Day & Date: Thursday, 02-05-2019 Time: 10:00 AM To 01:00 PM minutes. **Duration: 30 Minutes** Q.1 Choose the correct alternative. 1)

Seat

No.

- If $y = \cos^2 x$, then $y_n =$ _____ a) $2^n \cos(2x + n\frac{\pi}{2})$ c) $2^{n-1} \sin \left(2x + n \frac{\pi}{2} \right)$
- b) $2^{n-1}\cos\left(2x+n\frac{\pi}{2}\right)$ d) None of these 2)
- If $y = x^2 e^x$, then $y_n =$ _____. a) $e^x (x^2 + 2nx + n^2 n)$. b) $e^x(x^2 + 2x + 1)$ c) $e^{x}(x^{2} + 2nx - 1)$ d) $e^{x}(x^{2} + 2nx + n^{2})$ 3)
 - If $y = \sin^{-1} x$, then x =_____. a) $1 + y + \frac{y^2}{2!} + \frac{y^3}{3!} + \cdots$ b) $1 - y + \frac{y^2}{2!} - \frac{y^3}{3!} + \cdots$ d) $y + \frac{y^3}{3!} + \frac{y^5}{5!} + \cdots$ c) $y - \frac{y^3}{3!} + \frac{y^5}{5!} \dots$
- 4) In Taylor's series expansion of $e^x + \sin x$ about the point $x = \pi$, the coefficient of $(x - \pi)^2$ is _____.
 - a) e^{π} $e^{\pi} + 1$ b) *e*^π c) $e^{\pi} - 1$ d) $\overline{2}$

5) If the determinant of square matrix A of order m is equal to zero, then the rank of A is L- \ loog thop m

a)	equal to m	b)	less than m
C)	greater than m	d)	none of these

u) The system of equations AX = B is inconsistent if 6) rank of A = rank of (A:B) a) rank of $A \neq$ rank of (A:B) b) c) rank of A = rank of B None of these d) The eigen values of the matrix $\begin{bmatrix} 1 & 3 & -1 \\ 0 & 2 & 4 \\ 0 & 0 & 5 \end{bmatrix}$ are _____ 7) a) 0,2,5 b) 1, 2, 5 d) -1, -2, -5 c) 1, −2, −5 8) If $u = \tan^{-1}\left(\frac{x^3 + y^3}{x - y}\right)$ then the value of $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} =$ _____. a) $\cos 2u$ b) tan 2*u* d) C) 2u sin 2*u*

F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination April/May-2019 **ENGINEERING MATHEMATICS – I**

Instructions: 1) All questions are compulsory and Q. No. 1 Should be solve in first 30

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

MCQ/Objective Type Questions

SLR-FJ-1

Max. Marks: 70

Set

Marks: 14

			Set
9)	If $x = e^u \cos v$, $y = e^u \sin v$ then value	e of $\frac{\partial}{\partial t}$	(x,y) =
	a) e^{-u} c) e^{u}	b) d)	e^{2u} e^{-2u}
10)	If $\frac{\delta P}{P} = 2 \frac{\delta E}{E} - \frac{\delta R}{R}$ and percentage error 1% then percentage error in <i>P</i> is	in <i>E</i> :	and <i>R</i> are respectively 2% and
	a) 3% c) 1%	b) d)	4% 5%
11)	The function $f(x, y) = 0$ has a saddle a) $rf - s^2 > 0$ c) $rf - s^2 < 0$	poin b) d)	t if $rf - s^2 = 0$ None of these
12)	Which of the following is true? a) div (grad ϕ) = $\nabla \times \nabla \phi$ c) curl (grad ϕ) = $\nabla^2 \phi$	b) d)	div (grad ϕ) = ∇ . $\nabla \phi$ curl (div ϕ) = $\nabla^2 \phi$
13)	If $\bar{r} = ae^{3t} + be^{2t}$ then at $t = 0, \frac{d\bar{r}}{dt} = -a$ a) a c) $2b + 3a$	b) d)	b 2a + 3b
14)	Curl $(xyi + yzj + zxk)$ at (1,1,1) is a) $i + j + k$ c) $\sqrt{3}$	b) d)	$\begin{array}{c} - \cdot \\ 0 \\ -(i+j+k) \end{array}$

SLR-FJ-1

Ρ

• • •	. (D	ENGINEERING MATHEMATICS – I	May-2013
Day & Time	& Dat : 10:0	te: Thursday, 02-05-2019 Ma 00 AM To 01:00 PM	ax. Marks: 56
Instr	uctio	 ons: 1) All questions are compulsory. 2) Figures to the right indicate fill marks. 3) Use of non-programmable calculator is allowed. 	
		Section – I	
Q.2	Solv	ve any three of the following	09
	a) b) c)	Find the <i>n</i> th derivation of $\frac{3x}{2x^2-x-1}$ Expand $x^5 - x^4 + x^3 - x^2 + x - 1$ in power's of $(x - 1)$. Evaluate $\lim_{x \to 0} \frac{xe^x - \log(1 + x)}{x^2}$	
	d)	Find the rank of matrix by reducing to normal form.	
	-	$\begin{bmatrix} 6 & 1 & 3 & 8 \\ 4 & 2 & 6 & -1 \\ 10 & 3 & 9 & 7 \\ 16 & 4 & 12 & 15 \end{bmatrix}$	
	e)	Verify the Cayley- Hamilton theorem for the matrix A.	
		Where $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$	
Q.3	Solv	ve any three of the following	09
	a)	Prove that $sin^{-1}(3x-4x^3) = 3\left[x + \frac{x^3}{6} + \frac{3}{40}x^5 + \cdots\right]$	
	b)	Find the value of constant a and b such that $\lim_{x\to 0} \frac{a \cosh x - b \cos x}{2} = 1$	1
	c)	Solve the system of equations $x + 3y + 2z = 0$; $2x - y + 3z = 0$; 3x - 5y + 4z = 0; $x + 17y + 4z = 0$	
	d)	Examine whether the following vectors are linearly independent or dependent? If dependent then find the relation between them. $[2, -1, 3, 2], [1, 3, 4, 2], [3, -5, 2, 2]$	
	e)	Verify the Cauchy's mean value theorem for the functions, $f(x) = \sqrt{x+9}$ and $g(x) = \sqrt{x}$ in [0, 16]	
Q.4	Solv a)	ve any two of the following Find the eigen values and corresponding eigen vector of the matrix where $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$	10 A,
	b)	If $y = \sin(m \sin^{-1} x)$, prove that $(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} + (m^2 - n^2)y_n = 0$	
	C)	Expand $e^{x \sin x}$ in ascending power of x upto x^4 .	
0 F	0	Section – II	~~
Q.5	SOIN a)	ve any three $\partial^3 u$ (1 + 2 + 2 + 2 + 2 + 2)	09

Seat No.

E Y (B Tech) (Semester - I) (New) (CBCS) Examination April/May-2019

Page **3** of **16**

a) If $u = 9^{xyz}$, prove that $\frac{\partial^3 u}{\partial x \partial y \partial z} = (1 + 3xyz + x^2 y^2 z^2)e^{xy}$ b) If $z = x^2 + y^2$, $x = \cos t$, $y = \sin t$, find $\frac{dz}{dt}$ at $t = \pi$

Set Ρ

SLR-FJ-1

- If $x = e^u \cos v$, $y = e^u \sin v$, prove that JJ' = 1c)
- A rectangular box with open top has a given volume. Find the dimensions d) of the box such that the material required is minimum.
- Find the angle between the tangent planes to the surfaces $x \log z = y^2 1$ e) and $x^2y = 2 - z$ at (1, 1, 1).

