0.659 8) $Lf(t)\,\delta(t-a)=\underline{\qquad}.$ a) $e^{-as}f(t)$ b) $e^{-as}f(a)$ c) $e^{as}f(a)$ d) $e^{-as}f(t-a)$ If $z\{f(k)\} = F(z)$ , then $z\{a^k f(k)\} =$ \_\_\_\_\_ 9) b) $f\left(\frac{z}{a}\right)$ a) $f\left(\frac{a}{z}\right)$ C) $\frac{1}{a}f\left(\frac{z}{a}\right)$ d) None $z\{k\} = _____ \text{ for } |z| > 1$ a) $\frac{z}{z-1}$ 10) b) $\frac{1}{(z-1)^2}$ d) $\frac{z}{(z+1)^2}$ c) $\frac{z}{(z-1)^2}$ $(c_1 + c_2 x)e^{2x} + (c_3 + c_4 x)e^{-2x}$ is a general solution of \_\_\_\_\_. 11) a) $(D^2 - 4)^2 y = 0$ c) $(D^2 - 2)^2 y = 0$ b) $(D^2 + 4)^2 y = 0$ d) $(D^2 + 2)^2 v = 0$ The particular Integral of $(D^2 - 2D + 1)y = -4e^x$ is \_\_\_\_\_. 12) a) $-2x^2e^x$ b) $-4x^2e^x$ d) $x^2 e^x$ c) $(c_1 + c_2 x)e^x$ If a Poisson Distribution is such that P(x = 2) = P(x = 3) then the mean 13) is a) 2 b) 4 d) 9 c) 3 $L^{-1}\left[\frac{1}{s^2+4s+13}\right] = \underline{\qquad}.$ a) $e^{-2t}\cos 3t$ 14) b) $\frac{1}{2}e^{2t}\sin 3t$

c) 
$$\frac{1}{3}e^{-2t}\sin 3t$$
  
d)  $e^{-2t}\sin 3t$ 

	S.Y	7. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/I Computer Science & Engineering APPLIED MATHEMATICS - I	Dec-2019
Day & Time	& Da : 10:	ate: Saturday, 07-12-2019 00 AM To 01:00 PM	Max. Marks: 56
Instr	uctio	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Use of calculator is allowed.</li> </ul>	
		Section - I	
Q.2	Sol a) b) c) d)	Ve any three of the following questions. Solve $(D^3 + 2D^2 + D)y = x^2 + x$ Solve $(D^2 + 5D + 6)y = e^{-2x} \sin 2x$ Find $z \left\{ 2^k \cos\left(\frac{k\pi}{3} + \alpha\right) \right\}, k \ge 0$ Find $L \left[ \int_0^t u e^{-2u} \sin 3u  du \right]$	09
	e)	Find inverse laplace transform of $\log_{1}\sqrt{1+\frac{4}{s^{2}}}$	
Q.3	Sol a) b)	Ive any three of the following questions. Solve $\frac{d^3y}{dt^3} + y = \cos 2t$ If $f(t) = \begin{cases} 1 & 0 \le t \le 1\\ 0 & 1 < t < 2 \end{cases}$ and $f(t) = f(t+2)$ then show that $L[f(t)] = \frac{1}{s(1+e^{-s})}$	09
	U)	Find $L^{-1}\left[\frac{1}{(s+4)(s^2+9)}\right]$	
	a)	Find z-transform of $\left\{ \left(\frac{1}{3}\right)^{n} \right\}$	
	e)	Find $z\{k\alpha^k + k\beta^k\}, k \ge 0$	
Q.4	Sol a)	lve any two of the following questions.	10
	b)	Solve $\frac{dx^2}{dx^2} + y = \sin x \sin 2x + 3^x$ Find inverse z-transform of $f(z) = \frac{z}{(z-2)(z-3)}  z  < 2,  z  > 3$	
	U)	$\frac{dy}{dt} + 3y(t) + 2 \int_{0}^{t} y(t)dt = t  y = 0 \text{ when } t = 0$	

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# SLR-FR-34

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#### Section – II

#### **Q.5** Solve any three of the following questions.

- a) Obtain half range cosine series for
  - $f(x) = (x 1)^2, \quad 0 \le x \le 1$
- **b)** For a certain data the regression equations are 3x + 2y 26 = 0 and 6x + y 31 = 0 find the following.
  - 1) Mean of x & y
  - 2) Coefficient of correlation
  - 3) Most probable value of x when y = 15
- c) Assuming that 20% the population is literate so that the change of an individual being literate is  $\frac{1}{5}$  and assuming that 100 investigators can take a sample of 10 individuals to see whether they are literates, how many investigators would you except to report that three people or less were literate?
- d) The following mistakes per page were observed in a book.

No. of mistakes:	0	1	2	3	4	Total			
No. of pages:	211	90	19	5	0	325			
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Fit a Poisson distribution.

- e) A xerox machine owner earns by giving xeroxing service. The time required to complete xeroxing of one customer has an exponential distribution with the mean of 5 minutes. The arrival of customers is a Poisson process with mean rate of 6 customers per hour. If the machine owner works 8 hours a day, find
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  - 2) The average time a customer has to remain in the shop.

#### Q.6 Solve any three of the following questions.

- **a)** Find fourier series for  $f(x) = \frac{x(\pi^2 x^2)}{12}$  in  $(-\pi, \pi)$
- **b)** from the following data find the line of regression *y* on *x*

	У	x
Mean	508.4	26.7
SD	36.8	4.6

r=0.52

c) Calculate the coefficient of correlation from the following data.

<i>x</i> :	42	44	58	55	89	98	66
<i>y</i> :	56	59	53	58	65	78	58

d) Assuming that the diameter of 1000 plugs taken consecutively from a machine, form a normal distribution with mean 0.7515 and standard deviation 0.002, How many plugs are likely to be rejected if the approved diameter is  $0.752 \pm 0.004$ 

(Given: for a SNV z area between z=0 and z=1.75 is 0.4599 and that between z=0 and z=2.25 is 0.4878)

- e) Customers arrive at a petrol pump at the rate of 5 persons per hour. It takes on an average 4 minutes to serve a customer. Assuming this to be *M*|*M*|1|∞ system.
  - 1) Find the average number of persons waiting at the petrol pump i.e. in the system.
  - 2) What is the probability that a customer arriving at the petrol pump will have to wait in the Queue?

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SLR-FR-34

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# SLR-FR-34 Set R

#### Q.7 Solve any two of the following questions.

a) From the following data obtain the two lines of regression.

<i>x</i> :	91	97	108	121	67	124	51	73	111	57
<i>y</i> :	71	75	69	97	70	91	39	61	80	47

**b)** Find the fourier series for f(x) in  $(0,2\pi)$ 

$$f(x) = \begin{cases} x & , 0 < x \le \pi \\ 2\pi - x & , \pi < x < 2\pi \end{cases}$$

- c) Customers arrive at a clinic according to a Poisson process with a mean interval of 25 minutes. The physician needs on an average 20 minutes for a patient to examine.
  - 1) Find the expected number of patients at the clinic and in the queue?
  - 2) Find the percentage of patients who are not required to wait?
  - 3) Find the percentage of patients who have to wait?
  - 4) Find Average time spent by a patient at the clinic?

# S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Computer Science & Engineering**

**APPLIED MATHEMATICS - I** 

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory should be solved in first 30 minutes in answer book.

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

### **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

01100		te options and rewrite the sentence
1)	Laplace transform of $\int u^3 du =$	
	a) $\frac{3}{s^5}$	b) $\frac{6}{s^5}$
	c) $\frac{1}{s^5}$	d) $\frac{6}{s^4}$
2)	The two regression equations of the $y = 11.64 - 0.5x$ then coefficient of a) 0.659 c) 0.569	e variables are $x = 19.13 - 0.87y$ and correlation is b) $-0.649$ d) $-0.659$
3)	$Lf(t) \delta(t-a) = \underline{\qquad}.$ a) $e^{-as}f(t)$ c) $e^{as}f(a)$	b) $e^{-as}f(a)$ d) $e^{-as}f(t-a)$
4)	If $z\{f(k)\} = F(z)$ , then $z\{a^k f(k)\} =$ a) $f\left(\frac{a}{z}\right)$ c) $\frac{1}{a}f\left(\frac{z}{a}\right)$	b) $f\left(\frac{z}{a}\right)$ d) None
5)	$z\{k\} = \ for  z  > 1$ a) $\frac{z}{z-1}$ c) $\frac{z}{(z-1)^2}$	b) $\frac{1}{(z-1)^2}$ d) $\frac{z}{(z+1)^2}$
6)	$(c_1 + c_2 x)e^{2x} + (c_3 + c_4 x)e^{-2x}$ is a g a) $(D^2 - 4)^2 y = 0$ c) $(D^2 - 2)^2 y = 0$	general solution of b) $(D^2 + 4)^2 y = 0$ d) $(D^2 + 2)^2 y = 0$
7)	The particular Integral of $(D^2 - 2D - a) -2x^2e^x$ c) $(c_1 + c_2x)e^x$	+ 1) $y = -4e^{x}$ is b) $-4x^{2}e^{x}$ d) $x^{2}e^{x}$

### Seat No.

SLR-FR-34



Marks: 14

Max. Marks: 70

Set 8) If a Poisson Distribution is such that P(x = 2) = P(x = 3) then the mean is a) 2 b) 4 c) 3 d) 9 9)  $L^{-1}\left[\frac{1}{s^2+4s+13}\right] = \underline{\qquad}.$ a)  $e^{-2t}\cos 3t$ b)  $\frac{1}{3}e^{2t}\sin 3t$ d)  $e^{-2t}\sin 3t$ c)  $\frac{1}{3}e^{-2t}\sin 3t$ Idle time of the queuing system is \_\_\_\_ 10) b)  $1 - \frac{\lambda}{\mu}$ d)  $1 - \frac{\mu}{\lambda}$ a) <u>λ</u> μ c)  $\frac{\tilde{\mu}}{\mu}$ If mean of x = 70 mean of y = 149 and  $b_{yx} = 0.7$  then the line of 11)regression of y on x is \_\_\_\_\_ b) y = 0.6x + 80a) y = 0.8x + 120c) y = 0.5x + 60d) y = 0.7x + 10012) The number of defective ballot papers follows a Poisson distribution with mean 2. The probability that there will be no defective ballot paper in a box is a) 0.101 b) 0.113 d) 0.135 C) 0.124 In  $M|M|1|\infty$  system with  $\lambda = 12$  hrs and  $\mu = 16$  hrs the average number 13) of customers in the system is \_\_\_\_\_ b) a) 5 4 c) 3 d) 2 The half range sine series of f(x) defined in the interval (0, 2) is \_\_\_\_\_. 14) a)  $f(x) = \sum_{n=1}^{\infty} b_n \sin nx$  b)  $f(x) = \sum_{n=1}^{\infty} b_n \sin(2n\pi x)$ 

c) 
$$f(x) = \sum_{n=1}^{\infty} b_n \sin\left(\frac{n\pi x}{2}\right)$$
 d)  $f(x) = \sum_{n=1}^{\infty} a_n \cos\left(\frac{n\pi x}{2}\right)$ 

	S.Y	'. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/I Computer Science & Engineering APPLIED MATHEMATICS - I	Dec-2019
Day a Time	& Da : 10:	ate: Saturday, 07-12-2019 00 AM To 01:00 PM	Max. Marks: 56
Instr	uctio	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Use of calculator is allowed.</li> </ul>	
		Section - I	
Q.2	Sol a) b) c) d)	Solve $(D^3 + 2D^2 + D)y = x^2 + x$ Solve $(D^2 + 5D + 6)y = e^{-2x} \sin 2x$ Find $z \left\{ 2^k \cos\left(\frac{k\pi}{3} + \alpha\right) \right\}, k \ge 0$ Find $L \left[ \int_0^t u e^{-2u} \sin 3u  du \right]$	09
	e)	Find inverse laplace transform of $\log \sqrt{1 + \frac{4}{s^2}}$	
Q.3	Sol a)	Ive any three of the following questions.	09
	b)	Solve $\frac{1}{dt^3} + y = \cos 2t$ If $f(t) = \begin{cases} 1 & 0 \le t \le 1\\ 0 & 1 < t < 2 \end{cases}$ and $f(t) = f(t+2)$ then show that $L[f(t)] = \frac{1}{s(1+e^{-s})}$	
	c)	Find $L^{-1}\left[\frac{s+29}{s+29}\right]$	
	d)	Find z-transform of $\left\{ \left(\frac{1}{3}\right)^{ k } \right\}$	
	e)	Find $z\{k\alpha^k + k\beta^k\}, k \ge 0$	
Q.4	Sol a)	lve any two of the following questions.	10
	b)	Solve $\frac{x}{dx^2} + y = \sin x \sin 2x + 3^x$ Find inverse z-transform of $f(z) = \frac{z}{(z-2)(z-3)}  z  < 2,  z  > 3$	
	C)	$\frac{dy}{dt} + 3y(t) + 2 \int_{0}^{t} y(t)dt = t  y = 0 \text{ when } t = 0$	

Seat

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SLR-FR-34

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#### Section – II

#### Q.5 Solve any three of the following questions.

- a) Obtain half range cosine series for
  - $f(x) = (x 1)^2, \quad 0 \le x \le 1$
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  - 2) Coefficient of correlation
  - 3) Most probable value of x when y = 15
- c) Assuming that 20% the population is literate so that the change of an individual being literate is  $\frac{1}{5}$  and assuming that 100 investigators can take a sample of 10 individuals to see whether they are literates, how many investigators would you except to report that three people or less were literate?
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-								
No. of mistakes:	0	1	2	З	4	Total		
No. of pages:	211	90	19	5	0	325		
Cit a Daisagen distribution								

Fit a Poisson distribution.

- e) A xerox machine owner earns by giving xeroxing service. The time required to complete xeroxing of one customer has an exponential distribution with the mean of 5 minutes. The arrival of customers is a Poisson process with mean rate of 6 customers per hour. If the machine owner works 8 hours a day, find
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  - 2) The average time a customer has to remain in the shop.

#### **Q.6** Solve any three of the following questions.

- **a)** Find fourier series for  $f(x) = \frac{x(\pi^2 x^2)}{12}$  in  $(-\pi, \pi)$
- **b)** from the following data find the line of regression *y* on *x*

	У	x
Mean	508.4	26.7
SD	36.8	4.6

r=0.52

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<i>x</i> :	42	44	58	55	89	98	66
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(Given: for a SNV z area between z=0 and z=1.75 is 0.4599 and that between z=0 and z=2.25 is 0.4878)

- e) Customers arrive at a petrol pump at the rate of 5 persons per hour. It takes on an average 4 minutes to serve a customer. Assuming this to be *M*|*M*|1|∞ system.
  - 1) Find the average number of persons waiting at the petrol pump i.e. in the system.
  - 2) What is the probability that a customer arriving at the petrol pump will have to wait in the Queue?

09

SLR-FR-34

Set

09

# SLR-FR-34 Set S

#### Q.7 Solve any two of the following questions.

a) From the following data obtain the two lines of regression.

<i>x</i> :	91	97	108	121	67	124	51	73	111	57
<i>y</i> :	71	75	69	97	70	91	39	61	80	47

**b)** Find the fourier series for f(x) in  $(0,2\pi)$ 

$$f(x) = \begin{cases} x & , 0 < x \le \pi \\ 2\pi - x & , \pi < x < 2\pi \end{cases}$$

- c) Customers arrive at a clinic according to a Poisson process with a mean interval of 25 minutes. The physician needs on an average 20 minutes for a patient to examine.
  - 1) Find the expected number of patients at the clinic and in the queue?
  - 2) Find the percentage of patients who are not required to wait?
  - 3) Find the percentage of patients who have to wait?
  - 4) Find Average time spent by a patient at the clinic?

# S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering DISCRETE MATHEMATICAL STRUCTURES

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

**Duration: 30 Minutes** 

3)

c)

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

2) Figure to the indicate full marks

#### MCQ/Objective Type Questions

### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

 If J: Jerry takes calculus, K: Ken takes Sociology and L: Larry takes English Then following statement is denoted as: If either Jerry takes Calculus or Ken takes Sociology, then Larry will take English.

a)	$(J\Lambda K) \rightarrow L$	b)	$(J \lor K) \rightarrow L$
c)	$J \vee (K \rightarrow L)$	d)	$J \Lambda(K \rightarrow L)$

2) For any statement formula  $P \rightarrow Q$ , the statement formula  $\neg P \rightarrow \neg Q$  is called its \_\_\_\_\_.

a)	Converse	b)	Inverse
c)	Contrapositive	d)	Implies

C)	Contrapositive	d)	Implies
PC	NF is also called		

•					
а	a)	sum of	product canonical form	b)	product of sum canonical form

c) sum canonical form d) product canonical form

# 4) The complement of the set A is \_\_\_\_\_. a) A - B b) U - A

- c) A U d) B A
- 5) If A is {{Φ}, {Φ, {Φ}}, then the power set of A has how many element?
  a) 2
  b) 4
  - c) 6 d) 8

6) Let  $R = \{(3, 3), (6, 6), (9, 9), (12, 12), (3, 6), (6, 3), (3, 9), (9, 3), (9, 12), (12, 9)\}$ be a relation on the set  $A = \{3, 6, 9, 12\}$ . The relation is \_\_\_\_\_.

- a) reflexive and transitive
- b) reflexive and symmetric
- symmetric and transitive d) equivalence relation
- 7) A relation R in X is said to be a \_\_\_\_\_, if it is reflexive and symmetric.
  - a) void relation b) Circular
  - c) partial order relation d) compatibility relation
- 8) Let f and g be the function from the set of integers to itself, defined by
  - f(x) = 2x + 1 and g(x) = 3x + 4. Then the composition of f and g is \_\_\_\_\_. a) 6x + 9 b) 6x + 7
  - c) 6x + 6 d) 6x + 8

SLR-FR-35

Max. Marks: 70

Marks: 14

Set P

Seat No.

			SLR-FR-35
			Set P
9)	<a, +=""> is the given algebraic system a) Group c) Monoid</a,>	wher b) d)	e A = {0, 1, 2, 3, 4} <a,+> is Semigroup None of these</a,+>
10)	In the algebraic system <a,*> the ma onto is called as a) Automorphism c) Endomorphism</a,*>	apping b) d)	g f:A→A which is one to one Isomorphism Epimorphism
11)	If <g,*> is a group and order of the g a) {φ} c) φ</g,*>	roup b) d)	is 1 then G set is {e} {e, a}
12)	In lattice L, GLB {a,b} is denoted by _ a) a+b c) a <b< td=""><td>b) d)</td><td>a*b none of the above</td></b<>	b) d)	a*b none of the above
13)	Boolean algebra must be lattic a) Complement c) Both a and b	ce. b) d)	Distributive None of the above
14)	A group <g,*> in which the operation a) Subgroup</g,*>	n * is d b) d)	commutative is called Acyclic Group

c) Abelian Group

d) All of the above

### No. S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering

DISCRETE MATHEMATICAL STRUCTURES

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Seat

Instructions: 1) All questions are compulsory

2) Figure to the indicate full marks

#### Section I

#### Q.2 Answer the following questions. (any Three)

a) What is equivalence of formula? Show that following equivalence without constructing truth table.

 $(\neg P \land (\neg Q \land R))V(Q \land R) V(P \land R) \Leftrightarrow R$ 

- **b)** Explain with example partition and covering of sets.
- c) Explain the following terms with example.
  - 1) Duality Law
  - 2) Tautological implication
- d) Let X={2, 3, 6, 12, 24, 36} and relation  $\leq$  be such that x $\leq$ y if x divides y. Find the relation R and Draw hasse diagram of  $\langle x, \leq \rangle$ .

#### Q.3 Answer the following questions. (Any One)

- a) What is Cartesian product? If A={1}, B={a,b} and C={2, 3} find A  $\times$  B  $\times$  C, B<sup>2</sup> and B<sup>2</sup> $\times$  A.
- **b)** Given relation R={<1,2>, <3,4>, <2,2>} and S={<4,2>, <2,5>, <3,1>, <1,3>}. Find RoS, SoR, Ro(SoR), (RoS)oR, RoR, SoS, RoRoR, SoSoS.
- **Q.4** a) Find PCNF of the following without constructing truth table.  $(\neg p \rightarrow r) \land (q \leftrightarrow p)$ 
  - **b)** Find PDNF of the following without constructing truth table.  $(p \land q) \lor (\neg p \land r) \lor (q \land r)$

#### Section II

#### Q.5 Answer the following questions. (Any Three).

- a) Let X={1, 2, 3} and f, g, h and s be functions from X to X given by. f={<1, 2>, <2, 3>, <3, 1>}
  - $g=\{<1, 2>, <2, 3>, <3, 1>\}$   $g=\{<1, 2>, <2, 1>, <3, 3>\}$   $h=\{<1, 1>, <2, 2>, <3, 1>\}$   $s=\{<1, 1>, <2, 2>, <3, 3>\}$ Find
  - Find.
  - 1) Fog
  - 2) Gof
  - 3) Fohog
  - 4) Sofoh
- **b)** Define Algebraic System and Explain its properties with example.
- c) Define semigroup. Prove that <z,\*> is a semigroup; where Z is a set of integers and \* is multiplication. Whether it is monoid or not justify.
- d) What is Boolean algebra? Explain different properties of Boolean algebra.

08

12

12

**08** 

Max. Marks: 56

Set

#### Q.6 Answer the following questions. (Any One).

- a) What is inverse function? Find the inverse of following.
  - 1) f(x)=2x-5
  - 2)  $f(x) = (x-2)^3$
- **b)** Define the following terms:
  - 1) Subsemigroup
  - 2) Submonoid
  - 3) Semigroup homomorphism
  - 4) Monoid homomorphism

#### **Q.7** What is lattice? Explain with example following.

- a) Bounded lattice
- **b)** Complement Lattice
- c) Distributive lattice

SLR-FR-35 Set P

08

Seat No.					Set	Q
S	5.Y. (	B. Tech.) (Pa Ca DISCR	art - I) (New) (CBC omputer Science ETE MATHEMATI	S) E & Er CAL	xamination Nov/Dec-2019 ngineering STRUCTURES	
Day & Time: 1	Date 10:00	: Tuesday, 10-1 AM To 01:00 F	2-2019 PM		Max. Marks:	70
Instruc	ction	<b>s:</b> 1) Q. No. 1 is Each que 2) Figure to	s compulsory. It shoul stion carries one mar the indicate full mar	d be s k. ˈks	solved in first 30 minutes and	
			MCQ/Objective Ty	pe Qı	lestions	
Duratic	on: 30	) Minutes			Marks:	14
<b>Q.1 C</b> 1	Choo  )	se the correct Let f and g be t f(x) = 2x + 1 an a) $6x + 9$ c) $6x + 6$	alternatives from the he function from the s d g(x) = 3x + 4. Then	e opti et of i the co b) d)	ons and rewrite the sentence. ntegers to itself, defined by proposition of f and g is 6x + 7 6x + 8	14
2	2)	<a, +=""> is the gi a) Group c) Monoid</a,>	ven algebraic system	where b) d)	e A = {0, 1, 2, 3, 4} <a,+> is Semigroup None of these</a,+>	.•
3	3)	In the algebraic onto is called as a) Automorph c) Endomorph	system <a,*> the mass s hism bhism</a,*>	apping b) d)	f:A→A which is one to one Isomorphism Epimorphism	
4	l)	lf <g,*> is a gro a) {φ} c) φ</g,*>	oup and order of the g	iroup i b) d)	is 1 then G set is {e} {e, a}	
5	5)	In lattice L, GLE a) a+b c) a <b< td=""><td>3 {a,b} is denoted by _</td><td>b) d)</td><td>a*b none of the above</td><td></td></b<>	3 {a,b} is denoted by _	b) d)	a*b none of the above	
6	6)	Boolean algebr a) Compleme c) Both a and	a must be latti ent d b	ce. b) d)	Distributive None of the above	
7	7)	A group <g,*> a) Subgroup c) Abelian G</g,*>	in which the operatior roup	n * is c b) d)	commutative is called Acyclic Group All of the above	
8	3)	If J: Jerry takes English Then for If either Jerry ta English. a) $(J\Lambda K) \rightarrow L$ c) J $\lor$ $(K \rightarrow I)$	calculus, K: Ken take ollowing statement is o akes Calculus or Ken L)	es Soc denote takes b) d)	tiology and L: Larry takes ed as: Sociology, then Larry will take (J ∨ K) → L J Λ(K → L)	

# Seat No.

				Set Q
9)	For calle	any statement formula $P \rightarrow Q$ , the ed its	state	ment formula ¬P→ ¬ Q is
	a)	Converse	b)	Inverse
	c)	Contrapositive	d)	Implies
10)	PCN a)	IF is also called sum of product canonical form	b)	product of sum canonical form
	C)	sum canonical form	u)	product canonical form
11)	The a) c)	complement of the set A is A - B A - U	 b) d)	U – A B – A
12)	lf A a) c)	is $\{\{\Phi\}, \{\Phi, \{\Phi\}\}, \text{ then the power s} 26$	et of b) d)	A has how many element? 4 8
13)	Let l be a a) c)	R = {(3, 3), (6, 6), (9, 9), (12, 12), relation on the set A= {3, 6, 9, 12 reflexive and transitive symmetric and transitive	(3, 6) 2}. Th b) d)	, (6, 3), (3, 9), (9, 3), (9, 12), (12, 9)} e relation is reflexive and symmetric equivalence relation
14)	A re a)	lation R in X is said to be a void relation	_, if it b)	is reflexive and symmetric. Circular

c) partial order relation d) compatibility relation

# No.

#### S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Computer Science & Engineering DISCRETE MATHEMATICAL STRUCTURES**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Seat

Instructions: 1) All questions are compulsory

2) Figure to the indicate full marks

#### Section I

#### Answer the following questions. (any Three) Q.2

- What is equivalence of formula? Show that following equivalence without a) constructing truth table.
  - $(\neg P \land (\neg Q \land R))V(Q \land R) V(P \land R) \Leftrightarrow R$
- Explain with example partition and covering of sets. b)
- Explain the following terms with example. c)
  - **Duality Law** 1)
  - 2) Tautological implication
- Let X={2, 3, 6, 12, 24, 36} and relation  $\leq$  be such that x $\leq$ y if x divides y. d) Find the relation R and Draw hasse diagram of  $\langle x, \leq \rangle$ .

#### Answer the following questions. (Any One) Q.3

- What is Cartesian product? If A={1}, B={a,b} and C={2, 3} find  $A \times B \times C$ , a)  $B^2$  and  $B^2 \times A$ .
- Given relation R={<1,2>, <3,4>, <2,2>} and S={<4,2>, <2,5>, <3,1>, <1,3>}. b) Find RoS, SoR, Ro(SoR), (RoS)oR, RoR, SoS, RoRoR, SoSoS.
- Q.4 Find PCNF of the following without constructing truth table. a)  $(\neg p \rightarrow r) \land (q \leftrightarrow p)$ 
  - b) Find PDNF of the following without constructing truth table.  $(p \land q) \lor (\neg p \land r) \lor (q \land r)$

#### Section II

#### Answer the following questions. (Any Three). Q.5

- Let X={1, 2, 3} and f, g, h and s be functions from X to X given by. a) f={<1, 2>, <2, 3>, <3, 1>}
  - g={<1, 2>,<2, 1>, <3, 3>} h={<1, 1>,<2, 2>, <3, 1>} s={<1, 1>, <2, 2>, <3, 3>}

Find.

- 1) Fog
- 2) Gof
- 3) Fohog
- 4) Sofoh
- Define Algebraic System and Explain its properties with example. b)
- Define semigroup. Prove that  $\langle z, * \rangle$  is a semigroup; where Z is a set of c) integers and \* is multiplication. Whether it is monoid or not justify.
- What is Boolean algebra? Explain different properties of Boolean algebra. d)

80

12

Max. Marks: 56

12

**08** 

Set Q

#### Q.6 Answer the following questions. (Any One).

- a) What is inverse function? Find the inverse of following.
  - 1) f(x)=2x-5
  - 2)  $f(x) = (x-2)^3$
- **b)** Define the following terms:
  - 1) Subsemigroup
  - 2) Submonoid
  - 3) Semigroup homomorphism
  - 4) Monoid homomorphism

#### **Q.7** What is lattice? Explain with example following.

- a) Bounded lattice
- **b)** Complement Lattice
- c) Distributive lattice

08

SLR-FR-35 Set Q

08

			DISCRETE MATHEMATIC	CAL	STRUCTURES
Day & Time	& Date : 10:00	e: Tue D AM	esday, 10-12-2019 To 01:00 PM		Max. Marks: 70
Instr	uction	n <b>s:</b> 1) 2)	Q. No. 1 is compulsory. It should Each question carries one mark Figure to the indicate full mark	l be s ks	olved in first 30 minutes and
			MCQ/Objective Typ	e Qu	estions
Durat	tion: 3	0 Min	nutes		Marks: 14
Q.1	<b>Choc</b> 1)	lf A i a) c)	The correct alternatives from the s $\{\{\Phi\}, \{\Phi, \{\Phi\}\}, \text{ then the power s} $ 2 6	e <b>opti</b> et of b) d)	ons and rewrite the sentence. 14 A has how many element? 4 8
	2)	Let F be a a) c)	R = {(3, 3), (6, 6), (9, 9), (12, 12), relation on the set A= {3, 6, 9, 12 reflexive and transitive symmetric and transitive	(3, 6) 2}. Th b) d)	e relation is reflexive and symmetric equivalence relation
	3)	A rel a) c)	lation R in X is said to be a void relation partial order relation	_, if it b) d)	is reflexive and symmetric. Circular compatibility relation
	4)	Let f f(x) = a) c)	and g be the function from the set = $2x + 1$ and $g(x) = 3x + 4$ . Then t 6x + 9 6x + 6	et of i he co b) d)	ntegers to itself, defined by omposition of f and g is 6x + 7 6x + 8
	5)	<a, ·<br="">a) c)</a,>	+> is the given algebraic system Group Monoid	where b) d)	e A = {0, 1, 2, 3, 4} <a,+> is Semigroup None of these</a,+>
	6)	In th onto a) c)	e algebraic system <a,*> the ma is called as Automorphism Endomorphism</a,*>	pping b) d)	f:A→A which is one to one Isomorphism Epimorphism
	7)	lf <g a) c)</g 	$G,*>$ is a group and order of the graph $\{\phi\}$	roup i b) d)	s 1 then G set is {e} {e, a}
	8)	In la a) c)	ttice L, GLB {a,b} is denoted by _ a+b a <b< td=""><td>b) d)</td><td> a*b none of the above</td></b<>	b) d)	 a*b none of the above
	9)	Bool a) c)	ean algebra must be lattic Complement Both a and b	e. b) d)	Distributive None of the above
	10)	A gr a) c)	oup <g,*> in which the operation Subgroup Abelian Group</g,*>	* is c b) d)	ommutative is called Acyclic Group All of the above

### No.

Seat

S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering

### SLR-FR-35

Set | R

11) If J: Jerry takes calculus, K: Ken takes Sociology and L: Larry takes English Then following statement is denoted as:
If either Jerry takes Calculus or Ken takes Sociology, then Larry will take English.
a) (JΛK) → L
b) (J ∨ K) → L

- a)  $(\Lambda K) \rightarrow L$ b)  $(J \lor K) \rightarrow L$ c)  $J \lor (K \rightarrow L)$ d)  $J \Lambda (K \rightarrow L)$
- For any statement formula P→Q, the statement formula ¬P→ ¬ Q is called its \_\_\_\_\_.
  - a) Converse b) Inverse
  - c) Contrapositive d) Implies
- PCNF is also called \_\_\_\_\_ 13) sum of product canonical form b) product of sum canonical form a) sum canonical form d) product canonical form c) The complement of the set A is \_\_\_\_\_ 14) U - AA - B b) a)
  - c) A-U d) B-A

SLR-FR-35

Set | R

### No. S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Computer Science & Engineering**

**DISCRETE MATHEMATICAL STRUCTURES** 

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory

2) Figure to the indicate full marks

#### Section I

#### Answer the following questions. (any Three) Q.2

What is equivalence of formula? Show that following equivalence without a) constructing truth table.

 $(\neg P \land (\neg Q \land R))V(Q \land R) V(P \land R) \Leftrightarrow R$ 

- Explain with example partition and covering of sets. b)
- Explain the following terms with example. c)
  - **Duality Law** 1)
  - 2) Tautological implication
- Let X={2, 3, 6, 12, 24, 36} and relation  $\leq$  be such that x $\leq$ y if x divides y. d) Find the relation R and Draw hasse diagram of  $\langle x, \leq \rangle$ .

#### Answer the following questions. (Any One) Q.3

- What is Cartesian product? If A={1}, B={a,b} and C={2, 3} find  $A \times B \times C$ , a)  $B^2$  and  $B^2 \times A$ .
- Given relation R={<1,2>, <3,4>, <2,2>} and S={<4,2>, <2,5>, <3,1>, <1,3>}. b) Find RoS, SoR, Ro(SoR), (RoS)oR, RoR, SoS, RoRoR, SoSoS.
- Q.4 Find PCNF of the following without constructing truth table. a)  $(\neg p \rightarrow r) \land (q \leftrightarrow p)$ 
  - b) Find PDNF of the following without constructing truth table.  $(p \land q) \lor (\neg p \land r) \lor (q \land r)$

#### Section II

#### Answer the following questions. (Any Three). Q.5

- Let X={1, 2, 3} and f, g, h and s be functions from X to X given by. a) f={<1, 2>, <2, 3>, <3, 1>}
  - g={<1, 2>,<2, 1>, <3, 3>} h={<1, 1>,<2, 2>, <3, 1>} s={<1, 1>, <2, 2>, <3, 3>}
  - Find.
  - Fog 1)
  - 2) Gof
  - 3) Fohog
  - 4) Sofoh
- Define Algebraic System and Explain its properties with example. b)
- Define semigroup. Prove that  $\langle z, * \rangle$  is a semigroup; where Z is a set of c) integers and \* is multiplication. Whether it is monoid or not justify.
- What is Boolean algebra? Explain different properties of Boolean algebra. d)

80

Max. Marks: 56

12

12

**08** 

SLR-FR-35



R

Seat

#### Q.6 Answer the following questions. (Any One).

- a) What is inverse function? Find the inverse of following.
  - 1) f(x)=2x-5
  - 2)  $f(x) = (x-2)^3$
- **b)** Define the following terms:
  - 1) Subsemigroup
  - 2) Submonoid
  - 3) Semigroup homomorphism
  - 4) Monoid homomorphism

#### **Q.7** What is lattice? Explain with example following.

- a) Bounded lattice
- **b)** Complement Lattice
- c) Distributive lattice

80

SLR-FR-35 Set R 08

	S.Y.	(B. <sup>-</sup>	Tech.) (Part - I) (New) (CBC Computer Science DISCRETE MATHEMATI	S) E & Ei CAL	Examination Nov/Dec-2019 ngineering STRUCTURES
Day Time	& Date : 10:0	e: Tue 0 AM	esday, 10-12-2019 To 01:00 PM	•/ \_	Max. Marks: 70
Instr	ructio	ns: 1) 2)	) Q. No. 1 is compulsory. It shoul Each question carries one mar ) Figure to the indicate full mar	d be : k. ˈks	solved in first 30 minutes and
			MCQ/Objective Ty	pe Q	uestions
Dura	tion: 3	80 Mir	nutes		Marks: 14
Q.1	<b>Cho</b> 1)	ose t In th onto	he correct alternatives from the ne algebraic system <a,*> the material terms of the system set of the material terms of the system of the system set of the system of th</a,*>	e opt appina	ions and rewrite the sentence. 14 g f:A $\rightarrow$ A which is one to one
		a) c)	Automorphism Endomorphism	b) d)	Isomorphism Epimorphism
	2)	lf <0 a) c)	$G,*>$ is a group and order of the g $\{\phi\}$	roup b) d)	is 1 then G set is {e} {e, a}
	3)	In la a) c)	ittice L, GLB {a,b} is denoted by _ a+b a <b< td=""><td>b) d)</td><td> a*b none of the above</td></b<>	b) d)	 a*b none of the above
	4)	Boo a) c)	lean algebra must be lattic Complement Both a and b	ce. b) d)	Distributive None of the above
	5)	A gr a) c)	oup <g,*> in which the operatior Subgroup Abelian Group</g,*>	n * is ( b) d)	commutative is called Acyclic Group All of the above
	6)	If J: Eng If eit Eng a) c)	Jerry takes calculus, K: Ken take lish Then following statement is o ther Jerry takes Calculus or Ken lish. $(J\Lambda K) \rightarrow L$ J V (K $\rightarrow$ L)	es So denot takes b) d)	ciology and L: Larry takes ed as: Sociology, then Larry will take $(J \lor K) \rightarrow L$ $J \Lambda(K \rightarrow L)$
	7)	For calle a) c)	any statement formula P→Q, the ed its Converse Contrapositive	state b) d)	ement formula ¬P→ ¬ Q is Inverse Implies
	8)	PCN a) c)	IF is also called sum of product canonical form sum canonical form	b) d)	product of sum canonical form product canonical form
	9)	The a) c)	complement of the set A is A - B A - U	 b) d)	U – A B – A

Seat No.

SLR-FR-35

Set

S

I) (New) (CBCS) Examination Nov/Dec-2019

10) If A is  $\{\{\Phi\}, \{\Phi\}\}\$ , then the power set of A has how many element?

2 a) c)

- b) 4
- 6 d) 8
- Let  $R = \{(3, 3), (6, 6), (9, 9), (12, 12), (3, 6), (6, 3), (3, 9), (9, 3), (9, 12), (12, 9)\}$ 11) be a relation on the set A= {3, 6, 9, 12}. The relation is \_\_\_\_\_
  - reflexive and transitive a) symmetric and transitive
- reflexive and symmetric b) equivalence relation d)

SLR-FR-35

Set S

- 12) A relation R in X is said to be a \_\_\_\_\_, if it is reflexive and symmetric.
  - void relation a)
- Circular b)
- partial order relation compatibility relation C) d)
- Let f and g be the function from the set of integers to itself, defined by 13) f(x) = 2x + 1 and g(x) = 3x + 4. Then the composition of f and g is \_\_\_\_\_.
  - 6x + 9 6x + 7 a) b)
    - 6x + 6 d) 6x + 8
- <A, +> is the given algebraic system where A = {0, 1, 2, 3, 4} <A,+> is \_\_\_\_\_. 14)
  - Group a)

c)

C)

c)

- Semigroup b)
- Monoid
- d) None of these

### No. S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering

### DISCRETE MATHEMATICAL STRUCTURES

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Seat

Instructions: 1) All questions are compulsory

2) Figure to the indicate full marks

#### Section I

#### Q.2 Answer the following questions. (any Three)

a) What is equivalence of formula? Show that following equivalence without constructing truth table.

 $(\neg P \land (\neg Q \land R))V(Q \land R) V(P \land R) \Leftrightarrow R$ 

- **b)** Explain with example partition and covering of sets.
- c) Explain the following terms with example.
  - 1) Duality Law
  - 2) Tautological implication
- d) Let X={2, 3, 6, 12, 24, 36} and relation  $\leq$  be such that x $\leq$ y if x divides y. Find the relation R and Draw hasse diagram of <x,  $\leq$ >.

#### Q.3 Answer the following questions. (Any One)

- a) What is Cartesian product? If A={1}, B={a,b} and C={2, 3} find A  $\times$  B  $\times$  C, B<sup>2</sup> and B<sup>2</sup> $\times$  A.
- **b)** Given relation R={<1,2>, <3,4>, <2,2>} and S={<4,2>, <2,5>, <3,1>, <1,3>}. Find RoS, SoR, Ro(SoR), (RoS)oR, RoR, SoS, RoRoR, SoSoS.
- **Q.4** a) Find PCNF of the following without constructing truth table.  $(\neg p \rightarrow r) \land (q \leftrightarrow p)$ 
  - **b)** Find PDNF of the following without constructing truth table.  $(p \land q) \lor (\neg p \land r) \lor (q \land r)$

#### Section II

#### Q.5 Answer the following questions. (Any Three).

- a) Let X={1, 2, 3} and f, g, h and s be functions from X to X given by. f={<1, 2>, <2, 3>, <3, 1>}
  - $g=\{<1, 2>, <2, 3>, <3, 1>\}$   $g=\{<1, 2>, <2, 1>, <3, 3>\}$   $h=\{<1, 1>, <2, 2>, <3, 1>\}$   $s=\{<1, 1>, <2, 2>, <3, 3>\}$ Find
  - Find.
  - 1) Fog
  - 2) Gof
  - 3) Fohog
  - 4) Sofoh
- **b)** Define Algebraic System and Explain its properties with example.
- c) Define semigroup. Prove that <z,\*> is a semigroup; where Z is a set of integers and \* is multiplication. Whether it is monoid or not justify.
- d) What is Boolean algebra? Explain different properties of Boolean algebra.

08

12

00

12

**08** 

Max. Marks: 56

Set

S

#### Q.6 Answer the following questions. (Any One).

- a) What is inverse function? Find the inverse of following.
  - 1) f(x)=2x-5
  - 2)  $f(x) = (x-2)^3$
- **b)** Define the following terms:
  - 1) Subsemigroup
  - 2) Submonoid
  - 3) Semigroup homomorphism
  - 4) Monoid homomorphism

#### **Q.7** What is lattice? Explain with example following.

- a) Bounded lattice
- **b)** Complement Lattice
- c) Distributive lattice

SLR-FR-35 Set S

**08**
			MCQ/Objective T	ype	Questions	
Dura	tion: 3	0 Minute	s		Marks	: 14
Q.1	<b>Choo</b> 1)	<b>ose the c</b> Followir a) OS c) OS	correct alternatives from t ng is practically implemente I	<b>he o</b> d refe b) d)	ptions and rewrite the sentence. erence model TCP/IP None	14
	2)	Framing a) Dat c) App	y is task of layer. a link plication	b) d)	Transport Presentation	
	3)	An a) Dig c) Dis	signal is one which inten ital crete	sity v b) d)	aries smooth fashion over time. Analog all of above	
	4)	The slov a) Twi c) fibe	west transmission speed ar sted pair r optic	e tho b) d)	se of coaxial cable Microwave	
	5)	a) Fibe c) Co-	able is used for a long dista er optic axial	ance b) d)	transmission. Twisted pair None	
	6)	a) CR c) Bot	s method is used to detect a C h a & b	as we b) d)	ell as to correct the error. Hamming code None of this	
	7)	In IEEE a) Eth c) Thir	std.802.3, 10 Base 2 cablir ernet n Ethernet	ng is b) d)	called Thick Ethernet None of this	
	8)	Count-te a) Linl c) Sho	o-infinity problem can occur state routing ortest path routing	in b) d)	 Distance vector routing Both a and b	
	9)	In DQD a) data c) Bot	B stands for a queue distributed bus h	b) d)	distributed queue dual bus None	
	10)	What is a) Pre c) Erre	the purpose of preamble bi -bit counting or checking	ts in b) d)	an Ethernet frame? Synchronization Destination address	

### S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Computer Science & Engineering** DATA COMMUNICATION

2) Make suitable assumptions if necessary and state them clearly

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

answer book.

SLR-FR-36

Max. Marks: 70

Ρ

Seat

No.



- 4



- 11) Protocols in which the sender sends one frame and then waits for Acknowledgment before proceeding are \_\_\_\_\_.
  - a) Selective repeat
- b) Go back n
- c) Stop and wait
- d) All
- 12) The technique in which incoming packet is sent on these lines that are going Approximately in the right direction is
  - a) Flooding
  - c) Selective flooding
- b) Flow-based routing
- d) Symmetric flooding
- 13) \_\_\_\_\_ is collision free protocol.
  - a) Basic bit map
- b) Binary countdown
- c) Both a & b d) None of this
- 14) Which of the following is a static channel allocation method?
  - a) CSMA

b) TDM

c) CSMA/CD

d) Bit-map

Seat No.					Set	Ρ	
S.`	S.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering DATA COMMUNICATION						
Day & Time:	& Da : 10	ate: Thursday, 12-1 :00 AM To 01:00 Pl	2-2019 M		Max. Marks	s: 56	
Instru	ucti	ons: 1) All Questio 2) Make suita	ns are compulsory. ple assumptions if r	ecessary and state them cle	early		
			Section	n – I			
Q.2	At a) b) c) d) e)	tempt any four Draw Manchester Explain CRC with Write differences Explain different f Write uses of com	and differential Mar suitable example. between Serial and aming method. puter Network.	nchester for 00001111 Parallel transmission mode.		16	
Q.3	At a) b)	<b>tempt any one</b> Explain OSI Mode Explain different t	l with diagram. ansmission Impairn	nent.		06	
Q.4	At Wi	tempt the following the need of sl	<b>g</b> ding windows proto	col? Describe GO-Back N P	rotocol	06	
			Section	n - II			
Q.5	At a) b) c) d) e)	tempt any four Compare virtual c Explain Binary co Explain IEEE std. Write a short note Compare Leaky b	rcuit and datagram unt down protocol w 302.5. on CSMA. ucket and token bue	subnet. ith example. cket algorithm.		16	
Q.6	Att a) b)	t <b>empt any one</b> Explain Shortest p Explain IEEE std.	ath algorithm with e 802.3 in details with	example. n frame format.		06	
Q.7	At Ex pro	t <b>empt the followin</b> plain distance vecto oblem.	<b>)</b> r algorithm with exa	ample. Discuss count to infin	ity	06	

	a 2) M	nswer book. Iake suitable assumptions if r	eces	ssary and state them clearly	
	,	MCQ/Objective T	vpe	Questions	
ion: 3	0 Minut	es		Marks	s: 14
<b>Choo</b> 1)	<b>ose the</b> Count- a) Lir c) Sh	<b>correct alternatives from th</b> to-infinity problem can occur nk state routing nortest path routing	<b>ne op</b> in b) d)	b <b>tions and rewrite the sentence.</b> Distance vector routing Both a and b	14
2)	In DQI a) da c) Bo	DB stands for Ita queue distributed bus oth	b) d)	distributed queue dual bus None	
3)	What i a) Pr c) Er	s the purpose of preamble bit e-bit counting ror checking	s in a b) d)	an Ethernet frame? Synchronization Destination address	
4)	Protoc Acknov a) Se c) St	ols in which the sender sends wledgment before proceeding elective repeat op and wait	s one   are   b)   d)	e frame and then waits for  Go back n All	
5)	The te going / a) Flo c) Se	chnique in which incoming pa Approximately in the right dire ooding elective flooding	cket ctior b) d)	is sent on these lines that are n is Flow-based routing Symmetric flooding	
6)	a) Ba c) Bo	is collision free protocol. asic bit map oth a & b	b) d)	Binary countdown None of this	
7)	Which a) CS c) CS	of the following is a static cha SMA SMA/CD	annel b) d)	l allocation method? TDM Bit-map	
8)	Follow a) OS c) OS	ing is practically implemented SI SII	l refe b) d)	erence model TCP/IP None	
9)	Framir a) Da c) Ap	ng is task of layer. ata link oplication	b) d)	Transport Presentation	
10)	An	signal is one which intens	ity va	aries smooth fashion over time.	

b) Analog

d) all of above

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in

Duration: 3

a) Digital

C)

Discrete

## S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Computer Science & Engineering** DATA COMMUNICATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Seat No.

## SLR-FR-36



Q.1

Set Q

Max. Marks: 70

- SLR-FR-36 Set Q
- 11) The slowest transmission speed are those of \_\_\_\_\_.
  - a) Twisted pair
- b) coaxial cable d) Microwave
- c) fiber optic
- \_ cable is used for a long distance transmission. 12) a) Fiber optic
  - b) Twisted pair d) None
  - c) Co-axial
- 13) \_\_\_\_\_ is method is used to detect as well as to correct the error. a) CRC
  - b) Hamming code
  - c) Both a & b d) None of this
- In IEEE std.802.3, 10 Base 2 cabling is called \_\_\_\_ 14)
  - a) Ethernet

\_\_\_. b) Thick Ethernet

c) Thin Ethernet

d) None of this

Seat No.	t Set	Q				
S.Y	S.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering DATA COMMUNICATION					
Day & Time:	& Date: Thursday, 12-12-2019 Max. Mark : 10:00 AM To 01:00 PM	s: 56				
Instru	<ul><li>uctions: 1) All Questions are compulsory.</li><li>2) Make suitable assumptions if necessary and state them clearly</li></ul>					
	Section – I					
Q.2	<ul> <li>Attempt any four</li> <li>a) Draw Manchester and differential Manchester for 00001111</li> <li>b) Explain CRC with suitable example.</li> <li>c) Write differences between Serial and Parallel transmission mode.</li> <li>d) Explain different framing method.</li> <li>e) Write uses of computer Network.</li> </ul>	16				
Q.3	<ul><li>Attempt any one</li><li>a) Explain OSI Model with diagram.</li><li>b) Explain different transmission Impairment.</li></ul>	06				
Q.4	Attempt the following What is the need of sliding windows protocol? Describe GO-Back N Protocol	06				
	Section - II					
Q.5	<ul> <li>Attempt any four</li> <li>a) Compare virtual circuit and datagram subnet.</li> <li>b) Explain Binary count down protocol with example.</li> <li>c) Explain IEEE std.802.5.</li> <li>d) Write a short note on CSMA.</li> <li>e) Compare Leaky bucket and token bucket algorithm.</li> </ul>	16				
Q.6	<ul> <li>Attempt any one</li> <li>a) Explain Shortest path algorithm with example.</li> <li>b) Explain IEEE std. 802.3 in details with frame format.</li> </ul>	06				
Q.7	Attempt the following Explain distance vector algorithm with example. Discuss count to infinity problem.	06				

the light dife	ouor	115 <u></u> .	
-	b)	Flow-based routing	
	d)	Symmetric flooding	
protocol.			
	b)	Binary countdown	
	d)	None of this	
s a static cha	nne	I allocation method?	
	b)	TDM	
	d)	Bit-map	
			Page 7
			-

6) What is the purpose of preamble bits in an Ethernet frame? Pre-bit counting b) Synchronization a) d) Destination address Error checking c) Protocols in which the sender sends one frame and then waits for 7) Acknowledgment before proceeding are Selective repeat b) Go back n a)

Link state routing Distance vector routing a) b) Shortest path routing d) c)

- 1) cable is used for a long distance transmission. Fiber optic a)
- c) Co-axial d) None

- b) Twisted pair

**Computer Science & Engineering** DATA COMMUNICATION

2) Make suitable assumptions if necessary and state them clearly

MCQ/Objective Type Questions

Choose the correct alternatives from the options and rewrite the sentence.

- 2) is method is used to detect as well as to correct the error.
  - CRC b) Hamming code a)

  - c) Both a & b d) None of this

- 3) In IEEE std.802.3, 10 Base 2 cabling is called
  - b) Thick Ethernet a) Ethernet
    - c) Thin Ethernet d)
- 4) Count-to-infinity problem can occur in

Day & Date: Thursday, 12-12-2019

answer book.

Time: 10:00 AM To 01:00 PM

**Duration: 30 Minutes** 

5)

10)

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No.

Q.1

- In DQDB stands for
  - data queue distributed bus a) c) Both
- - d) All Stop and wait c)
- The technique in which incoming packet is sent on these lines that are 8) going Approximately in the right direction is

  - a) Flooding
  - Selective flooding c)
- 9) is collision free p Basic bit map a)

  - c) Both a & b
  - Which of the following is
  - CSMA a)
  - CSMA/CD C)



- Marks: 14

14

- Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in
- S.Y. (B.Tech.) (Part I) (New) (CBCS) Examination Nov/Dec-2019

Max. Marks: 70

Both a and b

None of this

- b) distributed queue dual bus d) None

of **12** 

R

- Following is practically implemented reference model \_\_\_\_\_. 11)
  - a) OSI

b) TCP/IP

c) OSII

- d) None
- Framing is task of \_\_\_\_\_ layer. 12)
  - a) Data link c) Application

b) Transport

SLR-FR-36

Set R

d) Presentation

13) An \_\_\_\_\_\_ signal is one which intensity varies smooth fashion over time. a) Digital

- b) Analog
- c) Discrete d) all of above
- The slowest transmission speed are those of \_\_\_\_\_. 14)
  - a) Twisted pair c) fiber optic

- b) coaxial cable
- d) Microwave

Seat No.				Set	R		
S.Y	S.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering DATA COMMUNICATION						
Day 8 Time:	& D : 10	ate: Thursday, 12-1 ):00 AM To 01:00 P	2-2019 M	Max. Marks	s: 56		
Instru	uct	ions: 1) All Questio 2) Make suita	ns are compulsory. Ible assumptions if necessary and state them	clearly			
			Section – I				
Q.2	At a) b) c) d) e)	tempt any four Draw Manchester Explain CRC with Write differences Explain different f Write uses of com	and differential Manchester for 00001111 suitable example. between Serial and Parallel transmission mo raming method. nputer Network.	de.	16		
Q.3	At a) b)	tempt any one Explain OSI Mode Explain different t	el with diagram. ransmission Impairment.		06		
Q.4	At W	<b>tempt the followin</b> hat is the need of sl	<b>g</b> iding windows protocol? Describe GO-Back I	N Protocol	06		
			Section - II				
Q.5	At a) b) c) d) e)	tempt any four Compare virtual of Explain Binary co Explain IEEE std. Write a short note Compare Leaky b	circuit and datagram subnet. unt down protocol with example. 802.5. e on CSMA. pucket and token bucket algorithm.		16		
Q.6	At a) b)	t <b>empt any one</b> Explain Shortest   Explain IEEE std.	path algorithm with example. 802.3 in details with frame format.		06		
Q.7	At E> pr	t <b>empt the followin</b> plain distance vecto oblem.	<b>g</b> or algorithm with example. Discuss count to in	nfinity	06		

## S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Computer Science & Engineering** DATA COMMUNICATION Max. Marks: 70

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Seat

No.

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

2) Make suitable assumptions if necessary and state them clearly

## MCQ/Objective Type Questions

#### **Duration: 30 Minutes** Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- What is the purpose of preamble bits in an Ethernet frame? 1)
  - a) Pre-bit counting b) Synchronization
    - c) Error checking
  - Protocols in which the sender sends one frame and then waits for 2) Acknowledgment before proceeding are \_\_\_\_\_.
    - a) Selective repeat
    - Stop and wait c)
  - 3) The technique in which incoming packet is sent on these lines that are going Approximately in the right direction is
    - a) Flooding
    - c) Selective flooding
  - \_ is collision free protocol. 4)
    - a) Basic bit map
      - c) Both a & b d) None of this
  - 5) Which of the following is a static channel allocation method?
    - b) TDM a) CSMA
    - c) CSMA/CD d) Bit-map

Following is practically implemented reference model \_\_\_\_\_. 6)

- a) OSI TCP/IP b)
- c) OSII None d)
- 7) Framing is task of \_\_\_\_\_ layer.
  - a) Data link
  - c) Application d) Presentation
- An \_\_\_\_\_ signal is one which intensity varies smooth fashion over time. 8)

b)

- a) Digital b) Analog
- c) Discrete d) all of above
- 9) The slowest transmission speed are those of \_
  - a) Twisted pair c) fiber optic

b) coaxial cable

Transport

d) Microwave

SLR-FR-36

Set

Marks: 14

- d) Destination address
- b) Go back n
- d) All
- b) Flow-based routing
- d) Symmetric flooding

b) Binary countdown

- 10) cable is used for a long distance transmission.
  - a) Fiber optic

a) Ethernet

- b) Twisted pair d) None
- c) Co-axial
- is method is used to detect as well as to correct the error. 11)
  - a) CRC b) Hamming code c) Both a & b
    - d) None of this

In IEEE std.802.3, 10 Base 2 cabling is called \_\_\_\_ 12)

- b) Thick Ethernet
- c) Thin Ethernet None of this d)
- Count-to-infinity problem can occur in \_ 13)
  - a) Link state routing
- Distance vector routing b)

SLR-FR-36

Set S

- c) Shortest path routing
- Both a and b d)
- In DQDB stands for \_ 14)
  - a) data queue distributed bus
  - c) Both

- b) distributed queue dual bus
- d) None

Set

S

Seat

No.

### S.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering DATA COMMUNICATION

Day & Time:	& Da : 10:	ite: Thursday, 12-12-2019 00 AM To 01:00 PM	Max. Marks: 56			
Instru	uctio	<ul><li>ons: 1) All Questions are compulsory.</li><li>2) Make suitable assumptions if necessary and state them clean</li></ul>	early			
		Section – I				
Q.2	Att a) b) c) d) e)	empt any four Draw Manchester and differential Manchester for 00001111 Explain CRC with suitable example. Write differences between Serial and Parallel transmission mode. Explain different framing method. Write uses of computer Network.	16			
Q.3	Atte a) b)	<b>empt any one</b> Explain OSI Model with diagram. Explain different transmission Impairment.	06			
Q.4	<b>Att</b> Wh	<b>empt the following</b> at is the need of sliding windows protocol? Describe GO-Back N P	06 rotocol			
		Section - II				
Q.5	Atte a) b) c) d) e)	empt any four Compare virtual circuit and datagram subnet. Explain Binary count down protocol with example. Explain IEEE std.802.5. Write a short note on CSMA. Compare Leaky bucket and token bucket algorithm.	16			
Q.6	Att a) b)	<b>empt any one</b> Explain Shortest path algorithm with example. Explain IEEE std. 802.3 in details with frame format.	06			
Q.7	Attempt the following 0 Explain distance vector algorithm with example. Discuss count to infinity problem.					

Seat No.		Set P						
S	S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering DIGITAL TECHNIQUES							
Day & I Time: 1	Date: Saturday, 14-12-2019 10:00 AM To 01:00 PM	Max. Marks: 70						
Instruc	<b>ctions:</b> 1) Q. No. 1 is compuls Book. 2) Figures to the right i	ory and should be solved in first 30 minutes in answer ndicates full marks.						
	MCQ/Ob	iective Type Questions						
Duratio	on: 30 Minutes	Marks: 14						
<b>Q.1 C</b>	Choose the correct alternativ 1) How many NAND gates a a) 1 c) 3	tes from the options and rewrite the sentence. 14 are require to implement OR gate? b) 2 d) 4						
2	<ol> <li>When input J and K are e</li> <li>a) MS JK FF</li> <li>c) D FF</li> </ol>	equal to 1 then it is called as Flip Flop. b) SR FF d) T FF						
3	<ul> <li>Identify port used in verile</li> <li>a) Input</li> <li>c) In out</li> </ul>	og as input as well as output b) Output d) None of these						
4	<ul><li>4) The logical sum of two or</li><li>a) Sop</li><li>c) OR operation</li></ul>	more logical product term is called b) Pos d) None						
5	5) A D – Flip – Flop can be a) JK c) T	constructed from an Flip Flop. b) SR d) None						
6	<ul> <li>6) Which is correct order of map?</li> <li>a) (00, 01, 10, 11)</li> <li>c) (00, 01, 11, 10)</li> </ul>	sequence for representing the input values in K- b) (00,10, 01, 11) d) (00, 10, 11, 01)						
7	<ul> <li>BCD counter is also know</li> <li>a) Decade counter</li> <li>c) Mod-5 counter</li> </ul>	vn as b) Mod-10 counter d) Both a & b						
8	<ul> <li>B) If A &amp; B are inputs of half</li> <li>a) A AND B</li> <li>c) A X-OR B</li> </ul>	adder the sum is given by b) A OR B d) A X-NOR B						
9	<ul> <li>9) The symbol for bitwise Al</li> <li>a) ~</li> <li>c) ∧</li> </ul>	ND in verilog b) & d) l						
1	10) In 8:1 Multiplexer how ma a) 2 c) 3	any select lines are required? b) 4 d) 1						

SLR-FR-37 Set P

- 11) According to Boolean law:  $A \cdot 1 = ?$ 
  - a) 0 b) 1
  - c) A d) None
- Verilog is an IEEE standard \_\_\_\_\_. 12)
  - a) IEEE 1346 b) **IEEE 1364**
  - c) IEEE 1394 **IEEE 1349** d)
- Device used for converting BCD to seven segment is called as \_\_\_\_\_. 13) a) Encoder
  - b)
  - c) Multiplexer

Decoder Demultiplexer d)

- 14)
  - $(56)_{10} = (?)_2$ a) 111000
    - c) 101100

- b) 111001
- d) 100111

Day & Time	& Dat : 10:0	te: Saturday, 14-12-2019 Max. Marks 00 AM To 01:00 PM	: 56
Instr	uctic	<ul> <li>ans: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Assume suitable data if necessary.</li> </ul>	
		Section – I	
Q.2	Atte a)	what is multiplexer? Design full adder using 4:1 MUX	08
Q.3	Atte a) b) c)	what is multiplexel? Design full adder using 4.1 MOX. empt any two. Obtain 1:8 demux using 1:2 demux only. Minimize the following logic function using k-map & realize it using the basic gates $Y = \sum m(0, 2, 5, 7, 8, 10, 13, 15)$ Convert (128) <sub>10</sub> into 1) Binary number system 2) Octal Number system 3) Hexadecimal Number system 4) BCD code 5) Gray code	10
Q.4	Atte a) b) c)	what is universal gate concept? Implement basic gates using NOR gate. Write short note on IC 74151. Explain use of don't care condition in k-map with example.	10
		Section – II	
Q.5	Atte a) b)	Provide the second state of the second stat	08
Q.6	Atte a) b) c)	empt any two. Write verilog code for 8:1 Multiplexer. Explain Excitation table of Flip Flop in detail. State different modes of shif register. Explain any one in detail.	10
Q.7	Atte a) b)	empt any two. Design Mod-6 asynchronous counter. Write HDL code for Full adder.	10

## No. S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering

DIGITAL TECHNIQUES

Seat

c) Explain D & T Flip Flop.

# SLR-FR-37

Set Ρ

Seat No.					Set C	2		
Ş	S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering DIGITAL TECHNIQUES							
Day & Time:	Day & Date: Saturday, 14-12-2019 Max. Marks: 70 Time: 10:00 AM To 01:00 PM							
Instru	Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book. 2) Figures to the right indicates full marks							
		Ň	ICQ/Objective T	vpe (	Questions			
Durati	on: 30 l	Vinutes	·····		Marks: 7	14		
Q.1	Choose 1) If a) c)	e <b>the correct</b> A & B are inp ) A AND B ) A X-OR B	alternatives from the uts of half adder the	ne op sum i b) d)	tions and rewrite the sentence. is given by A OR B A X-NOR B	14		
	2) T	he symbol for	bitwise AND in verile	og				
	a) c)	) ~ ) ^		b) d)	& I			
:	3) Ir a) c)	n 8:1 Multiplex ) 2 ) 3	er how many select	lines a b) d)	are required? 4 1			
	4) A a c	ccording to Bo ) 0 ) A	bolean law: $A \cdot 1 = ?$	b) d)	1 None			
:	5) V a c	erilog is an IE ) IEEE 1346 ) IEEE 1394	EE standard	b) d)	IEEE 1364 IEEE 1349			
	6) D a c	evice used for ) Encoder ) Multiplexer	r converting BCD to	seven b) d)	n segment is called as Decoder Demultiplexer			
	7) (5 a) c)	$56)_{10} = (?)_2$ ) 111000 ) 101100		b) d)	111001 100111			
;	8) H a) c)	ow many NAN ) 1 ) 3	ID gates are require	to im b) d)	plement OR gate? 2 4			
9	9) W a) c)	/hen input J ai ) MS JK FF ) D FF	nd K are equal to 1 t	hen it b) d)	is called as Flip Flop. SR FF T FF			
	10) lc a) c)	lentify port use ) Input ) In out	ed in verilog as input	as we b) d)	ell as output Output None of these			

Set Q

- 11) The logical sum of two or more logical product term is called \_\_\_\_\_.
  - a) Sop b) Pos
  - c) OR operation d) None
- 12) A D Flip Flop can be constructed from an \_\_\_\_\_ Flip Flop.
  - a) JK b) SR
  - c) T d) None
- 13) Which is correct order of sequence for representing the input values in Kmap?
  - a) (00, 01, 10, 11) b) (00,10, 01, 11)
  - c) (00, 01, 11, 10) d) (00, 10, 11, 01)

#### 14) BCD counter is also known as \_\_\_\_\_.

- a) Decade counter
- c) Mod-5 counter
- b) Mod-10 counter
- d) Both a & b

Time	: 10:0	00 AM To 01:00 PM	
Instr	uctio	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Assume suitable data if necessary.</li> </ul>	
		Section – I	
Q.2	Atte a) b)	<b>mpt any one.</b> Write short note on Number system. Explain how Decimal number converted into binary number with example? What is multiplexer? Design full adder using 4:1 MUX.	80
Q.3	Atte a) b) c)	empt any two.Obtain 1:8 demux using 1:2 demux only.Minimize the following logic function using k-map & realize it using the basic gates $Y = \sum m(0, 2, 5, 7, 8, 10, 13, 15)$ Convert $(128)_{10}$ into1)Binary number system2)Octal Number system3)Hexadecimal Number system4)BCD code5)Gray code	10
Q.4	Atte a) b) c)	<b>mpt any two.</b> What is universal gate concept? Implement basic gates using NOR gate. Write short note on IC 74151. Explain use of don't care condition in k-map with example.	10
		Section – II	
Q.5	Atte a) b)	<b>mpt any one.</b> What is verilog? Explain behavioral Modeling of HDL with example. List different types of counter. Explain 3 bit asynchronous down counter in detail.	80
Q.6	Atte a) b) c)	<b>mpt any two.</b> Write verilog code for 8:1 Multiplexer. Explain Excitation table of Flip Flop in detail. State different modes of shif register. Explain any one in detail.	10
Q.7	Atte a) b)	mpt any two. Design Mod-6 asynchronous counter. Write HDL code for Full adder.	10

Computer Science & Engineering DIGITAL TECHNIQUES

# Day & Date: Saturday, 14-12-2019

Seat

No.

c) Explain D & T Flip Flop.

# SLR-FR-37

Set Q S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Max. Marks: 56

		-	Computer Science DIGITAL TEC	& Ei HNIC	ngineering QUES		
Day & Time	& Date : 10:00	: Sa ) AM	turday, 14-12-2019 1 To 01:00 PM		Ma	x. Marks	: 70
Instr	uction	<b>is:</b> 1	) Q. No. 1 is compulsory and sho	ould b	e solved in first 30 minute	s in ansv	ver
		2	) Figures to the right indicates fu	ll mar	ks.		
			MCQ/Objective Ty	/pe C	Questions		
Durat	ion: 3	0 Mi	nutes	-		Marks	: 14
Q.1	Choc 1)	A D a)	the correct alternatives from th – Flip – Flop can be constructed JK	e opt from b)	ions and rewrite the ser an Flip Flop. SR	ntence.	14
	2)	C)	l	u)			
	2)	vvh maj a) c)	ich is correct order of sequence f p? (00, 01, 10, 11) (00, 01, 11, 10)	or rep b) d)	(00,10, 01, 11) (00, 10, 11, 01)	s in K-	
	3)	BCI a) c)	D counter is also known as Decade counter Mod-5 counter	 b) d)	Mod-10 counter Both a & b		
	4)	lf A a) c)	& B are inputs of half adder the s A AND B A X-OR B	sum is b) d)	s given by A OR B A X-NOR B		
	5)	The a) c)	e symbol for bitwise AND in verilo ∼ ∧	b) d)	 & I		
	6)	In 8 a) c)	1 Multiplexer how many select li 2 3	ines a b) d)	re required? 4 1		
	7)	Acc a) c)	cording to Boolean law: $A \cdot 1 = ?$ 0 A	b) d)	1 None		
	8)	Ver a) c)	ilog is an IEEE standard IEEE 1346 IEEE 1394	b) d)	IEEE 1364 IEEE 1349		
	9)	De\ a) c)	<i>r</i> ice used for converting BCD to s Encoder Multiplexer	even b) d)	segment is called as Decoder Demultiplexer	·	
	10)	(56 a) c)	$()_{10} = (?)_2$ 111000 101100	b) d)	111001 100111		

# Seat No.

# R S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

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Set



- 11) How many NAND gates are require to implement OR gate? a) 1

  - 4 c) 3 d)
- When input J and K are equal to 1 then it is called as \_\_\_\_\_ Flip Flop. 12)
  - b) SR FF

b)

- c) DFF d)
  - T FF

2

- 13) Identify port used in verilog as input as well as output \_\_\_\_\_.
  - Output a) Input b) c) In out
    - None of these d)
- The logical sum of two or more logical product term is called \_\_\_\_\_. 14)
  - a) Sop

a) MS JK FF

- Pos b)
- c) OR operation None d)

Time	: 10:0	00 AM To 01:00 PM	
Instru	uctio	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Assume suitable data if necessary.</li> </ul>	
		Section – I	
Q.2	Atte a) b)	<b>mpt any one.</b> Write short note on Number system. Explain how Decimal number converted into binary number with example? What is multiplexer? Design full adder using 4:1 MUX.	80
Q.3	Atte a) b) c)	empt any two.Obtain 1:8 demux using 1:2 demux only.Minimize the following logic function using k-map & realize it using the basic gates $Y = \sum m(0, 2, 5, 7, 8, 10, 13, 15)$ Convert $(128)_{10}$ into1)Binary number system2)Octal Number system3)Hexadecimal Number system4)BCD code5)Gray code	10
Q.4	Atte a) b) c)	<b>Empt any two.</b> What is universal gate concept? Implement basic gates using NOR gate. Write short note on IC 74151. Explain use of don't care condition in k-map with example.	10
		Section – II	
Q.5	Atte a) b)	<b>empt any one.</b> What is verilog? Explain behavioral Modeling of HDL with example. List different types of counter. Explain 3 bit asynchronous down counter in detail.	80
Q.6	Atte a) b) c)	<b>empt any two.</b> Write verilog code for 8:1 Multiplexer. Explain Excitation table of Flip Flop in detail. State different modes of shif register. Explain any one in detail.	10
Q.7	Atte a) b)	empt any two. Design Mod-6 asynchronous counter. Write HDL code for Full adder.	10

#### Seat No.

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering

## DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019

c) Explain D & T Flip Flop.

SLR-FR-37

Set R

Max. Marks: 56

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering DIGITAL TECHNIQUES												
Day Time	& Date : 10:00	e: Saturday, 14-12-2019 0 AM To 01:00 PM		Max. Marks: 70								
Instr	<ul> <li>Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.</li> <li>2) Figures to the right indicates full marks.</li> </ul>											
		MCQ/Objective Ty	/pe (	Questions								
Dura	tion: 3	0 Minutes	-	Marks: 14								
Q.1	<b>Choo</b> 1)	<b>ose the correct alternatives from th</b> In 8:1 Multiplexer how many select I a) 2 c) 3	ines a b) d)	tions and rewrite the sentence. 14 are required? 4 1								
	2)	According to Boolean law: $A \cdot 1 = ?$ a) 0 c) A	b) d)	1 None								
	3)	Verilog is an IEEE standard a) IEEE 1346 c) IEEE 1394	b) d)	IEEE 1364 IEEE 1349								
	4)	Device used for converting BCD to s a) Encoder c) Multiplexer	seven b) d)	segment is called as Decoder Demultiplexer								
	5)	$(56)_{10} = (?)_2$ a) 111000 c) 101100	b) d)	111001 100111								
	6)	How many NAND gates are require a) 1 c) 3	to imj b) d)	olement OR gate? 2 4								
	7)	When input J and K are equal to 1 th a) MS JK FF c) D FF	nen it b) d)	is called as Flip Flop. SR FF T FF								
	8)	Identify port used in verilog as input a) Input c) In out	as we b) d)	ell as output Output None of these								
	9)	The logical sum of two or more logic a) Sop c) OR operation	al pro b) d)	oduct term is called Pos None								
	10)	A D – Flip – Flop can be constructed a) JK c) T	d from b) d)	n an Flip Flop. SR None								

Seat No.

Set S

# Set S

11) Which is correct order of sequence for representing the input values in K-map?

.

- a) (00, 01, 10, 11) b) (00, 10, 11, 10) d) (00, 10, 11, 01)
- c) (00, 01, 11, 10) d) (00, 10, 11, 01)
- 12) BCD counter is also known as \_\_\_\_\_
  - a) Decade counter b) Mod-10 counter
  - c) Mod-5 counter d) Both a & b
- 13) If A & B are inputs of half adder the sum is given by \_\_\_\_\_.
  - a) A AND B b) A OR B
    - c) A X-OR B d) A X-NOR B
- 14) The symbol for bitwise AND in verilog \_\_\_\_\_
  - a) ~ b) & c) ∧ d) l

TIME	. 10.0		
Instr	uctio	<ul> <li><b>ns:</b> 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Assume suitable data if necessary.</li> </ul>	
		Section – I	
Q.2	Atte a) b)	empt any one. Write short note on Number system. Explain how Decimal number converted into binary number with example? What is multiplexer? Design full adder using 4:1 MUX.	08
Q.3	Atte a) b) c)	empt any two.Obtain 1:8 demux using 1:2 demux only.Minimize the following logic function using k-map & realize it using the basic gates $Y = \sum m(0, 2, 5, 7, 8, 10, 13, 15)$ Convert $(128)_{10}$ into1)Binary number system2)Octal Number system3)Hexadecimal Number system4)BCD code5)Gray code	10
Q.4	Atte a) b) c)	<b>mpt any two.</b> What is universal gate concept? Implement basic gates using NOR gate. Write short note on IC 74151. Explain use of don't care condition in k-map with example.	10
		Section – II	
Q.5	Atte a) b)	<b>mpt any one.</b> What is verilog? Explain behavioral Modeling of HDL with example. List different types of counter. Explain 3 bit asynchronous down counter in detail.	08
Q.6	Atte a) b) c)	<b>empt any two.</b> Write verilog code for 8:1 Multiplexer. Explain Excitation table of Flip Flop in detail. State different modes of shif register. Explain any one in detail.	10
Q.7	Atte a) b) c)	empt any two. Design Mod-6 asynchronous counter. Write HDL code for Full adder. Explain D & T Flip Flop.	10

### S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

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## SLR-FR-37

Set S

Max. Marks: 56

Seat							Set P			
	S Y	(R 1	ech) (Pa	rt - I) (Now) (	CBCS	3) F3	vamination Nov/Dec-2019			
Computer Science & Engineering										
COMPUTER GRAPHICS										
Day & Time: ´	Day & Date: Tuesday, 17-12-2019         Max. Marks: 70           Time: 10:00 AM To 01:00 PM         Max. Marks: 70									
Instruc	Instructions: 1) Q.1 is compulsory and should be solved in first 30 minutes in answer book.									
		(ے	l iguico to	MCO/Objecti		ວ. ໑ () ເ	lestions			
Duratio	on: 30	) Min	utes		ие тур		Marks: 14	1		
Q.1 (	Choo	se th	ne correct a	alternatives fro	om the	opti	ons. 14	ł		
1	1)	Useı a) c)	<sup>.</sup> generally p Edge fill Fence fill	provides an init	ial pixel	for _ b) d)	algorithm. Seed fill Edge flag			
2	2)	In qu a) c)	ad tree dat View port Window	a structure roo	t of the	tree b) d)	is the display Segment Byte			
3	3)	Refle a) c)	ection abou X=0 X=Y	t X-axis means	6	 b) d)	Y=0 Y=X			
4	4)	Cont a) c)	trol points a Iteration Values	re used to cont	trol the	b) d)	of the curve. Edges Shape			
5	5)	Pixe a) c)	l is the sma Unit Section	llest o	of comp	outer b) d)	graphics. Picture Region			
6	6)	Bezi a) c)	er curves a 6 5	re generated b	y using	b) d)	number of control points. 2 4			
7	7)	ln a a) c)	scaling whe Uniform Random	en Sx=Sy, then	it is	b) d)	type of scaling. Non uniform None of above			
8	3)	Supe a) c)	er sampling Shading Half toning	is a technique	for	b) d)	 Anti-aliasing None of the above			
g	9)	RLE a) c)	stands for Run Lengt Ram Leng	h Editor th Encoding		b) d)	Run Length Encoding None of these			
1	10)	A lin a) c)	e with end   Completely Invisible	ooint codes 010 y Visible	00 and	0010 b) d)	) respectively then the line is Partially Visible All above	I		

In generalised 4X4 transformation matrix for 3D, the upper left 3X3 sub 11) matrix produces \_\_\_\_\_.

- a) Reflection b) Rotation
- Scaling All above C) d)
- 12) \_ is a logical unit of display file.
  - Pixel b) Segment a) Buffer c)
    - d) Memory
- 13) The Bezier curve is contained within the \_ hull of defining polygon. Concave
  - Convex b)
  - Both a & b None of above d)
- clipping algorithm follows divide and conquer strategy. 14) Mid-point
  - Cohen-Sutherland a) C)
    - Four bit

a)

c)

b) d) None of above SLR-FR-38

Set P

#### No. S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering COMPUTER GRAPHICS

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate fill marks.

#### Section – I

#### Q.2 Solve any THREE.

Seat

- a) Explain the reflection through an arbitrary line in brief.
- b) Explain shadow mask technique with suitable diagram.
- c) Explain edge fill algorithm with example.
- d) Explain touch panel in brief.
- **Q.3** Consider a triangle A(2,2) B(4,2) and C(4,4) and apply combined transformation **08** as:
  - 1) 90 degree rotation about origin
  - **2)** Reflection through the line y=-x

#### OR

Describe Bresenham's circle generation (1/8<sup>th</sup> part) in detail with example.

Q.4 Consider A(5,5) and B(9,7) as two end points of a line. Rasterise the line using 08 Bresenham's line drawing algorithm.

#### Section – II

#### Q.5 Solve any THREE.

- a) Define fractal. Explain it in brief.
- **b**) Write note on viewing transformation.
- c) Explain the B-Spline curve in brief.
- d) Explain in brief parametric and non-parametric representation of curve.
- Q.6 What is corruption? Explain the concept of double buffering. State its08 advantages and disadvantages.

OR

Explain mid-point sub division algorithm in detail.

Q.7 Explain the working of Warnock algorithm in detail. Also explain quad tree data 08 structure.

Max. Marks: 56

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Set F

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Seat No.					Set	Q				
	S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering									
			COMPUTER G	RAP	HICS					
Day & Time:	Day & Date: Tuesday, 17-12-2019 Max. Marks: 70 Time: 10:00 AM To 01:00 PM									
Instru	Instructions: 1) Q.1 is compulsory and should be solved in first 30 minutes in answer book.									
		2) Figures to		(5. ••• •••	ostions					
Duratio	on: 3	0 Minutes			Marks	: 14				
Q.1 (	Choc	ose the correct	alternatives from the	opti	ons.	14				
	1)	Super sampling a) Shading c) Half toning	g is a technique for g	b) d)	Anti-aliasing None of the above					
4	2)	RLE stands for a) Run Leng c) Ram Leng	 th Editor gth Encoding	b) d)	Run Length Encoding None of these					
ć	3)	A line with end a) Complete c) Invisible	point codes 0100 and ly Visible	0010 b) d)	respectively then the line is Partially Visible All above	<u> </u>				
2	4)	In generalised matrix produces a) Reflection c) Scaling	4X4 transformation ma s	atrix fo b) d)	or 3D, the upper left 3X3 sub Rotation All above					
Ę	5)	is a logic a) Pixel c) Buffer	cal unit of display file.	b) d)	Segment Memory					
(	6)	The Bezier curv a) Concave c) Both a & b	ve is contained within t	he b) d)	hull of defining polygon. Convex None of above					
7	7)	a) Cohen-Su c) Four bit	g algorithm follows divi Itherland	de ar b) d)	nd conquer strategy. Mid-point None of above					
8	8)	User generally a) Edge fill c) Fence fill	provides an initial pixe	l for _ b) d)	algorithm. Seed fill Edge flag					
Q	9)	In quad tree da a) View port c) Window	ta structure root of the	tree b) d)	is the display Segment Byte					
	10)	Reflection about a) X=0 c) X=Y	ut X-axis means	 b) d)	Y=0 Y=X					

SLR-FR-38 Γ

SLR-FR-38 Set Q

- 11) Control points are used to control the \_\_\_\_\_ of the curve.
  - a) Iteration b) Edges
  - c) Values d) Shape
- 12) Pixel is the smallest \_\_\_\_\_ of computer graphics.
  - a) Unit b) Picture
  - c) Section d) Region
- 13) Bezier curves are generated by using \_\_\_\_\_ number of control points.
  - 6 b) 2 5 d) 4

a)

c)

- 14) In a scaling when Sx=Sy, then it is \_\_\_\_\_ type of scaling.
  - a) Uniform b) Non uniform
    - c) Random d) None of above

#### No. S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Computer Science & Engineering COMPUTER GRAPHICS

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate fill marks.

#### Section – I

#### Q.2 Solve any THREE.

- a) Explain the reflection through an arbitrary line in brief.
- b) Explain shadow mask technique with suitable diagram.
- c) Explain edge fill algorithm with example.
- d) Explain touch panel in brief.
- **Q.3** Consider a triangle A(2,2) B(4,2) and C(4,4) and apply combined transformation **08** as:
  - 1) 90 degree rotation about origin
  - **2)** Reflection through the line y=-x

#### OR

Describe Bresenham's circle generation (1/8<sup>th</sup> part) in detail with example.

Q.4 Consider A(5,5) and B(9,7) as two end points of a line. Rasterise the line using 08 Bresenham's line drawing algorithm.

#### Section – II

#### Q.5 Solve any THREE.

- a) Define fractal. Explain it in brief.
- **b**) Write note on viewing transformation.
- c) Explain the B-Spline curve in brief.
- d) Explain in brief parametric and non-parametric representation of curve.
- Q.6 What is corruption? Explain the concept of double buffering. State its08 advantages and disadvantages.

OR

Explain mid-point sub division algorithm in detail.

Q.7 Explain the working of Warnock algorithm in detail. Also explain quad tree data 08 structure.

Max. Marks: 56

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Seat No.							Set	R		
S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019										
Computer Science & Engineering COMPUTER GRAPHICS										
Day & Time: 2	Day & Date: Tuesday, 17-12-2019         Max. Marks: 70           Time: 10:00 AM To 01:00 PM         Max. Marks: 70									
Instruc	ctior	<b>is:</b> 1) 2)	Q.1 is com book. Figures to	pulsory and	should be	e solv	ved in first 30 minutes in answer			
		_,	r iguiee te		otivo Tvn		lactions			
Duratio	n. 3	0 Mir	utes		ctive Typ		Jestions Marks	· 14		
	511. 5 <sup>4</sup>			- 11	(		indires			
<b>Q.1</b> (	-noc 1)	Pixe a) c)	l is the sma Unit Section	llest	of comp	buter b) d)	graphics. Picture Region	14		
2	2)	Bezi a) c)	er curves a 6 5	re generated	by using	b) d)	number of control points. 2 4			
3	3)	In a a) c)	scaling whe Uniform Random	en Sx=Sy, the	en it is	b) d)	type of scaling. Non uniform None of above			
4	4)	Sup a) c)	er sampling Shading Half toning	is a techniqu I	ue for	b) d)	 Anti-aliasing None of the above			
5	5)	RLE a) c)	stands for Run Lengt Ram Leng	h Editor th Encoding		b) d)	Run Length Encoding None of these			
6	5)	A lin a) c)	e with end p Completel Invisible	ooint codes 0 y Visible	)100 and	0010 b) d)	) respectively then the line is Partially Visible All above			
7	7)	In ge matr a) c)	eneralised 4 ix produces Reflection Scaling	X4 transform	nation ma	b) d)	or 3D, the upper left 3X3 sub Rotation All above			
8	3)	a) c)	is a logic Pixel Buffer	al unit of disp	olay file.	b) d)	Segment Memory			
ç	9)	The a) c)	Bezier curv Concave Both a & b	e is containe	d within t	he b) d)	hull of defining polygon. Convex None of above			
1	10)	a) c)	clipping Cohen-Su Four bit	algorithm fo therland	llows divi	de aı b) d)	nd conquer strategy. Mid-point None of above			

Set R

11)	User	generally	provides an	initial pixel fo	r	algorithm.
	a)	Edge fill		b)	Se	ed fill

- Edge fill a)
- Fence fill Edge flag C) d)

In quad tree data structure root of the tree is the display \_\_\_\_\_. 12)

- View port Segment a) b)
- Window Byte C) d)
- Reflection about X-axis means \_\_\_\_\_. 13)
  - Y=0 X=0 b) a) X=Y Y=X
  - C) d)
- Control points are used to control the \_\_\_\_\_ of the curve. 14)
  - Iteration b) Edges a) Shape c) Values
    - d)

#### Set R No. S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Computer Science & Engineering COMPUTER GRAPHICS**

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate fill marks.

#### Section – I

#### Solve any THREE. Q.2

- a) Explain the reflection through an arbitrary line in brief.
- b) Explain shadow mask technique with suitable diagram.
- c) Explain edge fill algorithm with example.
- d) Explain touch panel in brief.
- Consider a triangle A(2,2) B(4,2) and C(4,4) and apply combined transformation Q.3 **08** as:
  - 1) 90 degree rotation about origin
  - 2) Reflection through the line y=-x

#### OR

Describe Bresenham's circle generation  $(1/8^{th} part)$  in detail with example.

Q.4 Consider A(5,5) and B(9,7) as two end points of a line. Rasterise the line using **08** Bresenham's line drawing algorithm.

#### Section – II

#### Q.5 Solve any THREE.

- a) Define fractal. Explain it in brief.
- **b)** Write note on viewing transformation.
- c) Explain the B-Spline curve in brief.
- d) Explain in brief parametric and non-parametric representation of curve.
- What is corruption? Explain the concept of double buffering. State its Q.6 80 advantages and disadvantages.

OR

Explain mid-point sub division algorithm in detail.

Q.7 Explain the working of Warnock algorithm in detail. Also explain guad tree data **08** structure.

Max. Marks: 56

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Seat No.							Set	S		
	S.Y.	<b>(</b> B.1	ech) (Pal) Co	rt - I) (New) omputer Sc	(CBCS	5) Ex & Fr	amination Nov/Dec-2019			
				COMPU	TER G	RAP	HICS			
Day & Time:	Day & Date: Tuesday, 17-12-2019Max. Marks: 70Fime: 10:00 AM To 01:00 PM									
Instru	Instructions: 1) Q.1 is compulsory and should be solved in first 30 minutes in answer book.									
		2)	Figures to			.s.				
Durati	on 3	0 Mir	nutes	MCQ/Objec	tive Typ	e Qu	lestions Marks	s <sup>.</sup> 14		
01	Choc			altornativos	from the	onti	one	11		
Q.1	1)	A lin a) c)	e with end p Completely Invisible	y Visible	100 and	0010 b) d)	respectively then the line is Partially Visible All above	14 '		
2	2)	In ge matr a) c)	eneralised 4 ix produces Reflection Scaling	X4 transform	ation ma	trix fo b) d)	or 3D, the upper left 3X3 sub Rotation All above			
;	3)	a) c)	is a logic Pixel Buffer	al unit of disp	lay file.	b) d)	Segment Memory			
	4)	The a) c)	Bezier curv Concave Both a & b	e is containe	d within t	he b) d)	hull of defining polygon. Convex None of above			
:	5)	a) c)	clipping Cohen-Sut Four bit	algorithm fol herland	lows divi	de ar b) d)	nd conquer strategy. Mid-point None of above			
l	6)	Usei a) c)	r generally p Edge fill Fence fill	provides an ir	nitial pixe	l for _ b) d)	algorithm. Seed fill Edge flag			
	7)	In qu a) c)	uad tree dat View port Window	a structure ro	oot of the	tree b) d)	is the display Segment Byte			
;	8)	Refle a) c)	ection abou X=0 X=Y	t X-axis mear	าร	 b) d)	Y=0 Y=X			
9	9)	Con <sup>.</sup> a) c)	trol points a Iteration Values	re used to co	ntrol the	b) d)	of the curve. Edges Shape			
	10)	Pixe a) c)	l is the sma Unit Section	llest	_ of comp	buter b) d)	graphics. Picture Region			



- 11) Bezier curves are generated by using \_ \_\_\_\_ number of control points.
  - 6 b) a)
  - C) 5 d) 4
- In a scaling when Sx=Sy, then it is \_\_\_\_ type of scaling. 12) a)
  - b) Non uniform Uniform
  - Random None of above C) d)
- 13) Super sampling is a technique for \_\_
  - Shading a)
  - Half toning C)
  - RLE stands for \_
- 14) Run Length Editor a)
  - Ram Length Encoding C)
- Run Length Encoding b)

None of the above

Anti-aliasing

None of these d)

2

b)

d)

## S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Computer Science & Engineering COMPUTER GRAPHICS**

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate fill marks.

#### Section – I

#### Solve any THREE. Q.2

- a) Explain the reflection through an arbitrary line in brief.
- b) Explain shadow mask technique with suitable diagram.
- c) Explain edge fill algorithm with example.
- d) Explain touch panel in brief.
- Consider a triangle A(2,2) B(4,2) and C(4,4) and apply combined transformation Q.3 **08** as:
  - 1) 90 degree rotation about origin
  - 2) Reflection through the line y=-x

#### OR

Describe Bresenham's circle generation  $(1/8^{th} part)$  in detail with example.

Q.4 Consider A(5,5) and B(9,7) as two end points of a line. Rasterise the line using **08** Bresenham's line drawing algorithm.

#### Section – II

#### Q.5 Solve any THREE.

- a) Define fractal. Explain it in brief.
- **b)** Write note on viewing transformation.
- c) Explain the B-Spline curve in brief.
- d) Explain in brief parametric and non-parametric representation of curve.
- What is corruption? Explain the concept of double buffering. State its Q.6 80 advantages and disadvantages.

OR

Explain mid-point sub division algorithm in detail.

Q.7 Explain the working of Warnock algorithm in detail. Also explain guad tree data **08** structure.

Max. Marks: 56

12

12

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### S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology **APPLIED MATHEMATICS - I**

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory should be solved in first 30 minutes in answer

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

MCQ/Objective Type Questions

**Duration: 30 Minutes** 

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- $(c_1 + c_2 x)e^{2x} + (c_3 + c_4 x)e^{-2x}$  is a general solution of \_ 1)
- a)  $(D^2 4)^2 v = 0$ b)  $(D^2 + 4)^2 y = 0$ d)  $(D^2 + 2)^2 y = 0$ c)  $(D^2 - 2)^2 v = 0$ The particular Integral of  $(D^2 - 2D + 1)y = -4e^x$  is \_\_\_\_\_. 2) b)  $-4x^2e^x$ a)  $-2x^2e^x$ d)  $x^2 e^x$ c)  $(c_1 + c_2 x)e^x$ If a Poisson Distribution is such that P(x = 2) = P(x = 3) then the mean 3) is a) 2 b) 4 c) 3 d) 9  $L^{-1}\left[\frac{1}{s^2+4s+13}\right] = \underline{\qquad}.$ 4)
  - b)  $\frac{1}{3}e^{2t}\sin 3t$ d)  $e^{-2t}\sin 3t$ a)  $e^{-2t}\cos 3t$ c)  $\frac{1}{2}e^{-2t}\sin 3t$
- Idle time of the queuing system is \_\_\_\_ 5)
  - b)  $1 \frac{\lambda}{\mu}$ d)  $1 \frac{\mu}{\lambda}$ a) <u>λ</u> μ c)  $\frac{r}{\mu}$
- If mean of x = 70 mean of y = 149 and  $b_{yx} = 0.7$  then the line of 6) regression of y on x is \_\_\_\_\_ b) y = 0.6x + 80
  - a) y = 0.8x + 120d) y = 0.7x + 100c) y = 0.5x + 60
- 7) The number of defective ballot papers follows a Poisson distribution with mean 2. The probability that there will be no defective ballot paper in a box is
  - a) 0.101 b) 0.113 c) 0.124 d) 0.135
- 8) In  $M|M|1|\infty$  system with  $\lambda = 12$  hrs and  $\mu = 16$  hrs the average number of customers in the system is \_\_\_\_\_
  - 5 b) 4 a) 3 d) 2 C)

SLR-FR-39

Set

Marks: 14

Max. Marks: 70

### SLR-FR-39

Set P

9) The half range sine series of f(x) defined in the interval (0, 2) is \_\_\_\_\_ a)  $f(x) = \sum_{n=1}^{\infty} b_n \sin nx$  b)  $f(x) = \sum_{n=1}^{\infty} b_n \sin(2n\pi x)$ c)  $f(x) = \sum_{n=1}^{\infty} b_n \sin\left(\frac{n\pi x}{2}\right)$  d)  $f(x) = \sum_{n=1}^{\infty} a_n \cos\left(\frac{n\pi x}{2}\right)$ Laplace transform of  $\int_{0}^{t} u^{3} du =$ a)  $\frac{3}{s^{5}}$ b)  $\frac{6}{s^{5}}$ d)  $\frac{6}{s^{4}}$ 10) 11) The two regression equations of the variables are x = 19.13 - 0.87y and y = 11.64 - 0.5x then coefficient of correlation is \_\_\_\_\_. a) 0.659 b) -0.649 c) 0.569 d) -0.659 12)  $Lf(t)\,\delta(t-a) = \_$ b)  $e^{-as}f(a)$ d)  $e^{-as}f(t-a)$ a)  $e^{-as}f(t)$ c)  $e^{as}f(a)$ c)  $e^{as} f(a)$ If  $z\{f(k)\} = F(z)$ , then  $z\{a^k f(k)\} =$ \_\_\_\_\_. b)  $f\left(\frac{z}{a}\right)$ 13) C)  $\frac{1}{a}f\left(\frac{z}{a}\right)$ d) None 14)  $z\{k\} = \_____ \text{ for } |z| > 1$ a)  $\frac{z}{z-1}$ b)  $\frac{1}{(z-1)^2}$ d)  $\frac{z}{(z+1)^2}$ **c)**  $\frac{z}{(z-1)^2}$ 

	S.Y	. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/I Information Technology APPLIED MATHEMATICS - I	Dec-2019
Day Time	& Da : 10:	ate: Saturday, 07-12-2019 :00 AM To 01:00 PM	Max. Marks: 56
Instr	ucti	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Use of calculator is allowed.</li> </ul>	
		Section - I	
Q.2	Sol a) b) c) d)	Ive any three of the following questions. Solve $(D^3 + 2D^2 + D)y = x^2 + x$ Solve $(D^2 + 5D + 6)y = e^{-2x} \sin 2x$ Find $z \left\{ 2^k \cos\left(\frac{k\pi}{3} + \alpha\right) \right\}, k \ge 0$ Find $L \left[ \int_{0}^{t} u e^{-2u} \sin 3u  du \right]$	09
	e)	Find inverse laplace transform of $\log \sqrt{1 + \frac{4}{s^2}}$	
Q.3	So	lve any three of the following questions.	09
	a)	Solve $\frac{d^3y}{dt^3} + y = \cos 2t$	
	b)	If $f(t) = \begin{cases} 1 & 0 \le t \le 1\\ 0 & 1 < t < 2 \end{cases}$ and $f(t) = f(t+2)$ then show that $L[f(t)] = \frac{1}{a(1+a^{-5})}$	
	c)	S(1 + $e^{-5}$ ) Find $I^{-1}\left[\frac{s+29}{s-1}\right]$	
	d)	$ [(s+4)(s^2+9)] = ((1)^{ k }) $	
	,	Find z-transform of $\left\{ \left(\frac{1}{3}\right) \right\}$	
	e)	Find $z\{k\alpha^{\kappa}+k\beta^{\kappa}\}, k\geq 0$	
Q.4	So a)	Ive any two of the following questions. $d^2 y$	10
	ч) ь)	Solve $\frac{dy^2}{dx^2} + y = \sin x \sin 2x + 3^x$ Find inverse z transform of	
	D)	$f(z) = \frac{z}{ z } < 2,  z  > 3$	
	c)	Use Laplace transform to solve	
	,	$\frac{dy}{dt} + 3y(t) + 2\int_{0}^{t} y(t)dt = t  y = 0 \text{ when } t = 0$	

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### Section – II

### Q.5 Solve any three of the following questions.

- a) Obtain half range cosine series for
  - $f(x) = (x 1)^2$ ,  $0 \le x \le 1$
- **b)** For a certain data the regression equations are 3x + 2y 26 = 0 and 6x + y 31 = 0 find the following.
  - 1) Mean of x & y
  - 2) Coefficient of correlation
  - 3) Most probable value of x when y = 15
- c) Assuming that 20% the population is literate so that the change of an individual being literate is  $\frac{1}{5}$  and assuming that 100 investigators can take a sample of 10 individuals to see whether they are literates, how many investigators would you except to report that three people or less were literate?
- d) The following mistakes per page were observed in a book.

•	•						
No. of mistakes:	0	1	2	3	4	Total	
No. of pages:	211	90	19	5	0	325	
Fit a Doisson distribution							

Fit a Poisson distribution.

- e) A xerox machine owner earns by giving xeroxing service. The time required to complete xeroxing of one customer has an exponential distribution with the mean of 5 minutes. The arrival of customers is a Poisson process with mean rate of 6 customers per hour. If the machine owner works 8 hours a day, find
  - 1) The average idle time
  - 2) The average time a customer has to remain in the shop.

### **Q.6** Solve any three of the following questions.

- a) Find fourier series for  $f(x) = \frac{x(\pi^2 x^2)}{12}$  in  $(-\pi, \pi)$
- **b)** from the following data find the line of regression y on x

	У	x
Mean	508.4	26.7
SD	36.8	4.6

- r=0.52
- c) Calculate the coefficient of correlation from the following data.

<i>x</i> :	42	44	58	55	89	98	66
<i>y</i> :	56	59	53	58	65	78	58

d) Assuming that the diameter of 1000 plugs taken consecutively from a machine, form a normal distribution with mean 0.7515 and standard deviation 0.002, How many plugs are likely to be rejected if the approved diameter is  $0.752 \pm 0.004$ 

(Given: for a SNV z area between z=0 and z=1.75 is 0.4599 and that between z=0 and z=2.25 is 0.4878)

- e) Customers arrive at a petrol pump at the rate of 5 persons per hour. It takes on an average 4 minutes to serve a customer. Assuming this to be  $M|M|1|\infty$  system.
  - 1) Find the average number of persons waiting at the petrol pump i.e. in the system.
  - 2) What is the probability that a customer arriving at the petrol pump will have to wait in the Queue?

SLR-FR-39

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# Set P

SLR-FR-39

### Q.7 Solve any two of the following questions.

a) From the following data obtain the two lines of regression.

<i>x</i> :	91	97	108	121	67	124	51	73	111	57
<i>y</i> :	71	75	69	97	70	91	39	61	80	47

**b)** Find the fourier series for f(x) in  $(0,2\pi)$ 

$$f(x) = \begin{cases} x & , 0 < x \le \pi \\ 2\pi - x & , \pi < x < 2\pi \end{cases}$$

- c) Customers arrive at a clinic according to a Poisson process with a mean interval of 25 minutes. The physician needs on an average 20 minutes for a patient to examine.
  - 1) Find the expected number of patients at the clinic and in the queue?
  - 2) Find the percentage of patients who are not required to wait?
  - 3) Find the percentage of patients who have to wait?
  - 4) Find Average time spent by a patient at the clinic?

# S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology

### **APPLIED MATHEMATICS - I**

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory should be solved in first 30 minutes in answer book.

- Figures to the right indicate full marks.
- Use of non programmable calculator is allowed.

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) In  $M|M|1|\infty$  system with  $\lambda = 12$  hrs and  $\mu = 16$  hrs the average number of customers in the system is \_\_\_\_\_
  - 5 b) a) 3 C) d)
- The half range sine series of f(x) defined in the interval (0, 2) is \_\_\_\_\_. 2)
  - a)  $f(x) = \sum_{n=1}^{\infty} b_n \sin nx$  b)  $f(x) = \sum_{n=1}^{\infty} b_n \sin(2n\pi x)$ c)  $f(x) = \sum_{n=1}^{\infty} b_n \sin\left(\frac{n\pi x}{2}\right)$  d)  $f(x) = \sum_{n=1}^{\infty} a_n \cos\left(\frac{n\pi x}{2}\right)$

Laplace transform of  $\int_{0}^{t} u^{3} du =$ a)  $\frac{3}{s^{5}}$ b)  $\frac{6}{s^{5}}$ d)  $\frac{6}{s^{4}}$ 3)

c) 
$$\frac{1}{s^5}$$
 d)

4) The two regression equations of the variables are x = 19.13 - 0.87y and y = 11.64 - 0.5x then coefficient of correlation is .

a) 0.659 b) -0.649 c) 0.569 d) -0.659 5)  $Lf(t)\,\delta(t-a) = \underline{\qquad}.$ a)  $e^{-as}f(t)$ b)  $e^{-as}f(a)$ c)  $e^{as}f(a)$ d)  $e^{-as}f(t-a)$ 

6) If 
$$z\{f(k)\} = F(z)$$
, then  $z\{a^k f(k)\} =$ \_\_\_\_\_.  
a)  $f\left(\frac{a}{z}\right)$  b)  $f\left(\frac{z}{a}\right)$   
c)  $\frac{1}{a}f\left(\frac{z}{a}\right)$  d) None

SLR-FR-39

Max. Marks: 70

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Marks: 14

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Set  $z\{k\} =$ \_\_\_\_\_ for |z| > 1a)  $\frac{z}{z-1}$ c)  $\frac{z}{(z-1)^2}$ 7) b)  $\frac{1}{(z-1)^2}$ d)  $\frac{z}{(z+1)^2}$  $(c_1 + c_2 x)e^{2x} + (c_3 + c_4 x)e^{-2x}$  is a general solution of \_\_\_\_\_. a)  $(D^2 - 4)^2 y = 0$  b)  $(D^2 + 4)^2 y = 0$ c)  $(D^2 - 2)^2 y = 0$  d)  $(D^2 + 2)^2 y = 0$ 8) The particular Integral of  $(D^2 - 2D + 1)y = -4e^x$  is \_\_\_\_\_. 9) b)  $-4x^2e^x$ d)  $x^2e^x$ a)  $-2x^2e^x$ C)  $(c_1 + c_2 x)e^x$ 10) If a Poisson Distribution is such that P(x = 2) = P(x = 3) then the mean is \_\_ a) 2 b) 4 c) 3 d) 9 11)  $L^{-1}\left[\frac{1}{s^2+4s+13}\right] =$ \_\_\_\_\_. a)  $e^{-2t}\cos 3t$ b)  $\frac{1}{3}e^{2t}\sin 3t$ d)  $e^{-2t}\sin 3t$ c)  $\frac{1}{2}e^{-2t}\sin 3t$ Idle time of the queuing system is \_ 12) b)  $1 - \frac{\lambda}{\mu}$ d)  $1 - \frac{\mu}{\lambda}$ a) <u>λ</u> c)  $\frac{\mu}{\lambda}$ If mean of x = 70 mean of y = 149 and  $b_{yx} = 0.7$  then the line of 13) regression of y on x is \_\_\_\_\_. a) y = 0.8x + 120b) y = 0.6x + 80c) y = 0.5x + 60d) v = 0.7x + 100The number of defective ballot papers follows a Poisson distribution with 14) mean 2. The probability that there will be no defective ballot paper in a

box is \_\_\_\_\_. a) 0.101 b) 0.113 c) 0.124 d) 0.135 SLR-FR-39

	S.Y	(. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/I Information Technology APPLIED MATHEMATICS - I	Dec-2019
Day Time	& Da : 10:	ate: Saturday, 07-12-2019 :00 AM To 01:00 PM	Max. Marks: 56
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		Section - I	
Q.2	Sol a) b) c) d)	Ive any three of the following questions. Solve $(D^3 + 2D^2 + D)y = x^2 + x$ Solve $(D^2 + 5D + 6)y = e^{-2x} \sin 2x$ Find $z \left\{ 2^k \cos\left(\frac{k\pi}{3} + \alpha\right) \right\}, k \ge 0$ Find $L \left[ \int_0^t u e^{-2u} \sin 3u  du \right]$	09
	e)	Find inverse laplace transform of $\log \sqrt{1 + \frac{4}{s^2}}$	
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	c) d) e)	$L[f(t)] = \frac{1}{s(1+e^{-s})}$ Find $L^{-1}\left[\frac{s+29}{(s+4)(s^2+9)}\right]$ Find z-transform of $\left\{\left(\frac{1}{3}\right)^{ k }\right\}$ Find $z\{k\alpha^k + k\beta^k\}, k \ge 0$	
Q.4	So	Ive any two of the following questions.	10
	a)	Solve $\frac{d^2y}{dx^2} + y = \sin x \sin 2x + 3^x$	
	b) c)	Find inverse z-transform of $f(z) = \frac{z}{(z-2)(z-3)}$ $ z  < 2$ , $ z  > 3$ Use Laplace transform to solve	
	,	$\frac{dy}{dt} + 3y(t) + 2\int_{0}^{t} y(t)dt = t  y = 0 \text{ when } t = 0$	

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### Section – II

### Q.5 Solve any three of the following questions.

- a) Obtain half range cosine series for
  - $f(x) = (x 1)^2, \qquad 0 \le x \le 1$
- **b)** For a certain data the regression equations are 3x + 2y 26 = 0 and 6x + y 31 = 0 find the following.
  - 1) Mean of x & y
  - 2) Coefficient of correlation
  - 3) Most probable value of x when y = 15
- c) Assuming that 20% the population is literate so that the change of an individual being literate is  $\frac{1}{5}$  and assuming that 100 investigators can take a sample of 10 individuals to see whether they are literates, how many investigators would you except to report that three people or less were literate?
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No. of mistakes:	0	1	2	3	4	Total	
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Fit a Poisson distribution.

- e) A xerox machine owner earns by giving xeroxing service. The time required to complete xeroxing of one customer has an exponential distribution with the mean of 5 minutes. The arrival of customers is a Poisson process with mean rate of 6 customers per hour. If the machine owner works 8 hours a day, find
  - 1) The average idle time
  - 2) The average time a customer has to remain in the shop.

### **Q.6** Solve any three of the following questions.

- a) Find fourier series for  $f(x) = \frac{x(\pi^2 x^2)}{12}$  in  $(-\pi, \pi)$
- **b)** from the following data find the line of regression y on x

	У	x
Mean	508.4	26.7
SD	36.8	4.6
r=0.52		

c) Calculate the coefficient of correlation from the following data.

<i>x</i> :	42	44	58	55	89	98	66
<i>y</i> :	56	59	53	58	65	78	58

d) Assuming that the diameter of 1000 plugs taken consecutively from a machine, form a normal distribution with mean 0.7515 and standard deviation 0.002, How many plugs are likely to be rejected if the approved diameter is  $0.752 \pm 0.004$ 

(Given: for a SNV z area between z=0 and z=1.75 is 0.4599 and that between z=0 and z=2.25 is 0.4878)

- e) Customers arrive at a petrol pump at the rate of 5 persons per hour. It takes on an average 4 minutes to serve a customer. Assuming this to be  $M|M|1|\infty$  system.
  - 1) Find the average number of persons waiting at the petrol pump i.e. in the system.
  - 2) What is the probability that a customer arriving at the petrol pump will have to wait in the Queue?

09

SLR-FR-39

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# SLR-FR-39 Set Q

### Q.7 Solve any two of the following questions.

a) From the following data obtain the two lines of regression.

3	<i>x</i> :	91	97	108	121	67	124	51	73	111	57
1	y:	71	75	69	97	70	91	39	61	80	47

**b)** Find the fourier series for f(x) in  $(0,2\pi)$ 

$$f(x) = \begin{cases} x & , 0 < x \le \pi \\ 2\pi - x & , \pi < x < 2\pi \end{cases}$$

- c) Customers arrive at a clinic according to a Poisson process with a mean interval of 25 minutes. The physician needs on an average 20 minutes for a patient to examine.
  - 1) Find the expected number of patients at the clinic and in the queue?
  - 2) Find the percentage of patients who are not required to wait?
  - 3) Find the percentage of patients who have to wait?
  - 4) Find Average time spent by a patient at the clinic?

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology

### **APPLIED MATHEMATICS - I**

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory should be solved in first 30 minutes in answer book.

- Figures to the right indicate full marks.
- Use of non programmable calculator is allowed.

MCQ/Objective Type Questions

**Duration: 30 Minutes** 

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Idle time of the queuing system is
  - b)  $1 \frac{\lambda}{\mu}$ d)  $1 \frac{\mu}{\lambda}$ a) <u>λ</u>  $_{\mu}^{\mu}$ c)
- If mean of x = 70 mean of y = 149 and  $b_{yx} = 0.7$  then the line of 2) regression of y on x is \_\_\_\_\_
  - a) v = 0.8x + 120b) v = 0.6x + 80d) v = 0.7x + 100c) y = 0.5x + 60
- The number of defective ballot papers follows a Poisson distribution with 3) mean 2. The probability that there will be no defective ballot paper in a box is
  - a) 0.101 b) 0.113 0.124 d) 0.135 C)
- 4) In  $M|M|1|\infty$  system with  $\lambda = 12$  hrs and  $\mu = 16$  hrs the average number of customers in the system is \_\_\_\_
  - 4 a) 5 b) c) 3 d) 2

The half range sine series of f(x) defined in the interval (0, 2) is \_\_\_\_\_. 5)

- a)  $f(x) = \sum_{n=1}^{\infty} b_n \sin nx$  b)  $f(x) = \sum_{n=1}^{\infty} b_n \sin(2n\pi x)$ c)  $f(x) = \sum_{n=1}^{\infty} b_n \sin\left(\frac{n\pi x}{2}\right)$  d)  $f(x) = \sum_{n=1}^{\infty} a_n \cos\left(\frac{n\pi x}{2}\right)$
- Laplace transform of  $\int u^3 du =$ 6) a)  $\frac{3}{s^5}$ 
  - b)  $\frac{6}{s^5}$ d)  $\frac{6}{s^4}$ c)

SLR-FR-39

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Max. Marks: 70

Marks: 14

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## SLR-FR-39



7)	The two regression equations of the $y = 11.64 - 0.5x$ then coefficient of a) 0.659 c) 0.569	vari corre b) d)	ables are $x = 19.13 - 0.87y$ and elation is -0.649 -0.659
8)	$Lf(t) \delta(t-a) = \underline{\qquad}.$ a) $e^{-as}f(t)$ c) $e^{as}f(a)$	b) d)	$e^{-as}f(a)$ $e^{-as}f(t-a)$
9)	If $z\{f(k)\} = F(z)$ , then $z\{a^k f(k)\} = \frac{1}{a}$ a) $f\left(\frac{a}{z}\right)$ c) $\frac{1}{a}f\left(\frac{z}{a}\right)$	b) d)	$f\left(\frac{z}{a}\right)$ None
10)	$z\{k\} = \text{ for }  z  > 1$ a) $\frac{z}{z-1}$ c) $\frac{z}{(z-1)^2}$	b) d)	$\frac{\frac{1}{(z-1)^2}}{\frac{z}{(z+1)^2}}$
11)	$(c_1 + c_2 x)e^{2x} + (c_3 + c_4 x)e^{-2x}$ is a g a) $(D^2 - 4)^2 y = 0$ c) $(D^2 - 2)^2 y = 0$	jene b) d)	ral solution of $(D^2 + 4)^2 y = 0$ $(D^2 + 2)^2 y = 0$
12)	The particular Integral of $(D^2 - 2D + a) -2x^2e^x$ c) $(c_1 + c_2x)e^x$	- 1)y b) d)	$v = -4e^{x} \text{ is } \underline{\qquad} .$ $-4x^{2}e^{x}$ $x^{2}e^{x}$
13)	If a Poisson Distribution is such that is a) 2 c) 3	<i>P(x</i> b) d)	<ul> <li>= 2) = P(x = 3) then the mean</li> <li>4</li> <li>9</li> </ul>
14)	$L^{-1} \left[ \frac{1}{s^2 + 4s + 13} \right] = \underline{\qquad}.$ a) $e^{-2t} \cos 3t$ c) $\frac{1}{3} e^{-2t} \sin 3t$	b) d)	$\frac{1}{3}e^{2t}\sin 3t$ $e^{-2t}\sin 3t$

	S.Y	′. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/I Information Technology APPLIED MATHEMATICS - I	Dec-2019
Day & Time:	& Da 10:	ate: Saturday, 07-12-2019 :00 AM To 01:00 PM	Max. Marks: 56
Instru	uctio	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Use of calculator is allowed.</li> </ul>	
		Section - I	
Q.2	Sol a) b) c) d)	Ive any three of the following questions. Solve $(D^3 + 2D^2 + D)y = x^2 + x$ Solve $(D^2 + 5D + 6)y = e^{-2x} \sin 2x$ Find $z \left\{ 2^k \cos\left(\frac{k\pi}{3} + \alpha\right) \right\}, k \ge 0$ Find $L \left[ \int_{0}^{t} u e^{-2u} \sin 3u  du \right]$	09
	e)	Find inverse laplace transform of $\log \sqrt{1 + \frac{4}{s^2}}$	
Q.3	Sol a) b) c)	Ive any three of the following questions. Solve $\frac{d^3y}{dt^3} + y = \cos 2t$ If $f(t) = \begin{cases} 1 & 0 \le t \le 1\\ 0 & 1 < t < 2 \end{cases}$ and $f(t) = f(t+2)$ then show that $L[f(t)] = \frac{1}{s(1+e^{-s})}$ Find $L^{-1}\left[\frac{s+29}{(s+4)(s^2+9)}\right]$	09
	d)	Find z-transform of $\left\{ \left(\frac{1}{-1}\right)^{ k } \right\}$	
	e)	Find $z\{k\alpha^k + k\beta^k\}, k \ge 0$	
Q.4	Sol	lve any two of the following questions.	10
	a)	Solve $\frac{d^2y}{dx^2} + y = \sin x \sin 2x + 3^x$	
	b) c)	Find inverse z-transform of $f(z) = \frac{z}{(z-2)(z-3)}  z  < 2,  z  > 3$ Use Laplace transform to solve $\frac{dy}{dt} + 3y(t) + 2 \int_{0}^{t} y(t)dt = t  y = 0 \text{ when } t = 0$	
		U	

Seat

No.