Solve any three Q.6

- **a)** If $x = u \tan v$, $y = u \sec v$ prove that $\left(\frac{\partial u}{\partial x}\right)_{v} \cdot \left(\frac{\partial v}{\partial x}\right)_{v} = \left(\frac{\partial u}{\partial y}\right)_{n} \cdot \left(\frac{\partial v}{\partial y}\right)_{x}$
- **b)** If z = f(x, y) find $x = uv, y = u^2 v^2$ then prove that $2\frac{\partial z}{\partial v} = \frac{1}{u^2 + v^2} \left[u \frac{\partial z}{\partial u} v \frac{\partial z}{\partial v} \right]$

c) If
$$f(x, y, z) = x^3y^2z^4$$
 find approximate value of f when $x = 1.99$
 $y = 3.01$ $z = 0.99$

- y = 3.01, z = 0.99Find unit vector normal to the surface $x^2y + 2xz^2 = 8$ at the point (1,0,2) d)
- Find the tangential and normal component of acceleration of particle e) morning on the curve $x = t^3 + 1$, $y = t^2$, z = t at t = 1

Solve any two Q.7

State Euler's theorem. If $u = \frac{1}{x^2} + \frac{1}{xy} + \frac{\log x - \log y}{x^2 + y^2}$ a) nrove that

1)
$$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + 2u = 0$$

2) $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = 6u$

- Find the extreme values of $\sin x + \sin y + \sin(x + y)$ b)
- Show that the vector c) $\bar{F} = (6xy + z^3)i + (3x^2 - z)j + (3x z^2 - y)k$ is irrotational. Find the function ϕ such that $\overline{F} = -\nabla \phi$

09

a) c)	$rf - s^2 > 0$ $rf - s^2 < 0$	b) d)	$rf - s^2 = 0$ None of these
Whi a) c)	ich of the following is true? div (grad ϕ) = $\nabla \times \nabla \phi$ curl (grad ϕ) = $\nabla^2 \phi$	b) d)	div (grad ϕ) = ∇ . $\nabla \phi$ curl (div ϕ) = $\nabla^2 \phi$
If $ar{r}$	$= ae^{3t} + be^{2t}$ then at $t = 0, \frac{d\bar{r}}{dt} = -$		_·
a) c)	a 2b + 3a	b) d)	b 2a + 3b
Cur	I (<i>xyi</i> + <i>yzj</i> + <i>zxk</i>) at (1,1,1) is		
a) c)	$\frac{i+j+k}{\sqrt{3}}$	b) d)	$0 \\ -(i+j+k)$
lf y a)	= $\cos^2 x$, then $y_n =$ $2^n \cos(2x + n\frac{\pi}{2})$	b)	$2^{n-1}\cos\left(2x+n\frac{\pi}{2}\right)$
c)	$2^{n-1}\sin\left(2x+n\frac{\pi}{2}\right)$	d)	None of these
lf <i>y</i> a) c)	= $x^2 e^x$, then $y_n = $ $e^x (x^2 + 2nx + n^2 - n)$ $e^x (x^2 + 2nx - 1)$	b) d)	$e^{x}(x^{2} + 2x + 1)$ $e^{x}(x^{2} + 2nx + n^{2})$

MCQ/Objective Type Questions

Duration: 30 Minutes

8)

9)

Q.1

Cho	ose the correct alternative	
1)	If $u = \tan^{-1}\left(\frac{x^3 + y^3}{x - y}\right)$ then the	e value of $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} =$
	a) cos 2uc) 2u	 b) tan 2u d) sin 2u
2)	If $x = e^u \cos v$, $y = e^u \sin v$ a) e^{-u}	then value of $\frac{\partial (x,y)}{\partial (u,v)} =$ b) e^{2u}

3) ly 2% and

)	If $\frac{\delta P}{P} = 2 \frac{\delta E}{E} - \frac{\delta R}{R}$ and percentage e	error in E	and R are respectivel
	1% then percentage error in P is		
	a) 3%	b)	4%
	c) 1%	d)	5%

	,	,	
4)	The function $f(x, y) = 0$ has a	saddle point if	
	a) $rf - s^2 > 0$	b) $rf - s^2 =$	0
	c) $rf - s^2 < 0$	d) None of th	פו

a)
$$rf - s^2 > 0$$

b) $rf - s^2 = 0$
c) $rf - s^2 < 0$
d) None of these

5) Which of the following is true?
a) div (grad
$$\phi$$
) = $\nabla \times \nabla \phi$
b) div (grad ϕ) = $\nabla^2 \phi$
c) curl (grad ϕ) = $\nabla^2 \phi$

6) If
$$\bar{r} = ae^{3t} + be^{2t}$$
 then at $t = 0, \frac{d\bar{r}}{dt} =$ _____.

a)
$$a$$
 b)
c) $2b + 3a$ d)

7) Curl
$$(xyi + yzj + zxk)$$
 at $(1,1,1)$ is _____.
a) $i + j + k$ b) 0
c) $\sqrt{3}$ d) $-(i + j + k)$

d) 5%
on
$$f(x, y) = 0$$
 has a saddle point if _____
 $x^2 > 0$ b) $rf - s^2$

c)
$$e^u$$
 d) e^{-2u}
If $\frac{\delta P}{P} = 2 \frac{\delta E}{E} - \frac{\delta R}{R}$ and percentage error in *E* and *R* are 1% then percentage error in *P* is _____.

F.Y. (B.Tech.) (Semester – I) (New) (CBCS) Examination April/May-2019 ENGINEÉRING MATHEMATICS - I

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o. 1 Should be solve in first 30
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Marks: 14

14

Max. Marks: 70

Q

SLR-FJ-1

Day & Date: Thursday, 02-05-2019

Time: 10:00 AM To 01:00 PM

SLR-FJ-1 Set

10) If $y = \sin^{-1} x$, then x =_____. a) $1 + y + \frac{y^2}{2!} + \frac{y^3}{3!} + \cdots$ c) $y - \frac{y^3}{3!} + \frac{y^5}{5!} \cdots$

b) $1 - y + \frac{y^2}{2!} - \frac{y^3}{3!} + \cdots$ d) $y + \frac{y^3}{3!} + \frac{y^5}{5!} + \cdots$

- In Taylor's series expansion of $e^x + \sin x$ about the point $x = \pi$, the 11) coefficient of $(x - \pi)^2$ is _____.
 - a) e^{π} c) $e^{\pi} - 1$
- $e^{\pi} + 1$ e^{π} b) d) $\overline{2}$
- If the determinant of square matrix A of order m is equal to zero, then the 12) rank of A is .
 - a) equal to m
- b) less than m
- none of these c) greater than m d)
- The system of equations AX = B is inconsistent if _ 13)
 - a) rank of A \neq rank of (A:B)
 - c) rank of A = rank of B
- rank of A = rank of (A:B) b) None of these
- d)
- The eigen values of the matrix $\begin{bmatrix} 1 & 3 & -1 \\ 0 & 2 & 4 \\ 0 & 0 & 5 \end{bmatrix}$ are ____ 14)
 - a) 0, 2, 5
 - c) 1, -2, -5

- b) 1, 2, 5 d) -1, -2, -5

Г.1	. (В	ENGINEERING MATHEMATICS – I	2019
Day & Time	& Dat : 10:0	te: Thursday, 02-05-2019 Max. Ma 00 AM To 01:00 PM	rks: 56
Instr	uctio	 ans: 1) All questions are compulsory. 2) Figures to the right indicate fill marks. 3) Use of non-programmable calculator is allowed. 	
		Section – I	
Q.2	Solv	ve any three of the following	09
	a)	Find the n^{th} derivation of $\frac{3x}{2x^2-x-1}$	
	b) c)	Expand $x^5 - x^4 + x^3 - x^2 + x - 1$ in power's of $(x - 1)$. Evaluate $\lim_{x \to 0} \frac{xe^x - \log(1 + x)}{x^2}$	
	d)	Find the rank of matrix by reducing to normal form.	
		$\begin{bmatrix} 6 & 1 & 3 & 8 \\ 4 & 2 & 6 & -1 \\ 10 & 3 & 9 & 7 \\ 16 & 4 & 12 & 15 \end{bmatrix}$	
	e)	Verify the Cayley- Hamilton theorem for the matrix A.	
		Where $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$	
Q.3	Solv	ve any three of the following	09
	a)	Prove that $sin^{-1}(3x - 4x^3) = 3\left[x + \frac{x^3}{6} + \frac{3}{40}x^5 + \cdots\right]$	
	b)	Find the value of constant a and b such that $\lim_{x\to 0} \frac{a \cosh x - b \cos x}{x^2} = 1$	
	c)	Solve the system of equations $x + 3y + 2z = 0$; $2x - y + 3z = 0$; 3x - 5y + 4z = 0; $x + 17y + 4z = 0$	
	d)	Examine whether the following vectors are linearly independent or dependent? If dependent then find the relation between them. $[2, -1, 3, 2], [1, 3, 4, 2], [3, -5, 2, 2]$	
	e)	Verify the Cauchy's mean value theorem for the functions, $f(x) = \sqrt{x+9}$ and $g(x) = \sqrt{x}$ in [0, 16]	
Q.4	Solv	ve any two of the following	10
	a)	Find the eigen values and corresponding eigen vector of the matrix A, where $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \end{bmatrix}$	
	b)	If $y = \sin(m \sin^{-1} x)$, prove that $(1 - x^2)y_{n+2} - (2n+1)xy_{n+1} + (m^2 - n^2)y_n = 0$	
	c)	Expand $e^{x \sin x}$ in ascending power of x upto x^4 .	
_	-	Section – II	
Q.5	Solv	ve any three	09
	aj	If $y = 9^{xyz}$ prove that $\frac{y^2}{y^2} = (1 \pm 3^{xyz} \pm x^2) e^{xyz}$	

Seat	
No.	

() (CBCS) Examination April/May-2010 EV 1D

- a) If $u = 9^{xyz}$, prove that $\frac{\partial^3 u}{\partial x \partial y \partial z} = (1 + 3xyz + x^2 y^2 z^2)e^{-t}$ b) If $z = x^2 + y^2$, $x = \cos t$, $y = \sin t$, find $\frac{dz}{dt}$ at $t = \pi$

SLR-FJ-1

Set

Q

- c) If $x = e^u \cos v$, $y = e^u \sin v$, prove that JJ' = 1
- d) A rectangular box with open top has a given volume. Find the dimensions of the box such that the material required is minimum.
- e) Find the angle between the tangent planes to the surfaces $x \log z = y^2 1$ and $x^2y = 2 - z$ at (1, 1, 1).

Q.6 Solve any three

- **a)** If $x = u \tan v$, $y = u \sec v$ prove that $\left(\frac{\partial u}{\partial x}\right)_y \cdot \left(\frac{\partial v}{\partial x}\right)_y = \left(\frac{\partial u}{\partial y}\right)_n \cdot \left(\frac{\partial v}{\partial y}\right)_x$
- **b)** If z = f(x, y) find $x = uv, y = u^2 v^2$ then prove that $2\frac{\partial z}{\partial v} = \frac{1}{u^2 + v^2} \left[u\frac{\partial z}{\partial u} - v\frac{\partial z}{\partial v} \right]$

c) If
$$f(x, y, z) = x^3y^2z^4$$
 find approximate value of f when $x = 1.99$
 $y = 3.01$ $z = 0.99$

- y = 3.01, z = 0.99d) Find unit vector normal to the surface $x^2y + 2xz^2 = 8$ at the point (1,0,2)
- e) Find the tangential and normal component of acceleration of particle morning on the curve $x = t^3 + 1$, $y = t^2$, z = t at t = 1

Q.7 Solve any two

a) State Euler's theorem. If $u = \frac{1}{x^2} + \frac{1}{xy} + \frac{\log x - \log y}{x^2 + y^2}$ prove that

1)
$$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + 2u = 0$$

2) $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = 6u$

- **b)** Find the extreme values of $\sin x + \sin y + \sin(x + y)$
- c) Show that the vector $\overline{F} = (6xy + z^3)i + (3x^2 - z)j + (3x z^2 - y)k$ is irrotational. Find the function ϕ such that $\overline{F} = -\nabla \phi$

10

Figures to the right indicate fill marks. Use of non-programmable calculator is allowed. MCQ/Objective Type Questions **Duration: 30 Minutes** Choose the correct alternative. 1) The function f(x, y) = 0 has a saddle point if _____ b) $rf - s^2 = 0$ a) $rf - s^2 > 0$ c) $rf - s^2 < 0$ d) None of these

- Which of the following is true? 2)
 - a) div (grad ϕ) = $\nabla \times \nabla \phi$ div (grad ϕ) = ∇ . $\nabla \phi$ b) $\operatorname{curl}(\operatorname{div} \Phi) = \nabla^2 \Phi$ c) curl (grad ϕ) = $\nabla^2 \phi$ d)
- If $\bar{r} = ae^{3t} + be^{2t}$ then at t = 0, $\frac{d\bar{r}}{dt} =$ _____ 3) b) b a) a d) 2a + 3bc) 2*b* + 3*a*
- 4) Curl (xyi + yzj + zxk) at (1,1,1) is _____ b) a) i+j+k0 c) $\sqrt{3}$ d) -(i + j + k)
- If $y = \cos^2 x$, then $y_n =$ _____. a) $2^n \cos(2x + n\frac{\pi}{2})$ 5) b) $2^{n-1}\cos\left(2x+n\frac{\pi}{2}\right)$ c) $2^{n-1} \sin(2x + n\frac{\pi}{2})$ d) None of these
- If $y = x^2 e^x$, then $y_n =$ _____. a) $e^x (x^2 + 2nx + n^2 n)$. 6) b) $e^{x}(x^{2}+2x+1)$ d) $e^{x}(x^{2} + 2nx + n^{2})$ c) $e^{x}(x^{2} + 2nx - 1)$
- If $y = \sin^{-1} x$, then x =_____. a) $1 + y + \frac{y^2}{2!} + \frac{y^3}{3!} + \cdots$ 7) b) $1 - y + \frac{y^2}{2!} - \frac{y^3}{3!} + \cdots$ d) $y + \frac{y^3}{21} + \frac{y^5}{51} + \cdots$ c) $y - \frac{y^3}{21} + \frac{y^5}{51} \dots$
- In Taylor's series expansion of $e^x + \sin x$ about the point $x = \pi$, the 8) coefficient of $(x - \pi)^2$ is _____.
 - a) e^{π} $e^{\pi} + 1$ b) e^{π} c) $e^{\pi} - 1$ d) 2

F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination April/May-2019 **ENGINEERING MATHEMATICS – I**

Day & Date: Thursday, 02-05-2019 Time: 10:00 AM To 01:00 PM

Seat

No.

Q.1

Instructions: 1) All questions are compulsory. And Q. No. 1 Should be solve in first 30 minutes.

Set

Max. Marks: 70

R

Marks: 14 14

		Set R
9)	If the determinant of square matrix A rank of A is	of order m is equal to zero, then the
	a) equal to mc) greater than m	b) less than md) none of these
10)	The system of equations $AX = B$ is ine a) rank of $A \neq$ rank of (A:B) c) rank of A = rank of B	consistent if b) rank of A = rank of (A:B) d) None of these
11)	The eigen values of the matrix $\begin{bmatrix} 1 & 3 \\ 0 & 2 \\ 0 & 0 \end{bmatrix}$	-1 4 5 are
	a) 0, 2, 5 c) 1, -2, -5	b) 1, 2, 5 d) -1, -2, -5
12)	If $u = \tan^{-1}\left(\frac{x^3+y^3}{x-y}\right)$ then the value of x a) $\cos 2u$ c) $2u$	$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \underline{\qquad}.$ b) tan 2 <i>u</i> d) sin 2 <i>u</i>
13)	If $x = e^u \cos v$, $y = e^u \sin v$ then value a) e^{-u}	e of $\frac{\partial(x,y)}{\partial(u,v)} =$ b) e^{2u}
	c) e^u	d) e^{-2u}
14)	If $\frac{\delta P}{P} = 2 \frac{\delta E}{E} - \frac{\delta R}{R}$ and percentage error 1% then percentage error in <i>P</i> is	in E and R are respectively 2% and
	a) 3%	b) 4%
	C) 1%	u) 5%