Set R

SLR-FR-39

### Section – II

### Q.5 Solve any three of the following questions.

- a) Obtain half range cosine series for
  - $f(x) = (x-1)^2, \quad 0 \le x \le 1$
- **b)** For a certain data the regression equations are 3x + 2y 26 = 0 and 6x + y 31 = 0 find the following.
  - 1) Mean of x & y
  - 2) Coefficient of correlation
  - 3) Most probable value of x when y = 15
- c) Assuming that 20% the population is literate so that the change of an individual being literate is  $\frac{1}{5}$  and assuming that 100 investigators can take a sample of 10 individuals to see whether they are literates, how many investigators would you except to report that three people or less were literate?
- d) The following mistakes per page were observed in a book.

-							
No. of mistakes:	0	1	2	3	4	Total	
No. of pages:	211	90	19	5	0	325	
Eit a Daisson distribution							

Fit a Poisson distribution.

- e) A xerox machine owner earns by giving xeroxing service. The time required to complete xeroxing of one customer has an exponential distribution with the mean of 5 minutes. The arrival of customers is a Poisson process with mean rate of 6 customers per hour. If the machine owner works 8 hours a day, find
  - 1) The average idle time
  - 2) The average time a customer has to remain in the shop.

### **Q.6** Solve any three of the following questions.

- **a)** Find fourier series for  $f(x) = \frac{x(\pi^2 x^2)}{12}$  in  $(-\pi, \pi)$
- **b)** from the following data find the line of regression *y* on *x*

	У	x
Mean	508.4	26.7
SD	36.8	4.6

r=0.52

c) Calculate the coefficient of correlation from the following data.

<i>x</i> :	42	44	58	55	89	98	66
<i>y</i> :	56	59	53	58	65	78	58

d) Assuming that the diameter of 1000 plugs taken consecutively from a machine, form a normal distribution with mean 0.7515 and standard deviation 0.002, How many plugs are likely to be rejected if the approved diameter is  $0.752 \pm 0.004$ 

(Given: for a SNV z area between z=0 and z=1.75 is 0.4599 and that between z=0 and z=2.25 is 0.4878)

- e) Customers arrive at a petrol pump at the rate of 5 persons per hour. It takes on an average 4 minutes to serve a customer. Assuming this to be *M*|*M*|1|∞ system.
  - 1) Find the average number of persons waiting at the petrol pump i.e. in the system.
  - 2) What is the probability that a customer arriving at the petrol pump will have to wait in the Queue?

09

SLR-FR-39

Set

# SLR-FR-39 Set R

### Q.7 Solve any two of the following questions.

a) From the following data obtain the two lines of regression.

<i>x</i> :	91	97	108	121	67	124	51	73	111	57
<i>y</i> :	71	75	69	97	70	91	39	61	80	47

**b)** Find the fourier series for f(x) in  $(0,2\pi)$ 

$$f(x) = \begin{cases} x & , 0 < x \le \pi \\ 2\pi - x & , \pi < x < 2\pi \end{cases}$$

- c) Customers arrive at a clinic according to a Poisson process with a mean interval of 25 minutes. The physician needs on an average 20 minutes for a patient to examine.
  - 1) Find the expected number of patients at the clinic and in the queue?
  - 2) Find the percentage of patients who are not required to wait?
  - 3) Find the percentage of patients who have to wait?
  - 4) Find Average time spent by a patient at the clinic?

### Set S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory should be solved in first 30 minutes in answer book.

**APPLIED MATHEMATICS - I** 

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

## MCQ/Objective Type Questions

**Duration: 30 Minutes** 

### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

	t	····
1)	Laplace transform of $\int u^3 du =$	
	a) $\frac{3}{s^5}$	b) $\frac{6}{s^5}$
	<b>c)</b> $\frac{1}{s^5}$	d) $\frac{6}{s^4}$
2)	The two regression equations of the $y = 11.64 - 0.5x$ then coefficient of a) 0.659	e variables are $x = 19.13 - 0.87y$ and correlation is b) $-0.649$ d) $-0.659$
3)	$Lf(t) \delta(t-a) = \$ a) $e^{-as}f(t)$ c) $e^{as}f(a)$	b) $e^{-as}f(a)$ d) $e^{-as}f(t-a)$
4)	If $z\{f(k)\} = F(z)$ , then $z\{a^k f(k)\} =$ a) $f\left(\frac{a}{z}\right)$ c) $\frac{1}{a}f\left(\frac{z}{a}\right)$	b) $f\left(\frac{z}{a}\right)$ d) None
5)	$z\{k\} = \ \text{ for }  z  > 1$ a) $\frac{z}{z-1}$ c) $\frac{z}{(z-1)^2}$	b) $\frac{1}{(z-1)^2}$ d) $\frac{z}{(z+1)^2}$
6)	$(c_1 + c_2 x)e^{2x} + (c_3 + c_4 x)e^{-2x}$ is a g a) $(D^2 - 4)^2 y = 0$ c) $(D^2 - 2)^2 y = 0$	general solution of b) $(D^2 + 4)^2 y = 0$ d) $(D^2 + 2)^2 y = 0$
7)	The particular Integral of $(D^2 - 2D - a) -2x^2e^x$ c) $(c_1 + c_2x)e^x$	+ 1) $y = -4e^{x}$ is b) $-4x^{2}e^{x}$ d) $x^{2}e^{x}$

Seat No.

## SLR-FR-39

Max. Marks: 70

Marks: 14

Set S

Set 8) If a Poisson Distribution is such that P(x = 2) = P(x = 3) then the mean is a) 2 b) 4 c) 3 d) 9 9)  $L^{-1}\left[\frac{1}{s^2+4s+13}\right] = \underline{\qquad}.$ a)  $e^{-2t}\cos 3t$ b)  $\frac{1}{3}e^{2t}\sin 3t$ d)  $e^{-2t}\sin 3t$ c)  $\frac{1}{3}e^{-2t}\sin 3t$ Idle time of the queuing system is \_\_\_\_ 10) b)  $1 - \frac{\lambda}{\mu}$ d)  $1 - \frac{\mu}{\lambda}$ a) <u>^</u> μ c)  $\frac{\tilde{\mu}}{\mu}$ If mean of x = 70 mean of y = 149 and  $b_{yx} = 0.7$  then the line of 11)regression of y on x is \_\_\_\_\_ a) y = 0.8x + 120b) y = 0.6x + 80c) y = 0.5x + 60d) y = 0.7x + 10012) The number of defective ballot papers follows a Poisson distribution with mean 2. The probability that there will be no defective ballot paper in a box is a) 0.101 b) 0.113 d) 0.135 c) 0.124 In  $M|M|1|\infty$  system with  $\lambda = 12$  hrs and  $\mu = 16$  hrs the average number 13) of customers in the system is \_\_\_\_\_ b) a) 5 4 c) 3 d) 2 The half range sine series of f(x) defined in the interval (0, 2) is \_\_\_\_\_. 14) a)  $f(x) = \sum_{n=1}^{\infty} b_n \sin nx$  b)  $f(x) = \sum_{n=1}^{\infty} b_n \sin(2n\pi x)$ 

c) 
$$f(x) = \sum_{n=1}^{\infty} b_n \sin\left(\frac{n\pi x}{2}\right)$$
 d)  $f(x) = \sum_{n=1}^{\infty} a_n \cos\left(\frac{n\pi x}{2}\right)$ 

SLR-FR-39

	S.Y	(. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/ Information Technology APPLIED MATHEMATICS - I	Dec-2019
Day Time	& Da : 10	ate: Saturday, 07-12-2019 :00 AM To 01:00 PM	Max. Marks: 56
Instr	ucti	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Use of calculator is allowed.</li> </ul>	
		Section - I	
Q.2	So a) b) c) d)	Ive any three of the following questions. Solve $(D^3 + 2D^2 + D)y = x^2 + x$ Solve $(D^2 + 5D + 6)y = e^{-2x} \sin 2x$ Find $z \left\{ 2^k \cos\left(\frac{k\pi}{3} + \alpha\right) \right\}, k \ge 0$ Find $L \left[ \int_0^t u e^{-2u} \sin 3u  du \right]$	09
	e)	Find inverse laplace transform of $\log \sqrt{1 + \frac{4}{s^2}}$	
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	c)	Find $L^{-1}\left[\frac{s+29}{(s+4)(s^2+9)}\right]$	
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SLR-FR-39 Set S

### Seat No.

### Section – II

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  - 2) What is the probability that a customer arriving at the petrol pump will have to wait in the Queue?

09

SLR-FR-39

Set

# SLR-FR-39 Set S

### Q.7 Solve any two of the following questions.

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  - 3) Find the percentage of patients who have to wait?
  - 4) Find Average time spent by a patient at the clinic?

Day Time	& Date : 10:0	e: Fri 0 AN	iday, 13-12-2019 / To 01:00 PM		Max	k. Marks: 70
Instr	uctio	n <b>s:</b> 1 2	) Q. No. 1 is compulsory and sho book. 2) Figures to right indicate full mar	uld b ks.	e solved in first 30 minutes	in answer
D	4: a.a. 0		MCQ/Objective Ty	pe Q	uestions	Marka: 44
Dura					in a surd an arrite the second	
Q.1	<b>Choo</b> 1)	Dur Dur 12k a) c)	ring a cycle the heat transfer are g J the net work transfer the cycle i 60000Nm 12000Nm	given s b) d)	by: 120kJ, -60kJ, -48kJ, a  24000Nm 4400Nm	nd
	2)	PM a) b) c) d)	M-I is impossible according to Zeroth law of thermodynamics First law of thermodynamics Second law of thermodynamics Boyle's law		law.	
	3)	Hea a) c)	at engine is used to heat space to convert heat into work	b) d)	to cool the space None	
	4)	Coe a) c)	efficient of performance of refriger equal to one greater than one	atior b) d)	system is always less than one None	
	5)	Wh a) b) c) d)	en a gas is heated at constant vo temperature increase pressure increase both temperature and pressure i temperature and pressure remai	lume ncrea ns co	, its ases onstant	
	6)	The a) b) c) d)	e internal energy of perfect gas de temperature, pressure and spect temperature, enthalpy and speci temperature, entropy and specifi temperature only	penc ific h fic he c he	l on eats eats ats	
	7)	In s a) b) c) d)	team power plants, condenser is reduce back pressure consume heat of exhaust steam condense feed water all above	usec	to	
	8)	For a) c)	impulse water turbine which turb pelton turbine Kaplan turbine	ine is b) d)	used francis turbine None	

Seat No.

# F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 BASIC MECHANICAL ENGINEERING

SLR-FR-4

Set P

- 9) The nozzle is used \_\_\_\_\_.
  - a) to increase pressure energy of water leaving to tailrace
  - b) to decrease pressure energy of water leaving to tail race
  - c) to increase kinetic energy of water striking to turbine
  - d) None
- 10) For the flue gas flow, tick the correct sequence \_\_\_\_\_
  - a) Boiler-Air preheater- economizer- ID fan- Chimney
  - b) Boiler- ID fan -Air preheater- Economizer- Chimney
  - c) Boiler- Economizer- Air preheater- ID fan- Chimney
  - d) None of the above
- 11) Term scavenging is generally related with \_\_\_\_
  - a) two stroke engines b) vertical engines
  - c) air cooled engines d) high speed engines
- 12) Centrifugal tension in belt depends upon \_\_\_\_\_.
  - a) velocity of the belt
  - b) mass per unit length of the belt
  - c) both a and b above
  - d) none of the above

spot facing

- 13) Which of the following operations can be performed by a drilling machine?
  - b) Reaming
  - c) tapping d) all of these

14) A welding process definitely needs following input \_\_\_\_\_.

a) heat

a)

C)

- b) Pressure
- Filler material d) none of the above

SLR-FR-4

Set | P

# F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019

Day & Date: Friday, 13-12-2019 Time: 10:00 AM To 01:00 PM

Seat No.

**Instructions:** 1) Q.No.2 and Q.No.4 are short answer type question.

- 2) Q.No.3 and Q.5 are long answer types question
- 3) Figures to the right indicate fill marks.
- 4) Use of log tables and non-programmable single memory calculator is allowed.
- 5) Neat diagrams must be drawn whenever necessary.

**BASIC MECHANICAL ENGINEERING** 

6) Make suitable assumptions, is necessary and mention them clearly.

### Section – I

#### Q.2 Attempt any five of the following

- Explain types of thermodynamic systems and give one example of a) each.
- b) State and explain second law of thermodynamics.
- Derive an expression of work done for adiabatic process. c)
- Draw neat sketch of window air conditioner. How it differ from split air d) conditioner?
- State the function of following units in Steam power plant. e)
  - 1) Condenser
  - 2) Economiser
  - 3) Cooling tower
- Compare BWR and PWR. **f**)
- g) Explain in brief working of double acting reciprocating pump.

#### Solve any one out of a) and b) and solve any two out of c) to f). Q.3

- Explain with neat sketch the working of Hydro power plant. State its a) advantages and disadvantages.
- b) A nozzle is used for increasing the velocity of steam. The enthalpy and 05 velocity of steam entering the nozzle are 3000 kJ/kg and 60 m/s respectively. The enthalpy at the exit of the nozzle 2800 kJ/kg. Inlet area is 0.12 m<sup>2</sup>, specific volume at inlet is 0.2 m<sup>3</sup>/kg and specific volume at outlet is  $0.5 \text{ m}^3/\text{kg}$ . The heat losses from horizontal nozzle are negligible. Find. 1) Velocity and the area at the exit from the nozzle
  - 2) Mass flow rate
  - 3) The ratio of inlet to exit diameter of nozzle
- c) What is Hydraulic Impulse Turbine? Explain the working of Pelton wheel. 04
- 0.8 kg air is compressed adiabatically from 200 KPa pressure and 70°C 04 d) temperature to 0.9 Mpa pressure. It is then expanded at constant pressure to reach its original volume. Find gross heat transfer and gross work transfer. 04

Assume  $C_p = 1.005$  and  $C_v = 0.718$  KJ/Kg <sup>0</sup>K.

e) Draw neat sketch of vane blower. Explain in brief its construction and 04 working.

15

13

05

Max. Marks: 56

SLR-FR-4

A closed system undergoes a thermodynamic cycle consisting of 5 f) processes. The following data gives the work and neat transfer for each of the process.

Process	Heat transfer in KJ/min	Work transfer in KJ/min
1-2	Nil	-8000
2-3	6000	Nil
3-4	2000	4000
4-5	Nil	8000
5-1	-4000	Nil

Show that the data is consistent with First law of thermodynamics and determine.

- 1) Net rate of work out put
- 2) Efficiency of cycle
- 3) Change in internal energy for cycle

### Section – II

#### Solve any five out of seven Q.4

- a) Compare two stroke engine and four stroke engine.
- b) A diesel engine has a compression ratio of 18 and cut off ratio 2.7. Calculate efficiency of engine.
- c) Write a short note on chain drives giving its advantages and disadvantages.
- d) Write a short note on gas welding.
- e) What are different steps involved in design process?
- Differentiate between Brazing and Soldering. f)
- g) Define the terms ductility, malleability, hardness.

#### Solve any one out of (a) and (b) and solve any two out of (c) to (f) 13 Q.5

a) Following data refers to an open belt drive:

-	•	
	Distance between two parallel shaft	= 4m
	Diameter of Pulley (larger)	= 1.5m
	Diameter of smaller Pulley	= 1m
	Initial tension in belt	= 2.8kN
	Mass of belt material	= 1.4kg/m
	Co-efficient of friction between the belt &	= 0.3
	pulley	
	Speed of smaller Pulley	= 400rpm
(	Calculate power transmitted	

- **b)** Draw block diagram of pillar drilling machine and explain functions of basic 05 elements. 04
- c) An engine working on an Otto has a compression ratio of 8. The compression begins at 100 KPa and 15°C. The heat supplied per cycle is 1800KJ/Kg of air. Determine :
  - 1) **Thermal Efficiency**
  - Maximum cycle temperature 2)
- d) Draw neat sketch of Horizontal milling machine. What are three motions 04 available on it? 04
- e) Explain Aesthetic considerations in design.
- Explain in brief construction of a Lathe machine with a block diagram. 04 f)

04

SLR-FR-4

Set

05

d)	none of the above
heat transfer are given transfer the cycle is	by: 120kJ, -60kJ, -48kJ, and
b)	24000Nm
d)	4400Nm

Reaming b) d) all of these b) Pressure

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book. 2) Figures to right indicate full marks. **MCQ/Objective Type Questions** 

**Duration: 30 Minutes** 

8)

Day & Date: Friday, 13-12-2019

Time: 10:00 AM To 01:00 PM

Seat

No.

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence.

- For impulse water turbine which turbine is used 1)
  - pelton turbine b) francis turbine a) None d)
  - Kaplan turbine c)
- 2) The nozzle is used \_\_\_\_\_.
  - to increase pressure energy of water leaving to tailrace a)

F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 **BASIC MECHANICAL ENGINEERING** 

- to decrease pressure energy of water leaving to tail race b)
- c) to increase kinetic energy of water striking to turbine
- d) None

#### 3) For the flue gas flow, tick the correct sequence \_\_\_\_\_

- Boiler-Air preheater- economizer- ID fan- Chimney a)
- Boiler- ID fan -Air preheater- Economizer- Chimnev b)
- Boiler- Economizer- Air preheater- ID fan- Chimney c)
- None of the above d)

#### 4) Term scavenging is generally related with

- two stroke engines vertical engines b) a)
- air cooled engines d) high speed engines c)
- 5) Centrifugal tension in belt depends upon \_\_\_\_\_
  - a) velocity of the belt
  - mass per unit length of the belt b)
  - both a and b above c)
  - d) none of the above

6) Which of the following operations can be performed by a drilling machine?

- spot facing a)
- tapping C)
- A welding process definitely needs following input \_ 7)
  - a) heat Filler material C)
  - During a cycle the
  - 12kJ the net work t
  - 60000Nm a)
  - c) 12000Nm

SLR-FR-4



Max. Marks: 70

Marks: 14

SLR-FR-4 Set Q

- 9) PMM-I is impossible according to \_\_\_\_\_ law.
  - a) Zeroth law of thermodynamics
  - b) First law of thermodynamics
  - c) Second law of thermodynamics
  - d) Boyle's law
- 10) Heat engine is used \_\_\_\_\_.
  - a) to heat space

- b) to cool the space
- c) to convert heat into work d) None
- 11) Coefficient of performance of refrigeration system is always \_\_\_\_\_.
  - a) equal to one b) less than one
  - c) greater than one d) None
- 12) When a gas is heated at constant volume, its \_\_\_\_\_.
  - a) temperature increase
  - b) pressure increase
  - c) both temperature and pressure increases
  - d) temperature and pressure remains constant
- 13) The internal energy of perfect gas depend on \_\_\_\_\_.
  - a) temperature, pressure and specific heats
  - b) temperature, enthalpy and specific heats
  - c) temperature, entropy and specific heats
  - d) temperature only
- 14) In steam power plants, condenser is used to \_\_\_\_\_.
  - a) reduce back pressure
  - b) consume heat of exhaust steam
  - c) condense feed water
  - d) all above

### F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 **BASIC MECHANICAL ENGINEERING**

Day & Date: Friday, 13-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q.No.2 and Q.No.4 are short answer type question.

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- 5) Neat diagrams must be drawn whenever necessary.
- 6) Make suitable assumptions, is necessary and mention them clearly.

### Section – I

#### Q.2 Attempt any five of the following

- Explain types of thermodynamic systems and give one example of a) each.
- b) State and explain second law of thermodynamics.
- Derive an expression of work done for adiabatic process. c)
- Draw neat sketch of window air conditioner. How it differ from split air d) conditioner?
- State the function of following units in Steam power plant. e)
  - 1) Condenser
  - 2) Economiser
  - 3) Cooling tower
- Compare BWR and PWR. **f**)
- g) Explain in brief working of double acting reciprocating pump.

#### Solve any one out of a) and b) and solve any two out of c) to f). Q.3

- Explain with neat sketch the working of Hydro power plant. State its a) advantages and disadvantages.
- b) A nozzle is used for increasing the velocity of steam. The enthalpy and 05 velocity of steam entering the nozzle are 3000 kJ/kg and 60 m/s respectively. The enthalpy at the exit of the nozzle 2800 kJ/kg. Inlet area is 0.12 m<sup>2</sup>, specific volume at inlet is 0.2 m<sup>3</sup>/kg and specific volume at outlet is  $0.5 \text{ m}^3/\text{kg}$ . The heat losses from horizontal nozzle are negligible. Find. 1) Velocity and the area at the exit from the nozzle
  - 2) Mass flow rate
  - 3) The ratio of inlet to exit diameter of nozzle
- c) What is Hydraulic Impulse Turbine? Explain the working of Pelton wheel. 04
- 0.8 kg air is compressed adiabatically from 200 KPa pressure and 70°C 04 d) temperature to 0.9 Mpa pressure. It is then expanded at constant pressure to reach its original volume. Find gross heat transfer and gross work transfer. 04

Assume  $C_p = 1.005$  and  $C_v = 0.718$  KJ/Kg <sup>0</sup>K.

e) Draw neat sketch of vane blower. Explain in brief its construction and 04 working.

Max. Marks: 56

SLR-FR-4

15

13

A closed system undergoes a thermodynamic cycle consisting of 5 f) processes. The following data gives the work and neat transfer for each of the process.

Process	Heat transfer in KJ/min	Work transfer in KJ/min
1-2	Nil	-8000
2-3	6000	Nil
3-4	2000	4000
4-5	Nil	8000
5-1	-4000	Nil

Show that the data is consistent with First law of thermodynamics and determine.

- 1) Net rate of work out put
- 2) Efficiency of cycle
- 3) Change in internal energy for cycle

### Section – II

#### Solve any five out of seven Q.4

- a) Compare two stroke engine and four stroke engine.
- b) A diesel engine has a compression ratio of 18 and cut off ratio 2.7. Calculate efficiency of engine.
- c) Write a short note on chain drives giving its advantages and disadvantages.
- d) Write a short note on gas welding.
- e) What are different steps involved in design process?
- Differentiate between Brazing and Soldering. f)
- g) Define the terms ductility, malleability, hardness.

#### Solve any one out of (a) and (b) and solve any two out of (c) to (f) 13 Q.5 05

a) Following data refers to an open belt drive:

-	Distance between two parallel shaft	= 4m
	Diameter of Pulley (larger)	= 1.5m
	Diameter of smaller Pulley	= 1m
	Initial tension in belt	= 2.8kN
	Mass of belt material	= 1.4kg/m
	Co-efficient of friction between the belt &	= 0.3
	pulley	
	Speed of smaller Pulley	= 400rpm
(	Calculate power transmitted	

- **b)** Draw block diagram of pillar drilling machine and explain functions of basic 05 elements. 04
- c) An engine working on an Otto has a compression ratio of 8. The compression begins at 100 KPa and 15°C. The heat supplied per cycle is 1800KJ/Kg of air. Determine :
  - 1) **Thermal Efficiency**
  - Maximum cycle temperature 2)
- d) Draw neat sketch of Horizontal milling machine. What are three motions 04 available on it? 04
- e) Explain Aesthetic considerations in design.
- Explain in brief construction of a Lathe machine with a block diagram. 04 f)

04

SLR-FR-4

Set

Seat No.

F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 **BASIC MECHANICAL ENGINEERING** 

Day & Date: Friday, 13-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to right indicate full marks.

### **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- When a gas is heated at constant volume, its \_\_\_\_\_. 1)
  - a) temperature increase
  - pressure increase b)
  - c) both temperature and pressure increases
  - d) temperature and pressure remains constant
- 2) The internal energy of perfect gas depend on \_\_\_\_\_
  - temperature, pressure and specific heats a)
  - temperature, enthalpy and specific heats b)
  - temperature, entropy and specific heats c)
  - d) temperature only
- 3) In steam power plants, condenser is used to \_\_\_\_\_.
  - reduce back pressure a)
  - consume heat of exhaust steam b)
  - condense feed water c)
  - d) all above
- 4) For impulse water turbine which turbine is used \_\_\_\_\_
  - a) pelton turbine b) francis turbine
  - c) Kaplan turbine d) None
- 5) The nozzle is used .
  - to increase pressure energy of water leaving to tailrace a)
  - to decrease pressure energy of water leaving to tail race b)
  - to increase kinetic energy of water striking to turbine c)
  - None d)
- 6) For the flue gas flow, tick the correct sequence
  - Boiler-Air preheater- economizer- ID fan- Chimney a)
  - b) Boiler- ID fan -Air preheater- Economizer- Chimney
  - Boiler- Economizer- Air preheater- ID fan- Chimney c)
  - d) None of the above

#### Term scavenging is generally related with \_\_\_\_\_ 7)

- a) two stroke engines c)
  - air cooled engines
- Centrifugal tension in belt depends upon . 8)
  - a) velocity of the belt
  - mass per unit length of the belt b)
  - c) both a and b above
  - d) none of the above

Marks: 14

Page 9 of 16

SLR-FR-4

Set

- 9) Which of the following operations can be performed by a drilling machine?
  - a) spot facing tapping

C)

b) Reaming SLR-FR-4

Set | R

- all of these d)
- A welding process definitely needs following input \_\_\_\_ 10)
  - a) heat b) Pressure c) Filler material
    - d) none of the above
- During a cycle the heat transfer are given by: 120kJ, -60kJ, -48kJ, and 11) 12kJ the net work transfer the cycle is
  - 60000Nm b) a)
  - 24000Nm 4400Nm 12000Nm d) c)
- 12) PMM-I is impossible according to \_\_\_\_\_ law.
  - a) Zeroth law of thermodynamics
  - b) First law of thermodynamics
  - c) Second law of thermodynamics
  - d) Boyle's law
- 13) Heat engine is used .
  - a) to heat space
  - c) to convert heat into work d) None
- 14) Coefficient of performance of refrigeration system is always \_\_\_\_\_.
  - equal to one a)
  - greater than one c)

- to cool the space b)
- less than one b)
- d) None

# F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019

Day & Date: Friday, 13-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q.No.2 and Q.No.4 are short answer type question.

- 2) Q.No.3 and Q.5 are long answer types question
- 3) Figures to the right indicate fill marks.
- 4) Use of log tables and non-programmable single memory calculator is allowed.
- 5) Neat diagrams must be drawn whenever necessary.

**BASIC MECHANICAL ENGINEERING** 

6) Make suitable assumptions, is necessary and mention them clearly.

### Section – I

#### Q.2 Attempt any five of the following

- Explain types of thermodynamic systems and give one example of a) each.
- b) State and explain second law of thermodynamics.
- Derive an expression of work done for adiabatic process. c)
- Draw neat sketch of window air conditioner. How it differ from split air d) conditioner?
- State the function of following units in Steam power plant. e)
  - 1) Condenser
  - 2) Economiser
  - 3) Cooling tower
- Compare BWR and PWR. **f**)
- g) Explain in brief working of double acting reciprocating pump.

#### Solve any one out of a) and b) and solve any two out of c) to f). Q.3

- Explain with neat sketch the working of Hydro power plant. State its a) advantages and disadvantages.
- b) A nozzle is used for increasing the velocity of steam. The enthalpy and 05 velocity of steam entering the nozzle are 3000 kJ/kg and 60 m/s respectively. The enthalpy at the exit of the nozzle 2800 kJ/kg. Inlet area is 0.12 m<sup>2</sup>, specific volume at inlet is 0.2 m<sup>3</sup>/kg and specific volume at outlet is  $0.5 \text{ m}^3/\text{kg}$ . The heat losses from horizontal nozzle are negligible. Find. 1) Velocity and the area at the exit from the nozzle
  - 2) Mass flow rate
  - 3) The ratio of inlet to exit diameter of nozzle
- c) What is Hydraulic Impulse Turbine? Explain the working of Pelton wheel. 04
- 0.8 kg air is compressed adiabatically from 200 KPa pressure and 70°C 04 d) temperature to 0.9 Mpa pressure. It is then expanded at constant pressure to reach its original volume. Find gross heat transfer and gross work transfer. 04

Assume  $C_p = 1.005$  and  $C_v = 0.718$  KJ/Kg <sup>0</sup>K.

e) Draw neat sketch of vane blower. Explain in brief its construction and 04 working.

Max. Marks: 56

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SLR-FR-4

Seat No.

A closed system undergoes a thermodynamic cycle consisting of 5 f) processes. The following data gives the work and neat transfer for each of the process.

Process	Heat transfer in KJ/min	Work transfer in KJ/min
1-2	Nil	-8000
2-3	6000	Nil
3-4	2000	4000
4-5	Nil	8000
5-1	-4000	Nil

Show that the data is consistent with First law of thermodynamics and determine.

- 1) Net rate of work out put
- 2) Efficiency of cycle
- 3) Change in internal energy for cycle

### Section – II

#### Solve any five out of seven Q.4

- a) Compare two stroke engine and four stroke engine.
- b) A diesel engine has a compression ratio of 18 and cut off ratio 2.7. Calculate efficiency of engine.
- c) Write a short note on chain drives giving its advantages and disadvantages.
- d) Write a short note on gas welding.
- e) What are different steps involved in design process?
- Differentiate between Brazing and Soldering. f)
- g) Define the terms ductility, malleability, hardness.

#### Solve any one out of (a) and (b) and solve any two out of (c) to (f) Q.5

a) Following data refers to an open belt drive:

Distance between two parallel shaft	= 4m
Diameter of Pulley (larger)	= 1.5m
Diameter of smaller Pulley	= 1m
Initial tension in belt	= 2.8kN
Mass of belt material	= 1.4kg/m
Co-efficient of friction between the belt &	= 0.3
pulley	
Speed of smaller Pulley	= 400rpm
Calculate power transmitted	

- **b)** Draw block diagram of pillar drilling machine and explain functions of basic 05 elements. 04
- c) An engine working on an Otto has a compression ratio of 8. The compression begins at 100 KPa and 15°C. The heat supplied per cycle is 1800KJ/Kg of air. Determine :
  - 1) **Thermal Efficiency**
  - Maximum cycle temperature 2)
- d) Draw neat sketch of Horizontal milling machine. What are three motions 04 available on it? 04
- e) Explain Aesthetic considerations in design.
- Explain in brief construction of a Lathe machine with a block diagram. 04 f)

04

SLR-FR-4

Set

13

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		2) I igures to fight indicate full marks.
_		MCQ/Objective Type Questions
Dura	tion: 3	30 Minutes Marks: 14
Q.1	<b>Choo</b> 1)	<ul> <li>ose the correct alternatives from the options and rewrite the sentence. 14</li> <li>For the flue gas flow, tick the correct sequence</li> <li>a) Boiler-Air preheater- economizer- ID fan- Chimney</li> <li>b) Boiler- ID fan -Air preheater- Economizer- Chimney</li> <li>c) Boiler- Economizer- Air preheater- ID fan- Chimney</li> <li>d) None of the above</li> </ul>
	2)	Term scavenging is generally related witha) two stroke enginesb) vertical enginesc) air cooled enginesd) high speed engines
	3)	<ul> <li>Centrifugal tension in belt depends upon</li> <li>a) velocity of the belt</li> <li>b) mass per unit length of the belt</li> <li>c) both a and b above</li> <li>d) none of the above</li> </ul>
	4)	Which of the following operations can be performed by a drilling machine?a) spot facingb) Reamingc) tappingd) all of these
	5)	A welding process definitely needs following input a) heat b) Pressure c) Filler material d) none of the above
	6)	During a cycle the heat transfer are given by: 120kJ, -60kJ, -48kJ, and12kJ the net work transfer the cycle isa) 60000Nmb) 24000Nmc) 12000Nmd) 4400Nm
	7)	<ul> <li>PMM-I is impossible according to law.</li> <li>a) Zeroth law of thermodynamics</li> <li>b) First law of thermodynamics</li> <li>c) Second law of thermodynamics</li> <li>d) Boyle's law</li> </ul>
	8)	Heat engine is useda) to heat spaceb) to cool the spacec) to convert heat into workd) None
	9)	Coefficient of performance of refrigeration system is always a) equal to one b) less than one

### F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 **BASIC MECHANICAL ENGINEERING**

Day & Date: Friday, 13-12-2019 Time: 10:00 AM To 01:00 PM

Seat

No.

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to right indicate full marks

## SLR-FR-4

Set

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greater than one d) None C)

Max. Marks: 70

- 10) When a gas is heated at constant volume, its \_\_\_\_\_.
  - a) temperature increase
  - b) pressure increase
  - c) both temperature and pressure increases
  - d) temperature and pressure remains constant
- 11) The internal energy of perfect gas depend on \_\_\_\_\_.
  - a) temperature, pressure and specific heats
  - b) temperature, enthalpy and specific heats
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- 12) In steam power plants, condenser is used to \_\_\_\_\_.
  - a) reduce back pressure
  - b) consume heat of exhaust steam
  - c) condense feed water
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- 13) For impulse water turbine which turbine is used \_\_\_\_\_.
  - a) pelton turbine b)
  - c) Kaplan turbine
- ) francis turbine
- d) None
- 14) The nozzle is used \_\_\_\_\_.
  - a) to increase pressure energy of water leaving to tailrace
  - b) to decrease pressure energy of water leaving to tail race
  - c) to increase kinetic energy of water striking to turbine
  - d) None

# F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019

### **BASIC MECHANICAL ENGINEERING**

Day & Date: Friday, 13-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q.No.2 and Q.No.4 are short answer type question.

- 2) Q.No.3 and Q.5 are long answer types question
- 3) Figures to the right indicate fill marks.
- 4) Use of log tables and non-programmable single memory calculator is allowed.
- 5) Neat diagrams must be drawn whenever necessary.
- 6) Make suitable assumptions, is necessary and mention them clearly.

### Section – I

#### Q.2 Attempt any five of the following

- Explain types of thermodynamic systems and give one example of a) each.
- b) State and explain second law of thermodynamics.
- Derive an expression of work done for adiabatic process. c)
- Draw neat sketch of window air conditioner. How it differ from split air d) conditioner?
- State the function of following units in Steam power plant. e)
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  - 3) Cooling tower
- Compare BWR and PWR. **f**)
- g) Explain in brief working of double acting reciprocating pump.

#### Solve any one out of a) and b) and solve any two out of c) to f). Q.3

- Explain with neat sketch the working of Hydro power plant. State its a) advantages and disadvantages.
- b) A nozzle is used for increasing the velocity of steam. The enthalpy and 05 velocity of steam entering the nozzle are 3000 kJ/kg and 60 m/s respectively. The enthalpy at the exit of the nozzle 2800 kJ/kg. Inlet area is 0.12 m<sup>2</sup>, specific volume at inlet is 0.2 m<sup>3</sup>/kg and specific volume at outlet is  $0.5 \text{ m}^3/\text{kg}$ . The heat losses from horizontal nozzle are negligible. Find. 1) Velocity and the area at the exit from the nozzle
  - 2) Mass flow rate
  - 3) The ratio of inlet to exit diameter of nozzle
- c) What is Hydraulic Impulse Turbine? Explain the working of Pelton wheel. 04
- 0.8 kg air is compressed adiabatically from 200 KPa pressure and 70°C 04 d) temperature to 0.9 Mpa pressure. It is then expanded at constant pressure to reach its original volume. Find gross heat transfer and gross work transfer. 04

Assume  $C_p = 1.005$  and  $C_v = 0.718$  KJ/Kg <sup>0</sup>K.

e) Draw neat sketch of vane blower. Explain in brief its construction and 04 working.

Max. Marks: 56

SLR-FR-4



Seat No.

15

13

A closed system undergoes a thermodynamic cycle consisting of 5 f) processes. The following data gives the work and neat transfer for each of the process.

Process	Heat transfer in KJ/min	Work transfer in KJ/min
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2-3	6000	Nil
3-4	2000	4000
4-5	Nil	8000
5-1	-4000	Nil

Show that the data is consistent with First law of thermodynamics and determine.

- 1) Net rate of work out put
- 2) Efficiency of cycle
- 3) Change in internal energy for cycle

### Section – II

#### Solve any five out of seven Q.4

- a) Compare two stroke engine and four stroke engine.
- b) A diesel engine has a compression ratio of 18 and cut off ratio 2.7. Calculate efficiency of engine.
- c) Write a short note on chain drives giving its advantages and disadvantages.
- d) Write a short note on gas welding.
- e) What are different steps involved in design process?
- Differentiate between Brazing and Soldering. f)
- g) Define the terms ductility, malleability, hardness.

#### Solve any one out of (a) and (b) and solve any two out of (c) to (f) Q.5

a) Following data refers to an open belt drive:

Distance between two parallel shaft	= 4m
Diameter of Pulley (larger)	= 1.5m
Diameter of smaller Pulley	= 1m
Initial tension in belt	= 2.8kN
Mass of belt material	= 1.4kg/m
Co-efficient of friction between the belt &	= 0.3
pulley	
Speed of smaller Pulley	= 400rpm
Calculate power transmitted	-

- **b)** Draw block diagram of pillar drilling machine and explain functions of basic 05 elements.
- c) An engine working on an Otto has a compression ratio of 8. The compression begins at 100 KPa and 15°C. The heat supplied per cycle is 1800KJ/Kg of air. Determine :
  - 1) **Thermal Efficiency**
  - Maximum cycle temperature 2)
- d) Draw neat sketch of Horizontal milling machine. What are three motions 04 available on it? 04
- e) Explain Aesthetic considerations in design.
- Explain in brief construction of a Lathe machine with a block diagram. 04 f)

04

SLR-FR-4

Set

05

04

15
# S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology

### **DISCRETE MATHEMATICAL STRUCTURES**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

**Duration: 30 Minutes** 

Seat

No.

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

2) Figure to the right indicates full marks.

#### MCQ/Objective Type Questions

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Domain of a function is
  - the maximal set of numbers for which a function is defined a)
  - the maximal set of numbers which a function can take values b)
  - c) it is set of natural numbers for which a function is defined
  - d) none of the mentioned

#### 2) Ordered collection of objects is \_\_\_\_\_

- b) a) Relation Set d) Function proposition C)
- 3) The Cartesian Product B x A is equal to the Cartesian product A x B. Is it True or False? b) False
  - a) True
- 4) Let m = "Mira like maths c = "Mira like computer science," g = "Mira's friend like literature" h = "Mira's friend has read Hamlet," and t = "Mira's friend has read The Tempest." Which of the following expresses the statement "Mira like computer science and math, but her friend like literature who hasn't read both The Tempest and Hamlet."?

 $c \wedge m \wedge g \wedge (\sim h \wedge \sim t)$ 

 $A=\{1,2\}$  and  $B=\{1,2,3\}$ 

 $c \wedge m \wedge (g \vee (\sim h \wedge \sim t))$ 

- a)  $c \wedge m \wedge (q \vee (\sim h \vee \sim t))$ b) d)
- $c \wedge m \wedge g \wedge (\sim h \vee \sim t)$ C)
- Which of the following two sets are equal? 5)
  - a)  $A = \{1, 2\}$  and  $B = \{1\}$
  - c)  $A=\{1,2,3\}$  and  $B=\{2,1,3\}$ d)  $A = \{1, 2, 4\}$  and  $B = \{1, 2, 3\}$

A relation R on a set A is called an equivalence relation iff it is \_\_\_\_\_. 6) Reflexive and symmetric Transitive b) a) d) None c) Both

- 7) Which one is the contrapositive of  $q \rightarrow p$ ?
  - a)  $p \rightarrow q$ b)  $\neg p \rightarrow \neg q$ c)  $\neg q \rightarrow \neg p$

b)

SLR-FR-40

Set

Max. Marks: 70

Marks: 14

- 8) Each of the following defines a relation on the positive integers N:
  - i) "x is greater than y."
  - iii) x + y = 10
  - "xy is the square of an integer." ii)
  - iv) x + 4y = 10

Determine, which of the relations are symmetric.

- ii) & iii) i) & ii) b) a)
- C) iii) & iv) d) none
- 9) Let R and S be relations on a set A. Assuming A has at least three elements, state whether each of the following statements is true \_\_\_\_\_.
  - a) If R and S are symmetric then  $R \cap S$  is symmetric.
  - b) If R and S are transitive then  $R \cup S$  is transitive
  - If R and S are ant symmetric then R U S is antisymmetric c)
  - d) None

#### 10) A relation R on a set A is called an equivalence relation iff it is \_\_\_\_\_.

- Reflexive and symmetric a)
- b) Transitive
- c) Transitive, Reflexive and symmetric
- d) None

(a) = a . Its
---------------

- one to one b) onto a) c) bijective d) all above
- Each of the following defines a relation on the positive integers N: 12)
  - "x is greater than y." i)
  - iii) x + y = 10
  - "xy is the square of an integer." ii)
  - iv) x + 4y = 10

Determine which of the relations are: reflexive.

- i) b) ii) & iii) a)
- None c) iv) d)
- 13) Let A = Z + the set of positive integers. Define the relation R on A by aRb if and only if a|b. R is \_\_\_\_\_.
  - transitive b) asymmetric a)
  - both C) d) none
- Integral domain in \_\_\_\_\_ have property with no zero deviser. 14)
  - field a) ring b) d) none
  - chain c)

SLR-FR-40

Set

# Seat No.

# S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology

## DISCRETE MATHEMATICAL STRUCTURES

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

#### Section I

#### Q.2 Attempt any three of the following questions.

- a) Explain Partition and covering with example S={a,b,c}
- **b)** Explain PDNF and PCNF with example.
- c) What are the different set operations?
- **d)** In the given ordered pair (4,6); (8,4); (4,4); (9,11); (6,3); (3,0); (2,3) find the following relations. Also, find the domain and range.
  - 1) Is two less than
  - 2) Is less than
  - 3) Is greater than
  - 4) Is equal to

#### Q.3 Attempt any two of the following questions.

- a) Give the power set of the following.
  - 1) {a,{b}}
  - 2) {1, }
  - 3) {X, Y, Z}
- b) Let A = B = {a, b, c}. Consider the relation g = {(a, b),(b, c),(c, c)}. Is g one-to-one? Is g onto? Why? With example explain?
- c) Write algorithm to convert infix expression to polish Notation with example.

#### Section II

#### Q.4 Attempt any three of the following questions.

- a) Definition lattice, LUB & GLB and give example.
- b) Let A = B = {a, b, c}. Consider the relation g = {(a,b), (b,c), (c,c)}. Is g one-to- one? Is g onto? Why? With example explain?
- **c)** Consider the relation  $R = \{(1, 3), (1, 4), (3, 2), (3, 3), (3, 4)\}$  on  $A = \{1, 2, 3, 4\}$ 
  - 1) Find the matrix MR of R
  - 2) Find the domain and range of R
  - 3) Find R-1
  - 4) Draw the directed graph of R
  - 5) Find the composition relation R°R
  - 6) Find  $R^{\circ}R$ -1 and R-1°R
- d) Describe Polish expressions and their compilation.

#### Q.5 Attempt the following questions.

- a) What is Partially Ordered Set? Let  $S = \{ c,b,a \}$  and A = P(S). Draw the Hasse diagram of the poset A with the partial order  $\subseteq$  (set inclusion)
- **b)** Define and explain Boolean functions for (B, \*, +, ', 0, 1).

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SLR-FR-40

Set

Max. Marks: 56

16

12

19

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# Set

### **DISCRETE MATHEMATICAL STRUCTURES**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

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

2) Figure to the right indicates full marks.

#### MCQ/Objective Type Questions

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence.

- 1) Each of the following defines a relation on the positive integers N:
  - "x is greater than y." i)
  - iii) x + y = 10
  - "xy is the square of an integer." ii)
  - x + 4y = 10iv)

Determine, which of the relations are symmetric.

- i) & ii) b) ii) & iii) a)
- iii) & iv) C) d) none

#### 2) Let R and S be relations on a set A. Assuming A has at least three elements, state whether each of the following statements is true \_\_\_\_\_.

- a) If R and S are symmetric then  $R \cap S$  is symmetric.
- b) If R and S are transitive then  $R \cup S$  is transitive
- c) If R and S are ant symmetric then  $R \cup S$  is antisymmetric
- d) None

#### 3) A relation R on a set A is called an equivalence relation iff it is .

- a) Reflexive and symmetric
- b) Transitive
- c) Transitive, Reflexive and symmetric
- d) None

Consider f : Z +  $\rightarrow$  Z + defined by f(a) = a<sup>2</sup>. f is . 4)

- one to one b) onto a)
- bijective d) all above C)
- Each of the following defines a relation on the positive integers N: 5)
  - "x is greater than y." i)
  - x + y = 10iii)
  - "xy is the square of an integer." ii)
  - x + 4y = 10iv)

Determine which of the relations are: reflexive.

- a) i) b) ii) & iii) c)
  - iv) d) None
- 6) Let A = Z + the set of positive integers. Define the relation R on A by aRb if and only if a|b. R is \_\_\_\_\_.
  - a) transitive
  - c) both
- b) asymmetric
- d) none

Max. Marks: 70

SLR-FR-40

**Duration: 30 Minutes** 

Seat No.

14

Marks: 14

Q

		SLR-FR-40
		Set Q
7)	Integral domain in have property a) ring b) c) chain d)	with no zero deviser. field none
8)	Domain of a function is a) the maximal set of numbers for which b) the maximal set of numbers which a c) it is set of natural numbers for which d) none of the mentioned	th a function is defined function can take values a function is defined
9)	Ordered collection of objects isa) Relationb)c) propositiond)	 Set Function
10)	The Cartesian Product B x A is equal to True or False? a) True b)	the Cartesian product A x B. Is it False
11)	Let m = "Mira like maths c = "Mira like con- friend like literature" h = "Mira's friend has friend has read The Tempest." Which of statement "Mira like computer science and literature who hasn't read both The Tem a) c $\Lambda$ m $\Lambda$ (g V (~h V ~t)) b) c) c $\Lambda$ m $\Lambda$ g $\Lambda$ (~h V ~t) d)	omputer science," g = "Mira's is read Hamlet," and t = "Mira's the following expresses the nd math, but her friend like pest and Hamlet."? c Λ m Λ g Λ (~h Λ ~t) c Λ m Λ (g V (~h Λ ~t)
12)	Which of the following two sets are equala) $A = \{1,2\}$ and $B = \{1\}$ b)c) $A = \{1,2,3\}$ and $B = \{2,1,3\}$	I? A={1,2} and B = {1,2,3} A= {1,2,4} and B = {1,2, 3}
13)	A relation R on a set A is called an equiv a) Reflexive and symmetric b) c) Both d)	alence relation iff it is Transitive None
14)	Which one is the contrapositive of $q \rightarrow p$ a) $p \rightarrow q$ b) c) $\neg q \rightarrow \neg p$ d)	? $\neg p \rightarrow \neg q$ none of these

### Seat No. S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

# Information Technology

## **DISCRETE MATHEMATICAL STRUCTURES**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

#### Section I

#### Q.2 Attempt any three of the following questions.

- Explain Partition and covering with example S={a,b,c} a)
- Explain PDNF and PCNF with example. b)
- C) What are the different set operations?
- In the given ordered pair (4,6); (8,4); (4,4); (9,11); (6,3); (3,0); (2,3) find the d) following relations. Also, find the domain and range.
  - 1) Is two less than
  - 2) Is less than
  - 3) Is greater than
  - 4) Is equal to

#### Q.3 Attempt any two of the following questions.

- a) Give the power set of the following.
  - 1) {a,{b}}
  - 2) {1, }
  - 3) {X, Y, Z}
- Let  $A = B = \{a, b, c\}$ . Consider the relation  $g = \{(a, b), (b, c), (c, c)\}$ . Is g oneb) to- one? Is g onto? Why? With example explain?
- Write algorithm to convert infix expression to polish Notation with example. c)

#### Section II

#### Q.4 Attempt any three of the following questions.

- Definition lattice, LUB & GLB and give example. a)
- Let  $A = B = \{a, b, c\}$ . Consider the relation  $g = \{(a,b), (b,c), (c,c)\}$ . Is g b) one-to- one? Is g onto? Why? With example explain?
- Consider the relation  $R = \{(1, 3), (1, 4), (3, 2), (3, 3), (3, 4)\}$  on  $A = \{1, 2, 3, 4\}$ c)
  - Find the matrix MR of R 1)
  - 2) Find the domain and range of R
  - 3) Find R-1
  - 4) Draw the directed graph of R
  - Find the composition relation R<sup>o</sup>R 5)
  - Find R°R-1 and R-1°R 6)
- Describe Polish expressions and their compilation. d)

#### Q.5 Attempt the following questions.

- **a)** What is Partially Ordered Set? Let  $S = \{c,b,a\}$  and A = P(S). Draw the Hasse diagram of the poset A with the partial order  $\subseteq$  (set inclusion)
- **b)** Define and explain Boolean functions for (B, \*, +, ., 0, 1).

16

SLR-FR-40

Max. Marks: 56



12

16

#### Max. Marks: 70 Each question carries one mark. 2) Figure to the right indicates full marks. MCQ/Objective Type Questions **Duration: 30 Minutes** Marks: 14 Choose the correct alternatives from the options and rewrite the sentence. 14 1) Which of the following two sets are equal? a) $A = \{1, 2\}$ and $B = \{1\}$ $A=\{1,2\}$ and $B=\{1,2,3\}$ b) c) $A=\{1,2,3\}$ and $B=\{2,1,3\}$ d) $A = \{1, 2, 4\}$ and $B = \{1, 2, 3\}$ 2) A relation R on a set A is called an equivalence relation iff it is . Reflexive and symmetric Transitive a) b) C) Both d) None 3) Which one is the contrapositive of $q \rightarrow p$ ? a) $p \rightarrow q$ b) $\neg p \rightarrow \neg q$ d) none of these $\neg q \rightarrow \neg p$ C) 4) Each of the following defines a relation on the positive integers N: "x is greater than y." i) iii) x + y = 10"xy is the square of an integer." ii) x + 4y = 10iv) Determine, which of the relations are symmetric. a) i) & ii) b) ii) & iii) iii) & iv) C) d) none 5) Let R and S be relations on a set A. Assuming A has at least three elements, state whether each of the following statements is true \_\_\_\_\_. a) If R and S are symmetric then $R \cap S$ is symmetric. If R and S are transitive then RU S is transitive b) c) If R and S are ant symmetric then $R \cup S$ is antisymmetric d) None

A relation R on a set A is called an equivalence relation iff it is \_\_\_\_\_. 6)

- a) Reflexive and symmetric
- b) Transitive
- Transitive, Reflexive and symmetric c)
- None d)

Consider f : Z +  $\rightarrow$  Z + defined by f(a) = a<sup>2</sup>. f is . 7)

one to one b) onto a) c) bijective d) all above

Seat No.

# S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology

### **DISCRETE MATHEMATICAL STRUCTURES**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes and

### Q.1

SLR-FR-40

Set R

Set | R 8) Each of the following defines a relation on the positive integers N: "x is greater than y." i) iii) x + y = 10"xy is the square of an integer." ii) x + 4y = 10iv) Determine which of the relations are: reflexive. ii) & iii) b) a) i) C) iv) d) None 9) Let A = Z + the set of positive integers. Define the relation R on A by aRb if and only if a|b. R is \_\_\_\_\_. a) transitive b) asymmetric c) both d) none Integral domain in \_\_\_\_\_ have property with no zero deviser. 10) a) ring b) field c) chain d) none 11) Domain of a function is \_\_\_\_ the maximal set of numbers for which a function is defined a) the maximal set of numbers which a function can take values b) c) it is set of natural numbers for which a function is defined d) none of the mentioned Ordered collection of objects is \_\_\_\_\_ 12) b) a) Relation Set d) Function proposition C) 13) The Cartesian Product B x A is equal to the Cartesian product A x B. Is it True or False? a) True b) False 14) Let m = "Mira like maths c = "Mira like computer science," g = "Mira's friend like literature" h = "Mira's friend has read Hamlet," and t = "Mira's

- friend like literature" h = "Mira's friend has read Hamlet," and t = "Mira's friend has read The Tempest." Which of the following expresses the statement "Mira like computer science and math, but her friend like literature who hasn't read both The Tempest and Hamlet."?
  - a) c Λ m Λ (g V (~h V ~t)) b)
- o) c∧m∧g∧(~h∧~t)

SLR-FR-40

- c)  $c \wedge m \wedge g \wedge (\sim h \vee \sim t)$  d)
- ) c Λ m Λ (g V (~h Λ~t) ) c Λ m Λ (g V (~h Λ~t)

### Seat No. S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

## Information Technology

### **DISCRETE MATHEMATICAL STRUCTURES**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

#### Section I

#### Q.2 Attempt any three of the following questions.

- Explain Partition and covering with example S={a,b,c} a)
- Explain PDNF and PCNF with example. b)
- C) What are the different set operations?
- In the given ordered pair (4,6); (8,4); (4,4); (9,11); (6,3); (3,0); (2,3) find the d) following relations. Also, find the domain and range.
  - 1) Is two less than
  - 2) Is less than
  - 3) Is greater than
  - 4) Is equal to

#### Q.3 Attempt any two of the following questions.

- a) Give the power set of the following.
  - 1) {a,{b}}
  - 2) {1, }
  - 3) {X, Y, Z}
- Let  $A = B = \{a, b, c\}$ . Consider the relation  $g = \{(a, b), (b, c), (c, c)\}$ . Is g oneb) to- one? Is g onto? Why? With example explain?
- Write algorithm to convert infix expression to polish Notation with example. c)

#### Section II

#### Q.4 Attempt any three of the following questions.

- Definition lattice, LUB & GLB and give example. a)
- Let  $A = B = \{a, b, c\}$ . Consider the relation  $g = \{(a,b), (b,c), (c,c)\}$ . Is g b) one-to- one? Is g onto? Why? With example explain?
- Consider the relation  $R = \{(1, 3), (1, 4), (3, 2), (3, 3), (3, 4)\}$  on  $A = \{1, 2, 3, 4\}$ c)
  - Find the matrix MR of R 1)
  - 2) Find the domain and range of R
  - 3) Find R-1
  - 4) Draw the directed graph of R
  - Find the composition relation R<sup>o</sup>R 5)
  - Find R°R-1 and R-1°R 6)
- Describe Polish expressions and their compilation. d)

#### Q.5 Attempt the following questions.

- **a)** What is Partially Ordered Set? Let  $S = \{c,b,a\}$  and A = P(S). Draw the Hasse diagram of the poset A with the partial order  $\subseteq$  (set inclusion)
- **b)** Define and explain Boolean functions for (B, \*, +, ., 0, 1).