SLR-FJ-1

F .1	. (В.	ENGINEERING MATHEMATICS – I	19
Day 8 Time	& Dat : 10:0	e: Thursday, 02-05-2019 Max. Marks 00 AM To 01:00 PM	: 56
Instr	uctio	 ns: 1) All questions are compulsory. 2) Figures to the right indicate fill marks. 3) Use of non-programmable calculator is allowed. 	
		Section – I	
Q.2	Solv	$re any three of the following \frac{3x}{3}$	09
	b) c)	Expand $x^5 - x^4 + x^3 - x^2 + x - 1$ in power's of $(x - 1)$. Evaluate $\lim_{x \to 1} \frac{xe^x - \log(1 + x)}{x^2}$	
	d)	Find the rank of matrix by reducing to normal form. $ \begin{bmatrix} 6 & 1 & 3 & 8 \\ 4 & 2 & 6 & -1 \\ 10 & 3 & 9 & 7 \\ 16 & 4 & 12 & 15 \end{bmatrix} $	
	e)	Verify the Cayley- Hamilton theorem for the matrix A. Where $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$	
Q.3	Solv	/e any three of the following	09
	a)	Prove that $sin^{-1}(3x - 4x^3) = 3\left[x + \frac{x^3}{6} + \frac{3}{40}x^5 + \cdots\right]$	
	b)	Find the value of constant a and b such that $\lim_{x\to 0} \frac{a \cosh x - b \cos x}{2} = 1$	
	c)	Solve the system of equations $x + 3y + 2z = 0$; $2x - y + 3z = 0$; 3x - 5y + 4z = 0; $x + 17y + 4z = 0$	
	d)	Examine whether the following vectors are linearly independent or dependent? If dependent then find the relation between them. [2, -1, 3, 2], [1, 3, 4, 2], [3, -5, 2, 2]	
	e)	Verify the Cauchy's mean value theorem for the functions, $f(x) = \sqrt{x+9}$ and $g(x) = \sqrt{x}$ in [0, 16]	
Q.4	Solv a)	We any two of the following Find the eigen values and corresponding eigen vector of the matrix A, where $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$	10
	b)	If $y = \sin(m \sin^{-1}x)$, prove that $(1 - x^2)y_{n+2} - (2n + 1)xy_{n+1} + (m^2 - n^2)y_n = 0$ Expand $a^x \sin^x$ in according power of x units x^4	
	0)	Expand e ⁻¹ and ascending power of x up to x .	
Q.5	Solv	/e any three	09
	a)	If $u = 9^{xyz}$, prove that $\frac{\partial^3 u}{\partial x \partial y \partial z} = (1 + 3xyz + x^2 y^2 z^2)e^{xyz}$	
	b)	If $z = x^2 + y^2$, $x = \cos t$, $y = \sin t$, find $\frac{dz}{dt}$ at $t = \pi$	

Seat

No.

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SLR-FJ-1

Set

R

- c) If $x = e^u \cos v$, $y = e^u \sin v$, prove that JJ' = 1
- d) A rectangular box with open top has a given volume. Find the dimensions of the box such that the material required is minimum.
- e) Find the angle between the tangent planes to the surfaces $x \log z = y^2 1$ and $x^2y = 2 - z$ at (1, 1, 1).

Q.6 Solve any three

- **a)** If $x = u \tan v$, $y = u \sec v$ prove that $\left(\frac{\partial u}{\partial x}\right)_y \cdot \left(\frac{\partial v}{\partial x}\right)_y = \left(\frac{\partial u}{\partial y}\right)_n \cdot \left(\frac{\partial v}{\partial y}\right)_x$
- **b)** If z = f(x, y) find $x = uv, y = u^2 v^2$ then prove that $2\frac{\partial z}{\partial v} = \frac{1}{u^2 + v^2} \left[u\frac{\partial z}{\partial u} - v\frac{\partial z}{\partial v} \right]$

c) If
$$f(x, y, z) = x^3y^2z^4$$
 find approximate value of f when $x = 1.99$
 $y = 3.01, z = 0.99$

- d) Find unit vector normal to the surface $x^2y + 2xz^2 = 8$ at the point (1,0,2)
- e) Find the tangential and normal component of acceleration of particle morning on the curve $x = t^3 + 1$, $y = t^2$, z = t at t = 1

Q.7 Solve any two

a) State Euler's theorem. If $u = \frac{1}{x^2} + \frac{1}{xy} + \frac{\log x - \log y}{x^2 + y^2}$ prove that

1)
$$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + 2u = 0$$

2) $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = 6u$

- **b)** Find the extreme values of $\sin x + \sin y + \sin(x + y)$
- c) Show that the vector $\overline{F} = (6xy + z^3)i + (3x^2 - z)j + (3x z^2 - y)k$ is irrotational. Find the function ϕ such that $\overline{F} = -\nabla \phi$

SLR-FJ-1 Set R

10

		MCQ/Objective Ty	pe Q	luestions
Dura	tion: 3	0 Minutes		Mar
Q.1	Choo	ose the correct alternative.		
	1)	The system of equations $AX = B$ is in a) rank of $A \neq$ rank of (A:B) c) rank of A = rank of B	nconsi b) d)	istent if rank of A = rank of (A:B) None of these
	2)	The eigen values of the matrix $\begin{bmatrix} 1 & 3 \\ 0 & 2 \\ 0 & 0 \end{bmatrix}$	-1 4 5.	are
		a) 0, 2, 5 c) 1, -2, -5	b) d)	1, 2, 5 -1, -2, -5
	3)	If $u = \tan^{-1}\left(\frac{x^3 + y^3}{x - y}\right)$ then the value of a) $\cos 2u$	$x \frac{\partial u}{\partial x} + b)$	$+ y \frac{\partial u}{\partial y} = \underline{\qquad}.$ $\tan 2u$ $\sin 2u$
	4)	If $x = e^u \cos v$, $y = e^u \sin v$ then value a) e^{-u}	u) e of ∂ b)	$ \frac{(x,y)}{(u,v)} = \underline{\qquad} \cdot \\ \rho^{2u} $
	5)	c) e^{u} If $\frac{\delta P}{P} = 2 \frac{\delta E}{E} - \frac{\delta R}{R}$ and percentage error	d) r in <i>E</i>	e^{-2u} and <i>R</i> are respectively 2% and
		 1% then percentage error in P is a) 3% c) 1% 	b) d)	4% 5%
	6)	The function $f(x, y) = 0$ has a saddle a) $rf - s^2 > 0$ c) $rf - s^2 < 0$	e poin b) d)	t if $rf - s^2 = 0$ None of these
	7)	Which of the following is true? a) div $(\operatorname{grad} \phi) = \nabla \times \nabla \phi$ c) curl $(\operatorname{grad} \phi) = \nabla^2 \phi$	b) d)	div (grad ϕ) = $\nabla \cdot \nabla \phi$ curl (div ϕ) = $\nabla^2 \phi$
	8)	If $\bar{r} = ae^{3t} + be^{2t}$ then at $t = 0, \frac{d\bar{r}}{dt} = 1$ a) a c) $2b + 3a$	b) d)	b 2a + 3b

Seat No.

F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination April/May-2019 **ENGINEERING MATHEMATICS – I**

Day & Date: Thursday, 02-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory. And Q. No. 1 Should be solve in first 30 minutes.

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

SLR-FJ-1

Set

Max. Marks: 70

S

'ks: 14

SLR-FJ-1 Set S

- 9) Curl (xyi + yzj + zxk) at (1,1,1) is _____. a) i + j + k b) 0 c) $\sqrt{3}$ d) -(i + j + k)
- 10) If $y = \cos^2 x$, then $y_n =$ _____. a) $2^n \cos(2x + n\frac{\pi}{2})$ b) $2^{n-1} \cos\left(2x + n\frac{\pi}{2}\right)$ c) $2^{n-1} \sin\left(2x + n\frac{\pi}{2}\right)$ d) None of these
- 11) If $y = x^2 e^x$, then $y_n =$ _____. a) $e^x (x^2 + 2nx + n^2 - n)$ c) $e^x (x^2 + 2nx - 1)$ b) $e^x (x^2 + 2x + 1)$ d) $e^x (x^2 + 2nx + n^2)$

12) If
$$y = \sin^{-1} x$$
, then $x =$ _____.
a) $1 + y + \frac{y^2}{2!} + \frac{y^3}{3!} + \cdots$ b) $1 - y + \frac{y^2}{2!} - \frac{y^3}{3!} + \cdots$
c) $y - \frac{y^3}{3!} + \frac{y^5}{5!} \cdots$ d) $y + \frac{y^3}{3!} + \frac{y^5}{5!} + \cdots$