16

SLR-FR-40



12

16

12

Max. Marks: 56

			peu	uestions	
Dura	ation: 3	30 Minutes		Marks	5: 14
Q.1	<b>Cho</b> 1)	<ul> <li>ose the correct alternatives from the A relation R on a set A is called an e</li> <li>a) Reflexive and symmetric</li> <li>b) Transitive</li> <li>c) Transitive, Reflexive and symmetric</li> <li>d) None</li> </ul>	<b>∍ opt</b> quiva ∍tric	ions and rewrite the sentence. lence relation iff it is	14
	2)	Consider f : Z + $\rightarrow$ Z + defined by f(a a) one to one c) bijective	) = a b) d)	<sup>2</sup> . f is onto all above	
	3)	Each of the following defines a relation i) "x is greater than y." iii) $x+y = 10$ ii) "xy is the square of an integer." iv) $x + 4y = 10$ Determine which of the relations are: a) i) c) iv)	on on refle b) d)	the positive integers N: exive. ii) & iii) None	
	4)	Let A = Z + the set of positive integer if and only if a b. R is a) transitive c) both	rs. De b) d)	efine the relation R on A by aRb asymmetric none	
	5)	Integral domain in have prop a) ring c) chain	erty v b) d)	with no zero deviser. field none	
	6)	<ul> <li>Domain of a function is</li> <li>a) the maximal set of numbers for v</li> <li>b) the maximal set of numbers which</li> <li>c) it is set of natural numbers for w</li> </ul>	which ch a f hich a	a function is defined function can take values a function is defined	

b)

d)

Set

Function

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Information Technology DISCRETE MATHEMATICAL STRUCTURES** 

Day & Date: Tuesday, 10-12-2019

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

2) Figure to the right indicates full marks.

Max. Marks: 70

d) none of the mentioned

Relation

proposition

a)

C)

Ordered collection of objects is \_\_\_\_\_

7)

Time: 10:00 AM To 01:00 PM

Seat

No.

### MCO/Objective Type Questions

SLR-FR-40

Set S

				SLR-FR-40
				Set S
8)	The Tru a)	e Cartesian Product B x A is equal ie or False? True	to the	e Cartesian product A x B. Is it False
9)	Let frie frie sta lite a) c)	m = "Mira like maths c = "Mira like and like literature" h = "Mira's friend and has read The Tempest." Which tement "Mira like computer science rature who hasn't read both The Te c Λ m Λ (g V (~h V ~t)) c Λ m Λ g Λ (~h V ~t)	e com has of th e and empe b) d)	puter science," g = "Mira's read Hamlet," and t = "Mira's e following expresses the math, but her friend like est and Hamlet."? $c \land m \land g \land (\sim h \land \sim t)$ $c \land m \land (g \lor (\sim h \land \sim t))$
10)	Wh a) c)	hich of the following two sets are eq $A = \{1,2\}$ and $B = \{1\}$ $A = \{1,2,3\}$ and $B = \{2,1,3\}$	qual? b) d)	A={1,2} and B = {1,2,3} A= {1,2,4} and B = {1,2, 3}
11)	A r a) c)	elation R on a set A is called an ec Reflexive and symmetric Both	luival b) d)	ence relation iff it is Transitive None
12)	Wh a) c)	hich one is the contrapositive of q – $p \rightarrow q$ $\neg q \rightarrow \neg p$	→ p? b) d)	$\neg p \rightarrow \neg q$ none of these
13)	Eac i) iii) iv) De a) c)	ch of the following defines a relatio "x is greater than y." x+y = 10 "xy is the square of an integer." x + 4y = 10 termine, which of the relations are i) & ii) iii) & iv)	n on symr b) d)	the positive integers N: netric. ii) & iii) none
14)	Let ele a)	R and S be relations on a set A. A ments, state whether each of the fe If R and S are symmetric then R	llowi ∩Si:	ning A has at least three ing statements is true s symmetric.

- b) If R and S are transitive then  $R \cup S$  is transitive
- c) If R and S are ant symmetric then  $R \cup S$  is antisymmetric d) None

# Seat

# S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology

### **DISCRETE MATHEMATICAL STRUCTURES**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

No.

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

#### Section I

#### Q.2 Attempt any three of the following questions.

- Explain Partition and covering with example S={a,b,c} a)
- Explain PDNF and PCNF with example. b)
- C) What are the different set operations?
- In the given ordered pair (4,6); (8,4); (4,4); (9,11); (6,3); (3,0); (2,3) find the d) following relations. Also, find the domain and range.
  - 1) Is two less than
  - 2) Is less than
  - 3) Is greater than
  - 4) Is equal to

#### Q.3 Attempt any two of the following questions.

- a) Give the power set of the following.
  - 1) {a,{b}}
  - 2) {1, }
  - 3) {X, Y, Z}
- Let  $A = B = \{a, b, c\}$ . Consider the relation  $g = \{(a, b), (b, c), (c, c)\}$ . Is g oneb) to- one? Is g onto? Why? With example explain?
- Write algorithm to convert infix expression to polish Notation with example. c)

#### Section II

#### Q.4 Attempt any three of the following questions.

- Definition lattice, LUB & GLB and give example. a)
- Let  $A = B = \{a, b, c\}$ . Consider the relation  $g = \{(a,b), (b,c), (c,c)\}$ . Is g b) one-to- one? Is g onto? Why? With example explain?
- Consider the relation  $R = \{(1, 3), (1, 4), (3, 2), (3, 3), (3, 4)\}$  on  $A = \{1, 2, 3, 4\}$ c)
  - Find the matrix MR of R 1)
  - 2) Find the domain and range of R
  - 3) Find R-1
  - 4) Draw the directed graph of R
  - Find the composition relation R<sup>o</sup>R 5)
  - Find R°R-1 and R-1°R 6)
- Describe Polish expressions and their compilation. d)

#### Q.5 Attempt the following questions.

- **a)** What is Partially Ordered Set? Let  $S = \{c,b,a\}$  and A = P(S). Draw the Hasse diagram of the poset A with the partial order  $\subseteq$  (set inclusion)
- **b)** Define and explain Boolean functions for (B, \*, +, ., 0, 1).

16

SLR-FR-40

Set

Max. Marks: 56



12

S

16

# SLR-FR-41

Set

Max. Marks: 70

Ρ

Seat	
No.	

### S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology DATA COMMUNICATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

C)

#### Marks: 14

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) is a type of transmission impairment in which the signal loses strength due to the resistance of the transmission medium.
  - Distortion a) Noise

- b) Attenuation d) Decibel
- 2) A television broadcast is an example of transmission.
  - Half-duplex b) Simplex a)
  - Full-duplex d) Automatic C)
- 3) In case of \_\_\_\_\_, there are still no connections used, but each frame sent is individually acknowledged.
  - a) Unacknowledged connectionless service
  - b) Acknowledged connectionless service
  - c) Acknowledged connection oriented service
  - d) Unacknowledged connection oriented service
- The core for an optical fiber has 4)
  - a) Lower index of refraction than air
  - b) Lower index of refraction than the cladding
  - c) A higher index of refraction than the cladding
  - d) None of these
- 5) Repeater operates at which layer of the OSI model?
  - a) Application layer **Presentation laver** b)
  - c) Physical layer d) Transport layer
- 6) The technique of temporarily delaying outgoing acknowledgements so that they can be hooked onto the next outgoing data frame is called
  - a) Piggybacking

7)

- b) Cyclic redundancy check
- Fletcher's checksum c)
- None of the mentioned d) In the \_\_\_\_\_ protocol we avoid unnecessary transmission (of all
- outstanding frames) by resending only frames which are corrupted or lost.
  - a) Go-Back-N ARQ
- Selective Repeat ARQ b)
- Stop-and-Wait ARQ d) All of the above c)

				SLR-FR-4	1
				Set P	)
8)	Wh des	ich of the following routing algorit sign?	hms o	can be used for network layer	
	a) c)	Shortest path algorithm Link state algorithm	b) d)	Distance vector algorithm All of the mentioned	
9)	Wh a) c)	iich one of the following tasks is n Framing Flow control	ot doi b) d)	ne by data link layer? Error control Channel coding	
10)	In _ me a) c)	, the chance of collision ca dium before trying to use it. CSMA CDMA	b) d)	reduced if a station senses the MA FDMA	
11)	IEE a) c)	E 802.5 standard represents Overview and Architecture Token Ring	b) d)	Token bus Virtual LAN and Security	
12)	Wh whi a) c)	en a host on network A sends a r ich address does the router look a Logical Port	nessa at? b) d)	age to a host on network B, Physical None of the above	
13)	A _ a) c)	routing table contains info static hierarchical	rmatio b) d)	on entered manually. Dynamic none of the above	
14)	In t If th	he CSMA, a station that he line is idle, it sends immediatel	nas a y. If th	frame to send senses the line. ne line is not idle, it waits a	

- random amount of time and then senses the line again. b)
  - Non-persistent None of the above a) 1-persistentc) P-persistent d)

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		DATA COMMUNICATION	
Day a Time	& Dat : 10:0	te: Thursday,12-12-2019 00 AM To 01:00 PM	Max. Marks: 56
Instr	uctio	<ul> <li>ans: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Assume suitable data if necessary.</li> </ul>	
		Section – I	
Q.2	Atte a) b) c) d)	empt Any three Explain the functions of Physical Layer and Data Link Layer. Describe A Simplex Stop-and-Wait Protocol. Write a short note on Transmission Impairments. Describe transmission characteristics of Twisted Pair Cable.	12
Q.3	Atte a) b)	empt any one Explain OSI Reference Model with neat diagram. What is Framing? Explain framing techniques with example?	08
Q.4	<b>Atte</b> Exp	empt the following. lain Go-Back-N protocol with neat diagram.	08
		Section – II	
Q.5	Atte a) b) c) d)	empt any three. Explain Distance Vector Routing algorithm with example. Write a short note on Router. Write a short note on Flow-Based Routing. Explain the working of Switch with diagram.	12
Q.6	Atte a) b)	empt any one. Explain Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD in deta Explain IEEE Std. 802.3 in detail with its Frame Format.	<b>08</b> ail.
Q.7	<b>Atte</b> Exp	empt the following. Iain Shortest Path Routing Algorithm in detail with example.	08

Information Technology

SLR-FR-41

Set Ρ

# Set

Seat No.

### S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology DATA COMMUNICATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Which of the following routing algorithms can be used for network layer design? b) Distance vector algorithm
  - a) Shortest path algorithm
  - c) Link state algorithm
- d) All of the mentioned
- 2) Which one of the following tasks is not done by data link layer?
  - Framing b) Error control a) c) Flow control d) Channel coding
- In \_\_\_\_\_, the chance of collision can be reduced if a station senses the 3) medium before trying to use it.
  - a) CSMA b) MA
  - c) CDMA d) **FDMA**
- 4) IEEE 802.5 standard represents
  - a) Overview and Architecture b)
  - c) Token Ring d)
- 5) When a host on network A sends a message to a host on network B, which address does the router look at? Physical
  - a) Logical
  - c) Port d) None of the above
- 6) A \_\_\_\_\_ routing table contains information entered manually.
  - a) static hierarchical C)
- b) Dynamic d) none of the above

Decibel

- 7) In the CSMA, a station that has a frame to send senses the line. If the line is idle, it sends immediately. If the line is not idle, it waits a random amount of time and then senses the line again.
  - Non-persistent 1-persistent b) a)
  - c) P-persistent d) None of the above
- is a type of transmission impairment in which the signal loses 8) strength due to the resistance of the transmission medium. b) Attenuation
  - a) Distortion
  - Noise d) c)

Q

Max. Marks: 70

Marks: 14

SLR-FR-41



- Token bus
- Virtual LAN and Security

b)

- SLR-FR-41 Set Q
- 9) A television broadcast is an example of \_\_\_\_\_ transmission.
  - a) Half-duplex

b) Simplex

Automatic

- c) Full-duplex
- 10) In case of \_\_\_\_\_, there are still no connections used, but each frame sent is individually acknowledged.

d)

- a) Unacknowledged connectionless service
- b) Acknowledged connectionless service
- c) Acknowledged connection oriented service
- d) Unacknowledged connection oriented service
- 11) The core for an optical fiber has \_\_\_\_
  - a) Lower index of refraction than air
  - b) Lower index of refraction than the cladding
  - c) A higher index of refraction than the cladding
  - d) None of these
- 12) Repeater operates at which layer of the OSI model?
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  - c) Physical layer d) Transport layer
- 13) The technique of temporarily delaying outgoing acknowledgements so that they can be hooked onto the next outgoing data frame is called
  - a) Piggybacking

- b) Cyclic redundancy check
- c) Fletcher's checksum
- d) None of the mentioned
- 14) In the \_\_\_\_\_ protocol we avoid unnecessary transmission (of all outstanding frames) by resending only frames which are corrupted or lost.
  - a) Go-Back-N ARQ
- b) Selective Repeat ARQ
- c) Stop-and-Wait ARQ
- d) All of the above

		DATA COMMUNICATION	
Day a Time	& Da <sup>:</sup> : 10:(	te: Thursday,12-12-2019 00 AM To 01:00 PM	Max. Marks: 56
Instr	uctic	<ul> <li>ans: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Assume suitable data if necessary.</li> </ul>	
		Section – I	
Q.2	Atte a) b) c) d)	Explain the functions of Physical Layer and Data Link Layer. Describe A Simplex Stop-and-Wait Protocol. Write a short note on Transmission Impairments. Describe transmission characteristics of Twisted Pair Cable.	12
Q.3	Atte a) b)	empt any one Explain OSI Reference Model with neat diagram. What is Framing? Explain framing techniques with example?	08
Q.4	<b>Atte</b> Exp	empt the following. lain Go-Back-N protocol with neat diagram.	08
		Section – II	
Q.5	Atte a) b) c) d)	empt any three. Explain Distance Vector Routing algorithm with example. Write a short note on Router. Write a short note on Flow-Based Routing. Explain the working of Switch with diagram.	12
Q.6	Atte a) b)	empt any one. Explain Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD in det Explain IEEE Std. 802.3 in detail with its Frame Format.	<b>08</b> ail.
Q.7	<b>Atte</b> Exp	empt the following. Iain Shortest Path Routing Algorithm in detail with example.	08

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology

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### Seat No.

# Set Q

## Set S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology

#### Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

DATA COMMUNICATION

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

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

c)

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Repeater operates at which layer of the OSI model?
  - Application layer a) Physical layer
- **Presentation laver** b) d) Transport layer
- 2) The technique of temporarily delaying outgoing acknowledgements so that they can be hooked onto the next outgoing data frame is called
  - Piggybacking a)
  - Fletcher's checksum None of the mentioned d) c)
- protocol we avoid unnecessary transmission (of all 3) In the outstanding frames) by resending only frames which are corrupted or lost. Selective Repeat ARQ

b)

- a) Go-Back-N ARQ b) All of the above c)
  - Stop-and-Wait ARQ d)
- 4) Which of the following routing algorithms can be used for network layer design?
  - a) Shortest path algorithm Link state algorithm c)
- b) Distance vector algorithm All of the mentioned d)

Cyclic redundancy check

- 5) Which one of the following tasks is not done by data link layer?
  - a) Framing b)
  - c) Flow control d) Channel coding
- In \_\_\_\_\_, the chance of collision can be reduced if a station senses the 6) medium before trying to use it.
  - a) CSMA b)
  - c) CDMA **FDMA** d)
- 7) IEEE 802.5 standard represents
  - a) Overview and Architecture Token bus b)
  - c) Token Ring Virtual LAN and Security d)
- When a host on network A sends a message to a host on network B, 8) which address does the router look at?
  - a) Logical b) Physical
  - None of the above c) Port d)

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R

Max. Marks: 70

Marks: 14

- Error control
- MA



- 9) A \_\_\_\_\_ routing table contains information entered manually.
  - a) static
- b) Dynamic

Attenuation

- c) hierarchical d) none of the above
- 10) In the \_\_\_\_\_ CSMA, a station that has a frame to send senses the line. If the line is idle, it sends immediately. If the line is not idle, it waits a random amount of time and then senses the line again.
  - a) 1-persistent b) Non-persistent
  - c) P-persistent d) None of the above
- 11) \_\_\_\_\_ is a type of transmission impairment in which the signal loses strength due to the resistance of the transmission medium.

b)

- a) Distortion
- c) Noise d) Decibel
- 12) A television broadcast is an example of \_\_\_\_\_ transmission.
  - a) Half-duplex b) Simplex
  - c) Full-duplex d) Automatic
- 13) In case of \_\_\_\_\_, there are still no connections used, but each frame sent is individually acknowledged.
  - a) Unacknowledged connectionless service
  - b) Acknowledged connectionless service
  - c) Acknowledged connection oriented service
  - d) Unacknowledged connection oriented service
- 14) The core for an optical fiber has \_
  - a) Lower index of refraction than air
  - b) Lower index of refraction than the cladding
  - c) A higher index of refraction than the cladding
  - d) None of these

		DATA COMMUNICATION	
Day a Time	& Dat : 10:0	te: Thursday,12-12-2019 00 AM To 01:00 PM	Max. Marks: 56
Instr	uctio	<ul> <li>ans: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Assume suitable data if necessary.</li> </ul>	
		Section – I	
Q.2	Atte a) b) c) d)	empt Any three Explain the functions of Physical Layer and Data Link Layer. Describe A Simplex Stop-and-Wait Protocol. Write a short note on Transmission Impairments. Describe transmission characteristics of Twisted Pair Cable.	12
Q.3	Atte a) b)	empt any one Explain OSI Reference Model with neat diagram. What is Framing? Explain framing techniques with example?	08
Q.4	<b>Atte</b> Exp	empt the following. lain Go-Back-N protocol with neat diagram.	08
		Section – II	
Q.5	Atte a) b) c) d)	empt any three. Explain Distance Vector Routing algorithm with example. Write a short note on Router. Write a short note on Flow-Based Routing. Explain the working of Switch with diagram.	12
Q.6	Atte a) b)	empt any one. Explain Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD in deta Explain IEEE Std. 802.3 in detail with its Frame Format.	<b>08</b> ail.
Q.7	<b>Atte</b> Exp	empt the following. Iain Shortest Path Routing Algorithm in detail with example.	08

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### Seat No.

Set R

# SLR-FR-41

# Set S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology

#### Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

DATA COMMUNICATION

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

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Seat

No.

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- In \_\_\_\_\_, the chance of collision can be reduced if a station senses the 1) medium before trying to use it.
  - a) CSMA b) MA c) CDMA d) **FDMA**

#### 2) IEEE 802.5 standard represents \_\_\_\_

- a) Overview and Architecture
  - b) Token bus c) Token Ring Virtual LAN and Security d)
- 3) When a host on network A sends a message to a host on network B, which address does the router look at?
  - a) Logical Physical b)
  - c) Port d) None of the above
- 4) \_ routing table contains information entered manually. А
  - a) static b) Dynamic hierarchical c)
    - d) none of the above
- CSMA, a station that has a frame to send senses the line. 5) In the If the line is idle, it sends immediately. If the line is not idle, it waits a random amount of time and then senses the line again.
  - a) 1-persistent Non-persistent b)
  - None of the above c) P-persistent d)
- is a type of transmission impairment in which the signal loses 6) strength due to the resistance of the transmission medium. Distortion Attenuation a) b)
  - Noise Decibel C) d)
- 7) A television broadcast is an example of \_\_\_\_\_ transmission.
  - a) Half-duplex Simplex b)
  - c) Full-duplex Automatic d)
- \_\_\_\_\_, there are still no connections used, but each frame 8) In case of sent is individually acknowledged.
  - a) Unacknowledged connectionless service
  - b) Acknowledged connectionless service
  - Acknowledged connection oriented service c)
  - d) Unacknowledged connection oriented service

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S

Max. Marks: 70

Marks: 14

- 9) The core for an optical fiber has
  - a) Lower index of refraction than air
  - b) Lower index of refraction than the cladding
  - c) A higher index of refraction than the cladding
  - d) None of these
- 10) Repeater operates at which layer of the OSI model?
  - a) Application layer **Presentation layer** b)
  - c) Physical layer d) Transport layer
- The technique of temporarily delaying outgoing acknowledgements so 11) that they can be hooked onto the next outgoing data frame is called

Piggybacking a)

12)

- b) Cyclic redundancy check
- Fletcher's checksum c)
- In the \_\_\_\_\_ protocol we avoid unnecessary transmission (of all
- outstanding frames) by resending only frames which are corrupted or lost.
  - a) Go-Back-N ARQ c) Stop-and-Wait ARQ
- b) Selective Repeat ARQ d) All of the above
- Which of the following routing algorithms can be used for network layer 13) design?
  - a) Shortest path algorithm
- b) Distance vector algorithm
- c) Link state algorithm
- All of the mentioned d)
- 14) Which one of the following tasks is not done by data link layer?
  - Framing a)

- Error control b)
- c) Flow control
- Channel coding d)

Set

- - d) None of the mentioned

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Day & Time	Day & Date: Thursday,12-12-2019 Fime: 10:00 AM To 01:00 PM		Max. Marks: 56
Instru	uctio	<ul> <li>ns: 1) All questions are compulsory.</li> <li>2) Figures to the right indicate full marks.</li> <li>3) Assume suitable data if necessary.</li> </ul>	
		Section – I	
Q.2	Atte a) b) c) d)	<b>mpt Any three</b> Explain the functions of Physical Layer and Data Link Layer. Describe A Simplex Stop-and-Wait Protocol. Write a short note on Transmission Impairments. Describe transmission characteristics of Twisted Pair Cable.	12
Q.3	Atte a) b)	<b>mpt any one</b> Explain OSI Reference Model with neat diagram. What is Framing? Explain framing techniques with example?	08
Q.4	<b>Atte</b> Expl	mpt the following. lain Go-Back-N protocol with neat diagram.	08
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Q.5	Atte a) b) c) d)	<b>mpt any three.</b> Explain Distance Vector Routing algorithm with example. Write a short note on Router. Write a short note on Flow-Based Routing. Explain the working of Switch with diagram.	12
Q.6	Atte a) b)	<b>mpt any one.</b> Explain Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD in deta Explain IEEE Std. 802.3 in detail with its Frame Format.	<b>08</b> il.
Q.7	<b>Atte</b> Expl	empt the following. Iain Shortest Path Routing Algorithm in detail with example.	08

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology DATA COMMUNICATION

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S

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The Boolean expression (A + B). (A + C)
  - a) A + B.Cb) B + A.Cc)  $\overline{A} + B.C$ d)  $\overline{B}$  + B.C.
- 2) The Boolean expression A + BC is equivalent to \_\_\_\_\_. a) AB + ACb) A + C
  - d) none c) (A + B) (A + C)
- Given Boolean theorem AB + A'C + BC = AB + A'C which of the 3) following is true?
  - a) (A + B) (A' + C) (B + C) = (A + B) (A' + C)
  - b) AB + A'C + BC = AB + BC
  - c) AB + A'C + BC = (A + B) (A' + C)(B + C)
  - d) (A + B)(A' + C)(B + C) = AB + A'C
- 4) De-Morgan's theorems states that
  - a)  $(A + B)' = A' \cdot B'$  and  $(AB)' = \overline{A' \cdot B'}$
  - b) (A + B)' = A' + B' and  $(AB)' = A' \cdot B'$
  - c)  $(A + B)' = A' \cdot B'$  and (AB)' = A' + B'
  - d) (A + B)' = A' + B' and (AB)' = A' + B'

#### If A, B and C are the inputs of a full adder then the sum is given by \_\_\_\_\_. 5)

- a) A AND B AND C b) A OR B AND C
- c) A XOR B XOR C d) A OR B OR C
- 6) If the number of n selected input lines to 2<sup>n</sup> then it requires \_\_\_\_\_ select lines.
  - a) 2 b) M 2<sup>n</sup> c) n d)
- Which of the following statements accurately represents the two BEST 7) methods of logic circuit simplification?
  - a) Actual circuit trial and error evaluation and waveform analysis
  - b) Karnaugh mapping and circuit waveform analysis
  - c) Boolean algebra and Karnaugh mapping
  - d) Boolean algebra and actual circuit trial and error evaluation

Max. Marks: 70

Marks: 14

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- 8) The input is equal to output, in \_\_\_\_
  - b) R-S F/F a) J-K F/F
  - c) T F/F d) DF/F
- The flip-flop which is free from race around problem \_\_\_\_ 9)
  - a) R-S flip-flop Master- Slave JK flip-flop b)
  - c) J-K flip-flop d) None
- 10) If a counter is connected using six flip-flops, then the maximum number of states that the counter can count are
  - 32 b) 64 a)
  - 16 c) d) 8
- Verilog code describes a positive edge trigger, negative edge trigger and 11) positive edge trigger with reset (CLR) uses a keywords \_\_\_\_\_
  - a) posedge and negedge
- b) posedge and always
- c) always and posedge
- d) none of the above
- Verilog supports predefined gate level primitives such as . 12)
  - xnor b) Or a) nor d) all of these c)
- Verilog define two intermediate variables and\_op1 and and\_op2 representing 13) two AND gate outputs through keyword \_\_\_\_\_.
  - b) Wire a) always
  - c) assign d) None
- 14) The use of keyword assign in the form of: assign X = S ? A : B; the statement does following assignment.
  - a) If S = 1, X = B and If S = 0, X = B
  - b) If S = 1, X = A and If S = 0, X = A
  - c) If S = 1, X = A and If S = 0, X = B
  - d) None

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Set

Max. Marks: 56

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Seat No.

### S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

### Section – I

### Q.2 Attempt any three.

- a) Convert the following octal number into Hexa-decimal number.
  - 1) (626)<sub>8</sub>
  - **2)** (2571)<sub>8</sub>
- **b)** Describe function of full subtractor circuit with its truth table, K-map simplification and logic diagram.
- c) Define Digital Comparator? Describe 2 bit digital comparator with example.
- d) Implement the expression using multiplexer.

$$F(A, B, C, D) = \sum m(0, 1, 2, 4, 5, 8, 10, 14)$$

### Q.3 Attempt any two.

- a) What is SOP Expression? Minimize the following expressions using K-map and realize using NAND gates.  $f(A, B, C, D) = \sum m(1,3,5,7,9,10,11,14)$
- b) 1) Convert the following binary numbers to their equivalent hex numbers.
  - i) 10100110101111
  - ii) 0.00011110101101
  - 2) Convert the following binary numbers to their equivalent octal numbers.
     i) 11001110001.000101111001
    - ii) 1011011110.1100101010011
- c) Give the function of the following terminals of IC 7447.
  - 1) LT
  - 2) RBI
  - 3) BI
  - 4) RBO

#### Section – II

#### Q.4 Attempt any three.

- a) Describe the Excitation Tables for Flip flops in detail.
- b) Draw symbol and write the truth table of JK flip flop.
- c) Design a 4 to 1 multiplexer using Verilog HDL.
- d) Write Verilog code for modulo-8 up counter design.

#### Q.5 Attempt any two.

- a) What is shift register? Explain 5 bit shift register.
- b) Describe the operation of 3 bit synchronous up counter with Truth Table and Logic diagram.
- c) Describe Behavioral Modeling with a verilog keyword always.

12

16

12

= B and If S $=$ 0, X $=$ B	
= A and If $S = 0, X = A$	
= A and If $S = 0, X = B$	
xpression $(A + B)$ , $(A + C)$	
b) $B + A.C$	
d) $\overline{B} + B.C$	
, ,	
	Dac

The flip-flop which is free from race around problem 2) R-S flip-flop b) Master- Slave JK flip-flop a) c) J-K flip-flop None d) 3) If a counter is connected using six flip-flops, then the maximum number of states that the counter can count are 64 b) 32 a) c) 16 d) 8

Information Technology **DIGITAL TECHNIQUES** 

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer

MCQ/Objective Type Questions

0) 10	u) 0	
Verilog code describes a	positive edge trigger,	negative edge

4) trigger and positive edge trigger with reset (CLR) uses a keywords

- a) posedge and negedge b) posedge and always
- c) always and posedge d) none of the above

Figures to the right indicate full marks.

4) Use of calculator is allowed.

The input is equal to output, in \_

- Verilog supports predefined gate level primitives such as \_\_\_\_\_. 5)
  - a) xnor b) Or
  - d) all of these c) nor
- Verilog define two intermediate variables and\_op1 and and\_op2 representing 6) two AND gate outputs through keyword \_\_\_\_\_.

a)	always	b)	Wire
C)	assign	d)	None

- 7) The use of keyword assign in the form of: assign X = S ? A : B; the statement does following assignment.
  - a) If S = 1.X =
  - b) If S = 1.X =
  - c) If S = 1, X =
  - d) None

c)  $\overline{A} + B.C$ 

The Boolean ex 8) a) A + B.C

Day & Date: Saturday, 14-12-2019

a) J-K F/F

T F/F

C)

book.

Time: 10:00 AM To 01:00 PM

**Duration: 30 Minutes** 

1)

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Q.1

Max. Marks: 70

Marks: 14

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Choose the correct alternatives from the options and rewrite the sentence.

- R-S F/F

- d) D F/F
- b)



- 9) The Boolean expression A + BC is equivalent to \_\_\_\_\_.
  - a) AB + AC b) A + C
  - c) (A + B) (A + C) d) none
- 10) Given Boolean theorem AB + A'C + BC = AB + A'C which of the following is true?
  - a) (A + B) (A' + C) (B + C) = (A + B) (A' + C)
  - b) AB + A'C + BC = AB + BC
  - c) AB + A'C + BC = (A + B)(A' + C)(B + C)
  - d) (A + B)(A' + C)(B + C) = AB + A'C
- 11) De-Morgan's theorems states that \_\_\_\_
  - a) (A + B)' = A'. B' and (AB)' = A'. B'
  - b)  $(A + B)' = A' + B' \text{ and } (AB)' = A' \cdot B'$
  - c)  $(A + B)' = A' \cdot B'$  and (AB)' = A' + B'
  - d) (A + B)' = A' + B' and (AB)' = A' + B'
- 12) If A, B and C are the inputs of a full adder then the sum is given by \_\_\_\_\_.
  - a) A AND B AND C b) A OR B AND C
  - c) A XOR B XOR C d) A OR B OR C
- 13) If the number of n selected input lines to 2<sup>n</sup> then it requires \_\_\_\_\_ select lines.
  - a) 2 b) M
  - c) N d) 2<sup>n</sup>
- 14) Which of the following statements accurately represents the two BEST methods of logic circuit simplification?
  - a) Actual circuit trial and error evaluation and waveform analysis
  - b) Karnaugh mapping and circuit waveform analysis
  - c) Boolean algebra and Karnaugh mapping
  - d) Boolean algebra and actual circuit trial and error evaluation

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Set

Q

Seat No.

### S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

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

2) Figures to the right indicate full marks.

#### Section – I

### Q.2 Attempt any three.

- a) Convert the following octal number into Hexa-decimal number.
  - 1) (626)<sub>8</sub>
  - 2) (2571)8
- **b)** Describe function of full subtractor circuit with its truth table, K-map simplification and logic diagram.
- c) Define Digital Comparator? Describe 2 bit digital comparator with example.
- d) Implement the expression using multiplexer.

$$F(A, B, C, D) = \sum m(0, 1, 2, 4, 5, 8, 10, 14)$$

### Q.3 Attempt any two.

- a) What is SOP Expression? Minimize the following expressions using K-map and realize using NAND gates.  $f(A, B, C, D) = \sum m(1,3,5,7,9,10,11,14)$
- b) 1) Convert the following binary numbers to their equivalent hex numbers.
  - i) 10100110101111
  - ii) 0.00011110101101
  - 2) Convert the following binary numbers to their equivalent octal numbers.
     i) 11001110001.000101111001
    - ii) 1011011110.1100101010011
- c) Give the function of the following terminals of IC 7447.
  - 1) LT
  - 2) RBI
  - 3) BI
  - 4) RBO

#### Section – II

#### Q.4 Attempt any three.

- a) Describe the Excitation Tables for Flip flops in detail.
- b) Draw symbol and write the truth table of JK flip flop.
- c) Design a 4 to 1 multiplexer using Verilog HDL.
- d) Write Verilog code for modulo-8 up counter design.

#### Q.5 Attempt any two.

- a) What is shift register? Explain 5 bit shift register.
- b) Describe the operation of 3 bit synchronous up counter with Truth Table and Logic diagram.
- c) Describe Behavioral Modeling with a verilog keyword always.

Max. Marks: 56

16

12

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### Seat No. S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

**DIGITAL TECHNIQUES** 

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

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) If A, B and C are the inputs of a full adder then the sum is given by \_
  - a) A AND B AND C
  - b) A OR B AND C d) A OR B OR C c) A XOR B XOR C
- If the number of n selected input lines to 2<sup>m</sup> then it requires select lines. 2)
  - a) 2 b) M
  - 2<sup>n</sup> d) c) n
- 3) Which of the following statements accurately represents the two BEST methods of logic circuit simplification?
  - Actual circuit trial and error evaluation and waveform analysis a)
  - b) Karnaugh mapping and circuit waveform analysis
  - Boolean algebra and Karnaugh mapping C)
  - d) Boolean algebra and actual circuit trial and error evaluation
- 4) The input is equal to output, in \_\_\_\_\_
  - a) J-K F/F R-S F/F b)
  - d) DF/F c) T F/F

The flip-flop which is free from race around problem 5)

- a) R-S flip-flop b) Master- Slave JK flip-flop
- c) J-K flip-flop d) None

If a counter is connected using six flip-flops, then the maximum number of 6) states that the counter can count are

- a) 64 b) 32 c) 16 d) 8
- Verilog code describes a positive edge trigger, negative edge trigger and 7) positive edge trigger with reset (CLR) uses a keywords \_\_\_\_\_.
  - posedge and negedge a) c) always and posedge
- b) posedge and always d) none of the above
- 8) Verilog supports predefined gate level primitives such as \_\_\_\_\_.
  - a) xnor b) Or
  - C) nor

- d) all of these

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Max. Marks: 70

Marks: 14

# SLR-FR-42



9)	Verilog define two intermediate variables and_op1 and and_op2 representing		
-	two AND gate o	utputs through keyword	l
	a) always	b)	Wire
	c) assign	d)	None
10)	The use of keyw	ord assign in the form	of: assign X = S? A : B; the
	statement does following assignment.		
	a) If $S = 1, X =$	B and If $S = 0, X = B$	
	b) If $S = 1, X =$	A and If $S = 0, X = A$	
	c) If $S = 1, X =$	A and If $S = 0, X = B$	
	d) None		
	<b>-</b> , -,		

#### 11) The Boolean expression (A + B). (A + C) \_\_\_\_\_.

a)	A + B.C	b)	B + A. C
-)		<u>ام</u>	<b>D</b> . D (

- c)  $\overline{A} + B.C$  d)  $\overline{B} + B.C$
- 12) The Boolean expression A + BC is equivalent to \_\_\_\_\_.
  - a) AB + ACc) (A + B) (A + C)b) A + Cd) none
- 13) Given Boolean theorem AB + A'C + BC = AB + A'C which of the following is true?

\_.

- a) (A + B) (A' + C) (B + C) = (A + B) (A' + C)
- b) AB + A'C + BC = AB + BC
- c) AB + A'C + BC = (A + B) (A' + C)(B + C)
- d) (A + B)(A' + C)(B + C) = AB + A'C

#### 14) De-Morgan's theorems states that \_\_\_\_

- a)  $(A + B)' = A' \cdot B'$  and  $(AB)' = A' \cdot B'$
- b) (A + B)' = A' + B' and  $(AB)' = A' \cdot B'$
- c)  $(A + B)' = A' \cdot B'$  and (AB)' = A' + B'
- d) (A + B)' = A' + B' and (AB)' = A' + B'

# SLR-FR-42

Set

Max. Marks: 56

R

Seat No.

### S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

### Section – I

### Q.2 Attempt any three.

- a) Convert the following octal number into Hexa-decimal number.
  - 1) (626)<sub>8</sub>
  - **2)** (2571)<sub>8</sub>
- **b)** Describe function of full subtractor circuit with its truth table, K-map simplification and logic diagram.
- c) Define Digital Comparator? Describe 2 bit digital comparator with example.
- d) Implement the expression using multiplexer.

$$F(A, B, C, D) = \sum m(0, 1, 2, 4, 5, 8, 10, 14)$$

### Q.3 Attempt any two.

- a) What is SOP Expression? Minimize the following expressions using K-map and realize using NAND gates.  $f(A, B, C, D) = \sum m(1,3,5,7,9,10,11,14)$
- **b)** 1) Convert the following binary numbers to their equivalent hex numbers.
  - i) 10100110101111
  - ii) 0.00011110101101
  - 2) Convert the following binary numbers to their equivalent octal numbers.
     i) 11001110001.000101111001
    - ii) 1011011110.11001010001
- c) Give the function of the following terminals of IC 7447.
  - 1) LT
  - 2) RBI
  - 3) BI
  - 4) RBO

#### Section – II

#### Q.4 Attempt any three.

- a) Describe the Excitation Tables for Flip flops in detail.
- **b**) Draw symbol and write the truth table of JK flip flop.
- c) Design a 4 to 1 multiplexer using Verilog HDL.
- d) Write Verilog code for modulo-8 up counter design.

#### Q.5 Attempt any two.

- a) What is shift register? Explain 5 bit shift register.
- b) Describe the operation of 3 bit synchronous up counter with Truth Table and Logic diagram.
- c) Describe Behavioral Modeling with a verilog keyword always.

12

16

12

# Set

### S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology **DIGITAL TECHNIQUES**

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Seat

No.

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) If a counter is connected using six flip-flops, then the maximum number of states that the counter can count are \_
  - a) 64 32 b)
  - C) 16 d) 8
- 2) Verilog code describes a positive edge trigger, negative edge trigger and positive edge trigger with reset (CLR) uses a keywords \_\_\_\_
  - a) posedge and negedge c) always and posedge
- b) posedge and always d) none of the above
- 3) Verilog supports predefined gate level primitives such as .
  - a) xnor b) Or c) nor d) all of these
- 4) Verilog define two intermediate variables and\_op1 and and\_op2 representing two AND gate outputs through keyword
  - always b) Wire a)
  - assign d) None c)
- 5) The use of keyword assign in the form of: assign X = S ? A : B; the statement does following assignment.
  - a) If S = 1, X = B and If S = 0, X = B
  - b) If S = 1, X = A and If S = 0, X = A
  - c) If S = 1, X = A and If S = 0, X = B
  - d) None

6) The Boolean expression (A + B). (A + C)

- a) A + B.Cb) B + A.Cc)  $\overline{A} + B.C$ d)  $\overline{B}$  + B.C
- The Boolean expression A + BC is equivalent to \_\_\_\_ 7) a) AB + ACb) A + C
  - c) (A + B) (A + C)d) none
- Given Boolean theorem AB + A'C + BC = AB + A'C which of the 8) following is true?
  - a) (A + B) (A' + C) (B + C) = (A + B) (A' + C)
  - b) AB + A'C + BC = AB + BC
  - c) AB + A'C + BC = (A + B)(A' + C)(B + C)
  - d) (A + B)(A' + C)(B + C) = AB + A'C

Max. Marks: 70

Marks: 14

S

- 9) De-Morgan's theorems states that \_\_\_\_\_
  - a)  $(A + B)' = A' \cdot B'$  and  $(AB)' = A' \cdot B'$
  - b) (A + B)' = A' + B' and (AB)' = A'. B'
  - c)  $(A + B)' = A' \cdot B'$  and (AB)' = A' + B'
  - d) (A + B)' = A' + B' and (AB)' = A' + B'
- 10) If A, B and C are the inputs of a full adder then the sum is given by \_\_\_\_\_.
  - a) A AND B AND C b) A OR B AND C
    - c) A XOR B XOR C d) A OR B OR C
- 11) If the number of n selected input lines to 2<sup>m</sup> then it requires \_\_\_\_\_ select lines.
  - a) 2 b) M
  - c) n d)  $2^n$
- 12) Which of the following statements accurately represents the two BEST methods of logic circuit simplification?
  - a) Actual circuit trial and error evaluation and waveform analysis
  - b) Karnaugh mapping and circuit waveform analysis
  - c) Boolean algebra and Karnaugh mapping
  - d) Boolean algebra and actual circuit trial and error evaluation
- 13) The input is equal to output, in \_\_\_\_\_.

a)	J-K F/F		b)	) R-S F/F
c)	T F/F		d)	) DF/F

- 14) The flip-flop which is free from race around problem \_\_\_\_\_
  - b) Master- Slave JK flip-flop
  - c) J-K flip-flop

a) R-S flip-flop

d) None

# SLR-FR-42

Set

Max. Marks: 56

S

Seat	
No.	

### S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology DIGITAL TECHNIQUES

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

#### Section – I

#### Attempt any three. Q.2

- a) Convert the following octal number into Hexa-decimal number.
  - 1)  $(626)_8$
  - 2)  $(2571)_8$
- b) Describe function of full subtractor circuit with its truth table, K-map simplification and logic diagram.
- c) Define Digital Comparator? Describe 2 bit digital comparator with example.
- d) Implement the expression using multiplexer.

$$F(A, B, C, D) = \sum m(0, 1, 2, 4, 5, 8, 10, 14)$$

#### Attempt any two. Q.3

- a) What is SOP Expression? Minimize the following expressions using K-map and realize using NAND gates.  $f(A, B, C, D) = \sum m(1,3,5,7,9,10,11,14)$
- **b)** 1) Convert the following binary numbers to their equivalent hex numbers.
  - 10100110101111 i)
  - 0.00011110101101 ii)
  - 2) Convert the following binary numbers to their equivalent octal numbers. 11001110001.000101111001 i)
    - 1011011110.11001010011
- ii) c) Give the function of the following terminals of IC 7447.
  - 1) LT
  - 2) RBI
  - 3) BI
  - 4) RBO

#### Section – II

#### Q.4 Attempt any three.

- a) Describe the Excitation Tables for Flip flops in detail.
- **b)** Draw symbol and write the truth table of JK flip flop.
- c) Design a 4 to 1 multiplexer using Verilog HDL.
- d) Write Verilog code for modulo-8 up counter design.

#### Attempt any two. Q.5

- a) What is shift register? Explain 5 bit shift register.
- **b)** Describe the operation of 3 bit synchronous up counter with Truth Table and Logic diagram.
- c) Describe Behavioral Modeling with a verilog keyword always.

12

16

12
			COMPUTER	R GRAP	HICS	
Day Time	& Date : 10:0	e: Tue 0 AM	esday, 17-12-2019 I To 01:00 PM		Max.	Marks: 70
Instr	uctio	<b>ns:</b> 1)	) Q. No. 1 is compulsory and s book.	should be	e solved in first 30 minutes	in answer
		2)	) Figures to the right indicate f	full marks	5.	
			MCQ/Objective	Type Q	uestions	
Dura	tion: 3	80 Mir	nutes	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Marks: 14
Q.1	<b>Cho</b> 1)	<b>ose t</b> l The a Cl	<b>he correct alternatives from</b> maximum number of points tl RT	<b>the opti</b> nat can b	<b>ons.</b> e displayed without overlap	<b>14</b> on
		a) c)	Aspect Ratio Brightness	b) d)	Resolution Pixel	
	2)	Brig a) c)	htness of a display is controlle Focusing anode Control grid	ed by var b) d)	ying the voltage on the Connection pins Power supply	
	3)	Whi a) c)	ch of the following is not a rigi Translation Shearing	d body tr b) d)	ansformation? Rotation Reflection	
	4)	In se a) c)	eed fill algorithm filling of poly Seed pixel Both a and b	gon starts b) d)	s from in polygon. Root pixels None	
	5)	The anot a) c)	transformation in which an ob ther in circular path around a Rotation Translation	oject is m specified b) d)	oved from one position to pivot point is called Shearing Scaling	
	6)	The a) b) c) d)	purpose of flood gun in DVST To store the picture pattern To slow down the flood elect To enable color pixels To focus the electron beam	Γ is trons		
	7)	lf ar rota a) c)	n object is rotated through an a tion matrix R = cos A sin A -sin A cos A sin A cos A	angle A ir b) d)	n clockwise direction, the cos A -sin A sin A cos A None	
	8)	The a) c)	line segment is, visible if both 0000 0101	n end poir b) d)	nts codes are 1111 1010	

# S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology

Page **1** of **12** 

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Seat

No.

Set P

9)	The	Bezier curve is contained with the	e	hull of defining polygon.
	a)	Concave	b)	Convex
	c)	Elliptical	d)	All
10)	In pa as	aramatric curve each co-ordinate of a single parameter.	of a p	point on a curve is represented
	a) _	precision	b)	Method
	c)	procedure	d)	Function
11)	The	window co-ordinates are called a	s	Co-ordinates.
,	a)	World	b)	Screen
	c)	Normal	d)	Scalar
12)		is a unit of display file.		
	a)	Segment	b)	Byte
	c)	LOC	d)	None of these
13)		algorithm is used for clipping the	ne line	е.
	a)	Sutherland-Cohen	b)	DDA
	c)	Bresenham's	d)	Iran-Sutherland
14)	Z-Bu	Iffer algorithm consists of frame b	&	
	a)	pixel buffer	b)	depth buffer
	c)	image buffer	d)	none of these

SLR-FR-43

Set P

Seat No.					Set	Ρ
S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology COMPUTER GRAPHICS						
Day & Date: Tuesday, 17-12-2019         Max. Marks: 56           Time: 10:00 AM To 01:00 PM         Max. Marks: 56						: 56
Instru	ctic	ons: 1) All question 2) Figures to	ns are compulsory. the right indicate fill i	narks.		
			Section	n – I		
Q.2	So a) b) c) d)	<b>Ive any three.</b> What is RLE? E Describe the 2D Explain 3D rotat Explain Bresenh	xplain in detail with a shearing with exam ion with example. am's line generatior	dvantages. ple. algorithm.		12
Q.3	So a) b) c)	<b>Ive any two.</b> Explain Bresenh What is mean by Describe 3D trai	an's Circle Generati Polygon filling? Exp Inslation and 3D refle	on algo. With the help of Ex blain Seed fill algorithm in de ction.	ample. etail.	16
• •	• • •		Secti	on – II		4.0
Q.4	Att a) b) c) d)	empt any three. State advantage Explain paramet Explain midpoint Explain display f	s and disadvantages ic curves in detail. sub division algo in le compilation in det	of Z-Buffer. detail. ail.		12
Q.5	Exp	plain antialiasing 8	half toning techniqu <b>OR</b>	es in detail.		08
	Wh	hat is segment? E>	plain segmented dis	play files in detail with all its	functions.	
Q.6	Wr a)	ite note. Back face remov	al algorithm			08

b) Painter's algorithm

SLR-FR-43

# Seat No.

NO.							
	S.Y.	(B. <sup>-</sup>	Tech) (Pa	rt - I) (New)	(CBCS) E	xamination Nov/	Dec-2019
		•		Informati	on Techn	ology	
				COMPUT	ER GRAP	PHICS	
Day &	a Date	e: Tue	esday, 17-12	2-2019			Max. Marks: 70
Time:	10:00	D AM	To 01:00 P	М			
Instru	uction	<b>is:</b> 1)	Q. No. 1 is	compulsory ar	nd should be	e solved in first 30 m	inutes in answer
		2)	book.	the state that is all a s	ta fullum and a	_	
		(۷	Figures to	the right indica	te full mark	S.	
<b>D</b>		~ • •	N	ICQ/Objecti	ve Type C	luestions	
Durati	ion: 3	0 Mir	nutes				Marks: 14
Q.1	Choc	ose th	ne correct a	alternatives fr	om the opt	ions.	14
	1)	Ine		nt is, visible if c	oth end poi	nts codes are	·
		a) C)	0101		(d (d	1010	
	2)	Tho	Bezier curv	e is contained	with the	bull of defining n	olvaon
	2)	a)	Concave	e is contained	b)	Convex	olygon.
		c)	Elliptical		d)	All	
	3)	In pa	aramatric cu	urve each co-oi	dinate of a	point on a curve is re	epresented
	,	as'_	of a	single paramet	er.	•	
		a)	precision		b)	Method	
		C)	procedure		d)	Function	
	4)	The	window co-	ordinates are o	alled as	Co-ordinates.	
		a)	World		b) d)	Screen	
	-	0)	inomai		u)	Scalal	
	5)	<u></u>	IS a UNIT (	of display file.	b)	Byte	
		а) С)	LOC		d)	None of these	
	6)	- /	algorithm	n is used for cli	oping the lin		
	0)	a)	Sutherland	d-Cohen	b)	DDA	
		c)	Bresenhar	n's	d)	Iran-Sutherland	
	7)	Z-Bu	uffer algorith	nm consists of t	rame buffer	· &	
		a)	pixel buffe	r	b)	depth buffer	
		c)	image buff	er	d)	none of these	
	8)	The	maximum r	number of point	s that can b	e displayed without	overlap on
		a CF	RT	 tio	<b>b</b> )	Decelution	
		a) c)	Aspect Ra Brightness		(a (b	Resolution	
	0)	0) Drial	brightness	, diaplay ia aanti		ving the voltage on t	ha
	9)	впgi a)	Focusing a	aispiay is conti anode	olled by val	Connection pins	.ne
		c)	Control gri	d	d)	Power supply	
	10)	Whi	ch of the fol	lowing is not a	riaid body t	ransformation?	
	- /	a)	Translation	ן ז	b)	Rotation	
		c)	Shearing		d)	Reflection	

SLR-FR-43 Set Q

11) In seed fill algorithm filling of polygon starts from \_\_\_\_\_ in polygon.

a) Seed pixel

C)

b) Root pixelsd) None

SLR-FR-43

Set Q

- c) Both a and b
- 12) The transformation in which an object is moved from one position to another in circular path around a specified pivot point is called \_\_\_\_\_.
  - a) Rotation b
    - b) Shearing
    - Translation d) Scaling
- 13) The purpose of flood gun in DVST is \_\_\_\_\_.
  - a) To store the picture pattern
  - b) To slow down the flood electrons
  - c) To enable color pixels
  - d) To focus the electron beam
- 14) If an object is rotated through an angle A in clockwise direction, the rotation matrix R = \_\_\_\_\_.
  - a) cos A sin A
    - -sin A cos A
  - c) sin A cos A cos A sin A

- b) cos A -sin A
  - sin A cos A
- d) None

NU.					
S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology COMPLITER GRAPHICS					
Day & Time:	Date: Tuesday, 17-12-2019 Max. Marks: 10:00 AM To 01:00 PM	56			
Instru	<ul><li>actions: 1) All questions are compulsory.</li><li>2) Figures to the right indicate fill marks.</li></ul>				
	Section – I				
Q.2	<ul> <li>Solve any three.</li> <li>a) What is RLE? Explain in detail with advantages.</li> <li>b) Describe the 2D shearing with example.</li> <li>c) Explain 3D rotation with example.</li> <li>d) Explain Bresenham's line generation algorithm.</li> </ul>	12			
Q.3	<ul> <li>Solve any two.</li> <li>a) Explain Bresenhan's Circle Generation algo. With the help of Example.</li> <li>b) What is mean by Polygon filling? Explain Seed fill algorithm in detail.</li> <li>c) Describe 3D translation and 3D reflection.</li> </ul>	16			
	Section – II				
Q.4	<ul> <li>Attempt any three.</li> <li>a) State advantages and disadvantages of Z-Buffer.</li> <li>b) Explain parametric curves in detail.</li> <li>c) Explain midpoint sub division algo in detail.</li> <li>d) Explain display file compilation in detail.</li> </ul>	12			
Q.5	Explain antialiasing & half toning techniques in detail. <b>OR</b>	80			
	What is segment? Explain segmented display files in detail with all its functions.				
Q.6	Write note. a) Back face removal algorithm	80			

SLR-FR-43 Set Q

Seat No

b) Painter's algorithm

	S.Y.	(B. 1	Tech) (Part - I) (No Infori COM	ew) (CBCS) E nation Techn PUTER GRAF	xamination Nov/ ology PHICS	Dec-2019
Day Time	& Date: 10:0	e: Tue 0 AM	esday, 17-12-2019 To 01:00 PM			Max. Marks: 70
Insti	ructio	<b>ns:</b> 1)	Q. No. 1 is compulso book.	ory and should b	e solved in first 30 m	inutes in answer
		۷.			s. Nuactiona	
Dura	ation: 3	30 Mir	nutes	ective Type C	Ruestions	Marks: 14
Q.1	Cho	ose t	he correct alternativ	es from the opt	ions	14
	1)	The ano a) c)	transformation in whi ther in circular path an Rotation Translation	ch an object is n ound a specified b) d)	noved from one posit I pivot point is called Shearing Scaling	ion to 
	2)	The a) b) c) d)	purpose of flood gun To store the picture To slow down the flo To enable color pixe To focus the electro	in DVST is pattern ood electrons Is n beam		
	3)	lf ar rota a) c)	object is rotated thro tion matrix R = cos A sin A -sin A cos A sin A cos A cos A sin A	ugh an angle A i b) d)	n clockwise direction cos A -sin A sin A cos A None	, the
	4)	The a) c)	line segment is, visib 0000 0101	le if both end po b) d)	ints codes are 1111 1010	
	5)	The a) c)	Bezier curve is conta Concave Elliptical	ined with the b) d)	hull of defining p Convex All	olygon.
	6)	In pa as _ a) c)	aramatric curve each of a single par precision procedure	co-ordinate of a ameter. b) d)	point on a curve is re Method Function	epresented
	7)	The a) c)	window co-ordinates World Normal	are called as b) d)	Co-ordinates. Screen Scalar	
	8)	a) c)	is a unit of display Segment LOC	file. b) d)	Byte None of these	
	9)	<u></u>	algorithm is used f Sutherland-Cohen	or clipping the lir b)	ne. DDA	

Seat

No.

Bresenham's d) Iran-Sutherland SLR-FR-43

Set

R

10) Z-Buffer algorithm consists of frame buffer & .

- pixel buffer depth buffer a) b)
  - image buffer d) none of these
- The maximum number of points that can be displayed without overlap on 11) a CRT
  - a) Aspect Ratio **Brightness**

Control grid

c)

c)

c)

- b) Resolution d) Pixel
- Brightness of a display is controlled by varying the voltage on the \_\_\_\_\_. 12)
  - Focusing anode b) a)
    - Connection pins d) Power supply

SLR-FR-43

Set | R

- Which of the following is not a rigid body transformation? 13)
  - Translation b) Rotation a)
  - C) Shearing d) Reflection
- 14) In seed fill algorithm filling of polygon starts from \_\_\_\_\_ in polygon.
  - Seed pixel a) b) Root pixels
  - Both a and b None c) d)

110.					
	S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology COMPUTER GRAPHICS				
Day & Time:	Dat 10:0	e: Tuesday, 17-12-2019 Max. Marks 00 AM To 01:00 PM	s: 56		
Instru	ictio	<ul><li>ns: 1) All questions are compulsory.</li><li>2) Figures to the right indicate fill marks.</li></ul>			
		Section – I			
Q.2	Sol a) b) c) d)	ve any three. What is RLE? Explain in detail with advantages. Describe the 2D shearing with example. Explain 3D rotation with example. Explain Bresenham's line generation algorithm.	12		
Q.3	Sol a) b) c)	ve any two. Explain Bresenhan's Circle Generation algo. With the help of Example. What is mean by Polygon filling? Explain Seed fill algorithm in detail. Describe 3D translation and 3D reflection.	16		
		Section – II			
Q.4	Att a) b) c) d)	empt any three. State advantages and disadvantages of Z-Buffer. Explain parametric curves in detail. Explain midpoint sub division algo in detail. Explain display file compilation in detail.	12		
Q.5	Exp	blain antialiasing & half toning techniques in detail. <b>OR</b>	08		
	Wh	at is segment? Explain segmented display files in detail with all its functions.			
Q.6	Wri a)	i <b>te note.</b> Back face removal algorithm	08		

b) Painter's algorithm

SLR-FR-43 Set R

Seat No.

Day Time	& Date : 10:0	e: Tu 0 AM	esday, 17-12-2019 I To 01:00 PM		Max. Ma	rks: 70
Insti	ructio	<b>ns:</b> 1	) Q. No. 1 is compulsory and sho book.	uld be	e solved in first 30 minutes in a	nswer
		2	) Figures to the right indicate full	mark	5.	
			MCQ/Objective Ty	pe Q	luestions	
Dura	ition: 3	30 Mir	nutes		Ma	rks: 14
Q.1	Cho	ose t	he correct alternatives from the	e opti	ons.	14
	1)	in p	aramatric curve each co-ordinate	ora	point on a curve is represented	I
		a)	precision	b)	Method	
		c)	procedure	d)	Function	
	2)	The	window co-ordinates are called a	as	Co-ordinates.	
		a)	World	b)	Screen	
		C)	Normal	d)	Scalar	
	3)		is a unit of display file.	<b>L</b> )	Dista	
		a) c)		(a (b	Byte None of these	
	4)	0)	algorithm is used for clipping t	ho lin		
	4)	<u>a)</u>	Sutherland-Cohen	b)	DDA	
		c)	Bresenham's	d)	Iran-Sutherland	
	5)	Z-B	uffer algorithm consists of frame	buffer	· &	
		a)	pixel buffer	b)	depth buffer	
		C)	image buffer	d)	none of these	
	6)	The	maximum number of points that	can b	e displayed without overlap on	
		a)	Aspect Ratio	b)	Resolution	
		c)	Brightness	d)	Pixel	
	7)	Brig	htness of a display is controlled b	oy var	ying the voltage on the	
		a)	Focusing anode	b)	Connection pins	
		C)	Control grid	d)	Power supply	
	8)	Whi	ch of the following is not a rigid b	ody tr	ansformation?	
		a) c)	Shearing	(a (b	Reflection	
	0)	Un s	end fill algorithm filling of polygon	-, etart	s from in polygon	
	3)	a)	Seed pixel	b)	Root pixels	
		c)	Both a and b	d)	None	
	10)	The	transformation in which an object	t is m	oved from one position to	
	-	ano	ther in circular path around a spe	cified	pivot point is called	
		a)	Rotation	b)	Shearing	

# c)

Translation d) Scaling SLR-FR-43

Set

S

Seat

No.

# S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology COMPUTER GRAPHICS

- 11) The purpose of flood gun in DVST is \_\_\_\_\_.
  - To store the picture pattern a)
  - To slow down the flood electrons b)
  - To enable color pixels c)
  - To focus the electron beam d)
- 12) If an object is rotated through an angle A in clockwise direction, the rotation matrix R = \_\_\_\_\_.
  - cos A sin A b) a) -sin A cos A sin A cos A C)
  - cos A sin A

- cos A -sin A sin A cos A
- d) None

- The line segment is, visible if both end points codes are \_\_\_\_\_. 13)
  - 0000 1111 a) b)
  - c) 0101 d) 1010
- The Bezier curve is contained with the \_ hull of defining polygon. 14)
  - Convex a) Concave
  - c) Elliptical

b) d) All

110.					
S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Information Technology COMPUTER GRAPHICS					
Day 8 Time:	• Da 10:0	te: Tuesday, 17-12-2019 Max. Marks 00 AM To 01:00 PM	: 56		
Instru	ictic	<ul><li>ns: 1) All questions are compulsory.</li><li>2) Figures to the right indicate fill marks.</li></ul>			
		Section – I			
Q.2	So a) b) c) d)	ve any three. What is RLE? Explain in detail with advantages. Describe the 2D shearing with example. Explain 3D rotation with example. Explain Bresenham's line generation algorithm.	12		
Q.3	So a) b) c)	lve any two. Explain Bresenhan's Circle Generation algo. With the help of Example. What is mean by Polygon filling? Explain Seed fill algorithm in detail. Describe 3D translation and 3D reflection.	16		
		Section – II			
Q.4	Att a) b) c) d)	empt any three. State advantages and disadvantages of Z-Buffer. Explain parametric curves in detail. Explain midpoint sub division algo in detail. Explain display file compilation in detail.	12		
Q.5	Ex	blain antialiasing & half toning techniques in detail. <b>OR</b>	08		
	Wł	at is segment? Explain segmented display files in detail with all its functions.			
Q.6	Wr a)	ite note. Back face removal algorithm	08		

SLR-FR-43 Set S

Seat No.

b) Painter's algorithm

Seat		
No.		
S	V (B Tech) (Pa	rt = I (New) (CBCS) Examination

# I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering **ENGINEERING MATHEMATICS - III**

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

book.

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer

Figures to the right indicates full marks.

Use of Non programmable Calculator is allowed.

MCQ/Objective Type Questions

**Duration: 30 Minutes** 

#### 14 Q.1 Choose the correct alternatives from the options and rewrite the sentence.

- The complete solution of  $(D^2 + 1)y = 0$  is \_\_\_\_\_ 1)
- a)  $y = c_1 e^x + c_2 e^{-x}$  $y = c_1 \cos x + c_2 \sin x$ b) c)  $y = (c_1 + c_{2^X})e^{-x}$ The P.I of  $(D^4 - m^4)y = \sin mx$  is \_\_\_\_\_. b)  $\frac{-x}{4m^3}\cos mx$ d)  $y = (c_1 + c_2)e^x$ 2) d)  $\frac{-x}{4m^3}\sin mx$ c)  $\frac{x}{4m^3}\sin mx$ If  $D = \frac{d}{dz}$  and  $z = \log x$ , then the diff. equation  $x \frac{d^2y}{dx^2} + 2 \frac{dy}{dx} = 6x$  becomes \_\_\_\_\_. 3) a)  $D(D^{2} - 1)v = 6e^{z}$ b)  $D(D-1)v = 6e^{2z}$ 
  - c)  $D(D+1)v = 6e^{2z}$ d)  $D(D+1)y = 6e^{z}$
- The solution of  $\sqrt{p} + \sqrt{q} = 1$ 4) a)  $z = ax + (1 - \sqrt{a})^2 + c$ b) z = ax + by + cc)  $z = ax + (1 + \sqrt{a})^2 + c$ d) None of these
- 5) The general solution of  $\left(xD^2 - D + \frac{1}{x}\right)y = 0$  is \_\_\_\_\_. b)  $(c_1 + c_2 x)e^x$ a)  $(c_1 + c_2 \log x)x$ d) C)  $(c_1 + c_2 x) \log x$ None of the above

The solution of  $p^2 - q^2 = 1$  is \_\_\_\_\_. b) 6)  $z = ax + \sqrt{a^2 + 1} v + c$ c)  $z = ax + (a^2 - 1), v + c$ d) None of these

- The solution of p + q = z is \_\_\_\_\_. 7) a)  $f(x + y, y + \log z)$ b)  $f(xy, y \log z)$ 
  - d) None of these c)  $f(x-y, y-\log z)$
- The value of  $\int_{c} \frac{3z+4}{z(2z+1)} dz = \dots$  where c is the circle |z| = 1. 8) a) 3π b) 2πi
  - c) d) 4 -4

SLR-FR-44



Marks: 14

Max. Marks: 70

# SLR-FR-44 Set P



Seat No.		Se	et	Ρ			
	S. Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019						
		Electrical Engineering ENGINEERING MATHEMATICS-III					
Day 8 Time:	& Da : 10:	te: Saturday, 07-12-2019 Max. Ma D0 AM To 01:00 PM	rks	: 56			
Instru	uctio	<ul> <li>ans: 1) All questions are compulsory.</li> <li>2) Figures to the right indicates full marks.</li> <li>3) Use of Non programmable calculator is allowed.</li> </ul>					
		Section – I					
Q.2	Atte	empt any three questions from the following.		09			
	a)	Solve $x^2 \frac{d^2 y}{dx^2} - x \frac{dy}{dx} + 4y = \cos \log x$ .					
	b) c)	Solve $(D^4 - 1)y = \cos x \cosh x$ . Solve $(D^3 - 3D^2 + 3D - 1)y = x^{1/2}e^x$					
	d)	Find the laplace transform of $\int_0^t te^{-3t} \sin(4t) dt$					
	e)	Solve $(3x + 1)^2 \frac{d^2y}{dx^2} - 3(3x + 1)\frac{dy}{dx} - 12y = 9x$					
Q.3	Atte	empt any three questions from the following		09			
	a)	Find the inverse laplace transform of $\frac{1}{s^2(s+1)^2}$					
	b)	Solve $(D^4 + 5D^2 + 4)y = cos(\frac{x}{2})cos(\frac{3x}{2})$					
	c)	Solve $(D^3 - 7D + 6)y = x^2$ .					
	d)	Evaluate by using laplace transform $\int_0^\infty \left(\frac{e^{-t} - e^{-3t}}{t}\right) dt$					
	e)	Solve $(x^2D^2 + xD - 1)y = x^3$					
Q.4	Atte	empt any two questions from the following. In an $L - C$ circuit the charge <i>a</i> on a plate of a condenser is given by		10			
		$\frac{d^2q}{dt^2} + \frac{q}{cL} = \frac{E_0}{L}\cos nt.$					
		If $w^2 = \frac{1}{LC}$ and initially $q = q_0$ at $t = 0$ and the current is $i = i_0$ at $t = 0$					
		prove that charge at any time t is given by $E^{-0}$					
	<b>۲</b>	$q = q_0 \cos wt + \frac{1}{w} \sin wt + \frac{1}{2Lw} t \sin wt.$					
	с)	Find the inverse laplace transform of $\frac{(s^2+2s+3)}{(s^2+2s+3)}$					
		Section – II					
Q.5	Atte	empt any three questions from the following.		09			
	a)	Find the value of $\int_C \frac{z-1}{(z+1)^2(z-2)} dz$ where c is the circle $ z-i  = 2$ .					
	b)	Solve $(p^3 + q^3) = 27z$ .					
	c)	Find the inverse z-transform of $\frac{z}{(z+a)}$ , $ z  < a$ .					
	d)	Solve $\left(\frac{1}{z} - \frac{1}{y}\right)p + \left(\frac{1}{x} - \frac{1}{z}\right)q = \left(\frac{1}{y} - \frac{1}{x}\right)$					

e) Find the Poles and Residues of  $f(z) = \cot z$ 

# Q.6 Attempt any three questions from the following.

- a) Solve  $pq = xy^2z^4$ b) Evaluate  $\int_{(0,0)}^{1,1} (3x^2 + 4xy + 3y^2)dx + 2(x^2 + 3xy + 4y^2)dy$  along y = x
- c) Find  $Z \{x_k\}$ , where  $\{x_k\} = k^2, k \ge 0$ . d) Find  $Z^{-1} \{\frac{1}{(z-a)^2}\}, |z| > |a|$ .
- Solve p(bz cy) + q(cx ay) = ay bxe)

#### Attempt any two questions from the following. Q.7

- Evaluate the following integral using residue theorem  $\int_c \frac{4-3z}{z(z-1)(z-2)} dz$ a)
- Where c is  $|z| = \frac{3}{2}$  **b)** Solve the P.D.E.  $\frac{\partial u}{\partial x} 2\frac{\partial u}{\partial t} = u$ , by the method of separation of variables. **c)** Find  $Z \{x_k\}$ , where  $\{x_k\} = c^k \cos \alpha k, k \ge 0$ .

10

SLR-FR-44

# Set 09

S. Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

**Electrical Engineering ENGINEERING MATHEMATICS - III** 

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicates full marks.
- 3) Use of Non programmable Calculator is allowed.

MCQ/Objective Type Questions

**Duration: 30 Minutes** 

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The value of  $\int_c \frac{3z+4}{z(2z+1)} dz = ...$  where c is the circle |z| = 1. 1) a) 3π b) 2πi c) 4 d) -4 2)  $L\left\{\int_0^t \sin 2u \, du\right\} = \cdots$ b)  $\frac{2}{s(s^2+4)}$ a)  $\frac{2}{s^2+4}$ c)  $\frac{2}{s(s^2-4)}$ d)  $\frac{2s}{s^2+t}$  $\int_{0}^{\infty} \frac{\sin t}{t} dt = \underline{\qquad}$ a)  $\pi$ c)  $\pi/4$ 3) b)  $\pi/2$ d)  $\pi/3$  $L^{-1}\left\{\frac{1}{(s-4)^3}\right\} \text{ is } \_\_\_.$ a)  $e^{4t} \frac{t^2}{2}$ 4) b)  $e^{-4t} \frac{t^2}{2}$ d)  $e^{-4t} \frac{t^3}{c}$ C)  $e^{4t} \frac{t^3}{6}$ The value of  $\int_c \frac{3z^2 + 7z + 1}{z(z+1)} dz = \cdots$  where *c* is the circle |z| = 1/2. 5) a) 3π b) 0 d) C) πi -4If  $Z \{x_k\} = F(z)$  then  $Z \{a^{-k}x_k\} = ?$ 6) b)  $\frac{1}{a}F(az)$ d) F(z/a)a) F(az)c)  $aF\left(\frac{z}{a}\right)$ If  $x_k = 1$ .  $k \ge 0$  then  $z\{x_k\} = ?$ a)  $\frac{z}{z-1}$ 7) b)
  - c)  $\frac{1}{(z-1)^2}$ d)

Max. Marks: 70

Marks: 14

Q



Seat No.

### Set The complete solution of $(D^2 + 1)y = 0$ is \_\_\_\_\_. a) $y = c_1 e^x + c_2 e^{-x}$ b) $y = c_1 \cos x + c_2 \sin x$ 8) c) $y = (c_1 + c_2 x)e^{-x}$ The P.I of $(D^4 - m^4)y = \sin mx$ is \_\_\_\_\_. b) $\frac{-x}{4m^3}\cos mx$ d) $y = (c_1 + c_2)e^x$ 9) d) $\frac{-x}{4m^3}\sin mx$ c) $\frac{x}{4m^3}\sin mx$ If $D = \frac{d}{dz}$ and $z = \log x$ , then the diff. equation $x \frac{d^2y}{dx^2} + 2 \frac{dy}{dx} = 6x$ becomes \_\_\_\_\_. a) $D(D-1)y = 6e^z$ b) $D(D-1)y = 6e^{2z}$ 10) c) $D(D+1)v = 6e^{2z}$ d) $D(D+1)v = 6e^{z}$ The solution of $\sqrt{p} + \sqrt{q} = 1$ 11) a) $z = ax + (1 - \sqrt{a})^2 + c$ b) z = ax + by + cc) $z = ax + (1 + \sqrt{a})^2 + c$ d) None of these The general solution of $\left(xD^2 - D + \frac{1}{x}\right)y = 0$ is \_\_\_\_\_. 12) a) $(c_1 + c_2 \log x)x$ b) $(c_1 + c_2 x)e^x$ c) $(c_1 + c_2 x) \log x$ d) None of the above The solution of $p^2 - q^2 = 1$ is \_\_\_\_\_. b) 13) $z = ax + \sqrt{a^2 + 1} v + c$ c) $z = ax + (a^2 - 1) \cdot v + c$ d) None of these The solution of p + q = z is \_\_\_\_\_. 14) a) $f(x + y, y + \log z)$ b) $f(xy, y \log z)$ c) $f(x - y, y - \log z)$ d) None of these

Seat No.		Set	Q			
S. Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering						
		ENGINEERING MATHEMATICS-III				
Day & Time:	& Da : 10:	ate: Saturday, 07-12-2019 Max. Marks 00 AM To 01:00 PM	: 56			
Instru	uctio	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Figures to the right indicates full marks.</li> <li>3) Use of Non programmable calculator is allowed.</li> </ul>				
		Section – I				
Q.2	Att	empt any three questions from the following.	09			
	a)	Solve $x^2 \frac{d^2 y}{dx^2} - x \frac{dy}{dx} + 4y = \cos \log x$ .				
	b) c)	Solve $(D^4 - 1)y = \cos x \cosh x$ . Solve $(D^3 - 3D^2 + 3D - 1)y = x^{1/2}e^x$				
	d)	Find the laplace transform of $\int_0^t te^{-3t} \sin(4t) dt$				
	e)	Solve $(3x + 1)^2 \frac{d^2y}{dx^2} - 3(3x + 1)\frac{dy}{dx} - 12y = 9x$				
Q.3	Att	empt any three questions from the following	09			
	a)	Find the inverse laplace transform of $\frac{1}{s^2(s+1)^2}$				
	b)	Solve $(D^4 + 5D^2 + 4)y = cos(\frac{x}{2})cos(\frac{3x}{2})$				
	c)	Solve $(D^3 - 7D + 6)y = x^2$ .				
	d)	Evaluate by using laplace transform $\int_0^\infty \left(\frac{e^{-t} - e^{-st}}{t}\right) dt$				
•	e)	Solve $(x^2D^2 + xD - 1)y = x^3$				
Q.4	Att a)	empt any two questions from the following. In an $L - C$ circuit the charge q on a plate of a condenser is given by	10			
		$\frac{d^2q}{dt_1^2} + \frac{q}{cL} = \frac{E_0}{L}\cos nt.$				
		If $w^2 = \frac{1}{LC}$ and initially $q = q_0$ at $t = 0$ and the current is $i = i_0$ at $t = 0$				
		prove that charge at any time t is given by $E^{-0}$ to invote				
	<b>b</b> )	$q = q_0 \cos wt + \frac{1}{w} \sin wt + \frac{1}{2Lw} t \sin wt.$				
	c)	Find the inverse laplace transform of $\frac{(s^2+2s+3)}{(s^2+2s+2)(s^2+2s+5)}$				
		Section – II				
Q.5	Att	empt any three questions from the following.	09			
	a)	Find the value of $\int_c \frac{z-1}{(z+1)^2(z-2)} dz$ where c is the circle $ z-i  = 2$ .				
	b)	Solve $(p^3 + q^3) = 27z$ .				
	C)	Find the inverse z-transform of $\frac{z}{(z+a)}$ , $ z  < a$ .				
	d)	Solve $\left(\frac{1}{z} - \frac{1}{y}\right)p + \left(\frac{1}{x} - \frac{1}{z}\right)q = \left(\frac{1}{y} - \frac{1}{x}\right)$				

e) Find the Poles and Residues of  $f(z) = \cot z$ 

# Q.6 Attempt any three questions from the following.

- a) Solve  $pq = xy^2z^4$ b) Evaluate  $\int_{(0,0)}^{1,1} (3x^2 + 4xy + 3y^2)dx + 2(x^2 + 3xy + 4y^2)dy$  along y = x
- c) Find  $Z \{x_k\}$ , where  $\{x_k\} = k^2, k \ge 0$ . d) Find  $Z^{-1} \{\frac{1}{(z-a)^2}\}, |z| > |a|$ .
- Solve p(bz cy) + q(cx ay) = ay bxe)

### Attempt any two questions from the following. Q.7

- Evaluate the following integral using residue theorem  $\int_c \frac{4-3z}{z(z-1)(z-2)} dz$ a)
- Where c is  $|z| = \frac{3}{2}$  **b)** Solve the P.D.E.  $\frac{\partial u}{\partial x} 2\frac{\partial u}{\partial t} = u$ , by the method of separation of variables. **c)** Find  $Z \{x_k\}$ , where  $\{x_k\} = c^k \cos \alpha k, k \ge 0$ .

10

SLR-FR-44

# Set 09

# Seat No. S. Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

**Electrical Engineering ENGINEERING MATHEMATICS - III** 

- 2) Figures to the right indicates full marks.
- 3) Use of Non programmable Calculator is allowed.

MCQ/Objective Type Questions

**Duration: 30 Minutes** 

2)

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The general solution of  $\left(xD^2 D + \frac{1}{x}\right)y = 0$  is \_\_\_\_\_. 1)
  - b)  $(c_1 + c_2 x)e^x$ a)  $(c_1 + c_2 \log x)x$
  - d) None of the above c)  $(c_1 + c_2 x) \log x$ The solution of  $p^2 - q^2 = 1$  is .

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

c) 
$$z = ax + (a^2 - 1) \cdot y + c$$

3) The solution of p + q = z is \_\_\_\_\_. b) a)  $f(x + y, y + \log z)$  $f(xy, y \log z)$ c)  $f(x-y, y-\log z)$ d) None of these

The value of  $\int_c \frac{3z+4}{z(2z+1)} dz = ...$  where c is the circle |z| = 1. 4)

a) 3π b) 2πi c) 4 d) -4 5)  $L\left\{\int_0^{\tau}\sin 2u\,du\right\}=\cdots$ a)  $\frac{2}{s^2+4}$ b) c)  $\frac{2}{s(s^2-4)}$ d)  $\int_0^\infty \frac{\sin t}{t} dt = ----.$ 6) b)  $\pi/2$ c)  $\pi/4$ d)  $\pi/3$ 7)  $L^{-1}\left\{\frac{1}{(s-4)^3}\right\}$  is \_\_\_\_\_. a)  $e^{4t}\frac{t^2}{2}$ 

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

Set R

Max. Marks: 70

SLR-FR-44

Marks: 14



### Set 8) The value of $\int_c \frac{3z^2 + 7z + 1}{z(z+1)} dz = \cdots$ where *c* is the circle |z| = 1/2. a) 3π b) 0 d) C) πi -4If $Z \{x_k\} = F(z)$ then $Z \{a^{-k}x_k\} = ?$ 9) b) $\frac{1}{a}F(az)$ a) F(az) $\ddot{F}(z/a)$ c) $aF\left(\frac{z}{a}\right)$ d) If $x_k = 1. k \ge 0$ then $z\{x_k\} = ?$ a) $\frac{z}{z-1}$ 10) b) $\frac{1}{z-1}$ d) $\frac{1}{1-7}$ c) $\frac{1}{(z-1)^2}$ The complete solution of $(D^2 + 1)y = 0$ is \_\_\_\_\_. a) $y = c_1 e^x + c_2 e^{-x}$ b) $y = c_1 \cos x + c_2 \sin x$ 11) c) $y = (c_1 + c_2 x)e^x$ d) $y = (c_1 + c_2)e^x$ c) $y = (c_1 + c_{2x/2})^2$ The P.I of $(D^4 - m^4)y = \sin mx$ is \_\_\_\_\_. b) $\frac{-x}{4m^3}\cos mx$ 12) d) $\frac{-x}{4m^3}\sin mx$ c) $\frac{x}{4m^3}\sin mx$ If $D = \frac{d}{dz}$ and $z = \log x$ , then the diff. equation $x \frac{d^2y}{dx^2} + 2 \frac{dy}{dx} = 6x$ becomes \_\_\_\_\_. 13) a) $D(D^{-1})y = 6e^{z}$ b) $D(D-1)v = 6e^{2z}$ c) $D(D+1)y = 6e^{2z}$ d) $D(D+1)y = 6e^{z}$ The solution of $\sqrt{p} + \sqrt{q} = 1$ 14) a) $z = ax + (1 - \sqrt{a})^2 + c$ b) z = ax + by + cc) $z = ax + (1 + \sqrt{a})^2 + c$ d) None of these

Seat No.		Set	R					
S. Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019								
Electrical Engineering								
Day 8	& Da	ite: Saturday, 07-12-2019 Max. Marks	s: 56					
Time:	10:	00 AM To 01:00 PM						
Instru	uctio	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Figures to the right indicates full marks.</li> <li>3) Use of Non programmable calculator is allowed.</li> </ul>						
		Section – I						
Q.2	Attempt any three questions from the following.							
	a)	Solve $x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} + 4y = \cos \log x$ .						
	b) c)	Solve $(D^4 - 1)y = \cos x \cosh x$ . Solve $(D^3 - 3D^2 + 3D - 1)y = x^{1/2}e^x$						
	d)	Find the laplace transform of $\int_0^t te^{-3t} \sin(4t) dt$						
	e)	Solve $(3x + 1)^2 \frac{d^2y}{dx^2} - 3(3x + 1)\frac{dy}{dx} - 12y = 9x$						
Q.3	Att	empt any three questions from the following	09					
	a)	Find the inverse laplace transform of $\frac{1}{s^2(s+1)^2}$						
	b)	Solve $(D^4 + 5D^2 + 4)y = cos(\frac{x}{2})cos(\frac{3x}{2})$						
	c)	Solve $(D^3 - 7D + 6)y = x^2$ .						
	d)	Evaluate by using laplace transform $\int_0^\infty \left(\frac{e^{-t}-e^{-3t}}{t}\right) dt$						
	e)	Solve $(x^2D^2 + xD - 1)y = x^3$						
Q.4 Attempt any two questions from the following. a) In an $L = C$ circuit the charge $a$ on a plate of a condenser is given by								
	ч,	$\frac{d^2q}{dt^2} + \frac{q}{cL} = \frac{E_0}{L}\cos nt.$						
		If $w^2 = \frac{1}{LC}$ and initially $q = q_0$ at $t = 0$ and the current is $i = i_0$ at $t = 0$						
		prove that charge at any time t is given by $i_0$ , $i_0$ , $E=0$ , $i_0$ , $E=0$ , $i_0$ , $E=0$ , $i_0$ , $E=0$ , $i_0$ ,						
	b) c)	$q = q_0 \cos wt + \frac{1}{w} \sin wt + \frac{1}{2Lw} t \sin wt.$						
		Find the inverse laplace transform of $\frac{(s^2+2s+3)}{(s^2+2s+3)}$						
		$(s^2+2s+2)(s^2+2s+5)$ Section – II						
Q.5	Att	empt any three questions from the following.	09					
	a)	Find the value of $\int_C \frac{z-1}{(z+1)^2(z-2)} dz$ where c is the circle $ z-i  = 2$ .						
	b)	Solve $(p^3 + q^3) = 27z$ .						
	c)	Find the inverse z-transform of $\frac{z}{(z+a)}$ , $ z  < a$ .						
	d)	Solve $\left(\frac{1}{z} - \frac{1}{y}\right)p + \left(\frac{1}{x} - \frac{1}{z}\right)q = \left(\frac{1}{y} - \frac{1}{x}\right)$						

e) Find the Poles and Residues of  $f(z) = \cot z$ 

# Q.6 Attempt any three questions from the following.

- a) Solve  $pq = xy^2z^4$ b) Evaluate  $\int_{(0,0)}^{1,1} (3x^2 + 4xy + 3y^2)dx + 2(x^2 + 3xy + 4y^2)dy$  along y = x
- c) Find  $Z \{x_k\}$ , where  $\{x_k\} = k^2, k \ge 0$ . d) Find  $Z^{-1} \{\frac{1}{(z-a)^2}\}, |z| > |a|$ .
- Solve p(bz cy) + q(cx ay) = ay bxe)

#### Attempt any two questions from the following. Q.7

- Evaluate the following integral using residue theorem  $\int_c \frac{4-3z}{z(z-1)(z-2)} dz$ a)
- Where c is  $|z| = \frac{3}{2}$  **b)** Solve the P.D.E.  $\frac{\partial u}{\partial x} 2\frac{\partial u}{\partial t} = u$ , by the method of separation of variables. **c)** Find  $Z \{x_k\}$ , where  $\{x_k\} = c^k \cos \alpha k, k \ge 0$ .

10

SLR-FR-44

Set

09

# Set

# S. Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ENGINEERING MATHEMATICS - III**

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicates full marks.
- 3) Use of Non programmable Calculator is allowed.

# **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

1)

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No.

### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14 $\int_{0}^{\infty} \frac{\sin t}{dt} dt =$

	$\int_0 t^{-1} t^{-1}$			
	a) π	b)	$\pi/2$	
	c) $\pi/4$	d)	$\pi/3$	
2)	$L^{-1}\left\{\frac{1}{(-1)^3}\right\}$ is			
	a) $e^{4t} \frac{t^2}{2}$	b)	$e^{-4t} \frac{t^2}{2}$	
	C) $e^{4t} \frac{t^3}{6}$	d)	$e^{-4t} \frac{t^3}{6}$	
3)	The value of $\int_c \frac{3z^2 + 7z + 1}{r(z+1)} dz = \cdots$ where c is the circle $ z  = 1/2$ .			
	a) $3\pi$	b)	0	
	c) πi	d)	-4	
4)	If $Z\{x_k\} = F(z)$ then $Z\{a^{-k}x_k\} = ?$			
,	a) $F(az)$	b)	$\frac{1}{2}F(az)$	
	$(c) = c^{(z)}$	d)	a F(z/a)	
	$aF\left(\frac{-}{a}\right)$	u)	I (2/u)	
5)	If $x_k = 1$ . $k \ge 0$ then $z\{x_k\} = ?$			
	a) $\frac{z}{z-1}$	b)	$\frac{1}{7-1}$	
		d)	$\frac{1}{1}$	
	c) $\frac{1}{(z-1)^2}$	u)	<u>1–z</u>	
6)	The complete solution of $(D^2 + 1)y$	= 0 is	;	
	a) $y = c_1 e^x + c_2 e^{-x}$	b)	$y = c_1 \cos x + c_2 \sin x$	
	c) $y = (c_1 + c_2 x)e^x$	d)	$y = (c_1 + c_2)e^x$	
7)	The P.I of $(D^4 - m^4)y = \sin mx$ is	•		
	a) $\frac{x}{1-x}\cos mx$	b)	$\frac{-x}{1-x}\cos mx$	
	$4m^3$	d)	$4m^{\circ}$	
	$\frac{\pi}{4m^3}\sin mx$	u)	$\frac{\pi}{4m^3}\sin mx$	
	1///		1110	

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Max. Marks: 70



Marks: 14

### Set S If $D = \frac{d}{dz}$ and $z = \log x$ , then the diff. equation $x \frac{d^2y}{dx^2} + 2 \frac{dy}{dx} = 6x$ becomes \_\_\_\_\_. a) $D(D-1)y = 6e^z$ b) $D(D-1)y = 6e^{2z}$ 8) c) $D(D+1)y = 6e^{2z}$ d) $D(D+1)v = 6e^{z}$ 9) The solution of $\sqrt{p} + \sqrt{q} = 1$ b) z = ax + by + ca) $z = ax + (1 - \sqrt{a})^2 + c$ c) $z = ax + (1 + \sqrt{a})^2 + c$ d) None of these The general solution of $\left(xD^2 - D + \frac{1}{x}\right)y = 0$ is \_\_\_\_\_. 10) a) $(c_1 + c_2 \log x)x$ b) $(c_1 + c_2 x)e^x$ d) None of the above c) $(c_1 + c_2 x) \log x$ The solution of $p^2 - q^2 = 1$ is \_\_\_\_\_. a) $z = ax + \sqrt{a^2 - 1}y + c$ b) $z = ax + \sqrt{a^2 + 1}y + c$ 11) c) $z = ax + (a^2 - 1).y + c$ d) None of these The solution of p + q = z is \_\_\_\_\_. 12) b) a) $f(x + y, y + \log z)$ $f(xy, y \log z)$ c) $f(x-y, y-\log z)$ None of these d) The value of $\int_c \frac{3z+4}{z(2z+1)} dz = ...$ where c is the circle |z| = 1. 13) a) 3π b) 2πi c) 4 d) -4 14) $L\left\{\int_{0}^{t} \sin 2u \, du\right\} = \cdots$ \_\_\_\_\_. a) $\frac{2}{s^{2}+4}$ b) $\frac{2}{s(s^2+4)}$ c) $\frac{2}{s(s^2-4)}$ d) $\frac{2s}{s^2+4}$

Seat No.			Set	S				
S. Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019								
Electrical Engineering								
Day &	. Da	te: Saturday, 07-12-2019 Mainteina noo-in	. Mark	s: 56				
Time:	10:	00 AM To 01:00 PM						
Instru	ictio	<ul> <li>ons: 1) All questions are compulsory.</li> <li>2) Figures to the right indicates full marks.</li> <li>3) Use of Non programmable calculator is allowed.</li> </ul>						
		Section – I						
Q.2	Atte	Attempt any three questions from the following.						
	a)	Solve $x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} + 4y = \cos \log x$ .						
	b) c)	Solve $(D^4 - 1)y = \cos x \cosh x$ . Solve $(D^3 - 3D^2 + 3D - 1)y = x^{1/2}e^x$						
	d)	Find the laplace transform of $\int_0^t te^{-3t} \sin(4t) dt$						
	e)	Solve $(3x + 1)^2 \frac{d^2y}{dx^2} - 3(3x + 1)\frac{dy}{dx} - 12y = 9x$						
Q.3	Atte	empt any three questions from the following		09				
	a)	Find the inverse laplace transform of $\frac{1}{s^2(s+1)^2}$						
	b)	Solve $(D^4 + 5D^2 + 4)y = cos(\frac{x}{2})cos(\frac{3x}{2})$						
	c)	Solve $(D^3 - 7D + 6)y = x^2$ .						
	d)	Evaluate by using laplace transform $\int_0^\infty \left(\frac{e^{-t}-e^{-st}}{t}\right) dt$						
_	e)	Solve $(x^2D^2 + xD - 1)y = x^3$						
Q.4	Q.4 Attempt any two questions from the following. a) In an $L$ C circuit the charge $q$ on a plate of a condensar is given by							
	ω,	$\frac{d^2q}{dt^2} + \frac{q}{cL} = \frac{E_0}{L}\cos nt.$						
		If $w^2 = \frac{1}{LC}$ and initially $q = q_0$ at $t = 0$ and the current is $i = i_0$ at $t = 0$	)					
		prove that charge at any time t is given by $E^{-0}$						
	L)	$q = q_0 \cos wt + \frac{1}{w} \sin wt + \frac{1}{2Lw} t \sin wt.$						
	а) с)	Solve $(D^{\circ} + D)y = \cos t + t^{-} + 3$ . $(s^{2}+2s+3)$						
	•	Find the inverse laplace transform of $\frac{1}{(s^2+2s+2)(s^2+2s+5)}$						
		Section – II						
Q.5	Atte	empt any three questions from the following.		09				
	4) Find the value of $\int_c \frac{z}{(z+1)^2(z-2)} dz$ where c is the circle $ z-i  = 2$ .							
	(a c)	Solve $(p^{\circ} + q^{\circ}) = 27z$ . Find the inverse z-transform of $\frac{z}{z}$ . $ z  < a$ .						
	d)	Solve $\left(\frac{1}{z} - \frac{1}{y}\right)p + \left(\frac{1}{x} - \frac{1}{z}\right)q = \left(\frac{1}{y} - \frac{1}{x}\right)$						

e) Find the Poles and Residues of  $f(z) = \cot z$ 

# Q.6 Attempt any three questions from the following.

- a) Solve  $pq = xy^2z^4$ b) Evaluate  $\int_{(0,0)}^{1,1} (3x^2 + 4xy + 3y^2)dx + 2(x^2 + 3xy + 4y^2)dy$  along y = x
- c) Find  $Z \{x_k\}$ , where  $\{x_k\} = k^2, k \ge 0$ . d) Find  $Z^{-1} \{\frac{1}{(z-a)^2}\}, |z| > |a|$ .
- Solve p(bz cy) + q(cx ay) = ay bxe)

#### Attempt any two questions from the following. Q.7

- Evaluate the following integral using residue theorem  $\int_c \frac{4-3z}{z(z-1)(z-2)} dz$ a)
- Where c is  $|z| = \frac{3}{2}$  **b)** Solve the P.D.E.  $\frac{\partial u}{\partial x} 2\frac{\partial u}{\partial t} = u$ , by the method of separation of variables. **c)** Find  $Z \{x_k\}$ , where  $\{x_k\} = c^k \cos \alpha k, k \ge 0$ .

10

SLR-FR-44

# Set 09

# Set S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

# **ELECTRICAL MACHINES – I**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 4) Draw neat diagrams whenever necessary.

# **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The armature of DC machine is made up of laminated sheets to \_\_\_\_\_. 1)
  - a) Reduce hysteresis loss
  - b) Reduce the eddy-current loss
  - Reduce armature copper loss C)
  - Increase dissipation of heat from the armature surface d)
- Equalizer rings are required in case armature is 2) lap wound
  - a) wave wound
  - delta wound d) duplex wound C)
- 3) In a D.C. generator the critical resistance refers to the resistance of \_\_\_\_\_.

b)

- a) brushes b) field
- d) C) armature load
- 4) Two generators A and B have 6-poles each. Generator A has wave wound armature while generator B has lap wound armature. The ratio of the induced e.m.f. is generator A and B will be
  - 2:3 3:1 b) a)
  - c) 3:2 d)
- Speed control by Ward Leonard method gives uniform speed variation \_\_\_\_\_. 5)
  - a) in one direction
- b) in both directions d) above normal speed only
- below normal speed only C)

Hopkinson's test on D.C. machines is conducted at 6)

- no-load a) b) C)
  - full-load
- 7) In a D.C. series motor, if the armature current is reduced by 50%, the torque of the motor will be equal to \_\_\_\_\_.
  - a) 100% of the previous value
  - 50% of the previous value b)
  - 25% of the previous value C)
  - 10% of the previous value d)
  - none of the above e)

Max. Marks: 70

Marks: 14

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- d) overload

1:3

- part load

- 8) The no-load current drawn by transformer is usually what per cent of the full-load current?
  - a) 0.2 to 0.5 per cent

c)

b) 2 to 5 per cent

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Set

- 12 to 15 per cent d) 20 to 30 per cent
- 9) What is the thickness of laminations used in a transformer?
  - a) 0.1 mm to 0.5 mm b) 4 mm to 5 mm
  - c) 14 mm to 15 mm d) 25 mm to 40 mm
- 10) Delta/star transformer works satisfactorily when \_\_\_\_\_.
  - a) load is balanced only
  - b) load is unbalanced only
  - c) on balanced as well as unbalanced loads
  - d) none of the above
- 11) Which type of winding is used in 3phase shell-type transformer?
  - a) Circular type b) Sandwich type
  - c) Cylindrical type d) Rectangular type
- 12) Auto-transformer makes effective saving on copper and copper losses, when its transformation ratio is \_\_\_\_\_.
  - a) approximately equal to one
- b) less than oned) none of the above
- c) great than one d) n
- 13) The average power factor at which V-V bank is operating is less than that with the load. The power factor is \_\_\_\_\_.
  - a) 57.7% of the balanced load power factor
  - b) 66.7% of the balanced load power factor
  - c) 86.6% of the balanced load power factor
  - d) None of these
- 14) Which of the following protection is normally not provided on small distribution transformers?
  - a) Over fluxing protection
- b) Buchholz relay
- c) Overcurrent protection
- d) All of the above

Seat No.

# S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINES – I

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 4) Draw neat diagrams whenever necessary.

# Section – I

# Q.2 Attempt any four of the following.

- a) Derive an emf equation of DC generator.
- **b)** Why DC series motor is not started without load? Explain with the help of equations and its characteristics.
- c) With neat sketch explain three-point starters for DC motor.
- d) With a neat sketch explain the Hopkinson's test for de motor.
- e) A DC Shunt motor designed to operate on 500 V supply takes full load current of 42 A and runs at 800 rpm. The flux per pole is reduced to 75% of its normal value. Calculate the speed of the motor if the total torque exerted on the armature is.
  - 1) unchanged
  - 2) reduced by 20%. The armature resistance is 0.6  $\Omega$  and the total voltage loss at the brushes is 2V.
- f) A 4 pole, long shunt lap -wound generator supplies 25 KW at a terminal voltage of 500 V. The armature resistance is  $0.03 \Omega$ , series field resistance is  $0.04 \Omega$ , and shunt field resistance is  $200\Omega$ . The brush drop may be taken as 1.0 V. Determine the e.m.f. generated. Calculate also the No. of conductors if speed is 1200 rpm. and flux per pole is 0.02 weber. Neglect armature reaction.

# Q.3 Attempt any two of the following.

- a) With neat sketch explain the armature reaction, its effect and remedies to overcome it.
- **b)** A DC shunt machine when run as a motor on no load takes 440W and run at 1000 r.p.m. The field current and armature resistance are 1A and 0.5 respectively. Calculate the efficiency of the machine when.
  - 1) Running as a generator delivering 40A at 220V
  - 2) As a motor taking 40A from 220V supply
- c) The brake test on a DC shunt motor gave the following results : tensions on two sides of the brake were 2.9 kg and 0.17 kg, radius of pully 7 cm, speed 1500 rpm, Input current was 2 A at 230V, line current = 2.8 A. Find:
  - 1) Output torque
  - 2) Output power
  - 3) Horse power
  - 4) Efficiency

12

16

Max. Marks: 56

Set P

### Section – II

### Q.4 Attempt any four of the following.

- a) How the mutual flux in transformer remains constant for any desired load changes.
- **b)** What are the losses which occur in transformer, how they varied with load and how it can be minimized?
- c) The no load current of a transformer is 5 A at 0.3 power factor when supplied at 230 V, 50 Hz. The number of turns of the primary winding is 200. Calculate:
  - 1) Secondary current and power factor
  - 2) The core loss
  - 3) The magnetizing current
- d) A 40KVA transformer has iron loss of 450W and full load copper loss of 850W. If the power factor of the load is 0.8 lagging, calculate.
  - 1) Full load efficiency
  - 2) The kVA
- e) Write short note on autotransformer.
- f) A 3-phase, 50 Hz transformer has a delta-connected primary and starconnected secondary, the line voltages being 22000 V and 400 V respectively. The secondary has a star-connected balanced load at 0.8 power factor lagging. The line current on the primary side is 5 A. Determine the current in each coil of the primary and in each secondary line. What is the output of the transformer in kW?

### Q.5 Attempt any two of the following:

a) The following data for 10 KVA, 450/120 V, 50 Hz transformer were obtained from OC and SC test
 OC Test: V1 = 120 V, I1=4.2 A, W1=80 W
 SC Test: V1=9.65 V, I1=22.2 A, W1=120 W

### Calculate

- 1) Equivalent circuit constants
- 2) Efficiency at full load 0.8 lagging power factor
- 3) Efficiency at half load 0.8 lagging power factor
- **b)** With the help of neat diagram explain Scott connection of three phasetransformer.
- c) Two single phase transformers with equal voltage ratio have impedance of (0.5+3i) and (0.6+1 i) with respect to secondary, If they operate in parallel, determine how they share a total load of 100KW, at 0.8 lag pf.

16

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Set

12

# S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

# **ELECTRICAL MACHINES – I**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 4) Draw neat diagrams whenever necessary.

# **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

C)

a)

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No.

### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The no-load current drawn by transformer is usually what per cent of the 1) full-load current?
  - a) 0.2 to 0.5 per cent 12 to 15 per cent
- 2 to 5 per cent b)
  - 20 to 30 per cent d)

4 mm to 5 mm

25 mm to 40 mm

- What is the thickness of laminations used in a transformer? 2)
  - 0.1 mm to 0.5 mm b) d)
  - C) 14 mm to 15 mm
- 3) Delta/star transformer works satisfactorily when \_\_\_\_\_.
  - load is balanced only a)
  - load is unbalanced only b)
  - on balanced as well as unbalanced loads C)
  - none of the above d)
- 4) Which type of winding is used in 3phase shell-type transformer?
  - Circular type Sandwich type a) b)
  - Cylindrical type d) Rectangular type C)
- Auto-transformer makes effective saving on copper and copper losses, 5) when its transformation ratio is \_\_\_\_\_
  - a) approximately equal to one b) less than one
  - great than one d) none of the above C)
- The average power factor at which V-V bank is operating is less than that 6) with the load. The power factor is .
  - 57.7% of the balanced load power factor a)
  - b) 66.7% of the balanced load power factor
  - 86.6% of the balanced load power factor c)
  - None of these d)
- 7) Which of the following protection is normally not provided on small distribution transformers?
  - a) Over fluxing protection
  - Overcurrent protection c)
- b) Buchholz relay
- All of the above d)

Set Q

Max. Marks: 70

Marks: 14



				Set	G
8)	The a) b) c) d)	armature of DC machine is made Reduce hysteresis loss Reduce the eddy-current loss Reduce armature copper loss Increase dissipation of heat from	up o	f laminated sheets to	
9)	Equa a) c)	alizer rings are required in case a wave wound delta wound	rmatı b) d)	ure is lap wound duplex wound	
10)	ln a a) c)	D.C. generator the critical resistant brushes armature	nce r b) d)	efers to the resistance of field load	
11)	Two wou the i a) c)	generators A and B have 6-poles nd armature while generator B ha nduced e.m.f. is generator A and 2 : 3 3 : 2	s eac s lap B wil b) d)	h. Generator A has wave wound armature. The ratio of l be 3 : 1 1 : 3	
12)	Spe a) c)	ed control by Ward Leonard meth in one direction below normal speed only	od gi b) d)	ves uniform speed variation in both directions above normal speed only	
13)	Hop a) c)	kinson's test on D.C. machines is no-load full-load	conc b) d)	lucted at part load overload	
11)	In a	DC sories motor if the armature	CUIT	ent is reduced by 50% the	

- In a D.C. series motor, if the armature current is reduced by 50%, the 14) torque of the motor will be equal to \_\_\_\_\_.
  - 100% of the previous value a)
  - 50% of the previous value b)
  - 25% of the previous value c)
  - 10% of the previous value d)
  - none of the above e)

Seat No.

# S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINES – I

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 4) Draw neat diagrams whenever necessary.

# Section – I

# Q.2 Attempt any four of the following.

- a) Derive an emf equation of DC generator.
- **b)** Why DC series motor is not started without load? Explain with the help of equations and its characteristics.
- c) With neat sketch explain three-point starters for DC motor.
- d) With a neat sketch explain the Hopkinson's test for de motor.
- e) A DC Shunt motor designed to operate on 500 V supply takes full load current of 42 A and runs at 800 rpm. The flux per pole is reduced to 75% of its normal value. Calculate the speed of the motor if the total torque exerted on the armature is.
  - 1) unchanged
  - 2) reduced by 20%. The armature resistance is 0.6  $\Omega$  and the total voltage loss at the brushes is 2V.
- f) A 4 pole, long shunt lap -wound generator supplies 25 KW at a terminal voltage of 500 V. The armature resistance is 0.03 Ω, series field resistance is 0.04 Ω, and shunt field resistance is 200Ω. The brush drop may be taken as 1.0 V. Determine the e.m.f. generated. Calculate also the No. of conductors if speed is 1200 rpm. and flux per pole is 0.02 weber. Neglect armature reaction.

# Q.3 Attempt any two of the following.

- a) With neat sketch explain the armature reaction, its effect and remedies to overcome it.
- **b)** A DC shunt machine when run as a motor on no load takes 440W and run at 1000 r.p.m. The field current and armature resistance are 1A and 0.5 respectively. Calculate the efficiency of the machine when.
  - 1) Running as a generator delivering 40A at 220V
  - 2) As a motor taking 40A from 220V supply
- c) The brake test on a DC shunt motor gave the following results : tensions on two sides of the brake were 2.9 kg and 0.17 kg, radius of pully 7 cm, speed 1500 rpm, Input current was 2 A at 230V, line current = 2.8 A. Find:
  - 1) Output torque
  - 2) Output power
  - 3) Horse power
  - 4) Efficiency

12

16

Max. Marks: 56

Set Q

### Section – II

### Q.4 Attempt any four of the following.

- a) How the mutual flux in transformer remains constant for any desired load changes.
- **b)** What are the losses which occur in transformer, how they varied with load and how it can be minimized?
- c) The no load current of a transformer is 5 A at 0.3 power factor when supplied at 230 V, 50 Hz. The number of turns of the primary winding is 200. Calculate:
  - 1) Secondary current and power factor
  - 2) The core loss
  - 3) The magnetizing current
- d) A 40KVA transformer has iron loss of 450W and full load copper loss of 850W. If the power factor of the load is 0.8 lagging, calculate.
  - 1) Full load efficiency
  - 2) The kVA
- e) Write short note on autotransformer.
- f) A 3-phase, 50 Hz transformer has a delta-connected primary and starconnected secondary, the line voltages being 22000 V and 400 V respectively. The secondary has a star-connected balanced load at 0.8 power factor lagging. The line current on the primary side is 5 A. Determine the current in each coil of the primary and in each secondary line. What is the output of the transformer in kW?

### Q.5 Attempt any two of the following:

a) The following data for 10 KVA, 450/120 V, 50 Hz transformer were obtained from OC and SC test
 OC Test: V1 = 120 V, I1=4.2 A, W1=80 W
 SC Test: V1=9.65 V, I1=22.2 A, W1=120 W

### Calculate

- 1) Equivalent circuit constants
- 2) Efficiency at full load 0.8 lagging power factor
- 3) Efficiency at half load 0.8 lagging power factor
- **b)** With the help of neat diagram explain Scott connection of three phasetransformer.
- c) Two single phase transformers with equal voltage ratio have impedance of (0.5+3i) and (0.6+1 i) with respect to secondary, If they operate in parallel, determine how they share a total load of 100KW, at 0.8 lag pf.

16

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Set

12
# Set

S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINES – I** 

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 4) Draw neat diagrams whenever necessary.

### **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

c)

a)

2)

### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

b)

- Speed control by Ward Leonard method gives uniform speed variation \_\_\_\_\_. 1)
  - a) in one direction
    - below normal speed only c) d)
  - Hopkinson's test on D.C. machines is conducted at
    - no-load a) full-load

b) part load overload d)

in both directions

above normal speed only

- 3) In a D.C. series motor, if the armature current is reduced by 50%, the torque of the motor will be equal to \_\_\_\_\_.
  - 100% of the previous value a)
  - 50% of the previous value b)
  - 25% of the previous value c)
  - 10% of the previous value d)
  - none of the above e)
- 4) The no-load current drawn by transformer is usually what per cent of the full-load current?
  - 0.2 to 0.5 per cent 2 to 5 per cent b)
  - 12 to 15 per cent 20 to 30 per cent c) d)
- 5) What is the thickness of laminations used in a transformer?
  - 0.1 mm to 0.5 mm b) 4 mm to 5 mm a)
  - 14 mm to 15 mm 25 mm to 40 mm C) d)
- Delta/star transformer works satisfactorily when \_\_\_\_\_. 6)
  - load is balanced only a)
  - b) load is unbalanced only
  - on balanced as well as unbalanced loads C)
  - none of the above d)
- 7) Which type of winding is used in 3phase shell-type transformer?
  - Circular type Sandwich type b) a)
  - Cylindrical type d) Rectangular type C)

Seat No.

Max. Marks: 70

Marks: 14

R

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Auto-transformer makes effective saving on copper and copper losses, 8) when its transformation ratio is approximately equal to one b) less than one a) C) great than one d) none of the above The average power factor at which V-V bank is operating is less than that 9) with the load. The power factor is \_ 57.7% of the balanced load power factor a) 66.7% of the balanced load power factor b) 86.6% of the balanced load power factor C) d) None of these Which of the following protection is normally not provided on small 10) distribution transformers? Over fluxing protection b) Buchholz relay a) Overcurrent protection All of the above c) d) 11) The armature of DC machine is made up of laminated sheets to \_\_\_\_\_. Reduce hysteresis loss a) b) Reduce the eddy-current loss Reduce armature copper loss C) Increase dissipation of heat from the armature surface d) Equalizer rings are required in case armature is \_\_\_\_ 12) wave wound lap wound a) b) delta wound d) duplex wound c) 13) In a D.C. generator the critical resistance refers to the resistance of \_\_\_\_\_. brushes b) field a) d) C) armature load 14) Two generators A and B have 6-poles each. Generator A has wave wound armature while generator B has lap wound armature. The ratio of the induced e.m.f. is generator A and B will be 2:3 3:1 a) b) 3:2 d) 1:3 c)

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16

Seat No.

### S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINES – I

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 4) Draw neat diagrams whenever necessary.

### Section – I

### Q.2 Attempt any four of the following.

- a) Derive an emf equation of DC generator.
- **b)** Why DC series motor is not started without load? Explain with the help of equations and its characteristics.
- c) With neat sketch explain three-point starters for DC motor.
- d) With a neat sketch explain the Hopkinson's test for de motor.
- e) A DC Shunt motor designed to operate on 500 V supply takes full load current of 42 A and runs at 800 rpm. The flux per pole is reduced to 75% of its normal value. Calculate the speed of the motor if the total torque exerted on the armature is.
  - 1) unchanged
  - 2) reduced by 20%. The armature resistance is 0.6  $\Omega$  and the total voltage loss at the brushes is 2V.
- f) A 4 pole, long shunt lap -wound generator supplies 25 KW at a terminal voltage of 500 V. The armature resistance is  $0.03 \Omega$ , series field resistance is  $0.04 \Omega$ , and shunt field resistance is  $200\Omega$ . The brush drop may be taken as 1.0 V. Determine the e.m.f. generated. Calculate also the No. of conductors if speed is 1200 rpm. and flux per pole is 0.02 weber. Neglect armature reaction.

### Q.3 Attempt any two of the following.

- a) With neat sketch explain the armature reaction, its effect and remedies to overcome it.
- **b)** A DC shunt machine when run as a motor on no load takes 440W and run at 1000 r.p.m. The field current and armature resistance are 1A and 0.5 respectively. Calculate the efficiency of the machine when.
  - 1) Running as a generator delivering 40A at 220V
  - 2) As a motor taking 40A from 220V supply
- c) The brake test on a DC shunt motor gave the following results : tensions on two sides of the brake were 2.9 kg and 0.17 kg, radius of pully 7 cm, speed 1500 rpm, Input current was 2 A at 230V, line current = 2.8 A. Find:
  - 1) Output torque
  - 2) Output power
  - 3) Horse power
  - 4) Efficiency

Max. Marks: 56

### Section – II

### Q.4 Attempt any four of the following.

- a) How the mutual flux in transformer remains constant for any desired load changes.
- **b)** What are the losses which occur in transformer, how they varied with load and how it can be minimized?
- c) The no load current of a transformer is 5 A at 0.3 power factor when supplied at 230 V, 50 Hz. The number of turns of the primary winding is 200. Calculate:
  - 1) Secondary current and power factor
  - 2) The core loss
  - 3) The magnetizing current
- d) A 40KVA transformer has iron loss of 450W and full load copper loss of 850W. If the power factor of the load is 0.8 lagging, calculate.
  - 1) Full load efficiency
  - 2) The kVA
- e) Write short note on autotransformer.
- f) A 3-phase, 50 Hz transformer has a delta-connected primary and starconnected secondary, the line voltages being 22000 V and 400 V respectively. The secondary has a star-connected balanced load at 0.8 power factor lagging. The line current on the primary side is 5 A. Determine the current in each coil of the primary and in each secondary line. What is the output of the transformer in kW?

### Q.5 Attempt any two of the following:

a) The following data for 10 KVA, 450/120 V, 50 Hz transformer were obtained from OC and SC test
 OC Test: V1 = 120 V, I1=4.2 A, W1=80 W
 SC Test: V1=9.65 V, I1=22.2 A, W1=120 W

### Calculate

- 1) Equivalent circuit constants
- 2) Efficiency at full load 0.8 lagging power factor
- 3) Efficiency at half load 0.8 lagging power factor
- **b)** With the help of neat diagram explain Scott connection of three phasetransformer.
- c) Two single phase transformers with equal voltage ratio have impedance of (0.5+3i) and (0.6+1 i) with respect to secondary, If they operate in parallel, determine how they share a total load of 100KW, at 0.8 lag pf.

16

R

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Set

S.Y. (B. Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINES – I** 

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 4) Draw neat diagrams whenever necessary.

### **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- Delta/star transformer works satisfactorily when . 1)
  - a) load is balanced only
  - b) load is unbalanced only
  - on balanced as well as unbalanced loads c)
  - d) none of the above
- Which type of winding is used in 3phase shell-type transformer? 2)
  - Circular type b) Sandwich type a)
  - Cylindrical type d) Rectangular type C)
- 3) Auto-transformer makes effective saving on copper and copper losses, when its transformation ratio is \_\_\_\_\_
  - approximately equal to one a) b) less than one
  - c) great than one d) none of the above
- 4) The average power factor at which V-V bank is operating is less than that with the load. The power factor is \_\_\_\_
  - 57.7% of the balanced load power factor a)
  - b) 66.7% of the balanced load power factor
  - 86.6% of the balanced load power factor c)
  - None of these d)

C)

- Which of the following protection is normally not provided on small 5) distribution transformers?
  - Over fluxing protection a)
    - b) Buchholz relay Overcurrent protection d) All of the above
- 6) The armature of DC machine is made up of laminated sheets to \_\_\_\_\_.
  - Reduce hysteresis loss a)
  - Reduce the eddy-current loss b)
  - Reduce armature copper loss c)
  - Increase dissipation of heat from the armature surface d)
- 7) Equalizer rings are required in case armature is \_
  - wave wound a) c)
    - lap wound b) delta wound d) duplex wound

Seat No.