- 13) In Taylor's series expansion of $e^x + \sin x$ about the point $x = \pi$, the coefficient of $(x \pi)^2$ is _____. a) e^{π} b) $e^{\pi} + 1$
 - c) $e^{\pi} 1$ d) $\frac{e^{\pi}}{2}$
- 14) If the determinant of square matrix A of order m is equal to zero, then the rank of A is _____.
 - a) equal to m b) less than m
 - c) greater than m d) none of these

1.1	. (В.	ENGINEERING MATHEMATICS – I	nay-2019			
Day & Time	& Dat : 10:0	te: Thursday, 02-05-2019 Ma 00 AM To 01:00 PM	x. Marks: 56			
Instr	uctio	 ons: 1) All questions are compulsory. 2) Figures to the right indicate fill marks. 3) Use of non-programmable calculator is allowed. 				
		Section – I				
Q.2	Solve any three of the following					
	a)	Find the n^{th} derivation of $\frac{3x}{2x^2-x-1}$				
	b) c)	Expand $x^5 - x^4 + x^3 - x^2 + x - 1$ in power's of $(x - 1)$. Evaluate $\lim_{x \to 0} \frac{xe^x - \log(1 + x)}{x^2}$				
	d)	Find the rank of matrix by reducing to normal form.				
		$\begin{bmatrix} 6 & 1 & 3 & 8 \\ 4 & 2 & 6 & -1 \\ 10 & 3 & 9 & 7 \\ 16 & 4 & 12 & 15 \end{bmatrix}$				
	e)	Verify the Cayley- Hamilton theorem for the matrix A.				
		Where $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$				
Q.3	Solv	ve any three of the following	09			
	a)	Prove that $sin^{-1}(3x - 4x^3) = 3\left[x + \frac{x^3}{6} + \frac{3}{40}x^5 + \cdots\right]$				
	b) Find the value of constant a and b such that $\lim_{x\to 0} \frac{a \cosh x - b \cos x}{2} = 1$					
c) Solve the system of equations $x + 3y + 2z = 0$; $2x - y + 3z = 0$; 3x - 5y + 4z = 0; $x + 17y + 4z = 0$						
	d)	Examine whether the following vectors are linearly independent or dependent? If dependent then find the relation between them. [2, -1, 3, 2], [1, 3, 4, 2], [3, -5, 2, 2]				
	e)	Verify the Cauchy's mean value theorem for the functions, $f(x) = \sqrt{x+9}$ and $g(x) = \sqrt{x}$ in [0, 16]				
Q.4	Solv	Solve any two of the following 10				
	a)	Find the eigen values and corresponding eigen vector of the matrix <i>A</i> where $A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \end{bmatrix}$	Α,			
	b)	If $y = \sin(m \sin^{-1} x)$, prove that $(1 - x^2)y_{n+2} - (2n+1)xy_{n+1} + (m^2 - n^2)y_n = 0$				
c) Expand $e^{x \sin x}$ in ascending power of x upto x^4 .						
	Section – II					
Q.5	Solve any three $a^3 y$					
	aj	If $y = Q^{xyz}$ prove that $\frac{y^2}{y^2} = (1 \pm 3xyz \pm x^2) e^{xyz}$				

Seat No.

F.Y. (B.Tech.) (Semester - I) (New) (CBCS) Examination April/May-2019

- a) If $u = 9^{xyz}$, prove that $\frac{\partial^3 u}{\partial x \partial y \partial z} = (1 + 3xyz + x^2 y^2 z^2)e^{-t}$ b) If $z = x^2 + y^2$, $x = \cos t$, $y = \sin t$, find $\frac{dz}{dt}$ at $t = \pi$

Page **15** of **16**

SLR-FJ-1

Set

S

- c) If $x = e^u \cos v$, $y = e^u \sin v$, prove that JJ' = 1
- d) A rectangular box with open top has a given volume. Find the dimensions of the box such that the material required is minimum.
- e) Find the angle between the tangent planes to the surfaces $x \log z = y^2 1$ and $x^2y = 2 - z$ at (1, 1, 1).

Q.6 Solve any three

- **a)** If $x = u \tan v$, $y = u \sec v$ prove that $\left(\frac{\partial u}{\partial x}\right)_y \cdot \left(\frac{\partial v}{\partial x}\right)_y = \left(\frac{\partial u}{\partial y}\right)_n \cdot \left(\frac{\partial v}{\partial y}\right)_x$
- **b)** If z = f(x, y) find $x = uv, y = u^2 v^2$ then prove that $2\frac{\partial z}{\partial v} = \frac{1}{u^2 + v^2} \left[u \frac{\partial z}{\partial u} - v \frac{\partial z}{\partial v} \right]$

c) If
$$f(x, y, z) = x^3y^2z^4$$
 find approximate value of f when $x = 1.99$
 $y = 3.01, z = 0.99$

- d) Find unit vector normal to the surface $x^2y + 2xz^2 = 8$ at the point (1,0,2)
- e) Find the tangential and normal component of acceleration of particle morning on the curve $x = t^3 + 1$, $y = t^2$, z = t at t = 1

Q.7 Solve any two

a) State Euler's theorem. If $u = \frac{1}{x^2} + \frac{1}{xy} + \frac{\log x - \log y}{x^2 + y^2}$ prove that

1)
$$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} + 2u = 0$$

2) $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = 6u$

- **b)** Find the extreme values of $\sin x + \sin y + \sin(x + y)$
- c) Show that the vector $\overline{F} = (6xy + z^3)i + (3x^2 - z)j + (3x z^2 - y)k$ is irrotational. Find the function ϕ such that $\overline{F} = -\nabla \phi$

SLR-FJ-1 Set S

10

Set

No. F.Y.B. Tech. (Semester – I) (New) (CBCS) Examination March/April-2019

Day & Date: Friday, 03-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Solve Q. 1 in first half an hour.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if found necessary and mention it clearly.

ENGINEERING MECHANICS

5) Use of nonprogrammable calculator is allowed.

MCQ / Objective Type Questions

Duration: 30 Minutes

Seat

Q.1 Choose the correct alternative.

- 1) When several forces of different magnitude and direction act at a point upon a body lying in a plane, they constitute _____.
 - a) coplanar force system
 - b) coplanar concurrent force system
 - c) coplanar non concurrent force system
 - d) concurrent force system
- 2) Varignon's theorem can be applied to determine _____.
 - a) Position of resultant
 - b) Location of centroid
 - c) Magnitude and direction of resultant
 - d) None of these
- 3) A particle acted upon by two forces of equal magnitudes is in equilibrium. The angle between two forces is _____.
 - a) zero b) 180° c) 90° d) 120°

4) The tangent of the angle of friction is equal to _____

- a) Limiting friction b) Kinetic friction
- c) Coefficient of friction d) Static friction

5) The type of joint that can resist a moment is called as _____

- roller joint b) hinged joint
- c) pin joint d) fixed joint
- 6) Roof trusses are _____

a)

- a) simple trusses
 - c) perfect trusses d) all of these
- The centre of gravity of a lamina will not be at its geometrical centre if it is a _____.

b)

- a) circleb) equilateral trianglec) rectangled) right angled triangle
- 8) The rate of doing work is known as _
 - a) Potential energyc) Power
- b) Kinetic energy

plane trusses

d) None

Max. Marks: 70

SLR-FJ-2

Marks: 14

- 9) In order to determine, the effects of force acting on a body we must know
 - a) It's magnitude
 - b) Direction of the line along which it acts
 - c) Point through which it acts on body
 - d) All of the above
- 10) When two ships are moving along inclined directions, then the time when two ships are closest together depends upon _____.
 - a) velocity of one of the ships
 - b) velocity of both the ships
 - c) velocity of both ships and angle between the two directions
 - d) none of above
- 11) A pulley starting from rest is given an angular acceleration of 2 rad/s2. What will be its angular velocity in rpm at the end of 2 minutes.
 - a) 4 rpm b) 240 rpm
 - c) 2292 rpm d) 1192 rpm
- 12) A ball of mass 2kg strikes the floor with a velocity 14 m/s and rebounds back with a velocity of 12 m/s. The impulse in this process is equal to _____.
 - a) 0 4NS b) 52 NS
 - c) 26 NS d) 28 NS
- 13) If the direction of velocities of two colliding bodies is not directed along the line of impact, it is called _____.
 - a) Direct impact
- b) Oblique impact
- c) Central impact d) Eccentric impact
- 14) A body is projected vertically upwards with a velocity u from a surface. The velocity with which it strikes the surface back is _____.
 - a) u b) 2u c) u²/g d) u/g

SLR-FJ-2

Set

Seat No.