## SLR-FR-45



Marks: 14

Max. Marks: 70

8) In a D.C. generator the critical resistance refers to the resistance of \_\_\_\_\_.

a) brushes

- b) field
- c) armature d) load
- 9) Two generators A and B have 6-poles each. Generator A has wave wound armature while generator B has lap wound armature. The ratio of the induced e.m.f. is generator A and B will be \_\_\_\_\_.
  - a) 2:3 b) 3:1
  - c) 3:2 d) 1:3

### 10) Speed control by Ward Leonard method gives uniform speed variation \_\_\_\_\_.

- a) in one direction
- b) in both directions

above normal speed only

SLR-FR-45

Set | S

- c) below normal speed only d)
- 11) Hopkinson's test on D.C. machines is conducted at \_\_\_\_\_.
  - a) no-load b) part load
  - c) full-load d) overload
- 12) In a D.C. series motor, if the armature current is reduced by 50%, the torque of the motor will be equal to \_\_\_\_\_.
  - a) 100% of the previous value
  - b) 50% of the previous value
  - c) 25% of the previous value
  - d) 10% of the previous value
  - e) none of the above
- 13) The no-load current drawn by transformer is usually what per cent of the full-load current?
  - a) 0.2 to 0.5 per cent
- b) 2 to 5 per cent

20 to 30 per cent

- c) 12 to 15 per cent d)
- 14) What is the thickness of laminations used in a transformer?
  - a) 0.1 mm to 0.5 mm
- b) 4 mm to 5 mm
- c) 14 mm to 15 mm
- d) 25 mm to 40 mm

Seat No.

### S.Y. (B. Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINES – I

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 4) Draw neat diagrams whenever necessary.

### Section – I

### Q.2 Attempt any four of the following.

- a) Derive an emf equation of DC generator.
- b) Why DC series motor is not started without load? Explain with the help of equations and its characteristics.
- c) With neat sketch explain three-point starters for DC motor.
- d) With a neat sketch explain the Hopkinson's test for de motor.
- e) A DC Shunt motor designed to operate on 500 V supply takes full load current of 42 A and runs at 800 rpm. The flux per pole is reduced to 75% of its normal value. Calculate the speed of the motor if the total torque exerted on the armature is.
  - 1) unchanged
  - 2) reduced by 20%. The armature resistance is 0.6  $\Omega$  and the total voltage loss at the brushes is 2V.
- f) A 4 pole, long shunt lap -wound generator supplies 25 KW at a terminal voltage of 500 V. The armature resistance is  $0.03 \Omega$ , series field resistance is  $0.04 \Omega$ , and shunt field resistance is  $200\Omega$ . The brush drop may be taken as 1.0 V. Determine the e.m.f. generated. Calculate also the No. of conductors if speed is 1200 rpm. and flux per pole is 0.02 weber. Neglect armature reaction.

### Q.3 Attempt any two of the following.

- a) With neat sketch explain the armature reaction, its effect and remedies to overcome it.
- **b)** A DC shunt machine when run as a motor on no load takes 440W and run at 1000 r.p.m. The field current and armature resistance are 1A and 0.5 respectively. Calculate the efficiency of the machine when.
  - 1) Running as a generator delivering 40A at 220V
  - 2) As a motor taking 40A from 220V supply
- c) The brake test on a DC shunt motor gave the following results : tensions on two sides of the brake were 2.9 kg and 0.17 kg, radius of pully 7 cm, speed 1500 rpm, Input current was 2 A at 230V, line current = 2.8 A. Find:
  - 1) Output torque
  - 2) Output power
  - 3) Horse power
  - 4) Efficiency

Max. Marks: 56

Set

12

### Section – II

### Q.4 Attempt any four of the following.

- a) How the mutual flux in transformer remains constant for any desired load changes.
- **b)** What are the losses which occur in transformer, how they varied with load and how it can be minimized?
- c) The no load current of a transformer is 5 A at 0.3 power factor when supplied at 230 V, 50 Hz. The number of turns of the primary winding is 200. Calculate:
  - 1) Secondary current and power factor
  - 2) The core loss
  - 3) The magnetizing current
- d) A 40KVA transformer has iron loss of 450W and full load copper loss of 850W. If the power factor of the load is 0.8 lagging, calculate.
  - 1) Full load efficiency
  - 2) The kVA
- e) Write short note on autotransformer.
- f) A 3-phase, 50 Hz transformer has a delta-connected primary and starconnected secondary, the line voltages being 22000 V and 400 V respectively. The secondary has a star-connected balanced load at 0.8 power factor lagging. The line current on the primary side is 5 A. Determine the current in each coil of the primary and in each secondary line. What is the output of the transformer in kW?

### Q.5 Attempt any two of the following:

a) The following data for 10 KVÅ, 450/120 V, 50 Hz transformer were obtained from OC and SC test
 OC Test: V1 = 120 V, I1=4.2 A, W1=80 W
 SC Test: V1=9.65 V, I1=22.2 A, W1=120 W

### Calculate

- 1) Equivalent circuit constants
- 2) Efficiency at full load 0.8 lagging power factor
- 3) Efficiency at half load 0.8 lagging power factor
- **b)** With the help of neat diagram explain Scott connection of three phasetransformer.
- c) Two single phase transformers with equal voltage ratio have impedance of (0.5+3i) and (0.6+1 i) with respect to secondary, If they operate in parallel, determine how they share a total load of 100KW, at 0.8 lag pf.

16

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Set

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Seat

No.

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) If the instrument is used in wrong manner while application, then it will results in b)
  - Systematic error a)
  - c) Random error
    - d) Environmental error

Instrument error

- 2) instruments arc those which measure the total quantity of electricity delivered in a particular time. Indicating
  - a) Absolute b)
  - c) Recording d) Integrating
- 3) Potentiometer is used for the measurement of \_\_\_\_\_.
  - a) Linear displacement
  - b) Angular displacement
  - c) Non linear displacement
  - d) Only (a) and (b)
- 4) The largest change in the measured variable which produces no instrument response is known as
  - a) Threshold b) Dynamic error
  - c) Dead zone None of these d)
- The spring material used in a spring control device should have the 5) following property
  - Should be non-magnetic a)
  - b) Most be of low temperature co-efficient
  - c) Should have low specific resistance
  - d) All of the above
- For the measurement of low resistances, Kelvin's double bridge has high 6) accuracy because
  - a) It has two set of ratio arms which eliminates effect of resistance of connecting lead
  - b) It has a null indicating galvanometer
  - c) It has two null indicator
  - It has four sets of ratio arms which eliminates the effect of resistance d) of connecting lead

Ρ Set

Max. Marks: 70

Marks: 14

				SLR-FR-46	
				Set P	
7)	<ul> <li>The two pressure coils of a single phase power factor meter have</li> <li>a) The same dimensions and the same number of turns</li> <li>b) The same dimension but different number of turns</li> <li>c) The same number of turns but different dimensions</li> <li>d) None of the above</li> </ul>				
8)	Wh a) c)	ich of following represent active t Strain gauge LVDT	ransc b) d)	lucer? Thermistor Thermocouple	
9)	Ele a) b) c) d)	ctronic voltmeters can be designed Only very small voltages Only very high voltages Both very small and very high very None of these	ed to oltage	measure es	
10)	An a) c)	oscilloscope indicates Peak to peak value of voltage RMS value	b) d)	DC value of voltage Average value	
11)	Q n a) c)	neter is used to measure the prop Inductive coils Capacitive coils	bertie: b) d)	s of Non inductive coils Both (a) and (c)	
12)	For cor a) c)	handling greater currents induct njunction with Potential T/F Power T/F	ion W b) d)	attcmeters are used in Current T/F Either of the above	
13)	Dig a) b) c) d)	ital multimeter is used for Measuring a.c. and d.c. current, Measuring a.c. current and volta Measuring d.c. current and resis Measuring a.c. voltage and resis	 volta age stance stance	ge and resistance	
14)	ln a a) b)	A CRT focusing anode is located Between pre-accelerating and a After accelerating anode	ccele	 rating anode	

- b) After accelerating anodec) Before pre-accelerating anoded) None of the above

### Seat No.

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday,12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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

### Q.2 Solve any Four.

- a) With neat sketch explain spring control method.
- **b)** What is mean by standard? Explain types of standard.
- c) The inductance of moving iron instrument is given by
   L = (10 + 5Θ - Θ<sup>2</sup>) μH
   Where Θ is deflection in radian from zero position? The spring constant is
   12 × 10<sup>-6</sup> Nm/rad. Calculate deflection for current of 5A.

   d) With next elected current of MMC instrument.
- **d)** With neat sketch explain PMMC instrument.
- e) Explain drysdale ac potentiometer with neat diagram.

### Q.3 Attempt any two.

- a) With neat sketch explain ammeter shunt & voltage multiplier.
- b) Explain Schering Bridge for measurement of unknown capacitance with phasor diagram.
- c) A bridge consist of the following Arm ab: - A choke coil having resistance R<sub>1</sub> & inductance L<sub>1</sub> Arm bc: - A non-inductive resistance R<sub>3</sub> Arm cd: - A mica condenser C<sub>4</sub> in series with non-inductive resistance R<sub>4</sub>

Arm da: - A non-inductive resistance R<sub>2</sub>

When this bridge fed from a source of 500 Hz, balance is obtained under following conditions

 $R_2$ = 2410 $\Omega$ ,  $R_3$ =750 $\Omega$ ,  $C_4$ = 0.35 $\mu$ F,  $R_4$ = 64.5 $\Omega$ 

The series resistance of capacitor is  $0.4\Omega$ .Calculate resistance and inductance(R<sub>1</sub>, L<sub>1</sub>) of choke coil .The supply is connected between a & c and detector is between b & d.

### Q.4 Attempt any four

- a) Explain detail classification of transducers.
- **b)** With help of block diagram explain digital multimeter.
- c) Define the following terms
  - 1) Transformation ratio
  - 2) Nominal ratio
  - 3) Turns ratio
  - 4) Ratio error
- d) Explain electronic energy meter with block diagram.
- e) Write features of cathode ray tube.

2019

Ρ

Max. Marks: 56

12

16



12

### Q.5 Attempt any two.

- a) Explain current transformer for measurement of current with equivalent circuit & phasor diagram.
- **b)** Explain ramp type DVM with neat diagram.
- c) Explain in detail block diagram of CRO.

## S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

### ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Seat

No.

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Which of following represent active transducer?
  - a) Strain gauge Thermistor b)
  - c) LVDT d) Thermocouple
- 2) Electronic voltmeters can be designed to measure \_\_\_\_\_.
  - a) Only very small voltages
  - b) Only very high voltages
  - c) Both very small and very high voltages
  - d) None of these

### An oscilloscope indicates \_ 3)

- a) Peak to peak value of voltage b)
- c) RMS value d) Average value
- Q meter is used to measure the properties of \_\_\_\_ 4)
  - a) Inductive coils Non inductive coils b)
  - c) Capacitive coils d) Both (a) and (c)
- For handling greater currents induction Wattcmeters are used in 5) conjunction with
  - a) Potential T/F b) Current T/F
  - c) Power T/F d) Either of the above
- 6) Digital multimeter is used for \_\_\_\_\_
  - Measuring a.c. and d.c. current, voltage and resistance a)
  - Measuring a.c. current and voltage b)
  - c) Measuring d.c. current and resistance
  - d) Measuring a.c. voltage and resistance
- 7) In a CRT focusing anode is located \_
  - a) Between pre-accelerating and accelerating anode
  - b) After accelerating anode
  - c) Before pre-accelerating anode
  - d) None of the above
- 8) If the instrument is used in wrong manner while application, then it will results in
  - Systematic error a) b)
  - c) Random error d)
- Instrument error
  - Environmental error

DC value of voltage

Marks: 14

Set Q

Max. Marks: 70

9) \_\_\_\_\_ instruments arc those which measure the total quantity of electricity delivered in a particular time.

- a) Absolute
- b) Indicating

SLR-FR-46

Set C

- c) Recording d) Integrating
- 10) Potentiometer is used for the measurement of \_\_\_\_\_.
  - a) Linear displacement
  - b) Angular displacement
  - c) Non linear displacement
  - d) Only (a) and (b)
- 11) The largest change in the measured variable which produces no instrument response is known as \_\_\_\_\_.
  - a) Threshold b) Dynamic error
  - c) Dead zone d) None of these
- 12) The spring material used in a spring control device should have the following property \_\_\_\_\_.
  - a) Should be non-magnetic
  - b) Most be of low temperature co-efficient
  - c) Should have low specific resistance
  - d) All of the above
- 13) For the measurement of low resistances, Kelvin's double bridge has high accuracy because \_\_\_\_\_.
  - a) It has two set of ratio arms which eliminates effect of resistance of connecting lead
  - b) It has a null indicating galvanometer
  - c) It has two null indicator
  - d) It has four sets of ratio arms which eliminates the effect of resistance of connecting lead
- 14) The two pressure coils of a single phase power factor meter have \_\_\_\_\_.
  - a) The same dimensions and the same number of turns
  - b) The same dimension but different number of turns
  - c) The same number of turns but different dimensions
  - d) None of the above

### Seat No.

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday,12-12-2019 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

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

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

### Q.2 Solve any Four.

- a) With neat sketch explain spring control method.
- **b)** What is mean by standard? Explain types of standard.
- c) The inductance of moving iron instrument is given by
   L = (10 + 5Θ - Θ<sup>2</sup>) μH
   Where Θ is deflection in radian from zero position? The spring constant is
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- e) Explain drysdale ac potentiometer with neat diagram.

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- b) Explain Schering Bridge for measurement of unknown capacitance with phasor diagram.
- A bridge consist of the following
   Arm ab: A choke coil having resistance R<sub>1</sub> & inductance L<sub>1</sub>
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   Arm cd: A mica condenser C<sub>4</sub> in series with non-inductive resistance

Arm cd: - A mica condenser  $C_4$  in series with non-inductive resistance  $R_4$ Arm da: - A non-inductive resistance  $R_2$ 

When this bridge fed from a source of 500 Hz, balance is obtained under following conditions

 $R_2$ = 2410 $\Omega$ ,  $R_3$ =750 $\Omega$ ,  $C_4$ = 0.35 $\mu$ F,  $R_4$ = 64.5 $\Omega$ 

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  - 2) Nominal ratio
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- e) Write features of cathode ray tube.

Set Q

12

16

Set Q

12

### Q.5 Attempt any two.

- a) Explain current transformer for measurement of current with equivalent circuit & phasor diagram.
- **b)** Explain ramp type DVM with neat diagram.
- c) Explain in detail block diagram of CRO.

## S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

### ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Marks: 14

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The spring material used in a spring control device should have the 1) following property \_
  - a) Should be non-magnetic
  - b) Most be of low temperature co-efficient
  - c) Should have low specific resistance
  - d) All of the above
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  - a) It has two set of ratio arms which eliminates effect of resistance of connecting lead
  - b) It has a null indicating galvanometer
  - c) It has two null indicator
  - d) It has four sets of ratio arms which eliminates the effect of resistance of connecting lead
- 3) The two pressure coils of a single phase power factor meter have \_\_\_\_\_.
  - a) The same dimensions and the same number of turns
  - The same dimension but different number of turns b)
  - c) The same number of turns but different dimensions
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- 4) Which of following represent active transducer?
  - a) Strain gauge b) Thermistor
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- Electronic voltmeters can be designed to measure \_\_\_\_\_. 5)
  - a) Only very small voltages
  - b) Only very high voltages
  - c) Both very small and very high voltages
  - d) None of these

#### 6) An oscilloscope indicates

- a) Peak to peak value of voltage DC value of voltage b)
- c) RMS value d) Average value
- Q meter is used to measure the properties of \_ 7)
  - a) Inductive coils
  - c) Capacitive coils
- b) Non inductive coils
- d) Both (a) and (c)

# Set

Max. Marks: 70



- 8) For handling greater currents induction Wattcmeters are used in conjunction with
  - a) Potential T/F

c) Power T/F

- b)
  - d) Either of the above
- 9) Digital multimeter is used for
  - Measuring a.c. and d.c. current, voltage and resistance a)
  - Measuring a.c. current and voltage b)
  - c) Measuring d.c. current and resistance
  - d) Measuring a.c. voltage and resistance
- In a CRT focusing anode is located \_ 10)
  - a) Between pre-accelerating and accelerating anode
  - After accelerating anode b)
  - c) Before pre-accelerating anode
  - d) None of the above
- If the instrument is used in wrong manner while application, then it will 11) results in
  - a) Systematic error
- b) Instrument error
- c) Random error d) Environmental error
- 12) instruments arc those which measure the total quantity of electricity delivered in a particular time.
  - Absolute a)

c)

- b) Indicating
- Recording Integrating c) d)
- 13) Potentiometer is used for the measurement of \_\_\_\_\_.
  - a) Linear displacement
  - b) Angular displacement
  - c) Non linear displacement
  - d) Only (a) and (b)
- The largest change in the measured variable which produces no 14) instrument response is known as
  - Threshold a)
    - Dead zone
- b) Dynamic error
- d) None of these

## SLR-FR-46 Set

Current T/F

### Seat No.

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering

ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday,12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All guestions are compulsory.

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

### Q.2 Solve any Four.

- a) With neat sketch explain spring control method.
- **b)** What is mean by standard? Explain types of standard.
- c) The inductance of moving iron instrument is given by
   L = (10 + 5Θ - Θ<sup>2</sup>) μH
   Where Θ is deflection in radian from zero position? The spring constant is
   12 × 10<sup>-6</sup> Nm/rad. Calculate deflection for current of 5A.
   With post sketch explain PMMC instrument
- **d)** With neat sketch explain PMMC instrument.
- e) Explain drysdale ac potentiometer with neat diagram.

### Q.3 Attempt any two.

- a) With neat sketch explain ammeter shunt & voltage multiplier.
- **b)** Explain Schering Bridge for measurement of unknown capacitance with phasor diagram.
- c) A bridge consist of the following Arm ab: - A choke coil having resistance R<sub>1</sub> & inductance L<sub>1</sub> Arm bc: - A non-inductive resistance R<sub>3</sub>
   Arm cd: - A mice condensor C<sub>1</sub> in series with non-inductive resistance

Arm cd: - A mica condenser  $C_4$  in series with non-inductive resistance  $R_4$ Arm da: - A non-inductive resistance  $R_2$ 

When this bridge fed from a source of 500 Hz, balance is obtained under following conditions

 $R_2$ = 2410 $\Omega$ ,  $R_3$ =750 $\Omega$ ,  $C_4$ = 0.35 $\mu$ F,  $R_4$ = 64.5 $\Omega$ 

The series resistance of capacitor is  $0.4\Omega$ .Calculate resistance and inductance(R<sub>1</sub>, L<sub>1</sub>) of choke coil .The supply is connected between a & c and detector is between b & d.

### Q.4 Attempt any four

- a) Explain detail classification of transducers.
- **b)** With help of block diagram explain digital multimeter.
- c) Define the following terms
  - 1) Transformation ratio
  - 2) Nominal ratio
  - 3) Turns ratio
  - 4) Ratio error
- d) Explain electronic energy meter with block diagram.
- e) Write features of cathode ray tube.

ON

R

Max. Marks: 56

12

16

Set R

12

### Q.5 Attempt any two.

- a) Explain current transformer for measurement of current with equivalent circuit & phasor diagram.
- **b)** Explain ramp type DVM with neat diagram.
- c) Explain in detail block diagram of CRO.

Seat	
No.	

S.Y. (B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** 

### ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

**Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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

### MCQ/Objective Type Questions

**Duration: 30 Minutes** 

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) An oscilloscope indicates
  - a) Peak to peak value of voltage b) DC value of voltage
  - c) RMS value d) Average value

#### Q meter is used to measure the properties of \_\_\_\_\_ 2)

- a) Inductive coils b) Non inductive coils
- c) Capacitive coils d) Both (a) and (c)
- 3) For handling greater currents induction Wattcmeters are used in conjunction with
  - a) Potential T/F Current T/F b)
  - c) Power T/F Either of the above d)
- 4) Digital multimeter is used for \_\_\_\_
  - Measuring a.c. and d.c. current, voltage and resistance a)
  - Measuring a.c. current and voltage b)
  - Measuring d.c. current and resistance c)
  - d) Measuring a.c. voltage and resistance

### In a CRT focusing anode is located 5)

- a) Between pre-accelerating and accelerating anode
- b) After accelerating anode
- Before pre-accelerating anode c)
- None of the above d)
- 6) If the instrument is used in wrong manner while application, then it will results in \_\_\_\_.
  - a) Systematic error b) Instrument error
  - c) Random error d) Environmental error
- instruments arc those which measure the total quantity of 7) electricity delivered in a particular time.
  - a) Absolute Indicating b)
  - c) Recording d) Integrating

S Set

Marks: 14

Max. Marks: 70

- 8) Potentiometer is used for the measurement of \_\_\_\_\_.
  - a) Linear displacement
  - b) Angular displacement
  - c) Non linear displacement
  - d) Only (a) and (b)
- 9) The largest change in the measured variable which produces no instrument response is known as \_\_\_\_\_.
  - a) Threshold b)
    - b) Dynamic error

Set

- c) Dead zone d) None of these
- 10) The spring material used in a spring control device should have the following property \_\_\_\_\_.
  - a) Should be non-magnetic
  - b) Most be of low temperature co-efficient
  - c) Should have low specific resistance
  - d) All of the above
- 11) For the measurement of low resistances, Kelvin's double bridge has high accuracy because \_\_\_\_\_.
  - a) It has two set of ratio arms which eliminates effect of resistance of connecting lead
  - b) It has a null indicating galvanometer
  - c) It has two null indicator
  - d) It has four sets of ratio arms which eliminates the effect of resistance of connecting lead
- 12) The two pressure coils of a single phase power factor meter have \_\_\_\_\_.
  - a) The same dimensions and the same number of turns
  - b) The same dimension but different number of turns
  - c) The same number of turns but different dimensions
  - d) None of the above
- 13) Which of following represent active transducer?
  - a) Strain gauge
- b) Thermistor
- d) Thermocouple
- 14) Electronic voltmeters can be designed to measure \_\_\_\_\_.
  - a) Only very small voltages
  - b) Only very high voltages
  - c) Both very small and very high voltages
  - d) None of these

c) LVDT

### Seat No.

S.Y. (B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering

ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday,12-12-2019 Time: 10:00 AM To 01:00 PM

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

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

### Q.2 Solve any Four.

- a) With neat sketch explain spring control method.
- **b)** What is mean by standard? Explain types of standard.
- c) The inductance of moving iron instrument is given by
   L = (10 + 5Θ - Θ<sup>2</sup>) μH
   Where Θ is deflection in radian from zero position? The spring constant is
   12 × 10<sup>-6</sup> Nm/rad. Calculate deflection for current of 5A.
   With post sketch explain PMMC instrument
- **d)** With neat sketch explain PMMC instrument.
- e) Explain drysdale ac potentiometer with neat diagram.

### Q.3 Attempt any two.

- a) With neat sketch explain ammeter shunt & voltage multiplier.
- **b)** Explain Schering Bridge for measurement of unknown capacitance with phasor diagram.
- c) A bridge consist of the following Arm ab: - A choke coil having resistance R<sub>1</sub> & inductance L<sub>1</sub> Arm bc: - A non-inductive resistance R<sub>3</sub>
   Arm cd: - A mice condensor C<sub>1</sub> in series with non-inductive resistance

Arm cd: - A mica condenser  $C_4$  in series with non-inductive resistance  $R_4$ Arm da: - A non-inductive resistance  $R_2$ 

When this bridge fed from a source of 500 Hz, balance is obtained under following conditions

R<sub>2</sub>= 2410Ω, R<sub>3</sub>=750Ω, C<sub>4</sub>= 0.35μF, R<sub>4</sub>= 64.5Ω

The series resistance of capacitor is  $0.4\Omega$ .Calculate resistance and inductance(R<sub>1</sub>, L<sub>1</sub>) of choke coil .The supply is connected between a & c and detector is between b & d.

### Q.4 Attempt any four

- a) Explain detail classification of transducers.
- **b)** With help of block diagram explain digital multimeter.
- c) Define the following terms
  - 1) Transformation ratio
  - 2) Nominal ratio
  - 3) Turns ratio
  - 4) Ratio error
- d) Explain electronic energy meter with block diagram.
- e) Write features of cathode ray tube.

ON

Max. Marks: 56

12

16



12

### Q.5 Attempt any two.

- a) Explain current transformer for measurement of current with equivalent circuit & phasor diagram.
- **b)** Explain ramp type DVM with neat diagram.
- c) Explain in detail block diagram of CRO.

Set S.Y.(B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** 

## **POWER SYSTEM-I**

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
  - 2) Figures to the right indicate full marks.

### **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

1)

Seat

No.

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
  - Out of the following which is conventional source of energy \_\_\_\_\_.
    - a) Tidal power
    - c) Nuclear energy
  - 2) Diversity factor is always \_\_\_\_\_.
    - a) Less than one
    - c) Above one
  - 3) A graphical representation between discharge and time is known as \_\_\_\_. Hectograph

b)

- a) Hydrograph
- c) Topograph d) Monograph
- 4) In hydro power plants \_\_\_\_
  - a) Initial cost is low and operating cost is high
  - b) Initial cost as well as operating costs are high
  - c) Initial cost is high and operating cost is low
  - d) Initial cost as well as operating cost is low
- 5) Capacity factor of power station is
  - a) Maximum demand / average demand
  - b) Average demand on station/maximum demand on station
  - c) Maximum installed capacity of station/average demand of station
  - d) Average demand of station / Maximum installed capacity of station
- 6) Live storage of coal in a power plant means \_\_\_\_\_.
  - a) Coal ready for combustion
  - b) Preheated coal
  - c) Storage of coal sufficient to meet 24 hour demand of the plant
  - d) Coal in transit
- 7) The material used for the manufacture of ground wire is \_\_\_\_\_
  - Galvanized steel a) Aluminium b)
  - c) Cast iron d) stainless steel
- Maximum permissible span for wooden poles is \_ 8)
  - a) upto 80 m b) 100-200m
  - c) 200-300 m d) 300 above

## d) Wind power

b) Geothermal energy

- b) Equal to one
- d) none of them

SLR-FR-47

Ρ

Marks: 14

Max. Marks: 70

- 9) The string efficiency of insulators can be increased by \_\_\_\_\_.
  - a) reducing the number of insulators
  - b) increasing number of insulators
  - c) correct grading of insulators of various capacitance
  - d) changing the orientation of string
- 10) In overhead lines for transmitting power we generally use: \_\_\_\_\_.
  - a) Copper Conductors b) Aluminum Conductors
  - c) ACSR conductors d) Galvanized Steel Conductors
- 11) Transmitted power remaining the same, if supply voltage of a D.C. 2-wire feeder is increased 100 percent, saving in copper is \_\_\_\_\_.
  - a) 25 percent b) 50 percent
  - c) 75 percent d) 100 percent
- 12) Which of the following material can be used as a moderator?
  - a) Graphite b) Heavy water
  - c) Beryllium d) Any of the above
- 13) Transmission and distribution of electric power by underground system is superior to overhead system in respect of \_\_\_\_\_.
  - a) Appearance and public safety
  - b) Maintenance cost
  - c) Frequency of faults, power failure and accidents
  - d) All of the above
- 14) Pin type insulators are generally not used for voltages beyond \_\_\_\_\_.
  - a) 1 kV

- b) 11 Kv
- c) 22 kV d) 33 Kv

Set P

# No.

### S.Y.(B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering POWER SYSTEM-I**

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

### Section-I

### Solve any four Q.2

- a) Define the following terms;
  - Peak load 1)
  - 2) load factor
  - 3) **Diversity factor**
  - Plant utility factor 4)
- **b)** Discuss factors governing the choice of site for Hydro power plant.
- c) With the help of neat sketch explain Gas turbine power plant.
- d) A generating station has a connected load of 43MW and a maximum demand of 20 MW; the units generated being  $61.5 \times 10^6$  per annum Calculate:
  - the demand factor 1)
  - 2) load factor
- e) Draw the layout of solar thermal power plant with neat diagram & explain the operation of main components.

#### Q.3 Solve any two

- a) What is tariff? Explain different types of tariff.
- b) What is function of nuclear reactor? Explain different component in nuclear reactor.
- c) Describe with neat sketch schematic arrangement of thermal power station.

### Section-II

### Solve any four Q.4

- a) Differentiate between overhead and underground system.
- b) What are the methods of improving string efficiency?
- c) What are the properties of conductor used in transmission and distribution line? Describe about ACSR conductor.
- d) Derive equation for conductor material required in 2-wire DC system with one conductor earthed.
- Each line of 3-ph system is suspended by a string of 3 identical insulator of e) self-capacitance C farad. The shunt capacitance of connecting metal work of each insulator is 0.2C to earth and 0.1C to line. Calculate the string efficiency of the system if a guard ring increases the capacitance to the line of metal work of lowest insulator to 0.3C

Max. Marks: 56

12

16

Ρ Set



# SLR-FR-47 Set P

### Q.5 Solve any two

- a) State and explain kelvin's law to determine the economic size of transmission conductor.
- **b)** Derive equation for conductor material required in single phase 2-wire AC with midpoint earthed compare with 2 wire DC system.
- c) In five insulator disc string capacitance between each insulator unit and earth is 1/6 of the mutual capacitance. Find the voltage distribution across each insulator in the string as percentage of voltage of the conductor to earth. Find string efficiency.

## Set S.Y.(B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering POWER SYSTEM-I**

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
  - 2) Figures to the right indicate full marks.

### **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

1)

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
  - Maximum permissible span for wooden poles is \_
  - a) upto 80 m b) 100-200m c) 200-300 m d) 300 above
  - 2) The string efficiency of insulators can be increased by \_\_\_\_\_.
    - a) reducing the number of insulators
    - b) increasing number of insulators
    - correct grading of insulators of various capacitance C)
    - d) changing the orientation of string

### In overhead lines for transmitting power we generally use: \_\_\_\_\_. 3) Aluminum Conductors

- a) Copper Conductors
- c) ACSR conductors **Galvanized Steel Conductors** d)

b)

- Transmitted power remaining the same, if supply voltage of a D.C. 2-wire 4) feeder is increased 100 percent, saving in copper is
  - a) 25 percent 50 percent b) c) 75 percent
    - d) 100 percent
- Which of the following material can be used as a moderator? 5)
  - a) Graphite b) Heavy water
  - Beryllium d) Any of the above c)
- 6) Transmission and distribution of electric power by underground system is superior to overhead system in respect of \_\_\_\_\_.
  - a) Appearance and public safety
  - b) Maintenance cost
  - c) Frequency of faults, power failure and accidents
  - d) All of the above
- 7) Pin type insulators are generally not used for voltages beyond \_\_\_\_\_.
  - a) 1 kV b) 11 Kv
  - 22 kV C) d) 33 Kv
- 8) Out of the following which is conventional source of energy \_\_\_\_\_. a) Tidal power
  - b) Geothermal energy d) Wind power
  - Nuclear energy C)
- Diversity factor is always \_\_\_\_\_. 9) a) Less than one

c) Above one

- b) Equal to one
- d) none of them

SLR-FR-47

Max. Marks: 70

Q



Seat No.

Marks: 14

Set Q

- 10) A graphical representation between discharge and time is known as \_\_\_\_.
  - a) Hydrograph

b) Hectograph

c) Topograph

- d) Monograph
- 11) In hydro power plants \_\_\_\_\_.
  - a) Initial cost is low and operating cost is high
  - b) Initial cost as well as operating costs are high
  - c) Initial cost is high and operating cost is low
  - d) Initial cost as well as operating cost is low
- 12) Capacity factor of power station is \_\_\_\_\_
  - a) Maximum demand / average demand
  - b) Average demand on station / maximum demand on station
  - c) Maximum installed capacity of station / average demand of station
  - d) Average demand of station / Maximum installed capacity of station
- 13) Live storage of coal in a power plant means \_\_\_\_\_.
  - a) Coal ready for combustion
  - b) Preheated coal
  - c) Storage of coal sufficient to meet 24 hour demand of the plant
  - d) Coal in transit
- 14) The material used for the manufacture of ground wire is \_\_\_\_\_.
  - a) Aluminium b) Galvanized steel
  - c) Cast iron d) stainless steel

### Seat No.

### S.Y.(B.Tech.) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering POWER SYSTEM-I**

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

### Section-I

### Solve any four Q.2

- a) Define the following terms;
  - Peak load 1)
  - 2) load factor
  - 3) **Diversity factor**
  - Plant utility factor 4)
- **b)** Discuss factors governing the choice of site for Hydro power plant.
- c) With the help of neat sketch explain Gas turbine power plant.
- d) A generating station has a connected load of 43MW and a maximum demand of 20 MW; the units generated being  $61.5 \times 10^6$  per annum Calculate:
  - the demand factor 1)
  - 2) load factor
- e) Draw the layout of solar thermal power plant with neat diagram & explain the operation of main components.

#### Q.3 Solve any two

- a) What is tariff? Explain different types of tariff.
- b) What is function of nuclear reactor? Explain different component in nuclear reactor.
- c) Describe with neat sketch schematic arrangement of thermal power station.

### Section-II

### Solve any four Q.4

- a) Differentiate between overhead and underground system.
- b) What are the methods of improving string efficiency?
- c) What are the properties of conductor used in transmission and distribution line? Describe about ACSR conductor.
- d) Derive equation for conductor material required in 2-wire DC system with one conductor earthed.
- Each line of 3-ph system is suspended by a string of 3 identical insulator of e) self-capacitance C farad. The shunt capacitance of connecting metal work of each insulator is 0.2C to earth and 0.1C to line. Calculate the string efficiency of the system if a guard ring increases the capacitance to the line of metal work of lowest insulator to 0.3C

Max. Marks: 56

16

12

16



Set

SLR-FR-47

# SLR-FR-47 Set Q

### Q.5 Solve any two

- a) State and explain kelvin's law to determine the economic size of transmission conductor.
- **b)** Derive equation for conductor material required in single phase 2-wire AC with midpoint earthed compare with 2 wire DC system.
- c) In five insulator disc string capacitance between each insulator unit and earth is 1/6 of the mutual capacitance. Find the voltage distribution across each insulator in the string as percentage of voltage of the conductor to earth. Find string efficiency.

Max. Marks: 70

### S.Y.(B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering POWER SYSTEM-I**

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

### **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

Marks: 14

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

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

a) Graphite

- The material used for the manufacture of ground wire is 3)
  - a) Aluminium Galvanized steel b)
  - c) Cast iron d) stainless steel
- 4) Maximum permissible span for wooden poles is \_ a) upto 80 m
  - b) 100-200m
  - c) 200-300 m d) 300 above
- The string efficiency of insulators can be increased by \_\_\_\_\_. 5)
  - a) reducing the number of insulators
  - b) increasing number of insulators
  - c) correct grading of insulators of various capacitance
    - d) changing the orientation of string
- 6) In overhead lines for transmitting power we generally use: \_\_\_\_
  - Copper Conductors Aluminum Conductors b) a)
  - ACSR conductors d) **Galvanized Steel Conductors** C)
- 7) Transmitted power remaining the same, if supply voltage of a D.C. 2-wire feeder is increased 100 percent, saving in copper is \_\_\_\_\_.
  - a) 25 percent 50 percent b)
  - c) 75 percent d) 100 percent
- Which of the following material can be used as a moderator? 8)
  - b) Heavy water
  - Beryllium d) Any of the above c)



 Transmission and distribution of electric power by underground system is superior to overhead system in respect of \_\_\_\_\_.

- a) Appearance and public safety
- b) Maintenance cost
- c) Frequency of faults, power failure and accidents
- d) All of the above

10) Pin type insulators are generally not used for voltages beyond \_\_\_\_\_.

- a) 1 kV b) 11 Kv
- c) 22 kV d) 33 Kv
- 11) Out of the following which is conventional source of energy \_\_\_\_\_.
  - a) Tidal power
- b) Geothermal energy

SLR-FR-47

Set

c) Nuclear energy

a) Less than one

- d) Wind power
- 12) Diversity factor is always \_\_\_\_\_.
- b) Equal to one
- d) none of them
- 13) A graphical representation between discharge and time is known as \_\_\_\_\_.
  - a) Hydrograph

c) Above one

- b) Hectograph
- c) Topograph d) Monograph
- 14) In hydro power plants \_\_\_\_\_.
  - a) Initial cost is low and operating cost is high
  - b) Initial cost as well as operating costs are high
  - c) Initial cost is high and operating cost is low
  - d) Initial cost as well as operating cost is low

### Seat No.

### S.Y.(B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM- I

Day & Date: Saturday,14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

### Section-I

### Q.2 Solve any four

- a) Define the following terms;
  - 1) Peak load
  - 2) load factor
  - 3) Diversity factor
  - 4) Plant utility factor
- **b)** Discuss factors governing the choice of site for Hydro power plant.
- c) With the help of neat sketch explain Gas turbine power plant.
- d) A generating station has a connected load of 43MW and a maximum demand of 20 MW; the units generated being  $61.5 \times 10^6$  per annum Calculate:
  - 1) the demand factor
  - 2) load factor
- e) Draw the layout of solar thermal power plant with neat diagram & explain the operation of main components.

### Q.3 Solve any two

- a) What is tariff? Explain different types of tariff.
- b) What is function of nuclear reactor? Explain different component in nuclear reactor.
- c) Describe with neat sketch schematic arrangement of thermal power station.

### Section-II

### Q.4 Solve any four

- a) Differentiate between overhead and underground system.
- **b)** What are the methods of improving string efficiency?
- c) What are the properties of conductor used in transmission and distribution line? Describe about ACSR conductor.
- d) Derive equation for conductor material required in 2-wire DC system with one conductor earthed.
- e) Each line of 3-ph system is suspended by a string of 3 identical insulator of self-capacitance C farad. The shunt capacitance of connecting metal work of each insulator is 0.2C to earth and 0.1C to line. Calculate the string efficiency of the system if a guard ring increases the capacitance to the line of metal work of lowest insulator to 0.3C

Max. Marks: 56

16

12

16



R

Set

# SLR-FR-47 Set R

### Q.5 Solve any two

- a) State and explain kelvin's law to determine the economic size of transmission conductor.
- **b)** Derive equation for conductor material required in single phase 2-wire AC with midpoint earthed compare with 2 wire DC system.
- c) In five insulator disc string capacitance between each insulator unit and earth is 1/6 of the mutual capacitance. Find the voltage distribution across each insulator in the string as percentage of voltage of the conductor to earth. Find string efficiency.
# Seat S.Y.(B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering POWER SYSTEM-I**

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
  - 2) Figures to the right indicate full marks.

### **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

1)

No.

- Choose the correct alternatives from the options and rewrite the sentence. Q.1 14
  - In overhead lines for transmitting power we generally use:
    - a) Copper Conductors b) c) ACSR conductors d)
- **Aluminum Conductors Galvanized Steel Conductors** 
  - Transmitted power remaining the same, if supply voltage of a D.C. 2-wire 2) feeder is increased 100 percent, saving in copper is
    - a) 25 percent b) 50 percent c) 75 percent
      - 100 percent d)
  - 3) Which of the following material can be used as a moderator?
    - Graphite b) Heavy water a) Beryllium
  - d) Any of the above C) Transmission and distribution of electric power by underground system is 4)
    - superior to overhead system in respect of .
    - a) Appearance and public safety
    - b) Maintenance cost
    - c) Frequency of faults, power failure and accidents
    - d) All of the above
  - 5) Pin type insulators are generally not used for voltages beyond \_\_\_\_\_.
    - a) 1 kV b) 11 Kv
    - c) 22 kV

6) Out of the following which is conventional source of energy \_\_\_\_\_ b) Geothermal energy

- a) Tidal power
- c) Nuclear energy
- 7) Diversity factor is always \_\_\_\_
  - a) Less than one
  - c) Above one d) none of them
- A graphical representation between discharge and time is known as \_\_\_\_. 8)
  - a) Hvdrograph Hectograph b) c) Topograph d) Monograph
- 9) In hydro power plants
  - a) Initial cost is low and operating cost is high
  - b) Initial cost as well as operating costs are high
  - c) Initial cost is high and operating cost is low
  - d) Initial cost as well as operating cost is low



Max. Marks: 70

Marks: 14



d) Wind power

b) Equal to one

d) 33 Kv

#### 10) Capacity factor of power station is \_\_\_\_

- a) Maximum demand I average demand
- b) Average demand on station / maximum demand on station
- c) Maximum installed capacity of station/average demand of station
- d) Average demand of station / Maximum installed capacity of station
- 11) Live storage of coal in a power plant means \_\_\_\_\_.
  - a) Coal ready for combustion
  - b) Preheated coal
  - c) Storage of coal sufficient to meet 24 hour demand of the plant
  - d) Coal in transit
- 12) The material used for the manufacture of ground wire is \_\_\_\_\_.
  - a) Aluminium b) Galvanized steel
  - c) Cast iron d) stainless steel
- 13) Maximum permissible span for wooden poles is \_\_\_\_\_.
  - a) upto 80 m b) 100-200m
    - c) 200-300 m d) 300 above
- 14) The string efficiency of insulators can be increased by \_\_\_\_\_.
  - a) reducing the number of insulators
  - b) increasing number of insulators
  - c) correct grading of insulators of various capacitance
  - d) changing the orientation of string

SLR-FR-47

Set S

# Seat No.

### S.Y.(B.Tech.) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM- I

Day & Date: Saturday,14-12-2019 Time: 10:00 AM To 01:00 PM

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

2) Figures to the right indicate full marks.

### Section-I

### Q.2 Solve any four

- a) Define the following terms;
  - 1) Peak load
  - 2) load factor
  - 3) Diversity factor
  - 4) Plant utility factor
- **b)** Discuss factors governing the choice of site for Hydro power plant.
- c) With the help of neat sketch explain Gas turbine power plant.
- d) A generating station has a connected load of 43MW and a maximum demand of 20 MW; the units generated being  $61.5 \times 10^6$  per annum Calculate:
  - 1) the demand factor
  - 2) load factor
- e) Draw the layout of solar thermal power plant with neat diagram & explain the operation of main components.

#### Q.3 Solve any two

- a) What is tariff? Explain different types of tariff.
- b) What is function of nuclear reactor? Explain different component in nuclear reactor.
- c) Describe with neat sketch schematic arrangement of thermal power station.

#### Section-II

### Q.4 Solve any four

- a) Differentiate between overhead and underground system.
- **b)** What are the methods of improving string efficiency?
- c) What are the properties of conductor used in transmission and distribution line? Describe about ACSR conductor.
- d) Derive equation for conductor material required in 2-wire DC system with one conductor earthed.
- e) Each line of 3-ph system is suspended by a string of 3 identical insulator of self-capacitance C farad. The shunt capacitance of connecting metal work of each insulator is 0.2C to earth and 0.1C to line. Calculate the string efficiency of the system if a guard ring increases the capacitance to the line of metal work of lowest insulator to 0.3C

Max. Marks: 56

12

16



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# SLR-FR-47 Set S

#### Q.5 Solve any two

- a) State and explain kelvin's law to determine the economic size of transmission conductor.
- **b)** Derive equation for conductor material required in single phase 2-wire AC with midpoint earthed compare with 2 wire DC system.
- c) In five insulator disc string capacitance between each insulator unit and earth is 1/6 of the mutual capacitance. Find the voltage distribution across each insulator in the string as percentage of voltage of the conductor to earth. Find string efficiency.

Day a Time	& Date : 10:00	e: Tu 0 AN	esday,17-12-2019 1 To 01:00 PM		Max.	Marks: 70
Instr	uctior	n <b>s:</b> 1 2	) Q. No. 1 is compulsory and sh Book. 2) Assume suitable data if neces	nould	l be solved in first 30 minutes	in answer
			MCQ/Objective T	vne	Questions	
Dura	tion: 3	80 Mi	nutes	JPC		Marks: 14
Q.1	<b>Choo</b> 1)	ose t A T a)	the correct alternatives from the ransporter is said in quiescent of the signal is given	h <b>e o</b> condi b)	ptions. ition when No current flowing through it	14
	2)	The a) c)	Bipolar Unijunction	b) d)	Unipolar None of above	
	3)	DC a) b) c) d)	load line is nothing but collection of all possible 'Q' point a line drawn on CE O/P charact a line whose slope depend on all of the above	ints cteris R <sub>C</sub>	tic	
	4)	The a) c)	e parameter h <sub>je</sub> is calledi Forward voltage gain Forward trans conductance	in CE b) d)	E. Forward current gain Forward power gain	
	5)	Higl a) c)	h frequency response of transis C <sub>c</sub> Junction Capacitance	toriz b) d)	ed amplifies get affected by $\_ C_c \& L_E \\ C_E$	
	6)	In J a) b) c) d)	FET operating above pinch- off Drain current remains practical Drain current starts decreasing Drain current increases rapidly Depletion region becomes small	volta Ily co J aller	age Instant	
	7)	Whi a) c)	ich of following filter circuit is ha L LC	iving b) d)	ripple independent of load? C CLC	
	8)	The a) c)	e effect of negative feedback on gain increased same	gain b) d)	is that it Decreases none of above	
	9)	The a)	e IC 7915 is Transistor Positive 15 V regulator	b)	MOSFET	

## Seat No.

Page **1** of **12** 

# SLR-FR-48

- c) Positive 15 V regulator
- d) Negative 15 V regulator

Set Ρ S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRONIC DEVICES AND CIRCUITS

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- 10) The transformer coupled class A power amplifies has a efficiency of \_\_\_\_\_.
  - a) 25% b) 50%
  - c) 78.5% d) 90%

#### 11) Cross over distortions occurs in \_\_\_\_\_.

- a) Class A b) Class B
  - c) Class AB d) Class C

12) For sustained oscillation in an oscillator loop gain should be \_\_\_\_\_.

- a) zero b) less than unity
- c) greater than unity
- 13) A transistor Hartley oscillator uses \_
  - a) Resistive feedback b) Inductive feedback
  - c) Capacitive feedback d) None of the above

d) infinite

b) Square

### 14) UJT relaxation is a \_\_\_\_\_ oscillator.

- a) Sinusoidal
- c) Non sinusoidal d) None of above

# Seat No.

## S.Y. (B.Tech) (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

### Section – I

#### Q.2 Solve any four.

- Draw and explain AC & DC equivalent circuit of CE amplifier. a)
- Explain on which factors frequency response of amplifier depends. b)
- c) How the *h* parameters is determined using graphical method.
- Differentiate between depletion & enhancement type MOSFET. d)
- Explain any one compensation techniques for  $Ic_0$ . e)

#### Q.3 Solve any two.

a) Determine Q point and 'S' for following circuit.

- Derive the  $A_v$ ,  $A_i$ ,  $R_o$ ,  $R_i$  in h parameters for CE amplifier. b)
- What do you understand by Biasing? Why different Biasing circuits are c) employed? How do you determine the best biasing circuit?

#### Section – II

#### Q.4 Solve any four.

- Compare L, C,  $\Pi$ , LC filter? a)
- Compare fixed & variable voltage regulator IC b)
- c) Discuss Advantage & Disadvantage of Negative feedback
- Differentiate Low signal & larger signal amplifier d)
- Draw UJT construction & characteristic e)

#### Q.5 Solve any two.

- Compare voltage series, current series, current shunt feedback circuits. a)
- Determine efficiency of class 'A' power Amplifier & class 'B' power amplifier. b)
- Explain various sinusoidal & non sinusoidal oscillators with circuit and c) waveforms.





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Max. Marks: 56

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Seat No.						Set	Q
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Day & Time:	Date 10:00	: Tuesday,17-12 AM To 01:00 F	2-2019 PM		Ma	k. Mark	s: 70
Instru	ction	<b>s:</b> 1) Q. No. 1 is Book. 2) Assume s	s compulsory and sl uitable data if neces	noulo ssary	d be solved in first 30 minute /.	s in ans	wer
		Ν	ACQ/Objective	Γνρε	e Questions		
Durati	on: 30	) Minutes	<b>,</b>	71	•••••	Mark	s: 14
Q.1	<b>Choo</b> 1)	se the correct The effect of ne a) gain increa c) same	alternatives from t egative feedback on sed	t <b>he c</b> gair b) d)	p <b>tions.</b> is that it Decreases none of above		14
:	2)	The IC 7915 is a) Transistor c) Positive 15	V regulator	b) d)	MOSFET Negative 15 V regulator		
	3)	The transforme a) 25% c) 78.5%	r coupled class A p	owei b) d)	amplifies has a efficiency of 50% 90%		·
	4)	Cross over dist a) Class A c) Class AB	ortions occurs in	 b) d)	Class B Class C		
!	5)	For sustained c a) zero c) greater tha	oscillation in an osci n unity	llatoı b) d)	<sup>.</sup> loop gain should be less than unity infinite		
	6)	A transistor Ha a) Resistive fe c) Capacitive	rtley oscillator uses eedback feedback	b) d)	 Inductive feedback None of the above		
-	7)	UJT relaxation a) Sinusoidal c) Non sinuso	is a oscillato bidal	r. b) d)	Square None of above		
ł	8)	A Transporter is a) It is unbias c) No signal is	s said in quiescent o ed s given	cond b) d)	ition when No current flowing through i None of these	t	
9	9)	The JFET is a) Bipolar c) Unijunction	device.	b) d)	Unipolar None of above		
	10)	DC load line is a) collection c b) a line draw c) a line whos d) all of the at	nothing but of all possible 'Q' po n on CE O/P charac se slope depend on pove	ints cteris R <sub>C</sub>	stic		

SLR-FR-48 Set Q

- 11) The parameter  ${\rm h}_{je}$  is called \_\_\_\_\_ in CE.
  - a) Forward voltage gain
- b) Forward current gain
- c) Forward trans conductance d) Forward power gain
- 12) High frequency response of transistorized amplifies get affected by \_\_\_\_\_.
  - a)  $C_c$  b)  $C_c \& L_E$
  - c) Junction Capacitance d)  $C_E$
- 13) In JFET operating above pinch- off voltage
  - a) Drain current remains practically constant
  - b) Drain current starts decreasing
  - c) Drain current increases rapidly
  - d) Depletion region becomes smaller
- 14) Which of following filter circuit is having ripple independent of load?
  - a) L b) C
  - c) LC d) CLC

# Seat No.

## S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

### Section - I

#### Q.2 Solve any four.

- Draw and explain AC & DC equivalent circuit of CE amplifier. a)
- Explain on which factors frequency response of amplifier depends. b)
- C) How the *h* parameters is determined using graphical method.
- Differentiate between depletion & enhancement type MOSFET. d)
- Explain any one compensation techniques for  $Ic_0$ . e)

#### Q.3 Solve any two.

a) Determine Q point and 'S' for following circuit.

- Derive the  $A_v$ ,  $A_i$ ,  $R_o$ ,  $R_i$  in *h* parameters for CE amplifier. b)
- What do you understand by Biasing? Why different Biasing circuits are c) employed? How do you determine the best biasing circuit?

#### Section – II

#### Q.4 Solve any four.

- Compare L, C,  $\Pi$ , LC filter? a)
- Compare fixed & variable voltage regulator IC b)
- C) Discuss Advantage & Disadvantage of Negative feedback
- Differentiate Low signal & larger signal amplifier d)
- Draw UJT construction & characteristic e)

#### Q.5 Solve any two.

- Compare voltage series, current series, current shunt feedback circuits. a)
- Determine efficiency of class 'A' power Amplifier & class 'B' power amplifier. b)
- Explain various sinusoidal & non sinusoidal oscillators with circuit and c) waveforms.

Max. Marks: 56

12

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1101	S.Y.	(B.	Tech) (Par	rt – I) (N	ew) (CB	CS)	Examination Nov/Dec	-2019	
		·		Éleo	trical E	ngir	neering		
Day &	& Date		esday,17-12/ 1 To 01:00 P	2-2019 M		-23	AND CIRCOILS Ma	x. Mark	s: 70
Instru	uction	า <b>ร:</b> 1	I) Q. No. 1 is Book.	compuls	ory and sh	noulo	d be solved in first 30 minute	s in ans	wer
		2				vna Vna	Questions		
Durat	ion: 3	0 M	inutes		jective i	урс		Mark	s: 14
Q.1	Choo 1)	b <b>se</b> Hig a) c)	the correct a h frequency C <sub>c</sub> Junction Ca	alternativ response apacitanc	<b>ves from t</b> of transis e	he d toriz b) d)	pptions. ed amplifies get affected by $C_c \& L_E \\ C_E$		
	2)	In J a) b) c) d)	IFET operation Drain current Drain current Drain current Depletion re	ng above nt remain nt starts o nt increas egion bec	pinch- off s practical decreasing ses rapidly comes sma	volt Ily co I	age onstant		
	3)	Wh a) c)	ich of followi L LC	ng filter o	ircuit is ha	ving b) d)	ripple independent of load? C CLC		
	4)	The a) c)	e effect of ne gain increas same	gative fee sed	edback on	gair b) d)	n is that it Decreases none of above		
	5)	The a) c)	e IC 7915 is Transistor Positive 15	 V regulat	or	b) d)	MOSFET Negative 15 V regulator		
	6)	The a) c)	e transformei 25% 78.5%	r coupled	class A po	owei b) d)	amplifies has a efficiency o 50% 90%	f	_·
	7)	Cro a) c)	oss over disto Class A Class AB	ortions oc	curs in	 b) d)	Class B Class C		
	8)	For a) c)	<sup>-</sup> sustained o zero greater thai	scillation n unity	in an oscil	latoi b) d)	loop gain should be less than unity infinite		
	9)	A tı a) c)	ransistor Har Resistive fe Capacitive	tley oscill edback feedback	ator uses	b) d)	 Inductive feedback None of the above		
	10)	UJ <sup>-</sup> a) c)	T relaxation i Sinusoidal Non sinuso	s a idal	_ oscillatoi	r. b) d)	Square None of above		

#### Page **7** of **12**

- A Transporter is said in quiescent condition when \_\_\_\_\_. 11)
  - a) It is unbiased
  - c) No signal is given
- b) No current flowing through it

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- d) None of these
- The JFET is \_\_\_\_\_ device. 12)
  - a) Bipolar

13)

c) Unijunction

- b) Unipolar d) None of above
- DC load line is nothing but \_\_\_\_
- a) collection of all possible 'Q' points
- b) a line drawn on CE O/P characteristic
- c) a line whose slope depend on R<sub>c</sub>
- d) all of the above
- 14) The parameter  $h_{ie}$  is called \_\_\_\_\_ in CE.
  - a) Forward voltage gain
  - c) Forward trans conductance d) Forward power gain
- b) Forward current gain

# Seat No.

## S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

### Section - I

#### Q.2 Solve any four.

- Draw and explain AC & DC equivalent circuit of CE amplifier. a)
- Explain on which factors frequency response of amplifier depends. b)
- C) How the *h* parameters is determined using graphical method.
- Differentiate between depletion & enhancement type MOSFET. d)
- Explain any one compensation techniques for  $Ic_0$ . e)

#### Q.3 Solve any two.

a) Determine Q point and 'S' for following circuit.

- Derive the  $A_v$ ,  $A_i$ ,  $R_o$ ,  $R_i$  in *h* parameters for CE amplifier. b)
- What do you understand by Biasing? Why different Biasing circuits are c) employed? How do you determine the best biasing circuit?

#### Section – II

#### Q.4 Solve any four.

- Compare L, C,  $\Pi$ , LC filter? a)
- Compare fixed & variable voltage regulator IC b)
- C) Discuss Advantage & Disadvantage of Negative feedback
- Differentiate Low signal & larger signal amplifier d)
- Draw UJT construction & characteristic e)

#### Q.5 Solve any two.

- Compare voltage series, current series, current shunt feedback circuits. a)
- Determine efficiency of class 'A' power Amplifier & class 'B' power amplifier. b)
- Explain various sinusoidal & non sinusoidal oscillators with circuit and c) waveforms.



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Max. Marks: 56

12



16

Seat No.						Set	S
S	6.Y. (B.T	ech) (Par	t – I) (New) (CB	CS)	Examination Nov/Dec-2	019	
			Electrical Er	ngir	neering		
Day &	Date: Tue	ELEC sday,17-12 To 01:00 P	-2019	-E9	AND CIRCUITS Max.	Marks	s: 70
Instruc	ctions: 1)	Q. No. 1 is	compulsory and sh	noulc	be solved in first 30 minutes	in ans	wer
	Book.						
	2)	Assume su	uitable data if neces	sary			
Duratio	n: 30 Min	N Nutes	ICQ/Objective I	уре	Questions	Marke	s· 1∆
	Choose th		altornativos from t	ho c	ontions	Mark	<b>1</b>
<b>Q.1</b> C	() The a) 2 c) 5	transformer 25% 78.5%	coupled class A po	b) d)	amplifies has a efficiency of _ 50% 90%		14 
2	2) Cros a) ( c) (	s over disto Class A Class AB	ortions occurs in	b) d)	Class B Class C		
3	3) Fors a) 2 c) (	sustained o zero greater thar	scillation in an oscil n unity	lator b) d)	loop gain should be less than unity infinite		
4	l) A tra a) l c) (	Insistor Har Resistive fe Capacitive f	tley oscillator uses edback feedback	b) d)	 Inductive feedback None of the above		
5	5) UJT a) 5 c) I	relaxation i Sinusoidal Non sinuso	s a oscillator idal	b) d)	Square None of above		
6	6) A Tra a) I c) I	ansporter is It is unbiase No signal is	s said in quiescent c ed given	ond b) d)	ition when No current flowing through it None of these		
7	7) The a) E c) l	JFET is Bipolar Unijunction	device.	b) d)	Unipolar None of above		
8	3) DC lo a) o b) a c) a d) a	oad line is r collection of a line drawr a line whose all of the ab	nothing but f all possible 'Q' poi n on CE O/P charac e slope depend on ove	nts teris R <sub>C</sub>	stic		
g	9) The a) I c) I	parameter I Forward vol Forward tra	h <sub>je</sub> is called i ltage gain ns conductance	n CE b) d)	E. Forward current gain Forward power gain		
1	0) High a) ( c) 、	frequency C <sub>c</sub> Junction Ca	response of transis	toriz b) d)	ed amplifies get affected by $\{C_c} \& L_E \\ C_E$		

SLR-FR-48 Set S

- 11) In JFET operating above pinch- off voltage
  - a) Drain current remains practically constant
  - b) Drain current starts decreasing
  - c) Drain current increases rapidly
  - d) Depletion region becomes smaller

#### 12) Which of following filter circuit is having ripple independent of load?

- a) L b) C
- c) LC d) CLC

### 13) The effect of negative feedback on gain is that it \_\_\_\_\_.

- a) gain increased
- b) Decreases
- d) none of above
- 14) The IC 7915 is \_\_\_\_\_.
  - a) Transistor

c) same

- c) Positive 15 V regulator
- b) MOSFET
- d) Negative 15 V regulator

## Seat No.

## S.Y. (B.Tech) (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

### Section – I

#### Q.2 Solve any four.

- Draw and explain AC & DC equivalent circuit of CE amplifier. a)
- Explain on which factors frequency response of amplifier depends. b)
- c) How the *h* parameters is determined using graphical method.
- Differentiate between depletion & enhancement type MOSFET. d)
- Explain any one compensation techniques for  $Ic_0$ . e)

#### Q.3 Solve any two.

a) Determine Q point and 'S' for following circuit.

- Derive the  $A_v$ ,  $A_i$ ,  $R_o$ ,  $R_i$  in *h* parameters for CE amplifier. b)
- What do you understand by Biasing? Why different Biasing circuits are c) employed? How do you determine the best biasing circuit?

#### Section – II

#### Q.4 Solve any four.

- Compare L, C,  $\Pi$ , LC filter? a)
- Compare fixed & variable voltage regulator IC b)
- C) Discuss Advantage & Disadvantage of Negative feedback
- Differentiate Low signal & larger signal amplifier d)
- Draw UJT construction & characteristic e)

#### Q.5 Solve any two.

- Compare voltage series, current series, current shunt feedback circuits. a)
- Determine efficiency of class 'A' power Amplifier & class 'B' power amplifier. b)
- Explain various sinusoidal & non sinusoidal oscillators with circuit and c) waveforms.

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Max. Marks: 56

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Seat No.								Set	Ρ
F. `	Y. (B E	.Tec ENG	ch.) (Semo	ester – I) (N G PHYSICS	New) (CE 5 — I / EN	BC: IGI	S) Examination Nov NEERING PHYSICS	/Dec-201 5 – II	9
Day & Time:	& Date : 10:0	e: Mo 0 AN	onday, 16-1: 1 To 01:00 F	2-2019 PM			Ν	/lax. Marks	: 70
Instru	uctio	<b>ns:</b> 1	) Q. No. 1 is book.	s compulsory	. It should	be	solved in first 30 minute	s in Answe	).
Cons	tants	2 3 3 3) 3)	<ol> <li>Figures to</li> <li>Make suit</li> <li>Avogadro's</li> <li>Velocity of I</li> <li>Charge of e</li> </ol>	the right indi able assumpt no., N= 6.02 ight, c = 3 x 1 lectron, e = 1	icate full n tions, if ne x $10^{26}$ / k. $0^8$ m/sec. .6 x $10^{-19}$	narł eces mol C.	ks. ssary.		
Dura				MCQ/Obje	ctive Typ	e Q	uestions	Maulus	
Durat	ion: 3		nutes		<b>,</b> ,			Marks	: 14
Q.1	Choo 1)	ose t The	he correct band dan e	alternatives	trom the	opt nate	tions.		14
	• ,	a) c)	0.3 eV 1.1 eV		b d	)  )	0.2 eV 1.3 eV		
	2)	The	packing de	nsity of a BC	C structur	e is			
		a) c)	$\pi/6$ $\sqrt{2\pi/6}$		a b	)  )	$\sqrt{3\pi/8}$ 8/ $\sqrt{3\pi}$		
	3)	, The as _	relation bet	ween inter pl	anner spa	, acin	g (d) and edge length (a	) is given	
		a) c)	$d = a / (h^2 - d) = a / (\sqrt{h^2})$	+ k <sup>2</sup> + l <sup>2</sup> ) <sup>2</sup> + k <sup>2</sup> + l <sup>2</sup> )	b d	)  )	$a = d / (\sqrt{h^2 + k^2 + l^2})$ a = d / (h <sup>2</sup> + k <sup>2</sup> + l <sup>2</sup> )		
	4)	Opti a) c)	imum revert 0.5 to 1 sec 1 to 2 seco	peration time cond and	for speec b d	h is )  )	0 to 1 second Above 5 second		
	5)	, The	sound wave	es with freque	ency less	, thai	n 20 Hz are called		
		a) c)	Audible wa Ultrasonic	ves waves	b d	)  )	Infrasonic waves Above all		
	6)	Tim a) c)	e dilation ec t = to/ $\sqrt{1-v^2}$ t = to/(1-v <sup>2</sup> /	luation is give /c <sup>2</sup> ć <sup>2</sup> )	en by b d	 ))  )	$t = to/\sqrt{1+v^2/c^2}$ $t = to/\sqrt{1-c^2/v^2}$		
	7)	The	Einstein's r	nass energy	relation is	giv	en by,		
	,	a) c)	M=Ec <sup>2</sup> E=moc <sup>2</sup>	0.	b d	)  )	$C=mE^2$ $E=mc^2$		
	8)	The a) c)	grating con No. of lines 2.54/no. of	stant is given s per cm lines per cm	n by the eo I	quat c) d)	tion No. of lines per inch 1/no. of lines per cm		
	9)	For a) c)	negative cry μο > μe μο < μe	/stal	b d	)  )	$\mu o = \mu e$ None of these		



a) (a, b)b) (a, a)c) (a, 0)d) (0, b)

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## F. Y. (B.Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019 ENGINEERING PHYSICS – I / ENGINEERING PHYSICS – II

Day & Date: Monday, 16-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Make suitable assumptions, if necessary.

2) Figures to the right indicate full marks.

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

- 2) Velocity of light,  $c = 3 \times 10^8$  m/sec.
  - 3) Charge of electron,  $e = 1.6 \times 10^{-19} C$ .

### Section – I

### Q.2 Attempt any six of the following :

- a) Explain effect of impurity on Fermi level in case of N type semiconductor.
- b) Explain classification of solids.
- c) Define co-ordination number. Obtain co- ordination number for SC and FCC.
- d) Define atomic packing factor. Calculate packing factor for BCC and FCC.
- e) Define the terms:
  - 1) Reverberation
  - 2) Reverberation Time
  - 3) Absorption coefficient
- f) Deduce Einstein's expression for mass-energy equivalence.
- **g)** A movie theater has a total volume of 40x20x10 m<sup>3</sup>. The acoustics of the theater needs to be designed to give reverberation time of 2 s. Calculate:
  - 1) Total absorption
  - 2) Average absorption within the theater
- **h)** A rod has length 100 cm. When the rod is in a satellite moving with a velocity that is one half of the velocity of light relative to laboratory. What is the length of the rod as determined by an observer?
  - 1) in the satellite
  - 2) in the laboratory

### Q.3 Attempt any two of the following:

a) In a Hall experiment, a current of 0.25 A is sent through a metal strip having thickness 0.2mm and width 5 mm. The Hall voltage is found to be 0.15 mV when a magnetic field of 0.2 Tesla is used. Given conductivity of metal is  $\sigma = 5.8 \times 10^7$ /ohm.m

Calculate:

- 1) Hall coefficient
- 2) Carrier concentration
- 3) Mobility of charge carrier
- b) Explain the term Miller indices. Derive the relation between lattice constant & interplaner spacing for cubic crystal.
- c) State and explain the factors affecting the architectural acoustics and their remedies.
- d) Derive the expression for Lorentz transformation equations & its inverse.

Max. Marks: 56

Set

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### Section – II

### Q.4 Attempt any six of the following :

- a) Explain positive and negative crystals.
- **b)** Write different properties of lasers.
- c) Give applications of LASER in different fields.
- **d)** Write advantages of optical fiber cables.
- e) Explain De Broglie wavelength of matter waves and also express it in terms of kinetic energy.
- f) Explain classification of carbon nano tubes.
- g) Find the De Broglies Wavelength of a 0.5 kg object moving with a speed of 2 m/s. Given  $h = h = 6.634 \times 10^{-34}$  J.s.
- h) Calculate the rotation produced by plane of polarization, if specific rotation is 66<sup>0</sup>. Length of tube is 200 mm & concentration of sugar solution is 20%.

### Q.5 Attempt any two of the following :

- **a)** With neat diagram explain construction and working of Laurent's half shade.
- **b)** Describe He-Ne laser with its construction and working.
- c) A fiber cable has an acceptance angle of 30° and a core index of refraction 1.4. calculate:
  - 1) the refractive index of the cladding
  - 2) Numerical aperture
  - 3) Fractional refractive index change
- d) Explain in detail Davisson Germer experiment.

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# SLR-FR-5 Set P

Seat No.								Set	Q
F. `	Y. (B E	.Teo ENG	ch.) (Seme INEERING	ester – I) (N 3 PHYSICS	lew) (0 5 — I / E	BC: NGI	S) Examination No NEERING PHYSIC	ov/Dec-20′ S – II	19
Day & Time:	& Date 10:0	e: Mo 0 AN	onday, 16-12 1 To 01:00 F	2-2019 PM				Max. Marks	s: 70
Instru	uctio	<b>ns:</b> 1	) Q. No. 1 is	s compulsory.	It shou	ld be	solved in first 30 minu	tes in Answe	ər
Cons	tants	2 3 3 2) 3)	2) Figures to 3) Make suita Avogadro's Velocity of li Charge of e	the right indiable assumpt no., N= $6.02$ ight, c = $3 \times 1$ lectron, e = $1$	cate full ions, if r x 10 <sup>26</sup> /I 0 <sup>8</sup> m/se .6 x 10 <sup>-1</sup>	marł neces k.mol c. <sup>9</sup> C.	ks. sary.		
Dura				MCQ/Obje	ctive Ty	pe Q	uestions	Manlar	
Durat	ion: 3			- 11	f			Marks	5:14
Q.1	1)	<b>se τ</b> The a) c)	grating con No. of lines 2.54/no. of	alternatives stant is given s per cm lines per cm	by the	e op equat b) d)	tions. tion No. of lines per inch 1/no. of lines per cm		14
	2)	For a) c)	negative cry μο > μe μο < μe	/stal		b) d)	$\mu o = \mu e$ None of these		
	3)	Stin a) c)	nulated emis $A + h\gamma \rightarrow A$ $A^* \rightarrow A + b$	sion process A* hγ	is repre	esente b) d)	ed by equation $A^* + h\gamma \rightarrow A + 2h\gamma$ $A^* + h\gamma \rightarrow A + h\gamma$	/	
	4)	The tran a) c)	process o sfer it into th electrical d Pumping	f supplying e ne state of po ischarge	energy pulation	to th inve b) d)	e laser medium with rsion is known as Lasing action Depumping	a view of 	
	5)	In g a) b) c) d)	raded index Uniform Increase to Less than o None of the	optical fibre t wards the axi cladding refra	the refra is of cor ctive inc	ictive e lex	index of core is		
	6)	The a)	acceptance $\sin^{-1}(n_1^2 -$	e angle θo is $n_2^2$ )	naving th	ne va b)	lue equal to $\sin^{-1}(n_1^2 + n_2^2)$		
		c)	$\sin^{-1}\sqrt{(n_1^2)}$	$-n_2^2$		d)	$\sin(n_1^2 - n_2^2)$		
	7)	The a) c)	chirality of ( (a, b) (a, 0)	nelical CNT is	S	b) d)	(a, a) (0, b)		
	8)	The a) c)	band gap e 0.3 eV 1.1 eV	nergy of Si is	approx	imate b) d)	ly 0.2 eV 1.3 eV		

**SLR-FR-5** Set The packing density of a BCC structure is \_\_\_\_\_. 9) a)  $\pi/6$  $\sqrt{3\pi/8}$ b) c)  $\sqrt{2\pi/6}$ d)  $8/\sqrt{3\pi}$ The relation between inter planner spacing (d) and edge length (a) is given 10) as a)  $d = a / (h^2 + k^2 + l^2)$  $a = d / (\sqrt{h^2 + k^2 + l^2})$ b)  $a = d / (h^2 + k^2 + l^2)$ c)  $d = a / (\sqrt{h^2 + k^2 + l^2})$ d) 11) Optimum reverberation time for speech is \_ a) 0.5 to 1 second 0 to 1 second b) 1 to 2 second c) d) Above 5 second 12) The sound waves with frequency less than 20 Hz are called \_\_\_\_\_. a) Audible waves b) Infrasonic waves Ultrasonic waves d) Above all c) Time dilation equation is given by \_\_\_\_ 13) a)  $t = to/\sqrt{1-v^2/c^2}$ b)  $t = to/\sqrt{1+v^2/c^2}$ c)  $t = to/(1-v^2/c^2)$  $t = to/\sqrt{1-c^2/v^2}$ d) 14) The Einstein's mass energy relation is given by, \_\_\_\_  $C=mE^2$  $M = Ec^2$ a) b) E=mc<sup>2</sup> E=moc<sup>2</sup> c) d)

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# F. Y. (B.Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019 ENGINEERING PHYSICS – I / ENGINEERING PHYSICS – II

Day & Date: Monday, 16-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Make suitable assumptions, if necessary.

2) Figures to the right indicate full marks.

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

- 2) Velocity of light,  $c = 3 \times 10^8$  m/sec.
  - 3) Charge of electron,  $e = 1.6 \times 10^{-19} C$ .

# Section – I

# Q.2 Attempt any six of the following :

- a) Explain effect of impurity on Fermi level in case of N type semiconductor.
- **b)** Explain classification of solids.
- c) Define co-ordination number. Obtain co- ordination number for SC and FCC.
- d) Define atomic packing factor. Calculate packing factor for BCC and FCC.
- e) Define the terms:
  - 1) Reverberation
  - 2) Reverberation Time
  - 3) Absorption coefficient
- f) Deduce Einstein's expression for mass-energy equivalence.
- g) A movie theater has a total volume of 40x20x10 m<sup>3</sup>. The acoustics of the theater needs to be designed to give reverberation time of 2 s. Calculate:
  - 1) Total absorption
  - 2) Average absorption within the theater
- **h)** A rod has length 100 cm. When the rod is in a satellite moving with a velocity that is one half of the velocity of light relative to laboratory. What is the length of the rod as determined by an observer?
  - 1) in the satellite
  - 2) in the laboratory

# Q.3 Attempt any two of the following:

a) In a Hall experiment, a current of 0.25 A is sent through a metal strip having thickness 0.2mm and width 5 mm. The Hall voltage is found to be 0.15 mV when a magnetic field of 0.2 Tesla is used. Given conductivity of metal is  $\sigma = 5.8 \times 10^7$ /ohm.m

Calculate:

- 1) Hall coefficient
- 2) Carrier concentration
- 3) Mobility of charge carrier
- b) Explain the term Miller indices. Derive the relation between lattice constant & interplaner spacing for cubic crystal.
- c) State and explain the factors affecting the architectural acoustics and their remedies.
- d) Derive the expression for Lorentz transformation equations & its inverse.

Max. Marks: 56

Set

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### Section – II

### Q.4 Attempt any six of the following :

- a) Explain positive and negative crystals.
- **b)** Write different properties of lasers.
- c) Give applications of LASER in different fields.
- d) Write advantages of optical fiber cables.
- e) Explain De Broglie wavelength of matter waves and also express it in terms of kinetic energy.
- f) Explain classification of carbon nano tubes.
- g) Find the De Broglies Wavelength of a 0.5 kg object moving with a speed of 2 m/s. Given  $h = h = 6.634 \times 10^{-34}$  J.s.
- h) Calculate the rotation produced by plane of polarization, if specific rotation is 66<sup>0</sup>. Length of tube is 200 mm & concentration of sugar solution is 20%.

### Q.5 Attempt any two of the following :

- **a)** With neat diagram explain construction and working of Laurent's half shade.
- **b)** Describe He-Ne laser with its construction and working.
- c) A fiber cable has an acceptance angle of 30° and a core index of refraction 1.4. calculate:
  - 1) the refractive index of the cladding
  - 2) Numerical aperture
  - 3) Fractional refractive index change
- d) Explain in detail Davisson Germer experiment.

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# SLR-FR-5 Set Q

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F. `	Ү. (В Е	.Tech.) (Seme ENGINEERING	ster – I) (New) (( PHYSICS – I / E	CBC ENG	S) Examination Nov/	Dec-20′ - II	19
Day & Time:	& Date 10:0	e: Monday, 16-12- 0 AM To 01:00 PM	-2019 M		Ma	ax. Marks	: 70
Instru Cons	uction tants	ns: 1) Q. No. 1 is book. 2) Figures to t 3) Make suital 1) Avogadro's n 2) Velocity of lig 3) Charge of ele	compulsory. It shounds indicate fulls ble assumptions, if o., N= $6.02 \times 10^{26}$ / where the section of the se	Id be I mar nece: k.mo ec.	e solved in first 30 minutes ks. ssary. I	in Answe	er
		e, ensige er ere	MCO/Objective T	vne (	Juestions		
Durat	ion: 3	0 Minutes	WCQ/Objective T	yhe d		Marks	: 14
Q.1	<b>Choo</b> 1)	The sound waves a) Audible wave c) Ultrasonic w	<b>Iternatives from th</b> s with frequency les es aves	<b>ne op</b> ss tha b) d)	<b>tions.</b> n 20 Hz are called Infrasonic waves Above all		14
	2)	Time dilation equal a) $t = to/\sqrt{1-v^2/c^2}$ c) $t = to/(1-v^2/c^2)$	ation is given by <sup>2</sup>	b) d)	$t = to/\sqrt{1+v^2/c^2}$ $t = to/\sqrt{1-c^2/v^2}$		
	3)	The Einstein's ma a) M=Ec <sup>2</sup> c) E=moc <sup>2</sup>	ass energy relation	is giv b) d)	ven by, C=mE <sup>2</sup> E=mc <sup>2</sup>		
	4)	The grating const a) No. of lines c) 2.54/no. of li	tant is given by the per cm ines per cm	equa b) d)	tion No. of lines per inch 1/no. of lines per cm		
	5)	For negative crys a) $\mu o > \mu e$ c) $\mu o < \mu e$	stal	b) d)	$\mu o = \mu e$ None of these		
	6)	Stimulated emiss a) $A + h\gamma \rightarrow A$ c) $A^* \rightarrow A + h$	sion process is repro * ιγ	esent b) d)	ed by equation $A^* + h\gamma \rightarrow A + 2h\gamma$ $A^* + h\gamma \rightarrow A + h\gamma$		
	7)	The process of transfer it into the a) electrical dis c) Pumping	supplying energy e state of populatior charge	to th n inve b) d)	le laser medium with a rsion is known as Lasing action Depumping	view of	
	8)	In graded index of a) Uniform b) Increase tow c) Less than cla d) None of thes	optical fibre the refra vards the axis of con adding refractive ind se	active re dex	index of core is		

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9)	The acceptance angle $\theta$ o is having a) $\sin^{-1}(n_1^2 - n_2^2)$	the va b)	alue equal to $\sin^{-1}(n_1^2 + n_2^2)$ .
	c) $\sin^{-1}\sqrt{(n_1^2 - n_2^2)}$	d)	$\sin(n_1^2 - n_2^2)$
10)	The chirality of helical CNT is a) (a, b) c) (a, 0)	 b) d)	(a, a) (0, b)
11)	The band gap energy of Si is approx a) 0.3 eV c) 1.1 eV	kimato b) d)	ely 0.2 eV 1.3 eV
12)	The packing density of a BCC struc a) $\pi/6$ c) $\sqrt{2\pi/6}$	ture is b) d)	$\frac{5}{\sqrt{3\pi/8}}$ $\frac{1}{8/\sqrt{3\pi}}$
13)	The relation between inter planner s as a) $d = a / (h^2 + k^2 + l^2)$ c) $d = a / (\sqrt{h^2 + k^2 + l^2})$	spacir b) d)	a = d / $(\sqrt{h^2 + k^2 + l^2})$ a = d / $(h^2 + k^2 + l^2)$
14)	Optimum reverberation time for spe a) 0.5 to 1 second	ech is b)	6 0 to 1 second

c) 1 to 2 second d) Above 5 second

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# F. Y. (B.Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019 ENGINEERING PHYSICS – I / ENGINEERING PHYSICS – II

Day & Date: Monday, 16-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Make suitable assumptions, if necessary.

2) Figures to the right indicate full marks.

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

- 2) Velocity of light,  $c = 3 \times 10^8$  m/sec.
  - 3) Charge of electron,  $e = 1.6 \times 10^{-19} C$ .

# Section – I

# Q.2 Attempt any six of the following :

- a) Explain effect of impurity on Fermi level in case of N type semiconductor.
- **b)** Explain classification of solids.
- c) Define co-ordination number. Obtain co- ordination number for SC and FCC.
- d) Define atomic packing factor. Calculate packing factor for BCC and FCC.
- e) Define the terms:
  - 1) Reverberation
  - 2) Reverberation Time
  - 3) Absorption coefficient
- f) Deduce Einstein's expression for mass-energy equivalence.
- g) A movie theater has a total volume of 40x20x10 m<sup>3</sup>. The acoustics of the theater needs to be designed to give reverberation time of 2 s. Calculate:
  - 1) Total absorption
  - 2) Average absorption within the theater
- **h)** A rod has length 100 cm. When the rod is in a satellite moving with a velocity that is one half of the velocity of light relative to laboratory. What is the length of the rod as determined by an observer?
  - 1) in the satellite
  - 2) in the laboratory

# Q.3 Attempt any two of the following:

a) In a Hall experiment, a current of 0.25 A is sent through a metal strip having thickness 0.2mm and width 5 mm. The Hall voltage is found to be 0.15 mV when a magnetic field of 0.2 Tesla is used. Given conductivity of metal is  $\sigma = 5.8 \times 10^7$ /ohm.m

Calculate:

- 1) Hall coefficient
- 2) Carrier concentration
- 3) Mobility of charge carrier
- b) Explain the term Miller indices. Derive the relation between lattice constant & interplaner spacing for cubic crystal.
- c) State and explain the factors affecting the architectural acoustics and their remedies.
- d) Derive the expression for Lorentz transformation equations & its inverse.

Max. Marks: 56

#### Section – II

### Q.4 Attempt any six of the following :

- a) Explain positive and negative crystals.
- b) Write different properties of lasers.
- c) Give applications of LASER in different fields.
- d) Write advantages of optical fiber cables.
- e) Explain De Broglie wavelength of matter waves and also express it in terms of kinetic energy.
- Explain classification of carbon nano tubes. f)
- g) Find the De Broglies Wavelength of a 0.5 kg object moving with a speed of 2 m/s. Given h=  $h=6.634 \times 10^{-34}$  J.s.
- **h)** Calculate the rotation produced by plane of polarization, if specific rotation is 66<sup>0</sup>. Length of tube is 200 mm & concentration of sugar solution is 20%.

#### Attempt any two of the following : Q.5

- With neat diagram explain construction and working of Laurent's half a) shade.
- b) Describe He-Ne laser with its construction and working.
- c) A fiber cable has an acceptance angle of 30° and a core index of refraction 1.4. calculate:
  - 1) the refractive index of the cladding
  - 2) Numerical aperture
  - 3) Fractional refractive index change
- d) Explain in detail Davisson Germer experiment.

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# SLR-FR-5 Set R

Seat	t	Set S							
F. Y. (B.Tech.) (Semester – I) (New) (CBCS) Examination Nov/Dec-2019 ENGINEERING PHYSICS – I / ENGINEERING PHYSICS – II									
Day a Time	Day & Date: Monday, 16-12-2019 Max. Marks: 70 Time: 10:00 AM To 01:00 PM								
Instr	uctio	<ul> <li>s: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book.</li> <li>2) Figures to the right indicate full marks.</li> </ul>							
3) Make suitable assumptions, if necessary. <b>Constants:</b> 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.									
Dura	MCQ/Objective Type Questions								
01		warks. 14							
<b>Q</b> .1	1)	Stimulated emission process is represented by equation a) $A + h\gamma \rightarrow A^*$ b) $A^* + h\gamma \rightarrow A + 2h\gamma$ b) $A^* + h\gamma \rightarrow A + h\gamma$							
	2)	<ul> <li>The process of supplying energy to the laser medium with a view of ransfer it into the state of population inversion is known as</li> <li>a) electrical discharge</li> <li>b) Lasing action</li> <li>c) Pumping</li> <li>d) Depumping</li> </ul>							
	3)	n graded index optical fibre the refractive index of core is a) Uniform b) Increase towards the axis of core c) Less than cladding refractive index d) None of these							
	4)	The acceptance angle $\theta_0$ is having the value equal to a) $\sin^{-1}(n_1^2 - n_2^2)$ b) $\sin^{-1}(n_1^2 + n_2^2)$ .							
		c) $\sin^{-1}\sqrt{(n_1^2 - n_2^2)}$ d) $\sin(n_1^2 - n_2^2)$							
	5)	The chirality of helical CNT is         a) (a, b)       b) (a, a)         c) (a, 0)       d) (0, b)							
	6)	The band gap energy of Si is approximately a) 0.3 eV b) 0.2 eV c) 1.1 eV d) 1.3 eV							
	7)	The packing density of a BCC structure is a) $\pi/6$ b) $\sqrt{3\pi/8}$ b) $\sqrt{2\pi/6}$ d) $8/\sqrt{3\pi}$							
	8)	The relation between inter planner spacing (d) and edge length (a) is given as a) $d = a / (b^2 + k^2 + l^2)$ b) $a = d / (\sqrt{b^2 + k^2 + l^2})$							
		(i) $d = a / (\sqrt{h^2 + k^2 + l^2})$ (j) $a = d / (\sqrt{h^2 + k^2 + l^2})$ (j) $a = d / (h^2 + k^2 + l^2)$							

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9)	Optimum reverberation time f a) 0.5 to 1 second c) 1 to 2 second	or speech is b) 0 to 1 second d) Above 5 second	
10)	The sound waves with freque a) Audible waves c) Ultrasonic waves	ncy less than 20 Hz are called b) Infrasonic waves d) Above all	l
11)	Time dilation equation is given a) $t = to/\sqrt{1-v^2/c^2}$ c) $t = to/(1-v^2/c^2)$	b) $t = to/\sqrt{1+v^2/c^2}$ d) $t = to/\sqrt{1-c^2/v^2}$	
12)	The Einstein's mass energy re a) M=Ec <sup>2</sup> c) E=moc <sup>2</sup>	elation is given by, b) C=mE <sup>2</sup> d) E=mc <sup>2</sup>	
13)	<ul><li>The grating constant is given</li><li>a) No. of lines per cm</li><li>c) 2.54/no. of lines per cm</li></ul>	by the equation b) No. of lines per i d) 1/no. of lines pe	inch r cm
14)	For negative crystal a) $\mu_0 > \mu_e$	b) μο = μe	

c) μο < μ*e* 

- d) None of these

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## F. Y. (B.Tech.) (Semester – I) (New) (CBCS) Examination Dec-2019 ENGINEERING PHYSICS – I / ENGINEERING PHYSICS – II

Day & Date: Monday, 16-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Make suitable assumptions, if necessary.

2) Figures to the right indicate full marks.

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

- 2) Velocity of light,  $c = 3 \times 10^8$  m/sec.
  - 3) Charge of electron,  $e = 1.6 \times 10^{-19} C$ .

### Section – I

### Q.2 Attempt any six of the following :

- a) Explain effect of impurity on Fermi level in case of N type semiconductor.
- b) Explain classification of solids.
- c) Define co-ordination number. Obtain co- ordination number for SC and FCC.
- d) Define atomic packing factor. Calculate packing factor for BCC and FCC.
- e) Define the terms:
  - 1) Reverberation
  - 2) Reverberation Time
  - 3) Absorption coefficient
- f) Deduce Einstein's expression for mass-energy equivalence.
- **g)** A movie theater has a total volume of 40x20x10 m<sup>3</sup>. The acoustics of the theater needs to be designed to give reverberation time of 2 s. Calculate:
  - 1) Total absorption
  - 2) Average absorption within the theater
- **h)** A rod has length 100 cm. When the rod is in a satellite moving with a velocity that is one half of the velocity of light relative to laboratory. What is the length of the rod as determined by an observer?
  - 1) in the satellite
  - 2) in the laboratory

### Q.3 Attempt any two of the following:

a) In a Hall experiment, a current of 0.25 A is sent through a metal strip having thickness 0.2mm and width 5 mm. The Hall voltage is found to be 0.15 mV when a magnetic field of 0.2 Tesla is used. Given conductivity of metal is  $\sigma = 5.8 \times 10^7$ /ohm.m

Calculate:

- 1) Hall coefficient
- 2) Carrier concentration
- 3) Mobility of charge carrier
- b) Explain the term Miller indices. Derive the relation between lattice constant & interplaner spacing for cubic crystal.
- c) State and explain the factors affecting the architectural acoustics and their remedies.
- d) Derive the expression for Lorentz transformation equations & its inverse.

Max. Marks: 56

10

#### Section – II

#### Q.4 Attempt any six of the following :

- a) Explain positive and negative crystals.
- **b)** Write different properties of lasers.
- c) Give applications of LASER in different fields.
- d) Write advantages of optical fiber cables.
- e) Explain De Broglie wavelength of matter waves and also express it in terms of kinetic energy.
- f) Explain classification of carbon nano tubes.
- g) Find the De Broglies Wavelength of a 0.5 kg object moving with a speed of 2 m/s. Given  $h = h = 6.634 \times 10^{-34}$  J.s.
- h) Calculate the rotation produced by plane of polarization, if specific rotation is 66<sup>0</sup>. Length of tube is 200 mm & concentration of sugar solution is 20%.

#### Q.5 Attempt any two of the following :

- **a)** With neat diagram explain construction and working of Laurent's half shade.
- **b)** Describe He-Ne laser with its construction and working.
- c) A fiber cable has an acceptance angle of 30° and a core index of refraction 1.4. calculate:
  - 1) the refractive index of the cladding
  - 2) Numerical aperture
  - 3) Fractional refractive index change
- d) Explain in detail Davisson Germer experiment.



10

# SLR-FR-5 Set S

<b>ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II</b>				
Day & Date: Wednesday, 18-12-2019 Time: 10:00 AM To 01:00 PM	Max. Marks: 70			
Instructions: 1) Q. No. 1 is compulsory and should be solve book.	d in first 30 minutes in answer			

- 2) Figures to the right indicate full marks.
- 3) Draw neat and labeled diagram whenever necessary.

MCQ/Objective Type Questions

#### Q.1 Choose the correct alternatives from the options.

- For corrosion of iron to take place 1)
  - a) Presence of moisture is sufficient
  - b) Presence of both moisture and Oxygen is essential
  - c) Hydrogen is required

Seat

No.

**Duration: 30 Minutes** 

- d) Strong acid is necessary
- When a buried pipeline is protected from corrosion by connecting to 2) magnesium block it is called \_\_\_\_
  - a) Unsuppressed voltage protection
  - b) Sacrificial anodic protection
  - c) Sacrificial cathodic protection
  - d) None of these
- 3) A lubricant is used primarily to prevent \_\_\_\_\_.
  - a) Corrosion of meta
  - b) Oxidation of metal
  - c) wearing out of metallic surface
  - d) reduction of metals
- 4) Lubricant used in a machine working at low temperature should possess
  - high pour point a) c) high cloud point

c) cologulants

- b) low flash point
- d) low pour point

Hard water may be softened by passing it through \_\_\_\_\_ 5)

- a) sodium silicate
- b) ion-exchange resin d) rock salt
- pH of natural water is . 6)
  - 14 a) 0 b)
  - c) 7 d) 10-7
- When two molecules combine to form one product molecule, it is called 7)
  - a) addition reaction
- b) substitution reaction
- c) elimination reaction

# SLR-FR-6



Max. Marks: 70

Marks: 14

- 8) Carbon in cast iron \_\_\_\_\_.
  - a) increases its hardness
  - c) imparts softness
- 9) Annealing of glass is \_\_\_\_\_.
  - a) cooling glass articles rapidly
  - b) passing molten glass between rollers
  - c) allowing glass articles to cool gradually
  - d) plunging glass articles suddenly into water
- 10) A good fuel should possess \_\_\_\_\_
  - a) low calorific value
  - b) high ignition temperature c) high calorific value d) high ash content
- 11) In bomb calorimeter the ignition of fuel is made with the help of \_\_\_\_\_.
  - a) Cu fuse wire
  - c) Al fuse wire

- b) Mg fuse wire d) Zn fuse wire
- 12) Structural units of high polymers, are called \_\_\_\_\_.
  - a) fibres b) thermo units
  - d) Fabrics c) monomers
- A plastic which can be softened on heating and hardened on cooling is 13) called .
  - a) thermo-elastic

b) thermosoftening plastic

b) decreases its hardness

d) decreases fluidity

- c) thermosetting
- d) Thermite
- 14) The technique by which a mixture is separated into its constituents by a moving gas phase passing over a stationary adsorbent, is called \_\_\_\_\_.
  - column chromatography a)

c) spectroscopy d) ion-exchange chromatography

- b) gas chromatography

SLR-FR-6 Set

Set

## Seat No.

## F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II

Day & Date: Wednesday, 18-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw neat and labeled diagram whenever necessary.

#### Section-I

#### Q.2 Attempt any Four

 A sample of water on analysis was found to contain the following impurities in mg/lit, Calculates temporary, permanent and total hardness of water in mg/lit.

Impurities	Amount	Mol. Wt.
Ca(HCO <sub>3</sub> ) <sub>2</sub>	75	162
Mg(HCO <sub>3</sub> ) <sub>2</sub>	34	146
CaSO <sub>4</sub>	22	136
MgSO <sub>4</sub>	13	120

- **b)** Explain Ion Exchange process for softening the hard water.
- c) Explain with examples the addition and substitution type of reactions.
- d) Define Lubricant. Explain the solid lubricant.
- e) Describe the mechanism of oxidation corrosion.
- f) Explain the factors influencing the rate of corrosion.

#### Q.3 Attempt any Four.

- a) Define
  - 1) Alkalinity
  - 2) BOD
  - 3) Dissolved oxygen
- **b)** Explain the disinfection of water by Chlorine.
- c) Explain the synthesis of Ibuprofen.
- d) Numerical Saponification value 11.4 grams of oil after saponification with 50 ml of N/2 alkaline KOH solution and on subsequent titration with N/2 HCl gave a titre value of 16 ml to the phenolphthalein end point. A blank experiment was conducted without taking the oil and on repeating the same procedure gave titre value 50 ml. Calculate the saponification value the oil.(Mol. wt. of KOH =56)
- e) Define
  - 1) Viscosity
  - 2) Viscosity index
  - 3) Flash point & Fire point
- f) Explain the prevention of corrosion by -Metal cladding.

Max. Marks: 56

12

#### Section-II

#### Q.4 Attempt any Four

- a) Define alloy. Explain purpose of alloying.
- **b)** A sample of coal containing 5% H, when tested in the laboratory for its calorific value in the bomb calorimeter, the following data were obtained.

Weight of coal burnt	= 0.8 g
Weight of water taken	= 2000 g
Water equivalent of bomb and calorimeter	= 600 g
Rise in temperature	$= 2.38^{\circ}C$
Cooling correction	$= 0.04^{\circ}C$
Fuse wire correction	= 10 cal.
Acid correction	= 50 cal

Calculate the gross and net calorific value of the coal in cal/ g. (Take latent heat of condensation of steam = 587 cal/g)

- c) Explain construction and working of Boy's calorimeter.
- d) What is rubber? Explain isolation and processing of natural rubber.
- e) Explain extrusion and injection molding of plastics into articles.
- f) Explain construction and working of Gas liquid chromatography.

#### Q.5 Attempt any Four

- a) Explain any three types of glass.
- b) Define Ceramics. Explain properties of ceramics.
- c) Define fuel. Explain classification of fuel.
- d) Explain composition and classification of petroleum.
- e) Calculate Molecular weight of polyvinyl chloride having degree of polymerization 300.(Mol. Wt. of vinyl chloride = 62.5)
- f) What weight of  $Na_2CO_3$  is required to prepare 0.3 N 400 ml solution and 0.2 M 500 ml solution.(Mol. Wt. of  $Na_2CO_3 = 106$ )

16


Day Time	& Date e: 10:0	e: Wednesday, 18-12-2019 0 AM To 01:00 PM		Max. Marks: 7	'0
Instr	ructio	ns: 1) Q. No. 1 is compulsory and sl book.	າould	be solved in first 30 minutes in answe	r
		<ul><li>a) Draw neat and labeled diagra</li></ul>	m wł	ienever necessary.	
_		MCQ/Objective 1	уре	Questions	
Dura	ition: 3	30 Minutes	_	Marks: 1	4
Q.1	<b>Cho</b> 1)	ose the correct alternatives from t Carbon in cast iron	he o	ptions. 1	4
	.,	<ul> <li>a) increases its hardness</li> <li>c) imparts softness</li> </ul>	b) d)	decreases its hardness decreases fluidity	
	2)	<ul> <li>Annealing of glass is</li> <li>a) cooling glass articles rapidly</li> <li>b) passing molten glass between</li> <li>c) allowing glass articles to cool (</li> <li>d) plunging glass articles sudden</li> </ul>	rolle gradu ly inte	rs Ially o water	
	3)	A good fuel should possess a) low calorific value c) high calorific value	 b) d)	high ignition temperature high ash content	
	4)	In bomb calorimeter the ignition of a) Cu fuse wire	fuel i b) d)	s made with the help of Mg fuse wire Zn fuse wire	
	5)	<ul><li>Structural units of high polymers, a</li><li>a) fibres</li><li>c) monomers</li></ul>	re ca b) d)	Iled thermo units Fabrics	
	6)	A plastic which can be softened on called a) thermo-elastic c) thermosetting	heat b) d)	ing and hardened on cooling is thermosoftening plastic Thermite	
	7)	The technique by which a mixture i moving gas phase passing over a s a) column chromatography c) spectroscopy	s sep statio b) d)	parated into its constituents by a nary adsorbent, is called gas chromatography ion-exchange chromatography	
	8)	<ul> <li>For corrosion of iron to take place</li> <li>a) Presence of moisture is sufficient</li> <li>b) Presence of both moisture and</li> <li>c) Hydrogen is required</li> <li>d) Strong paid is pageagenet.</li> </ul>	ənt I Oxy	 gen is essential	

Seat No.

# F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 **ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II**

Max. Marks: 70

Q

d) Strong acid is necessary

# **SLR-FR-6**

Set

- When a buried pipeline is protected from corrosion by connecting to magnesium block it is called \_\_\_\_\_.
  - a) Unsuppressed voltage protection
  - b) Sacrificial anodic protection
  - c) Sacrificial cathodic protection
  - d) None of these
- 10) A lubricant is used primarily to prevent \_\_\_\_\_.
  - a) Corrosion of meta
  - b) Oxidation of metal
  - c) wearing out of metallic surface
  - d) reduction of metals
- 11) Lubricant used in a machine working at low temperature should possess
  - a) high pour point

b) low flash point

SLR-FR-6

Set Q

- c) high cloud point
- d) low pour point
- 12) Hard water may be softened by passing it through \_\_\_\_\_.
  - a) sodium silicate
- b) ion-exchange resin
- c) cologulants
- d) rock salt
- 13) pH of natural water is \_\_\_\_\_.
  - a) 0 b) 14
  - c) 7 d) 10-7
- 14) When two molecules combine to form one product molecule, it is called
  - a) addition reaction

c) elimination reaction

- b) substitution reaction
- d) rearrangement reaction

Set

Q

16

# Seat No.

# F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II

Day & Date: Wednesday, 18-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw neat and labeled diagram whenever necessary.

#### Section-I

## Q.2 Attempt any Four

 A sample of water on analysis was found to contain the following impurities in mg/lit, Calculates temporary, permanent and total hardness of water in mg/lit.

Impurities	Amount	MOI. Wt.
Ca(HCO <sub>3</sub> ) <sub>2</sub>	75	162
Mg(HCO <sub>3</sub> ) <sub>2</sub>	34	146
CaSO <sub>4</sub>	22	136
MgSO <sub>4</sub>	13	120

**b)** Explain Ion Exchange process for softening the hard water.

...

- c) Explain with examples the addition and substitution type of reactions.
- d) Define Lubricant. Explain the solid lubricant.

.

- e) Describe the mechanism of oxidation corrosion.
- f) Explain the factors influencing the rate of corrosion.

## Q.3 Attempt any Four.

- a) Define
  - 1) Alkalinity
  - 2) BOD
  - 3) Dissolved oxygen
- **b)** Explain the disinfection of water by Chlorine.
- c) Explain the synthesis of Ibuprofen.
- d) Numerical Saponification value 11.4 grams of oil after saponification with 50 ml of N/2 alkaline KOH solution and on subsequent titration with N/2 HCl gave a titre value of 16 ml to the phenolphthalein end point. A blank experiment was conducted without taking the oil and on repeating the same procedure gave titre value 50 ml. Calculate the saponification value the oil.(Mol. wt. of KOH =56)
- e) Define
  - 1) Viscosity
  - 2) Viscosity index
  - 3) Flash point & Fire point
- f) Explain the prevention of corrosion by -Metal cladding.

Max. Marks: 56

## Section-II

### Q.4 Attempt any Four

- a) Define alloy. Explain purpose of alloying.
- **b)** A sample of coal containing 5% H, when tested in the laboratory for its calorific value in the bomb calorimeter, the following data were obtained.

Weight of coal burnt	= 0.8 g
Weight of water taken	= 2000 g
Water equivalent of bomb and calorimeter	= 600 g
Rise in temperature	$= 2.38^{\circ}C$
Cooling correction	$= 0.04^{\circ}C$
Fuse wire correction	= 10 cal.
Acid correction	= 50 cal

Calculate the gross and net calorific value of the coal in cal/ g. (Take latent heat of condensation of steam = 587 cal/g)

- c) Explain construction and working of Boy's calorimeter.
- d) What is rubber? Explain isolation and processing of natural rubber.
- e) Explain extrusion and injection molding of plastics into articles.
- f) Explain construction and working of Gas liquid chromatography.

## Q.5 Attempt any Four

- a) Explain any three types of glass.
- b) Define Ceramics. Explain properties of ceramics.
- c) Define fuel. Explain classification of fuel.
- d) Explain composition and classification of petroleum.
- e) Calculate Molecular weight of polyvinyl chloride having degree of polymerization 300.(Mol. Wt. of vinyl chloride = 62.5)
- f) What weight of  $Na_2CO_3$  is required to prepare 0.3 N 400 ml solution and 0.2 M 500 ml solution.(Mol. Wt. of  $Na_2CO_3 = 106$ )

16

SLR-FR-6

Set

F.`	Y. (B EN	.Teo IGII	ch.) (Semester - I) (New) (C NEERING CHEMISTRY I / E	BC	S) Examination Nov/Dec-2019 INEERING CHEMISTRY II
Day & Time	& Date : 10:00	e: W 0 AN	ednesday, 18-12-2019 / To 01:00 PM		Max. Marks: 70
Instr	uctior	<b>1s:</b> 1	<ol> <li>Q. No. 1 is compulsory and sho book.</li> </ol>	ould	be solved in first 30 minutes in answer
			<ol> <li>Figures to the right indicate full</li> <li>Draw neat and labeled diagram</li> </ol>	ma n wh	rks. enever necessary.
			MCQ/Objective Ty	уре	Questions
Durat	tion: 3	0 M	inutes		Marks: 14
Q.1	<b>Choo</b> 1)	o <b>se</b> Hai a) c)	the correct alternatives from th rd water may be softened by pas sodium silicate cologulants	<b>e oj</b> sing b) d)	otions. 14 it through ion-exchange resin rock salt
	2)	рН а) с)	of natural water is 0 7	b) d)	14 10-7
	3)	Wh	en two molecules combine to for	m or	ne product molecule, it is called
		a) c)	 addition reaction elimination reaction	b) d)	substitution reaction rearrangement reaction
	4)	Ca a) c)	rbon in cast iron increases its hardness imparts softness	b) d)	decreases its hardness decreases fluidity
	5)	Anı a) b) c) d)	nealing of glass is cooling glass articles rapidly passing molten glass between r allowing glass articles to cool gr plunging glass articles suddenly	oller adua into	s ally o water
	6)	A g a) c)	ood fuel should possess low calorific value high calorific value	b) d)	high ignition temperature high ash content
	7)	In k a) c)	bomb calorimeter the ignition of fu Cu fuse wire Al fuse wire	uel is b) d)	s made with the help of Mg fuse wire Zn fuse wire
	8)	Str a) c)	uctural units of high polymers, are fibres monomers	e cal b) d)	lled thermo units Fabrics
	9)	A p call a) c)	lastic which can be softened on l led thermo-elastic thermosetting	neati b) d)	ing and hardened on cooling is thermosoftening plastic Thermite

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No.

Seat

Set

R

Page **9** of **16** 

4

# 10) The technique by which a mixture is separated into its constituents by a moving gas phase passing over a stationary adsorbent, is called \_\_\_\_\_.

- a) column chromatography
- b) gas chromatography
- c) spectroscopy
- d) ion-exchange chromatography

SLR-FR-6

Set

- 11) For corrosion of iron to take place
  - a) Presence of moisture is sufficient
  - b) Presence of both moisture and Oxygen is essential
  - c) Hydrogen is required
  - d) Strong acid is necessary
- 12) When a buried pipeline is protected from corrosion by connecting to magnesium block it is called \_\_\_\_\_.
  - a) Unsuppressed voltage protection
  - b) Sacrificial anodic protection
  - c) Sacrificial cathodic protection
  - d) None of these
- 13) A lubricant is used primarily to prevent \_\_\_\_\_.
  - a) Corrosion of meta
  - b) Oxidation of metal
  - c) wearing out of metallic surface
  - d) reduction of metals
- 14) Lubricant used in a machine working at low temperature should possess
  - a) high pour point

- b) low flash point
- c) high cloud point
- d) low pour point

# SLR-FR-6

Set

R

16

# Seat No.

# F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II

Day & Date: Wednesday, 18-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw neat and labeled diagram whenever necessary.

#### Section-I

## Q.2 Attempt any Four

 A sample of water on analysis was found to contain the following impurities in mg/lit, Calculates temporary, permanent and total hardness of water in mg/lit.

Ca(HCO <sub>3</sub> ) <sub>2</sub>	75	162
Mg(HCO <sub>3</sub> ) <sub>2</sub>	34	146
CaSO <sub>4</sub>	22	136
MgSO <sub>4</sub>	13	120

Impurities Amount Mol. Wt.

- **b)** Explain Ion Exchange process for softening the hard water.
- c) Explain with examples the addition and substitution type of reactions.
- d) Define Lubricant. Explain the solid lubricant.
- e) Describe the mechanism of oxidation corrosion.
- f) Explain the factors influencing the rate of corrosion.

## Q.3 Attempt any Four.

- a) Define
  - 1) Alkalinity
  - 2) BOD
  - 3) Dissolved oxygen
- **b)** Explain the disinfection of water by Chlorine.
- c) Explain the synthesis of Ibuprofen.
- d) Numerical Saponification value 11.4 grams of oil after saponification with 50 ml of N/2 alkaline KOH solution and on subsequent titration with N/2 HCl gave a titre value of 16 ml to the phenolphthalein end point. A blank experiment was conducted without taking the oil and on repeating the same procedure gave titre value 50 ml. Calculate the saponification value the oil.(Mol. wt. of KOH =56)
- e) Define
  - 1) Viscosity
  - 2) Viscosity index
  - 3) Flash point & Fire point
- f) Explain the prevention of corrosion by -Metal cladding.

Max. Marks: 56

### Section-II

## Q.4 Attempt any Four

- a) Define alloy. Explain purpose of alloying.
- **b)** A sample of coal containing 5% H, when tested in the laboratory for its calorific value in the bomb calorimeter, the following data were obtained.

Weight of coal burnt	= 0.8 g
Weight of water taken	= 2000 g
Water equivalent of bomb and calorimeter	= 600 g
Rise in temperature	$= 2.38^{\circ}C$
Cooling correction	$= 0.04^{\circ}C$
Fuse wire correction	= 10 cal.
Acid correction	= 50 cal

Calculate the gross and net calorific value of the coal in cal/ g. (Take latent heat of condensation of steam = 587 cal/g)

- c) Explain construction and working of Boy's calorimeter.
- d) What is rubber? Explain isolation and processing of natural rubber.
- e) Explain extrusion and injection molding of plastics into articles.
- f) Explain construction and working of Gas liquid chromatography.

## Q.5 Attempt any Four

- a) Explain any three types of glass.
- b) Define Ceramics. Explain properties of ceramics.
- c) Define fuel. Explain classification of fuel.
- d) Explain composition and classification of petroleum.
- e) Calculate Molecular weight of polyvinyl chloride having degree of polymerization 300.(Mol. Wt. of vinyl chloride = 62.5)
- f) What weight of  $Na_2CO_3$  is required to prepare 0.3 N 400 ml solution and 0.2 M 500 ml solution.(Mol. Wt. of  $Na_2CO_3 = 106$ )

16

R

SLR-FR-6

Set

F.	.Y. (B El	3.Tech.) (Semester - I) (New) (Cl NGINEERING CHEMISTRY I / E	BC NG	S) Examination Nov/Dec-2	2019
Day Time	& Dat e: 10:0	te: Wednesday, 18-12-2019 00 AM To 01:00 PM		Max. Ma	arks: 70
Inst	ructio	<b>ns:</b> 1) Q. No. 1 is compulsory and sho	uld	be solved in first 30 minutes in a	nswer
		<ul><li>2) Figures to the right indicate full</li><li>3) Draw neat and labeled diagram</li></ul>	ma wł	rks. ienever necessary.	
		MCQ/Objective Ty	pe	Questions	
Dura	ation: (	30 Minutes	-	Ma	arks: 14
Q.1	<b>Cho</b> 1)	ose the correct alternatives from the A good fuel should possess	e o	ptions.	14
	·	<ul><li>a) low calorific value</li><li>c) high calorific value</li></ul>	b) d)	high ignition temperature high ash content	
	2)	In bomb calorimeter the ignition of fu- a) Cu fuse wire c) Al fuse wire	eli b) d)	s made with the help of Mg fuse wire Zn fuse wire	
	3)	Structural units of high polymers, are a) fibres c) monomers	e ca b) d)	lled thermo units Fabrics	
	4)	A plastic which can be softened on h called a) thermo-elastic c) thermosetting	eat b) d)	ing and hardened on cooling is thermosoftening plastic Thermite	
	5)	The technique by which a mixture is a moving gas phase passing over a state a) column chromatography c) spectroscopy	sep atio b) d)	parated into its constituents by a nary adsorbent, is called gas chromatography ion-exchange chromatography	
	6)	<ul> <li>For corrosion of iron to take place</li> <li>a) Presence of moisture is sufficien</li> <li>b) Presence of both moisture and C</li> <li>c) Hydrogen is required</li> <li>d) Strong acid is necessary</li> </ul>	it Dxy	 gen is essential	
	7)	<ul> <li>When a buried pipeline is protected f magnesium block it is called</li> <li>a) Unsuppressed voltage protection</li> <li>b) Sacrificial anodic protection</li> <li>c) Sacrificial cathodic protection</li> <li>d) None of these</li> </ul>	ron	n corrosion by connecting to	
	8)	A lubricant is used primarily to preven a) Corrosion of meta b) Oxidation of metal	nt _		

c) wearing out of metallic surfaced) reduction of metals

# **SLR-FR-6**

Set S

## Seat No.

- 9) Lubricant used in a machine working at low temperature should possess
  - a) high pour point
  - high cloud point c) d) low pour point
- 10) Hard water may be softened by passing it through
  - b) ion-exchange resin
  - cologulants
- pH of natural water is \_\_\_\_\_. 11)

c)

- b) 14 a) 0
- c) 7 d) 10-7

.

- When two molecules combine to form one product molecule, it is called 12)
  - a) addition reaction
  - elimination reaction C)
- 13) Carbon in cast iron
  - a) increases its hardness
  - imparts softness c)
- d) rearrangement reaction

b) substitution reaction

- 14) Annealing of glass is \_\_\_\_\_.
  - a) cooling glass articles rapidly
  - b) passing molten glass between rollers
  - c) allowing glass articles to cool gradually
  - d) plunging glass articles suddenly into water

SLR-FR-6

Set

# b) decreases its hardness

d) decreases fluidity

b) low flash point

- a) sodium silicate
- d)
- - rock salt

# SLR-FR-6

Set

S

16

# Seat No.

# F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination Nov/Dec-2019 ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II

Day & Date: Wednesday, 18-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Draw neat and labeled diagram whenever necessary.

#### Section-I

## Q.2 Attempt any Four

 A sample of water on analysis was found to contain the following impurities in mg/lit, Calculates temporary, permanent and total hardness of water in mg/lit.

Impurities	Amount	Mol. Wt.		
Ca(HCO <sub>3</sub> ) <sub>2</sub>	75	162		
Mg(HCO <sub>3</sub> ) <sub>2</sub>	34	146		
CaSO <sub>4</sub>	22	136		
MgSO <sub>4</sub>	13	120		

- b) Explain Ion Exchange process for softening the hard water.
- c) Explain with examples the addition and substitution type of reactions.
- d) Define Lubricant. Explain the solid lubricant.
- e) Describe the mechanism of oxidation corrosion.
- f) Explain the factors influencing the rate of corrosion.

## Q.3 Attempt any Four.

- a) Define
  - 1) Alkalinity
  - 2) BOD
  - 3) Dissolved oxygen
- **b)** Explain the disinfection of water by Chlorine.
- c) Explain the synthesis of Ibuprofen.
- d) Numerical Saponification value 11.4 grams of oil after saponification with 50 ml of N/2 alkaline KOH solution and on subsequent titration with N/2 HCl gave a titre value of 16 ml to the phenolphthalein end point. A blank experiment was conducted without taking the oil and on repeating the same procedure gave titre value 50 ml. Calculate the saponification value the oil.(Mol. wt. of KOH =56)
- e) Define
  - 1) Viscosity
  - 2) Viscosity index
  - 3) Flash point & Fire point
- f) Explain the prevention of corrosion by -Metal cladding.

Max. Marks: 56

### Section-II

## Q.4 Attempt any Four

- a) Define alloy. Explain purpose of alloying.
- **b)** A sample of coal containing 5% H, when tested in the laboratory for its calorific value in the bomb calorimeter, the following data were obtained.

Weight of coal burnt	= 0.8 g
Weight of water taken	= 2000 g
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Rise in temperature	$= 2.38^{\circ}C$
Cooling correction	$= 0.04^{\circ}C$
Fuse wire correction	= 10 cal.
Acid correction	= 50 cal

Calculate the gross and net calorific value of the coal in cal/ g. (Take latent heat of condensation of steam = 587 cal/g)

- c) Explain construction and working of Boy's calorimeter.
- d) What is rubber? Explain isolation and processing of natural rubber.
- e) Explain extrusion and injection molding of plastics into articles.
- f) Explain construction and working of Gas liquid chromatography.