> F.Y.B. Tech. (Semester - I) (New) (CBCS) Examination March/April-2019 **ENGINEERING MECHANICS**

Day & Date: Friday, 03-05-2019 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 found necessary and mention it clearly.
- 4) Use of nonprogrammable calculator is allowed.

Section – I

Q.2 Solve any four out of six :

e)

f)

- State and derive Varignon's theorem of moment. a)
- State and explain types of equilibrium. b)
- State and derive perpendicular axis theorem. c)
- Find the magnitude and direction of resultant for the two forces as shown d) in Fig. 1



20



A rectangular plate is subjected to the forces as shown in Fig. 4. Find the a) magnitude, direction and position of the resultant from point B.

120mm

Fig. 3

16



15

120

20





SLR-FJ-2

Max. Marks: 56





b) Two cylinders of weight 200N and 300mm diameter each are supported by inclined plane and a vertical wall as shown in Fig.5. Assuming smooth contact surfaces, find the reactions at all supports and contact points



c) Analyze the given truss in Fig.6 by using method of joints.





- a) Prove any two equations of rectilinear motion.
- b) State law of conservation of momentum and conservation of energy.
- c) Explain use of any two motion curves with neat sketches.
- d) State types of mechanical vibrations. Explain single degree of freedom.
- e) A stone takes 6 seconds to reach the ground after it is dropped from the tower. If the stone is stopped after 2 seconds of its fall and then released again, how much time it will take to reach ground. Take $g = 9.81 \text{ m/s}^2$
- f) Obtain equation of a trajectory of projectile motion.

Section – II

Q.5 Solve any two.

- a) A man weighing 750 N stands on the floor of a lift. Determine the pressure exerted on the floor when
 a) the lift moves upwards with an acceleration of 2.5 m/s²
 b) the lift moves downwards with an acceleration of 2.5 m/s²
 Use D'Alembert's principle.
- A hammer of mass 200 kg is made to fall free from 2 m height on pile of mass 1500 kg. The pile is driven 50 mm into ground in one blow.
 Determine

a) the common velocity of the pile and hammer after impact,

- b) the energy lost in the impact and
- c) the average resistance of the ground to penetration.
- c) A pilot flying his bomber at a height of 600 m with uniform horizontal velocity of 480 km/hr wants to strike a target which lies on the ground in the direction of flight. At what angle below the horizontal should the pilot see the target at the time of bombing in order to hit the target. Neglect the air resistance.

16

SLR-FJ-2 Set P

No. F.Y.B. Tech. (Semester - I) (New) (CBCS) Examination March/April-2019

Day & Date: Friday, 03-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Solve Q. 1 in first half an hour.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if found necessary and mention it clearly.
- 5) Use of nonprogrammable calculator is allowed.

MCQ / Objective Type Questions

Duration: 30 Minutes

Seat

Q.1 Choose the correct alternative.

- The rate of doing work is known as 1)
 - a) Potential energy
 - c) Power d) None
- In order to determine, the effects of force acting on a body we must know 2)
 - It's magnitude a)
 - b) Direction of the line along which it acts
 - c) Point through which it acts on body
 - d) All of the above
- 3) When two ships are moving along inclined directions, then the time when two ships are closest together depends upon _____.
 - a) velocity of one of the ships
 - b) velocity of both the ships
 - c) velocity of both ships and angle between the two directions
 - d) none of above
- 4) A pulley starting from rest is given an angular acceleration of 2 rad/s2. What will be its angular velocity in rpm at the end of 2 minutes.
 - a) 4 rpm 240 rpm b)
 - c) 2292 rpm 1192 rpm d)
- A ball of mass 2kg strikes the floor with a velocity 14 m/s and rebounds back 5) with a velocity of 12 m/s. The impulse in this process is equal to _____.
 - a) 04NS b) 52 NS
 - c) 26 NS d) 28 NS
- If the direction of velocities of two colliding bodies is not directed along the 6) line of impact, it is called _____.
 - a) Direct impact b) **Oblique** impact
 - c) Central impact d) Eccentric impact
- A body is projected vertically upwards with a velocity u from a surface. 7) The velocity with which it strikes the surface back is _____.
 - a) 2u u b) u^2/q c) d) u/g

Marks: 14

14

Max. Marks: 70

Kinetic energy b)

				Set	Q
8)	Whaupo a) b) c) d)	en several forces of different mag n a body lying in a plane, they cor coplanar force system coplanar concurrent force system coplanar non concurrent force sy concurrent force system	nitude nstitut n stem	e and direction act at a point te	
9)	 Varignon's theorem can be applied to determine a) Position of resultant b) Location of centroid c) Magnitude and direction of resultant d) None of these 				
10)	A pa The a) c)	article acted upon by two forces of angle between two forces is zero 90°	f equa b) d)	al magnitudes is in equilibrium. 180° 120°	
11)	The a) c)	tangent of the angle of friction is Limiting friction Coefficient of friction	equal b) d)	to Kinetic friction Static friction	
12)	The a) c)	e type of joint that can resist a mor roller joint pin joint	nent i b) d)	s called as hinged joint fixed joint	
13)	Roc a) c)	of trusses are simple trusses perfect trusses	b) d)	plane trusses all of these	
14)	The a	e centre of gravity of a lamina will r	not be	e at its geometrical centre if it is	
	a) c)	circle rectangle	b) d)	equilateral triangle right angled triangle	

SLR-FJ-2

F.Y.B. Tech. (Semester - I) (New) (CBCS) Examination March/April-2019

ENGINEERING MECHANICS

Day & Date: Friday, 03-05-2019 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) Assume suitable data if found necessary and mention it clearly.
- 4) Use of nonprogrammable calculator is allowed.

Section – I

Q.2 Solve any four out of six :

e)

f)

- State and derive Varignon's theorem of moment. a)
- State and explain types of equilibrium. b)
- State and derive perpendicular axis theorem. c)
- Find the magnitude and direction of resultant for the two forces as shown d) in Fig. 1



Determine the location of centroid of the lamina shown in Fig. 3

20



A rectangular plate is subjected to the forces as shown in Fig. 4. Find the a) magnitude, direction and position of the resultant from point B.

120mm

Fig. 3

16



120

20



Fig. 1



12

Max. Marks: 56

SLR-FJ-2





b) Two cylinders of weight 200N and 300mm diameter each are supported by inclined plane and a vertical wall as shown in Fig.5. Assuming smooth contact surfaces, find the reactions at all supports and contact points



c) Analyze the given truss in Fig.6 by using method of joints.





- a) Prove any two equations of rectilinear motion.
- b) State law of conservation of momentum and conservation of energy.
- c) Explain use of any two motion curves with neat sketches.
- d) State types of mechanical vibrations. Explain single degree of freedom.
- e) A stone takes 6 seconds to reach the ground after it is dropped from the tower. If the stone is stopped after 2 seconds of its fall and then released again, how much time it will take to reach ground. Take $g = 9.81 \text{ m/s}^2$
- f) Obtain equation of a trajectory of projectile motion.

Section – II

Q.5 Solve any two.

- a) A man weighing 750 N stands on the floor of a lift. Determine the pressure exerted on the floor when
 a) the lift moves upwards with an acceleration of 2.5 m/s²
 b) the lift moves downwards with an acceleration of 2.5 m/s²
 Use D'Alembert's principle.
- A hammer of mass 200 kg is made to fall free from 2 m height on pile of mass 1500 kg. The pile is driven 50 mm into ground in one blow.
 Determine

a) the common velocity of the pile and hammer after impact,

- b) the energy lost in the impact and
- c) the average resistance of the ground to penetration.
- c) A pilot flying his bomber at a height of 600 m with uniform horizontal velocity of 480 km/hr wants to strike a target which lies on the ground in the direction of flight. At what angle below the horizontal should the pilot see the target at the time of bombing in order to hit the target. Neglect the air resistance.

16

SLR-FJ-2 Set Q

No. F.Y.B. Tech. (Semester - I) (New) (CBCS) Examination March/April-2019 **ENGINEERING MECHANICS**

Day & Date: Friday, 03-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Solve Q. 1 in first half an hour.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if found necessary and mention it clearly.
- 5) Use of nonprogrammable calculator is allowed.

MCQ / Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternative.

- A pulley starting from rest is given an angular acceleration of 2 rad/s2. 1) What will be its angular velocity in rpm at the end of 2 minutes.
 - a) 4 rpm
 - c) 2292 rpm d) 1192 rpm
- A ball of mass 2kg strikes the floor with a velocity 14 m/s and rebounds back 2) with a velocity of 12 m/s. The impulse in this process is equal to .
- a) 04NS 52 NS b)
 - c) 26 NS d) 28 NS
- 3) If the direction of velocities of two colliding bodies is not directed along the line of impact, it is called _____.
 - a) Direct impact b) **Oblique** impact
 - c) Central impact d) Eccentric impact
- A body is projected vertically upwards with a velocity u from a surface. 4) The velocity with which it strikes the surface back is _____.
 - 2u a) u b)
 - u^2/q C) d) u/a
- When several forces of different magnitude and direction act at a point 5) upon a body lying in a plane, they constitute _____.
 - a) coplanar force system
 - b) coplanar concurrent force system
 - c) coplanar non concurrent force system
 - d) concurrent force system
- Varignon's theorem can be applied to determine _____. 6)
 - a) Position of resultant
 - Location of centroid b)
 - Magnitude and direction of resultant c)
 - d) None of these
- A particle acted upon by two forces of equal magnitudes is in equilibrium. 7) The angle between two forces is _____
 - b) 180° zero a)
 - 90° d) 120° c)

SLR-FJ-2

Max. Marks: 70



Marks: 14

14

- 240 rpm b)

Seat

				Set	R
8)	Th∉ a) c)	e tangent of the angle of friction is Limiting friction Coefficient of friction	equa b) d)	l to Kinetic friction Static friction	
9)	The a) c)	e type of joint that can resist a mor roller joint pin joint	ment b) d)	is called as hinged joint fixed joint	
10)	Ro a) c)	of trusses are simple trusses perfect trusses	b) d)	plane trusses all of these	
11)	The centre of gravity of a lamina will not be at its geometrical centre if it is				
	a _ a) c)	circle rectangle	b) d)	equilateral triangle right angled triangle	
12)	The a) c)	e rate of doing work is known as _ Potential energy Power	b) d)	 Kinetic energy None	
13)	In order to determine, the effects of force acting on a body we must know				
	 a) It's magnitude b) Direction of the line along which it acts c) Point through which it acts on body d) All of the above 				

14) When two ships are moving along inclined directions, then the time when two ships are closest together depends upon _____.

- a) velocity of one of the ships
- b) velocity of both the ships
- c) velocity of both ships and angle between the two directions
- d) none of above

SLR-FJ-2

Seat No.

F.Y.B. Tech. (Semester - I) (New) (CBCS) Examination March/April-2019 **ENGINEERING MECHANICS**

Day & Date: Friday, 03-05-2019 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 found necessary and mention it clearly.
- 4) Use of nonprogrammable calculator is allowed.

Section – I

Q.2 Solve any four out of six :

e)

- State and derive Varignon's theorem of moment. a)
- State and explain types of equilibrium. b)
- State and derive perpendicular axis theorem. c)
- Find the magnitude and direction of resultant for the two forces as shown d) in Fig. 1



15

120

20

f) Determine the location of centroid of the lamina shown in Fig. 3

20



A rectangular plate is subjected to the forces as shown in Fig. 4. Find the a) magnitude, direction and position of the resultant from point B.

120mm

Fig. 3

16





Max. Marks: 56

SLR-FJ-2





b) Two cylinders of weight 200N and 300mm diameter each are supported by inclined plane and a vertical wall as shown in Fig.5. Assuming smooth contact surfaces, find the reactions at all supports and contact points



c) Analyze the given truss in Fig.6 by using method of joints.





- a) Prove any two equations of rectilinear motion.
- b) State law of conservation of momentum and conservation of energy.
- c) Explain use of any two motion curves with neat sketches.
- d) State types of mechanical vibrations. Explain single degree of freedom.
- e) A stone takes 6 seconds to reach the ground after it is dropped from the tower. If the stone is stopped after 2 seconds of its fall and then released again, how much time it will take to reach ground. Take $g = 9.81 \text{ m/s}^2$
- f) Obtain equation of a trajectory of projectile motion.

Section – II

Q.5 Solve any two.

- a) A man weighing 750 N stands on the floor of a lift. Determine the pressure exerted on the floor when
 a) the lift moves upwards with an acceleration of 2.5 m/s²
 b) the lift moves downwards with an acceleration of 2.5 m/s²
 Use D'Alembert's principle.
- A hammer of mass 200 kg is made to fall free from 2 m height on pile of mass 1500 kg. The pile is driven 50 mm into ground in one blow.
 Determine

a) the common velocity of the pile and hammer after impact,

- b) the energy lost in the impact and
- c) the average resistance of the ground to penetration.
- c) A pilot flying his bomber at a height of 600 m with uniform horizontal velocity of 480 km/hr wants to strike a target which lies on the ground in the direction of flight. At what angle below the horizontal should the pilot see the target at the time of bombing in order to hit the target. Neglect the air resistance.

16

SLR-FJ-2 Set R

No. F.Y.B. Tech. (Semester - I) (New) (CBCS) Examination March/April-2019

ENGINEERING MECHANICS

Day & Date: Friday, 03-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Solve Q. 1 in first half an hour.
- 3) Figures to the right indicate full marks.
- 4) Assume suitable data if found necessary and mention it clearly.
- 5) Use of nonprogrammable calculator is allowed.

MCQ / Objective Type Questions

Duration: 30 Minutes

Seat

Q.1 Choose the correct alternative.

- Roof trusses are 1)
 - a) simple trusses
 - plane trusses b) c) perfect trusses d) all of these
- 2) The centre of gravity of a lamina will not be at its geometrical centre if it is
 - a_____ a) circle
- equilateral triangle b)
- right angled triangle c) rectangle d)
- 3) The rate of doing work is known as
 - a) Potential energy b) Kinetic energy
 - c) Power d) None
- 4) In order to determine, the effects of force acting on a body we must know
 - a) It's magnitude
 - b) Direction of the line along which it acts
 - c) Point through which it acts on body
 - d) All of the above

When two ships are moving along inclined directions, then the time when 5) two ships are closest together depends upon _____.

- a) velocity of one of the ships
- b) velocity of both the ships
- c) velocity of both ships and angle between the two directions
- d) none of above

A pulley starting from rest is given an angular acceleration of 2 rad/s2. 6) What will be its angular velocity in rpm at the end of 2 minutes.

- a) 4 rpm b) 240 rpm
- c) 2292 rpm d) 1192 rpm
- A ball of mass 2kg strikes the floor with a velocity 14 m/s and rebounds back 7) with a velocity of 12 m/s. The impulse in this process is equal to _____.
 - a) 04NS 52 NS b)
 - c) 26 NS 28 NS d)

SLR-FJ-2



Max. Marks: 70

Marks: 14 14

				SLR-FJ-2
				Set S
8)	lf th line a) c)	e direction of velocities of two coll of impact, it is called Direct impact Central impact	iding b) d)	bodies is not directed along the Oblique impact Eccentric impact
9)	A be The a) c)	ody is projected vertically upwards velocity with which it strikes the s u u ² /g	with urfac b) d)	a velocity u from a surface. e back is 2u u/g
10)	Whe upo a) b) c) d)	en several forces of different magr n a body lying in a plane, they cor coplanar force system coplanar concurrent force system coplanar non concurrent force system concurrent force system	nitude nstitut stem	e and direction act at a point e
11)	Vari a) b) c) d)	ignon's theorem can be applied to Position of resultant Location of centroid Magnitude and direction of resulta None of these	dete ant	rmine
12)	A pa The a) c)	article acted upon by two forces of angle between two forces is zero 90°	[;] equa b) d)	al magnitudes is in equilibrium. 180° 120°
13)	The a) c)	tangent of the angle of friction is c Limiting friction Coefficient of friction	equal b) d)	to Kinetic friction Static friction
14)	The a) c)	type of joint that can resist a mon roller joint pin joint	nent i b) d)	s called as hinged joint fixed joint

Seat No.