## Q.5 Attempt any Four

- a) Explain any three types of glass.
- b) Define Ceramics. Explain properties of ceramics.
- c) Define fuel. Explain classification of fuel.
- d) Explain composition and classification of petroleum.
- e) Calculate Molecular weight of polyvinyl chloride having degree of polymerization 300.(Mol. Wt. of vinyl chloride = 62.5)
- f) What weight of  $Na_2CO_3$  is required to prepare 0.3 N 400 ml solution and 0.2 M 500 ml solution.(Mol. Wt. of  $Na_2CO_3 = 106$ )

16

# Set F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

**Duration: 30 Minutes** 

Q.1

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Use of non-programmable calculator is allowed.

4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book page no 3. Each question carries one mark.

Cho sent	ose the correct alternatives from t tence.	he op	tions and rewrite the
1)	The differential equation $\frac{dy}{dx} = \frac{a_1x+b_2}{a_1x+b_2}$	$\frac{1y+c_1}{y+c_2}$	will be exact if
	a) $b_2 = -a_1$ c) $b_1 = a_2$	b) d)	$\begin{array}{l}a_2=-b_1\\a_1=b_2\end{array}$
2)	Solution of $\frac{dy}{dx} = -\frac{x}{y}$ at $x = 1$ and y	$=\sqrt{3}$	is
	a) $x - y^2 = 2$ c) $x^2 - y^2 = 2$	b) d)	x + y2 = 4 $x2 + y2 = 4$
3)	The factorial series $\sum_{n=1}^{\infty}$ is		
	a) Convergent c) Oscillatory	b) d)	Divergent Absolutely convergent
4)	The series $1^2 + 2^2 + 3^2 + \dots$ is a) Convergent c) Oscillatory	b) d)	 Divergent Absolutely convergent
5)	If $x = \cos \theta + i \sin \theta$ then $x^5 - \frac{1}{5} = 1$		
	a) $2\cos 5\theta$ c) $2\sin 5\theta$	b) d)	2 <i>i</i> cos 5 <i>θ</i> 2 <i>i</i> sin 5 <i>θ</i>
6)	$cos(x + iy) = \$ a) $cos x cos y + sin x sin y$ c) $cos x cos hy - i sin x sin hy$	b) d)	$\cos x \cos hy + i \sin x \sin hy$ $\cos hx \sin hy - i \sin hx \sin hy$
7)	The sufficient conditions for $f(z)$ to a) $u_x = -v_x$ , $u_y = v_y$ c) $u_x = v_y$ , $u_y = v_x$	be ar b) d)	nalytic is $u_x = v_y, u_y = -v_x$ $u_x = -v_y, u_y = v_x$
8)	The value of $B(1,n) + B(m,1)$ is a) $\frac{m+n}{mn}$	b) d)	$\frac{m-n}{\frac{m+n}{mn}}$

## **MCQ/Objective Type Questions**

**ENGINEERING MATHEMATICS – II** 

Max. Marks: 70

Ρ

# SLR-FR-7

## Seat No.

Marks: 14

Set 9) Which of the following is not true? b)  $\frac{1}{4}$   $\frac{3}{4} = \sqrt{2\pi}$ a)  $\frac{1}{2} = \sqrt{\pi}$ n+1 = n n $\boxed{-2} = \infty$ c) d) For the curve  $r = a \sin 3\theta$  the equations of tangents at the pole are \_\_\_\_\_. 10) b)  $\theta = \frac{\pi}{4}, \frac{2\pi}{4}, \frac{3\pi}{4}, ...$ d)  $\theta = 0, \pi, 3\pi, ...$ a)  $\theta = \frac{\pi}{2}, \frac{\pi}{3}, \frac{2\pi}{3}, \dots$ c)  $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \pi, ...$ The curve  $y = x(x^2 - 1)$  is symmetrical \_ 11)About y-axis a) About x-axis b) c) About the line y = xd) In opposite quadrants Changing the order of the integration in the double integral 12)  $I = \int_{0}^{8} \int_{x/4}^{2} f(x, y) dy dx \text{ leads to } I = \int_{r}^{8} \int_{p}^{q} f(x, y) dx dy \text{ What is q?}$ a) 4y b)  $16v^2$ b)  $16y^2$ a) 4y d) c) 8 x  $1\pi/4$  $\int_{0}^{\infty} \int_{0}^{0} 2r \sec^{2}\theta dr d\theta \quad \text{is } \underline{\qquad}.$ The value of the integral 13) a) -1 b) 1 2 c) 0 d) If the density at any point varies as the distance of the point from the x-14) axis, then  $\rho$  is equal to \_\_\_\_\_. b) Kxyd)  $K(x^2 + y^2)$ b) a) Kx c) Ky

SLR-FR-7

09

# Seat No.

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019 **ENGINEERING MATHEMATICS – II** 

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Use of non-programmable calculator is allowed.
- 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book page no 3. Each question carries one mark.

#### Section – I

#### Q.2 Attempt any three of the following.

- a) Solve  $(y^2 e^{xy^2} + 4x^3)dx + (2xye^{xy^2} 3y^2)dy = 0$ b) Solve  $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$
- Solve  $(1 + y^2)dx = (e^{\tan^{-1}y} x)dy$ . c)
- **d)** Find continued product of all values of  $\left(\frac{1}{2} + \frac{i\sqrt{3}}{2}\right)^{\frac{3}{4}}$ .
- e) Examine the convergence of  $\sum \sin^3\left(\frac{1}{n}\right)$ .

#### Q.3 Attempt any three of the following.

- a) Solve y(1 + xy)dx - x(1 - xy)dy = 0
- When a switch is closed, the current built up in an electric circuit is given b) by  $E = Ri + L \frac{di}{dt}$ . If L = 640, R = 250, E = 500 and i = 0 when t = 0, show that the current will approach 2 amp when  $t \to \infty$ .
- By cauchy's test examine the convergence of  $\sum \left(1 + \frac{1}{n}\right)^{n^2}$ . C)
- Find the analytic function whose real part is  $x^4 6x^2y^2 + y^4$ . d)
- Determine whether  $\cos hz$  is analytic, if so find its derivative. e)

#### Attempt any two of the following Q.4

- Find orthogonal trajectories of, a)
  - i)  $r^2 = a^2 \sin 2\theta$ .
  - ii)  $x^3 3xy^2 = a$ .
- Define absolute and conditional convergence. Examine the convergence of b) the series.  $-\frac{1}{2} + \frac{2}{5} - \frac{3}{10} + \dots + (-1)^n \frac{n}{n^2 + 1} + \dots$
- c) Show that the function  $u = e^x \cos y$  is harmonic. Also find its harmonic conjugate.

#### Section – II

#### Q.5 Attempt any three from the following

- a) Evaluate  $\int_{0}^{\infty} \sqrt{x} \bar{e}^{x^{3}} dx$ b) Evaluate  $\int_{0}^{\infty} \frac{\tan^{-1}\left(\frac{x}{a}\right) \tan^{-1}\left(\frac{x}{b}\right)}{x} dx$
- c) Trace the curve  $r = a \cos 2\theta$ .

10

09

09

SLR-FR-7

Set

Max. Marks: 56

#### Attempt any three from the following Q.6

Evaluate

d)

a)

- $\int \cos^6 3\theta \sin^2 6\theta d\theta$ Evaluate
- b) Trace the curve  $x = a(t + \sin t)$ ,  $y = a(1 + \cos t)$  $\int \int \frac{\frac{\pi}{2}}{\int \frac{\pi}{2}} \frac{\frac{\pi}{2}}{y} dy dx$
- Change the order of integration and evaluate c)
- d) Find the mass of the wire in the shape of the cardiod  $r = a(1 - \cos \theta)$ , if the density at any point of the wire is K times its distance from the pole.
- $1\sqrt{1+x^2}$ Evaluate  $\int_{0}^{1} \int_{0}^{1+x^{2}} \frac{dx \, dy}{1+x^{2}+y^{2}}$ e)

#### Q.7 Attempt any two from the following

- Evaluate  $\int_{-\infty}^{1} (1 \sqrt{x})^{1/2} dx \int_{-\infty}^{1/2} (2y 4y^2)^{\frac{1}{2}} dy$ a)
- Trace the curve  $ay^2 = x(a^2 x^2)$  with full justification. b)
- Find the area bounded by the parabola  $y^2 = 4x$  and the line C) 2x - 3y + 4 = 0

 $\int \int \int \int \int \int dz dx dy$ Change to polar co-ordinate system and evaluate e)

 $\int_{a}^{a} \int_{a}^{a} \frac{x^2 dx dy}{(x^2 + y^2)^{\frac{3}{2}}}$ 

SLR-FR-7 Set

09

F.Y. (B.Tech.) (Semester - II) (New) (CBCS) Examination Nov/Dec-2019

**ENGINEERING MATHEMATICS – II** 

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Seat

No.

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Use of non-programmable calculator is allowed.

4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book page no 3. Each question carries one mark.





The value of $B(1,n) + B(m,1)$ is					
a) $m+n$	b)	m - n			
c) $\frac{m-n}{2}$	d)	m + n			
mn		mn			
Which of the following is not true?					

2) vynich of the following is not true?

a) 
$$\begin{bmatrix} \frac{1}{2} \\ \frac{1}{2} \end{bmatrix} = \sqrt{\pi}$$
  
b)  $\begin{bmatrix} \frac{1}{4} \\ \frac{3}{4} \end{bmatrix} = \sqrt{2\pi}$   
c)  $\boxed{n+1} = n \boxed{n}$   
d)  $\boxed{-2} = \infty$ 

3) For the curve  $r = a \sin 3\theta$  the equations of tangents at the pole are \_\_\_\_\_.

a) 
$$\theta = \frac{\pi}{2}, \frac{\pi}{3}, \frac{2\pi}{3}, \dots$$
  
b)  $\theta = \frac{\pi}{4}, \frac{2\pi}{4}, \frac{3\pi}{4}, \dots$   
c)  $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \pi, \dots$   
d)  $\theta = 0, \pi, 3\pi, \dots$ 

- 4) The curve  $y = x(x^2 - 1)$  is symmetrical a) About x-axis About y-axis b) c) About the line y = x
  - d) In opposite quadrants
- 5) Changing the order of the integration in the double integral 8 2 s q

$$I = \int_{0}^{\infty} \int_{x/4}^{x/4} f(x, y) dy dx \text{ leads to } I = \int_{r}^{\infty} \int_{p}^{r} f(x, y) dx dy \text{ What is q?}$$
a)  $4y$ 
b)  $16y^2$ 
c)  $8$ 
b)  $16y^2$ 
d)  $x$ 
The value of the integral  $\int_{0}^{1} \int_{0}^{\pi/4} 2r \sec^2\theta dr d\theta$  is \_\_\_\_\_.

6)

7) If the density at any point varies as the distance of the point from the xaxis, then  $\rho$  is equal to \_\_\_\_\_.

a) 
$$Kx$$
  
c)  $Ky$ 
b)  $Kxy$   
d)  $K(x^2 + y^2)$ 

SLR-FR-7

Max. Marks: 70



Marks: 14

SLR-FR-7 Set Q

8)	The differential equation $\frac{dy}{dx} = \frac{a_1x + b_1y + c_1}{a_2x + b_2y + c_2}$ will be exact if			ill be exact if
	a)	$b_2 = -a_1$	b)	$a_2 = -b_1$
	c)	$b_1 = a_2$	d)	$a_1 = b_2$
9)	Sol	ution of $\frac{dy}{dx} = -\frac{x}{y}$ at $x = 1$ and $y =$	$\sqrt{3}$ is	S
	a)	$x - y^2 = 2$	b)	$x + y^2 = 4$
	c)	$x^2 - y^2 = 2$	d)	$x^2 + y^2 = 4$
10)	The	e factorial series $\sum \frac{1}{n!}$ is		
	a)	Convergent	b)	Divergent
	c)	Oscillatory	d)	Absolutely convergent
11)	The	e series $1^2 + 2^2 + 3^2 + \dots$ is		
	a)	Convergent	b)	Divergent
	c)	Oscillatory	d)	Absolutely convergent
12)	If x	$= \cos \theta + i \sin \theta$ then $x^5 - \frac{1}{x^5} = $		·
	a)	2 cos 5 <i>θ</i>	b)	2 <i>i</i> cos 5 <i>θ</i>
	c)	$2\sin 5\theta$	d)	$2i \sin 5\theta$
13)	cos	$(x+iy) = \underline{\qquad}.$		
	a)	$\cos x \cos y + \sin x \sin y$	b)	$\cos x \cos hy + i \sin x \sin hy$
	c)	$\cos x \cos hy - i \sin x \sin hy$	d)	$\cos hx \sin hy - i \sin hx \sin hy$
14)	The	e sufficient conditions for $f(z)$ to be	be ana	alytic is
	a)	$u_x = -v_x$ , $u_y = v_y$	b)	$u_x = v_y$ , $u_y = -v_x$
	c)	$u_x = v_y$ , $u_y = v_x$	d)	$u_x = -v_y$ , $u_y = v_x$

09

# Seat No.

## F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019 **ENGINEERING MATHEMATICS – II**

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Use of non-programmable calculator is allowed.
- 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book page no 3. Each question carries one mark.

## Section – I

#### Q.2 Attempt any three of the following.

- a) Solve  $(y^2 e^{xy^2} + 4x^3)dx + (2xye^{xy^2} 3y^2)dy = 0$ b) Solve  $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$
- Solve  $(1 + y^2)dx = (e^{\tan^{-1}y} x)dy$ . c)
- **d)** Find continued product of all values of  $\left(\frac{1}{2} + \frac{i\sqrt{3}}{2}\right)^{\frac{3}{4}}$ .
- e) Examine the convergence of  $\sum \sin^3\left(\frac{1}{n}\right)$ .

#### Q.3 Attempt any three of the following.

- a) Solve y(1 + xy)dx - x(1 - xy)dy = 0
- When a switch is closed, the current built up in an electric circuit is given b) by  $E = Ri + L \frac{di}{dt}$ . If L = 640, R = 250, E = 500 and i = 0 when t = 0, show that the current will approach 2 amp when  $t \to \infty$ .
- By cauchy's test examine the convergence of  $\sum \left(1 + \frac{1}{n}\right)^{n^2}$ . C)
- Find the analytic function whose real part is  $x^4 6x^2y^2 + y^4$ . d)
- Determine whether  $\cos hz$  is analytic, if so find its derivative. e)

#### Attempt any two of the following Q.4

- Find orthogonal trajectories of, a)
  - i)  $r^2 = a^2 \sin 2\theta$ .
  - ii)  $x^3 3xy^2 = a$ .
- Define absolute and conditional convergence. Examine the convergence of b) the series.  $-\frac{1}{2} + \frac{2}{5} - \frac{3}{10} + \dots + (-1)^n \frac{n}{n^2 + 1} + \dots$
- c) Show that the function  $u = e^x \cos y$  is harmonic. Also find its harmonic conjugate.

#### Section – II

#### Q.5 Attempt any three from the following

- **a)** Evaluate  $\int_{0}^{\infty} \sqrt{x} \bar{e}^{x^{3}} dx$  **b)** Evaluate  $\int_{0}^{\infty} \frac{\tan^{-1}\left(\frac{x}{a}\right) \tan^{-1}\left(\frac{x}{b}\right)}{x} dx$
- c) Trace the curve  $r = a \cos 2\theta$ .

Max. Marks: 56

SLR-FR-7

Set

09

09

#### Attempt any three from the following Q.6

Evaluate

d)

a)

- $\int \cos^6 3\theta \sin^2 6\theta d\theta$ Evaluate
- b) Trace the curve  $x = a(t + \sin t)$ ,  $y = a(1 + \cos t)$  $\int \int \frac{\frac{\pi}{2}}{\int \frac{\pi}{2}} \frac{\frac{\pi}{2}}{y} dy dx$
- Change the order of integration and evaluate c)
- d) Find the mass of the wire in the shape of the cardiod  $r = a(1 - \cos \theta)$ , if the density at any point of the wire is K times its distance from the pole.
- $1\sqrt{1+x^2}$ Evaluate  $\int_{0}^{1} \int_{0}^{1+x^{2}} \frac{dx \, dy}{1+x^{2}+y^{2}}$ e)

#### Q.7 Attempt any two from the following

- Evaluate  $\int_{1}^{1} (1 \sqrt{x})^{1/2} dx \int_{1}^{1/2} (2y 4y^2)^{\frac{1}{2}} dy$ a)
- Trace the curve  $ay^2 = x(a^2 x^2)$  with full justification. b)
- Find the area bounded by the parabola  $y^2 = 4x$  and the line C) 2x - 3y + 4 = 0

 $\int \int \int \int \int \int dz dx dy$ Change to polar co-ordinate system and evaluate e)

 $\int_{a}^{a} \int_{a}^{a} \frac{x^2 dx dy}{(x^2 + y^2)^{\frac{3}{2}}}$ 

Set

SLR-FR-7

09

No. F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019 **ENGINEERING MATHEMATICS – II** 

MCQ/Objective Type Questions

Day & Date: Friday, 22-11-2019

Time: 10:00 AM To 01:00 PM

**Duration: 30 Minutes** 

3)

Seat

Instructions: 1) All questions are compulsory.

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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.

 $\cos x \cos hy + i \sin x \sin hy$ 

m - n

 $\cos hx \sin hy - i \sin hx \sin hy$ 



$\prod x = \cos \theta + t \sin \theta \tan x$	$x^{5}$ – ———	•	
a) 2 cos 5 <i>θ</i>	b)	2 <i>i</i> cos 5θ	
c) $2\sin 5\theta$	d)	2 <i>i</i> sin 5θ	

2)	$\cos(x+iy) = $	
	a) $\cos x \cos y + \sin x \sin y$	b)
	c) $\cos x \cos hy - i \sin x \sin hy$	d)

C)  $\cos x \cos hy - i \sin x \sin hy$ 

The sufficient conditions for f(z) to be analytic is \_\_\_\_\_  $u_{x} = v_{y}, u_{y} = -v_{x}$ a)  $u_x = -v_x, \ u_y = v_y$ b)

c)  $u_x = v_y, u_y = v_x$ d)  $u_x = -v_y, u_y = v_x$ 

4)	The value of $B(1,n) + B(m,1)$ is	
,	a) $m+n$	b)

c) $\frac{m-n}{2}$	d)	m+n
mn		mn

- Which of the following is not true? 5)
  - $\frac{1}{2} = \sqrt{\pi}$  $\boxed{\frac{1}{4}} \quad \boxed{\frac{3}{4}} = \sqrt{2\pi}$ b) a) n+1 = n n $-2 = \infty$ d) C)

For the curve  $r = a \sin 3\theta$  the equations of tangents at the pole are \_\_\_\_\_. 6)

- b)  $\theta = \frac{\pi}{4}, \frac{2\pi}{4}, \frac{3\pi}{4}, \dots$ a)  $\theta = \frac{\pi}{2}, \frac{\pi}{3}, \frac{2\pi}{3}, \dots$ c)  $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \pi, ...$  $\theta = 0, \pi, 3\pi, \dots$ d)
- The curve  $y = x(x^2 1)$  is symmetrical \_ 7) a) About x-axis About y-axis b)
  - c) About the line y = xd) In opposite quadrants

SLR-FR-7

Max. Marks: 70



Marks: 14

8) Changing the order of the integration in the double integral Changing the order of the integral  $I = \int_{0}^{8} \int_{x/4}^{2} f(x, y) dy dx \quad \text{leads to} \quad I = \int_{r}^{s} \int_{p}^{q} f(x, y) dx dy \quad \text{What is q?}$ a) 4yb)  $16y^{2}$ d) x $1\pi/4$ The value of the integral  $\int_{0}^{1} \int_{0}^{n/4} 2r \sec^2\theta dr d\theta$  is \_\_\_\_\_. 9) a) -1 1 b) d) 2 c) 0 If the density at any point varies as the distance of the point from the x-10) axis, then  $\rho$  is equal to \_\_\_\_\_. b) Kxyd)  $K(x^2 + y^2)$ a) *Kx* c) KyThe differential equation  $\frac{dy}{dx} = \frac{a_1x+b_1y+c_1}{a_2x+b_2y+c_2}$  will be exact if \_\_\_\_\_. a)  $b_2 = -a_1$  b)  $a_2 = -b_1$ c)  $b_1 = a_2$  d)  $a_1 = b_2$ 11) Solution of  $\frac{dy}{dx} = -\frac{x}{y}$  at x = 1 and  $y = \sqrt{3}$  is \_\_\_\_\_. a)  $x - y^2 = 2$ b)  $x + y^2 = 4$ c)  $x^2 - y^2 = 2$ d)  $x^2 + y^2 = 4$ 12) a)  $x - y^2 = 2$ c)  $x^2 - y^2 = 2$ The factorial series  $\sum_{n!}^{1}$  is \_\_\_\_\_. 13) b) Divergent a) Convergent d) c) Oscillatory Absolutely convergent The series  $1^2 + 2^2 + 3^2 + ...$  is \_\_\_\_\_ a) Convergent b) 14) Divergent c) Oscillatory d) Absolutely convergent

SLR-FR-7

Set

# Seat No.

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019 **ENGINEERING MATHEMATICS – II** 

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Use of non-programmable calculator is allowed.
- 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book page no 3. Each question carries one mark.

## Section – I

#### Q.2 Attempt any three of the following.

- a) Solve  $(y^2 e^{xy^2} + 4x^3)dx + (2xye^{xy^2} 3y^2)dy = 0$ b) Solve  $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$
- Solve  $(1 + y^2)dx = (e^{\tan^{-1}y} x)dy$ . c)
- **d)** Find continued product of all values of  $\left(\frac{1}{2} + \frac{i\sqrt{3}}{2}\right)^{\frac{3}{4}}$ .
- e) Examine the convergence of  $\sum \sin^3\left(\frac{1}{n}\right)$ .

#### Q.3 Attempt any three of the following.

- a) Solve y(1 + xy)dx - x(1 - xy)dy = 0
- When a switch is closed, the current built up in an electric circuit is given b) by  $E = Ri + L \frac{di}{dt}$ . If L = 640, R = 250, E = 500 and i = 0 when t = 0, show that the current will approach 2 amp when  $t \to \infty$ .
- By cauchy's test examine the convergence of  $\sum \left(1 + \frac{1}{n}\right)^{n^2}$ . C)
- Find the analytic function whose real part is  $x^4 6x^2y^2 + y^4$ . d)
- Determine whether  $\cos hz$  is analytic, if so find its derivative. e)

#### Attempt any two of the following Q.4

- Find orthogonal trajectories of, a)
  - i)  $r^2 = a^2 \sin 2\theta$ .
  - ii)  $x^3 3xy^2 = a$ .
- Define absolute and conditional convergence. Examine the convergence of b) the series.  $-\frac{1}{2} + \frac{2}{5} - \frac{3}{10} + \dots + (-1)^n \frac{n}{n^2 + 1} + \dots$
- c) Show that the function  $u = e^x \cos y$  is harmonic. Also find its harmonic conjugate.

#### Section – II

#### Q.5 Attempt any three from the following

- **a)** Evaluate  $\int_{0}^{\infty} \sqrt{x} \bar{e}^{x^{3}} dx$  **b)** Evaluate  $\int_{0}^{\infty} \frac{\tan^{-1}\left(\frac{x}{a}\right) \tan^{-1}\left(\frac{x}{b}\right)}{x} dx$
- c) Trace the curve  $r = a \cos 2\theta$ .

Max. Marks: 56

SLR-FR-7

Set

09

09

10

# $\int \int \int \int \int \int dz dx dy$ Evaluate

d)

a)

Change to polar co-ordinate system and evaluate e)

#### Attempt any three from the following Q.6

- $\int \cos^6 3\theta \sin^2 6\theta d\theta$ Evaluate
- b) Trace the curve  $x = a(t + \sin t)$ ,  $y = a(1 + \cos t)$  $\int \int \frac{\frac{\pi}{2}}{\int \frac{\pi}{2}} \frac{\frac{\pi}{2}}{y} dy dx$
- Change the order of integration and evaluate c)
- d) Find the mass of the wire in the shape of the cardiod  $r = a(1 - \cos \theta)$ , if the density at any point of the wire is K times its distance from the pole.
- $1\sqrt{1+x^2}$ Evaluate  $\int_{0}^{1} \int_{0}^{1} \frac{dx \, dy}{1 + x^2 + y^2}$ e)

#### Q.7 Attempt any two from the following

- Evaluate  $\int_{1}^{1} (1 \sqrt{x})^{1/2} dx \int_{1}^{1/2} (2y 4y^2)^{\frac{1}{2}} dy$ a)
- Trace the curve  $ay^2 = x(a^2 x^2)$  with full justification. b)
- Find the area bounded by the parabola  $y^2 = 4x$  and the line C) 2x - 3y + 4 = 0

 $\int_{a}^{a} \int_{a}^{a} \frac{x^2 dx dy}{(x^2 + y^2)^{\frac{3}{2}}}$ 



09

02.1

INO.					
F.Y.	(B.Tech.) (Seme	ster – II) (New) (	(CBCS) Exam	nination Nov/D	ec-2019
	EN	<b>IGINEERING M</b> /	ATHEMATICS	5 — II	

Day & Date: Friday,22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Use of non-programmable calculator is allowed.
- 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book page no 3. Each question carries one mark.

M	CQ/Obj	ective	Туре	Questions	

Duration: 30 Minutes

Seat

- Q.1 Choose the correct alternatives from the options and rewrite the sentence.
  - 1) For the curve  $r = a \sin 3\theta$  the equations of tangents at the pole are \_\_\_\_\_.
    - a)  $\theta = \frac{\pi}{2}, \frac{\pi}{3}, \frac{2\pi}{3}, \dots$ b)  $\theta = \frac{\pi}{4}, \frac{2\pi}{4}, \frac{3\pi}{4}, \dots$ c)  $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \pi, \dots$ d)  $\theta = 0, \pi, 3\pi, \dots$
  - 2) The curve  $y = x(x^2 1)$  is symmetrical \_\_\_\_\_.
    - a) About x-axis
      b) About y-axis
      c) About the line y = x
      d) In opposite quadrants
  - 3) Changing the order of the integration in the double integral
  - $I = \int_{0}^{8} \int_{x/4}^{2} f(x, y) dy dx \quad \text{leads to} \quad I = \int_{r}^{s} \int_{p}^{q} f(x, y) dx dy \quad \text{What is q?}$  $\frac{16y^2}{x}$ b) a) 4y c) 8  $1 \pi / 4$  $\int_{0} \int_{0} 2r \sec^2\theta dr d\theta \quad \text{is} \____.$ The value of the integral 4) a) -1 b) 1 c) 0 d) 2 5) If the density at any point varies as the distance of the point from the xaxis, then  $\rho$  is equal to \_\_\_\_\_.
    - a) Kxc) Kyb) Kxyd)  $K(x^2 + y^2)$
  - 6) The differential equation  $\frac{dy}{dx} = \frac{a_1x+b_1y+c_1}{a_2x+b_2y+c_2}$  will be exact if \_\_\_\_\_. a)  $b_2 = -a_1$  b)  $a_2 = -b_1$ 
    - a)  $b_2 = -a_1$ b)  $a_2 = -b_1$ c)  $b_1 = a_2$ d)  $a_1 = b_2$

7) Solution of  $\frac{dy}{dx} = -\frac{x}{y}$  at x = 1 and  $y = \sqrt{3}$  is \_\_\_\_\_. a)  $x - y^2 = 2$ b)  $x + y^2 = 4$ c)  $x^2 - y^2 = 2$ d)  $x^2 + y^2 = 4$  Max. Marks: 70

Marks: 14

#### The factorial series $\sum_{n!} \frac{1}{n!}$ is \_\_\_\_\_. 8) a) Convergent b) Divergent Absolutely convergent c) Oscillatory d) The series $1^2 + 2^2 + 3^2 + \dots$ is \_\_\_\_ 9) a) Convergent Divergent b) c) Oscillatory d) Absolutely convergent If $x = \cos \theta + i \sin \theta$ then $x^5 - \frac{1}{x^5} =$ \_\_\_\_\_ 10) b) 2*i* cos 5θ a) $2\cos 5\theta$ c) $2 \sin 5\theta$ d) 2*i* sin 5θ 11) $\cos(x+iy) = \_\_\_.$ a) $\cos x \cos y + \sin x \sin y$ b) $\cos x \cos hy + i \sin x \sin hy$ c) $\cos x \cos hy - i \sin x \sin hy$ $\cos hx \sin hy - i \sin hx \sin hy$ d) The sufficient conditions for f(z) to be analytic is . 12) $u_x = v_y, u_y = -v_x$ a) $u_x = -v_x$ , $u_y = v_y$ b) d) C) $u_x = v_y, u_y = v_x$ $u_x = -v_y$ , $u_y = v_x$ 13) The value of B(1, n) + B(m, 1) is \_\_\_\_\_ b) a) m+nm - nc) $\underline{m-n}$ m + nd) mn mnWhich of the following is not true? 14) $\boxed{\frac{1}{4}} \quad \boxed{\frac{3}{4}} = \sqrt{2\pi}$ $\frac{1}{2} = \sqrt{\pi}$ b) a) $\boxed{n+1} = n \boxed{n}$ $\boxed{-2} = \infty$ c) d)

SLR-FR-7

Set

# Seat No.

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019 **ENGINEERING MATHEMATICS – II** 

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicates 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.

#### Section – I

#### Q.2 Attempt any three of the following.

- a) Solve  $(y^2 e^{xy^2} + 4x^3)dx + (2xye^{xy^2} 3y^2)dy = 0$ b) Solve  $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$
- Solve  $(1 + y^2)dx = (e^{\tan^{-1}y} x)dy$ . c)
- **d)** Find continued product of all values of  $\left(\frac{1}{2} + \frac{i\sqrt{3}}{2}\right)^{\frac{3}{4}}$ .
- e) Examine the convergence of  $\sum \sin^3\left(\frac{1}{n}\right)$ .

#### Q.3 Attempt any three of the following.

- a) Solve y(1 + xy)dx - x(1 - xy)dy = 0
- When a switch is closed, the current built up in an electric circuit is given b) by  $E = Ri + L \frac{di}{dt}$ . If L = 640, R = 250, E = 500 and i = 0 when t = 0, show that the current will approach 2 amp when  $t \to \infty$ .
- By cauchy's test examine the convergence of  $\sum \left(1 + \frac{1}{n}\right)^{n^2}$ . C)
- Find the analytic function whose real part is  $x^4 6x^2y^2 + y^4$ . d)
- Determine whether  $\cos hz$  is analytic, if so find its derivative. e)

#### Attempt any two of the following Q.4

- Find orthogonal trajectories of, a)
  - i)  $r^2 = a^2 \sin 2\theta$ .
  - ii)  $x^3 3xy^2 = a$ .
- Define absolute and conditional convergence. Examine the convergence of b) the series.  $-\frac{1}{2} + \frac{2}{5} - \frac{3}{10} + \dots + (-1)^n \frac{n}{n^2 + 1} + \dots$
- c) Show that the function  $u = e^x \cos y$  is harmonic. Also find its harmonic conjugate.

#### Section – II

#### Q.5 Attempt any three from the following

- **a)** Evaluate  $\int_{0}^{\infty} \sqrt{x} \bar{e}^{x^{3}} dx$  **b)** Evaluate  $\int_{0}^{\infty} \frac{\tan^{-1}\left(\frac{x}{a}\right) \tan^{-1}\left(\frac{x}{b}\right)}{x} dx$
- c) Trace the curve  $r = a \cos 2\theta$ .

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09

SLR-FR-7

Max. Marks: 56

09

Evaluate

d)

a)

Change to polar co-ordinate system and evaluate e)

#### Attempt any three from the following Q.6

- Evaluate  $\int \cos^6 3\theta \sin^2 6\theta d\theta$
- b) Trace the curve  $x = a(t + \sin t)$ ,  $y = a(1 + \cos t)$  $\int \int \frac{\frac{\pi}{2}}{\int \frac{\pi}{2}} \frac{\frac{\pi}{2}}{y} dy dx$
- Change the order of integration and evaluate c)
- d) Find the mass of the wire in the shape of the cardiod  $r = a(1 - \cos \theta)$ , if the density at any point of the wire is K times its distance from the pole.
- $1\sqrt{1+x^2}$ Evaluate  $\int_{0}^{1} \int_{0}^{1} \frac{dx \, dy}{1 + x^2 + y^2}$ e)

#### Q.7 Attempt any two from the following

- Evaluate  $\int_{1}^{1} (1 \sqrt{x})^{1/2} dx \int_{1}^{1/2} (2y 4y^2)^{\frac{1}{2}} dy$ a)
- Trace the curve  $ay^2 = x(a^2 x^2)$  with full justification. b)
- Find the area bounded by the parabola  $y^2 = 4x$  and the line C) 2x - 3y + 4 = 0

 $\int_{-\infty}^{4} \int_{-\infty}^{2\sqrt{z}} \int_{-\infty}^{\sqrt{4z-x^2}} dz dx dy$ 



10

09

Set

SLR-FR-7

# SLR-FR-8

Seat	
No.	

## F.Y. (B. Tech.) (Semester - II) (New) (CBCS) Examination Nov/Dec-2019 **ENGINEERING GRAPHICS & DESIGN**

Day & Date: Saturday, 23-11-2019 Time: 10:00 AM To 02:00 PM

**Instructions:** 1) All questions from each section are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Retain all construction lines
- 4) Assume suitable dimensions, wherever required and mention it clearly.
- 5) All dimensions are in 'mm'.
- 6) Return all the answer-sheet supplied irrespective of their use.

## \*Note: Objectives type answer-sheet must be returned after first 40 minutes strictly.

## Section I

#### Solve any FOUR: (Objective Type) Q.1

- Refer Fig. 1. Complete the projections of line AB 70mm long and makes 35<sup>°</sup> 03 a) with HP and the front view length is 55mm.
- Refer Fig. 2. Find the angle between intersecting lines PQ and QR. b) 03
- Refer Fig. 3. Complete the projections of line CD perpendicular to line SK at c) 03 point C. also find the TL of line CD
- Refer Fig. 4. Complete the projections of line RS 45mm long and parallel to d) 04 line MN. Also find the shortest distance between lines RS and MN. 04
- Refer Fig. 5. Find the strike and dip of given triangle ABC. e)
- Refer Fig. 6 Complete the top view of triangle PQR if it strikes S50<sup>0</sup>E and **f**) 03 dips 45<sup>°</sup>NE.

#### Q.2 Solve the following:

- Complete the projection of line AB and find its grade if 04 a)
  - 1) Its TVL is 70 mm
  - 2) Its inclination with VP is 40
  - Its apparent inclination with HP is 50 3)
  - Consider the point A to be 15mm away from both the reference planes.
- Complete the projections of line PQ if b)
  - It bears S 60 E W.R.T. P 1)
  - Its grade is positive 60 % W.R.T. P 2)
  - True length is 60 mm 3)
  - Consider the point P 10mm above HP and 15mm infront of VP.
- A rectangle ABCD of (50mm X 70mm) side is kept on VP on one of its C) 04 smaller side in VP. Complete the projections if surface of plane is inclined to VP in such way that the front view appears as a square.
- An isosceles triangular plate ABC having base, AB = 50 mm and height 70 mm is Q.3 07 so placed on corner 'C' in V.P such that the altitude passing through resting corner makes 40° with VP and 35° with HP
- A pentagonal prism of base side 35 mm and axis 70 mm, is resting on one of its Q.4 10 base corner in HP, in such a way that the lateral edge passing through that corner makes 40<sup>°</sup> to HP and the plane containing that lateral edge and axis of prism is inclined to VP by 35<sup>°</sup>. Draw the projection of prism.

03

Max. Marks: 70

# SLR-FR-8 Set P

A hexagonal pyramid (side of base 35 mm and height of axis 75 mm) rests on its edge of base on HRP. The face containing that edge makes 40<sup>°</sup> with HRP and resting edge of solid makes 35<sup>°</sup> to FRP. Draw projections.

#### Section II

- **Q.5** Figure shows a pictorial view of an object. Draw the following views, by using first **14** angle method of projection.
  - a) Sectional front view in X-direction along A-A;
  - b) Top view; and
  - c) Right hand side view



Q.6 A tetrahedron with all sides 70mm rest on one of its corner in HP and tilts to have 07 axis 45<sup>°</sup> to HP and parallel to VP. It is cut by horizontal cutting plane and bisecting the axis. Complete the projection and draw FV and sectional TV.

OR

A square pyramid base side 40mm and axis 70mm is lying on one of its triangular face on HP, with axis parallel to VP. It is cut by an AIP such that true shape is trapezium of parallel sides 40mm and 20mm, Draw FV, sectional TV and true shape of section. Also find angle made by cutting plane with HP.

**SLR-FR-8** 

Set

Ρ

07





A Hexagonal pyramid side of base 40 mm and axis 70 mm long is resting on base in HRP with a side parallel to FRP. It is cut by an auxiliary inclined plane passing through extreme right hand corner of base and inclined at 40<sup>0</sup> to HRP. Draw front view, top view and development of lateral surfaces of cut hexagonal pyramid.

Seat	
No.	

# F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019 **BASIC CIVIL ENGINEERING**

Day & Date: Monday, 25-11-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

- 3) Use of non programmable scientific calculator is allowed.
- 4) Assume suitable data if necessary and state it clearly.
- 5) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book

			MCQ/Objective 1	Гуре (	Questions	
Dura	tion: 3	0 Mir	nutes		Marks	: 14
Q.1	<b>Choc</b> 1)	o <b>se t</b> l Civil a) c)	<b>he correct alternatives from</b> t Engineering deals with the ba Air Shelter	t <b>he op</b> sic ne b) d)	b <b>tions and rewrite the sentence.</b> Weds of life except Water Electricity	14
	2)	Map a) c)	is drawing where scale is Small Medium	b) d)	 Large Any of the above	
	3)	The a) c)	total number of brass tally in 3 2 4	0 met b) d)	er metric chain are 3 5	
	4)	To r instr a) c)	nark perpendicular offset from rument is used Open Cross staff Optical square	fixed b) d)	point on survey line following French cross staff None of these	
	5)	The a) c)	most common coagulant is magnesium sulphate chorine	b) d)	 alum bleaching powder	
	6)	Barı a) c)	ier constructed across the rive Storage reservoir Both a and b	r is ca b) d)	lled as Dam None of these	
	7)	In b a) c)	road gauge the inner distance 1.767 m 0.762 m	betwe b) d)	en rails is 1.762 m 1.676 m	
	8)	The as _ a) c)	lowest part of a structure whic  Super -structure Foundation	h tran b) d)	smits the load to the soil is known Plinth Basement	
	9)	Seq a) b) c) d)	uence of load transfer in frame Beam, Column, Foundation a Column, Slab, Beam, Founda Foundation, Beam, Column, S Slab, Beam, Column and Fou	ed stru nd Sla ition Slab indatio	cture is ab on	

SLR-FR-9



Max. Marks: 70

# **SLR-FR-9**

- Set P
- Following is not an element of super-structure of building \_\_\_\_\_. 10)
  - Lintel a) Plinth C)
- b) Window d) Parapat
- Initial setting Time of Ordinary Portland Cement (OPC) is \_\_\_\_\_. 11)
  - a) 20 Min b) 400 Min 30 Min
    - 600 Min d)
- 12) GIS stands for .

C)

- Geographic Information System a)
- Generic Information System b)
- c) Geological Information System
- Geographic Information Sharing d)
- The study of something without making actual contact with the object of 13) study is \_\_
  - b) Contouring a) Remote sensing
  - d) C) Triangulation GPS
- 14) Building bye-laws are laid
  - To prevent hapazard growth of city a)
  - b) To avoid air and noise pollution
  - To ensure proper light of ventilation, parking etc c)
  - All of above d)

# SLR-FR-9

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F.Y.	(B.Tech.) (Seme	ester – II) (New) (CBCS) Examination Nov/Dec-2	201	19
		BASIC CIVIL ENGINEERING		

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Use of non programmable scientific calculator is allowed.
- 4) Assume suitable data if necessary and state it clearly.

## Section – I

# Q.2 Attempt any four of the following questions.

- a) With neat sketch of road in cutting explain its various functional components
- b) With example show that local attraction at station doesn't affect on included angle at that station.
- c) Enlist the sub domains of civil engineering and explain any two.
- d) Explain the chlorine treatment stating its advantages and requirement.
- e) With neat sketch explain different components of earthen dam.
- f) Enlist general principles of Surveying and explain them.
- g) What are the different works which are executed by civil engineer?

## **Q.3** Attempt any two of the following questions.

Stations

BS

- a) 1) Enlist different methods of irrigation and explain border strip method with neat sketch stating its advantages and disadvantages.
  - 2) With neat sketch explain Water Bound Macadam road structure.
- **b)** Following readings are taken in a closed compass traverse. Draw the rough traverse, Calculate the induced angles and check for the local attraction and angular error. Calculate the corrected bearings. Give the sample calculations.

Stations	А	В	С	D	Е
F.B.	N 82° E	S 55° E	S 47° W	N 7I° W	N 6° W
B.B	S 4º 38' E	S 83° W	N 53° 30' W	N 47° E	S 75° E

В

2.005

С

1.650

D 2.550

c) In running fly levels from a bench mark at A the following readings were recorded.

А

1.500

	FS	0.800	1.760	2.365				
From the last position of instrument it is required to set five pegs at interval								
of 20 m on r	of 20 m on rising gradient of 1 in 50. If the Reduced Level of first peg is							
250.500 m. Determine staff readings and Reduced Levels of those pegs.								
Also determ	ine the Red	luced Leve	els of statio	ons A, B, ar	nd C if Re	duced		
Level of stat	ion D is 250	).230 m. L	Jse height	of instrume	ent metho	d.		

Max. Marks: 56

16

12

Set

Seat No.

## Section – II

# Q.4 Attempt any four of the following questions.

- a) A bungalow is to be constructed on a plot 20 m x 20 m with G+1 storey, permissible FSI is 1.2 and front margin is 3 m and side margin is 1.5 m each. If maximum construction is to be made on G.F. compute the area that can be construct on F.F.
- **b)** Enlist Principles of planning. Discuss any two principles with neat sketches.
- c) Differentiate between Sub-structure and Super structure.
- d) Write note on Remote sensing.
- e) Differentiate between PCC and RCC.
- f) Write note on Energy Efficient Building.

## Q.5 Attempt any two of the following questions.

- a) Draw the cross section of building showing various elements of building. Explain any four in brief.
- **b)** Write note on:
  - 1) Global Positioning System
  - 2) Geographic Information System
- c) Write Ideal Engineering Properties and uses of following building materials.
  - 1) Stone
  - 2) Brick
  - 3) Cement



SLR-FR-9

Set

# F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019

Day & Date: Monday, 25-11-2019

Time: 10:00 AM To 01:00 PM

Seat

No.

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Use of non programmable scientific calculator is allowed.

**BASIC CIVIL ENGINEERING** 

- 4) Assume suitable data if necessary and state it clearly.
- 5) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book.

## **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The lowest part of a structure which transmits the load to the soil is known 1)
  - as \_\_\_\_\_.
    - Super -structure b) a) Plinth
    - c) Foundation d) Basement
- 2) Sequence of load transfer in framed structure is \_\_\_\_\_.
  - Beam, Column, Foundation and Slab a)
    - Column, Slab, Beam, Foundation b)
    - Foundation, Beam, Column, Slab C)
    - Slab, Beam, Column and Foundation d)

Following is not an element of super-structure of building \_\_\_\_\_. 3)

- a) Lintel Window b)
- Plinth C) d) Parapat

4) Initial setting Time of Ordinary Portland Cement (OPC) is .

- 20 Min 400 Min a) b)
- 30 Min d) 600 Min C)
- GIS stands for 5)
  - **Geographic Information System** a)
  - **Generic Information System** b)
  - **Geological Information System** c)
  - Geographic Information Sharing d)
- The study of something without making actual contact with the object of 6) study is .
  - Remote sensing a) b)
  - Triangulation d) GPS c)
- 7) Building bye-laws are laid \_
  - To prevent hapazard growth of city a)
  - To avoid air and noise pollution b)
  - To ensure proper light of ventilation, parking etc c)
  - All of above d)
- Civil Engineering deals with the basic needs of life except \_\_\_\_\_. 8)
  - Air a) Shelter c)
    - Water b) Electricity d)

Contouring



Set

Max. Marks: 70

Marks: 14
					Set	Q	
9)	Map a) c)	is drawing where scale is Small Medium	b) d)	 Large Any of the above			
10)	The a) c)	total number of brass tally in 30 2 4	mete b) d)	er metric chain are 3 5			
11)	To n instr a) c)	nark perpendicular offset from fi ument is used Open Cross staff Optical square	xed p b) d)	ooint on survey line following French cross staff None of these			
12)	The a) c)	most common coagulant is magnesium sulphate chorine	b) d)	 alum bleaching powder			
13)	Barr a) c)	ier constructed across the river Storage reservoir Both a and b	is cal b) d)	led as Dam None of these			
14)	In br a) c)	road gauge the inner distance b 1.767 m 0.762 m	etwee b) d)	en rails is 1.762 m 1.676 m			

SLR-FR-9

# SLR-FR-9

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F.Y.	(B.Tech.) (Seme	ster – II) (New) (CBCS) Examination Nov/Dec-20	19
		BASIC CIVIL ENGINEERING	

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Seat No.

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Use of non programmable scientific calculator is allowed.
- 4) Assume suitable data if necessary and state it clearly.

# Section – I

# **Q.2** Attempt any four of the following questions.

- a) With neat sketch of road in cutting explain its various functional components
- b) With example show that local attraction at station doesn't affect on included angle at that station.
- c) Enlist the sub domains of civil engineering and explain any two.
- d) Explain the chlorine treatment stating its advantages and requirement.
- e) With neat sketch explain different components of earthen dam.
- f) Enlist general principles of Surveying and explain them.
- g) What are the different works which are executed by civil engineer?

# Q.3 Attempt any two of the following questions.

Stations

- a) 1) Enlist different methods of irrigation and explain border strip method with neat sketch stating its advantages and disadvantages.
  - 2) With neat sketch explain Water Bound Macadam road structure.
- **b)** Following readings are taken in a closed compass traverse. Draw the rough traverse, Calculate the induced angles and check for the local attraction and angular error. Calculate the corrected bearings. Give the sample calculations.

Stations	А	В	С	D	E
F.B.	N 82° E	S 55° E	S 47° W	N 7I° W	N 6° W
B.B	S 4º 38' E	S 83° W	N 53° 30' W	N 47° E	S 75° E

c) In running fly levels from a bench mark at A the following readings were recorded.

А

	BS	1.500	2.005	1.650	2.550				
	FS	0.800	1.760	2.365					
the last position of instrument it is required to set five pegs at inte									
m on rising gradient of 1 in 50. If the Reduced Level of first peg is									
00 m. Determine staff reading a and Deduced Levels of these read									

В

С

D

From the last position of instrument it is required to set five pegs at interval of 20 m on rising gradient of 1 in 50. If the Reduced Level of first peg is 250.500 m. Determine staff readings and Reduced Levels of those pegs. Also determine the Reduced Levels of stations A, B, and C if Reduced Level of station D is 250.230 m. Use height of instrument method.

Max. Marks: 56

16

## Section – II

# Q.4 Attempt any four of the following questions.

- a) A bungalow is to be constructed on a plot 20 m x 20 m with G+1 storey, permissible FSI is 1.2 and front margin is 3 m and side margin is 1.5 m each. If maximum construction is to be made on G.F. compute the area that can be construct on F.F.
- **b)** Enlist Principles of planning. Discuss any two principles with neat sketches.
- c) Differentiate between Sub-structure and Super structure.
- d) Write note on Remote sensing.
- e) Differentiate between PCC and RCC.
- f) Write note on Energy Efficient Building.

## Q.5 Attempt any two of the following questions.

- a) Draw the cross section of building showing various elements of building. Explain any four in brief.
- **b)** Write note on:
  - 1) Global Positioning System
  - 2) Geographic Information System
- c) Write Ideal Engineering Properties and uses of following building materials.
  - 1) Stone
  - 2) Brick
  - 3) Cement



SLR-FR-9

Set Q

# No. F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019 **BASIC CIVIL ENGINEERING**

Day & Date: Monday, 25-11-2019

Time: 10:00 AM To 01:00 PM

Seat

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

- 3) Use of non programmable scientific calculator is allowed.
- 4) Assume suitable data if necessary and state it clearly.
- 5) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book

### **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

#### Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The most common coagulant is \_\_\_\_ 1)
  - magnesium sulphate b) alum a) bleaching powder chorine c) d)
- 2) Barrier constructed across the river is called as
  - Storage reservoir a) b) Dam
  - Both a and b None of these c) d)

3) In broad gauge the inner distance between rails is \_\_\_\_

- 1.767 m a) b) 1.762 m
- 0.762 m d) 1.676 m c)
- 4) The lowest part of a structure which transmits the load to the soil is known
  - as a) Super -structure b) Plinth
  - Foundation d) Basement c)
- 5) Sequence of load transfer in framed structure is \_\_\_\_\_.
  - Beam, Column, Foundation and Slab a)
  - Column, Slab, Beam, Foundation b)
  - Foundation, Beam, Column, Slab c)
  - Slab, Beam, Column and Foundation d)

Following is not an element of super-structure of building \_\_\_\_\_. 6)

- a) Lintel b) Window
- c) Plinth d) Parapat

Initial setting Time of Ordinary Portland Cement (OPC) is \_\_\_\_\_. 7)

- 20 Min b) 400 Min a)
- 30 Min 600 Min c) d)
- 8) GIS stands for \_\_\_\_\_
  - Geographic Information System a)
  - **Generic Information System** b)
  - **Geological Information System** c)
  - **Geographic Information Sharing** d)

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Max. Marks: 70

Marks: 14



Set R 9) The study of something without making actual contact with the object of study is \_\_\_\_\_ a) Remote sensing b) Contouring Triangulation d) GPS C) 10) Building bye-laws are laid To prevent hapazard growth of city a) To avoid air and noise pollution b) To ensure proper light of ventilation, parking etc C) All of above d) 11) Civil Engineering deals with the basic needs of life except \_\_\_\_\_. Air Water a) b) Shelter C) d) Electricity 12) Map is drawing where scale is \_\_\_\_\_ Small b) Large a) c) Medium d) Any of the above The total number of brass tally in 30 meter metric chain are \_\_\_\_\_. 13) a) 2 b) 3 c) 4 d) 5 14) To mark perpendicular offset from fixed point on survey line following instrument is used . Open Cross staff b) French cross staff a) Optical square c) d) None of these

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# SLR-FR-9

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Seat No.

Instructions: 1) All questions are compulsory.

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

**BASIC CIVIL ENGINEERING** 

4) Assume suitable data if necessary and state it clearly.

# Section – I

# Q.2 Attempt any four of the following questions.

- With neat sketch of road in cutting explain its various functional components a)
- b) With example show that local attraction at station doesn't affect on included angle at that station.
- c) Enlist the sub domains of civil engineering and explain any two.
- d) Explain the chlorine treatment stating its advantages and requirement.
- With neat sketch explain different components of earthen dam. e)
- Enlist general principles of Surveying and explain them. f)
- g) What are the different works which are executed by civil engineer?

#### Q.3 Attempt any two of the following questions.

Stations

- 1) Enlist different methods of irrigation and explain border strip method a) with neat sketch stating its advantages and disadvantages.
  - With neat sketch explain Water Bound Macadam road structure. 2)
- **b)** Following readings are taken in a closed compass traverse. Draw the rough traverse, Calculate the induced angles and check for the local attraction and angular error. Calculate the corrected bearings. Give the sample calculations.

Stations	А	В	С	D	E
F.B.	N 82° E	S 55° E	S 47° W	N 7I° W	N 6° W
B.B	S 4º 38' E	S 83° W	N 53° 30' W	N 47° E	S 75° E

In running fly levels from a bench mark at A the following readings were C) recorded.

А

	BS	1.500	2.005	1.650	2.550	
	FS	0.800	1.760	2.365		
From the last	st position o	of instrume	nt it is requ	uired to set	five pegs	at interval
of 20 m on I	ising gradie	ent of 1 in 8	50. If the R	Reduced Le	vel of first	t peg is
250.500 m.	Determine :	staff readir	has and Re	educed Lev	els of tho	se peas.

В

С

D

of 20 250. Also determine the Reduced Levels of stations A, B, and C if Reduced Level of station D is 250.230 m. Use height of instrument method.

Max. Marks: 56

16



#### Section – II

### Q.4 Attempt any four of the following questions.

- A bungalow is to be constructed on a plot 20 m x 20 m with G+1 storey, a) permissible FSI is 1.2 and front margin is 3 m and side margin is 1.5 m each. If maximum construction is to be made on G.F. compute the area that can be construct on F.F.
- **b)** Enlist Principles of planning. Discuss any two principles with neat sketches.
- Differentiate between Sub-structure and Super structure. C)
- d) Write note on Remote sensing.
- e) Differentiate between PCC and RCC.
- Write note on Energy Efficient Building. f)

#### Q.5 Attempt any two of the following questions.

- Draw the cross section of building showing various elements of building. a) Explain any four in brief.
- **b)** Write note on:
  - 1) Global Positioning System
  - 2) Geographic Information System
- c) Write Ideal Engineering Properties and uses of following building materials.
  - 1) Stone
  - 2) Brick
  - 3) Cement



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Set R

# Set F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019 **BASIC CIVIL ENGINEERING**

Day & Date: Monday, 25-11-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

- 3) Use of non programmable scientific calculator is allowed.
- 4) Assume suitable data if necessary and state it clearly.
- 5) Q. No. 1 is compulsory. It should be solved in first 30 minutes in answer book

#### **MCQ/Objective Type Questions**

**Duration: 30 Minutes** 

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
  - Following is not an element of super-structure of building . 1)
    - Lintel Window a) b)
    - Plinth d) Parapat c)
  - 2) Initial setting Time of Ordinary Portland Cement (OPC) is \_\_\_\_\_.
    - 20 Min 400 Min a) b) 600 Min
    - 30 Min c) d)
  - 3) GIS stands for
    - Geographic Information System a)
    - **Generic Information System** b)
    - **Geological Information System** c)
    - d) Geographic Information Sharing
  - 4) The study of something without making actual contact with the object of study is \_\_\_\_\_.
    - Remote sensing a)
- b) Contouring d) GPS
- Triangulation c)
- Building bye-laws are laid 5)
  - To prevent hapazard growth of city a)
  - To avoid air and noise pollution b)
  - To ensure proper light of ventilation, parking etc C)
  - d) All of above

6) Civil Engineering deals with the basic needs of life except .

- Air Water a) b)
- Shelter Electricity c) d)

7) Map is drawing where scale is \_\_\_\_\_

b) Small Large a) Medium d) Any of the above c)

The total number of brass tally in 30 meter metric chain are \_\_\_\_\_. 8)

- a) 2 b) 3
- 4 5 c) d)

Max. Marks: 70

Marks: 14

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# Seat No.



- b) Column, Slab, Beam, Foundation
- c) Foundation, Beam, Column, Slab
- d) Slab, Beam, Column and Foundation

# F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination Nov/Dec-2019 **BASIC CIVIL ENGINEERING**

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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### Section – I

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- c) Enlist the sub domains of civil engineering and explain any two.
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- With neat sketch explain different components of earthen dam. e)
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BS

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А

1.500

	FS	0.800	1.760	2.365				
From the las	st position o	of instrume	nt it is requ	uired to set	five pegs	at interval		
of 20 m on rising gradient of 1 in 50. If the Reduced Level of first peg is								
250.500 m. Determine staff readings and Reduced Levels of those pegs.								
Also determ	ine the Red	luced Leve	els of statio	ons A, B, ar	nd C if Re	duced		

В

2.005

С

1.650

D

2.550

Level of station D is 250.230 m. Use height of instrument method.

Max. Marks: 56

16

12



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Seat No.

#### Section – II

### Q.4 Attempt any four of the following questions.

- a) A bungalow is to be constructed on a plot 20 m x 20 m with G+1 storey, permissible FSI is 1.2 and front margin is 3 m and side margin is 1.5 m each. If maximum construction is to be made on G.F. compute the area that can be construct on F.F.
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  - 2) Brick
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Set S