F.Y.B. Tech. (Semester - I) (New) (CBCS) Examination March/April-2019 **ENGINEERING MECHANICS**

Day & Date: Friday, 03-05-2019 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 found necessary and mention it clearly.
- 4) Use of nonprogrammable calculator is allowed.

Section – I

Q.2 Solve any four out of six :

e)

- State and derive Varignon's theorem of moment. a)
- State and explain types of equilibrium. b)
- State and derive perpendicular axis theorem. c)
- Find the magnitude and direction of resultant for the two forces as shown d) in Fig. 1



f) Determine the location of centroid of the lamina shown in Fig. 3

20



A rectangular plate is subjected to the forces as shown in Fig. 4. Find the a) magnitude, direction and position of the resultant from point B.

120mm

Fig. 3



15

120

20





12

SLR-FJ-2





b) Two cylinders of weight 200N and 300mm diameter each are supported by inclined plane and a vertical wall as shown in Fig.5. Assuming smooth contact surfaces, find the reactions at all supports and contact points



c) Analyze the given truss in Fig.6 by using method of joints.





- a) Prove any two equations of rectilinear motion.
- b) State law of conservation of momentum and conservation of energy.
- c) Explain use of any two motion curves with neat sketches.
- d) State types of mechanical vibrations. Explain single degree of freedom.
- e) A stone takes 6 seconds to reach the ground after it is dropped from the tower. If the stone is stopped after 2 seconds of its fall and then released again, how much time it will take to reach ground. Take $g = 9.81 \text{ m/s}^2$
- f) Obtain equation of a trajectory of projectile motion.

Section – II

Q.5 Solve any two.

- a) A man weighing 750 N stands on the floor of a lift. Determine the pressure exerted on the floor when
 a) the lift moves upwards with an acceleration of 2.5 m/s²
 b) the lift moves downwards with an acceleration of 2.5 m/s²
 Use D'Alembert's principle.
- A hammer of mass 200 kg is made to fall free from 2 m height on pile of mass 1500 kg. The pile is driven 50 mm into ground in one blow.
 Determine
 - a) the common velocity of the pile and hammer after impact,
 - b) the energy lost in the impact and
 - c) the average resistance of the ground to penetration.
- c) A pilot flying his bomber at a height of 600 m with uniform horizontal velocity of 480 km/hr wants to strike a target which lies on the ground in the direction of flight. At what angle below the horizontal should the pilot see the target at the time of bombing in order to hit the target. Neglect the air resistance.

16

SLR-FJ-2 Set S
No. F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination March/April-2019 **BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

Day & Date: Saturday, 04-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Make suitable assumptions, if necessary.

- 2) Figures to the right indicate fill marks.
- 3) Q. No. 1 is compulsory; it should be solved in first 30 minutes in answer Book.
- 4) Answer MCQ/Objective type question on Page No.3 only. Don't forget to mention Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 MCQ/Objective Questions

- Power factor is defined as _____. 1)
 - Cosine of angle between voltage and current a)
 - Ratio of true power to apparent power b)
 - Both a and b c)
 - d) R/C

a) b)

C)

3)

2) Which of the following statements is true? For the circuit shown in Figure

- E2 + E3 = E1 = Ir1 + Ir2 + Ir3d) The relation between the line and phase voltage of a delta connected circuit is given by .
- $V_{\rm L} = \sqrt{3} * V_{\rm P}$ $V_{\rm L} = 2V_{\rm p/r}$ $V_L = V_P$ a) b) d) $V_{\rm L} = V_{\rm P}/\sqrt{2}$ C)
- Four identical resistors are first connected in parallel and then in series. 4) The resultant resistance of the first combination to the second will be
 - 1/16 times a) b) 16 times 4 times d) C)
- While comparing magnetic and electrical circuits, the permeance of 5) magnetic circuit is compared with which parameter of electrical circuit?
 - Resistance b) Conductance a)
 - Conductivity d) Resistivity b)
- Form factor for sinusoidal alternating current is . 6)
 - a) $\pi/2\sqrt{2}$ b) 1 c) 1.11 d) 0.634





SLR-FJ-3

Max. Marks: 70

Marks: 14

14

- 1/4 times

E2 + E3 - E1 - I(r1 + r2 + r3) = 0I(r1 + r2 + r3) = E1 - E2 - E3

					Set
7)	The a) c)	peak value of a sinusoidal wavef 0.637 V $_{\rm average}$ 0.707 V $_{\rm rms}$	orm is b) d)	s equal to 0.637 V _{rms} 1.414 V _{rms}	
8)	A cr a) c)	ystal diode is adevice. Non-linear Linear	b) d)	Bilateral none of the above	
9)	LED a) c)	do not require Heating both a and b	b) d)	warm up time none of the above	
10)	The a) c)	element that has biggest size in a Collector Emitter	a tran b) d)	sistor is Base collector-base junction	
11)	Pho a) c)	tovoltaic cell is a transduce Active Reactive	er. b) d)	Passive None	
12)	Whi mea a) c)	ch of the following device cannot asurement? RTD Thermistor	be us b) d)	ed for temperature Thermocouple LVDT	
13)	In B a) c)	oolean algebra, the dot sign (.) in OR operation NOT operation	dicate b) d)	es AND operation none of the above	
14)	The	decimal no. (25.O2) ₁₀ is equivale	nt to	binary no	

- a) (11000.00001)₂ c) (11100.00001)₂ b) (10100.000)₂ d) (11001.000001)₂

Ρ

Page	3	of	16
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Set

Max. Marks: 56

F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination March/April-2019

Day & Date: Saturday, 04-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate fill marks.

Section I

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

Q.2 Attempt any FOUR

What is the value of unknown resistor R in figure below if the voltage drop a) across the 500 Ω resistor is 2.5 volts? All resistances are in ohm.

- B b) The load to a 3 phase supply consists of 3 similar coils connected in star. The line currents are 25A and KVA and KW inputs are 20 and 11 respectively. Find
 - 1) Phase and line voltage
 - 2) **KVAR** input
 - resistance and reactance of each coil 3)

12 V

- A single phase transformer has 350 primary & 1050 secondary turns. The C) primary is connected to 400 V, 50 Hz supply. If net cross sectional area of core is 50 cm². Find:
 - Maximum Value of Flux density in core 1)
 - Voltage induced in secondary winding 2)
- Compare electric circuit and magnetic circuit with their similarities and d) dissimilarities.
- Derive an expression for average value of an AC quantity. e)
- Find RAB in the circuit, given in fig. **f**)





R

500 n

Seat

No.

Q.3 Solve any two:

- a) Derive the equation for converting delta resistances into equivalent star resistances.
- A coil of 500 turns and resistance of 20 ohms is wound uniformly on an iron ring of mean circumference 50 cm & cross sectional area 4 cm². It is connected to 24 V DC supply. Relative permeability of material is 800. Find:
 - 1) MMF
 - 2) Magnetic field strength
 - 3) Total flux
 - 4) Reluctance
- c) A coil of resistance of R = 50 Ω and inductance L = 29.8 mH and capacitance of C=3.4 μ F are connected in series and supplied by 200 V, 50 Hz supply. Find :
 - 1) The impedance of the circuit
 - 2) Current flowing through the circuit
 - 3) Power consumed in the circuit
 - 4) Power factor of the circuit

Section II

Q.4 Attempt any FOUR

- a) State and explain intrinsic and extrinsic semiconductor.
- **b)** Explain Avalanche and Zener breakdown mechanism in reverse biased diode with suitable circuit diagram.
- c) Explain working of BJT as a switch.
- d) Explain photoelectric pick up with suitable application.
- e) Explain wire type strain gauge in details. What is gauge factor?
- f) State and prove Demorgan's theorem.

Q.5 Attempt any two:

- a) Explain half wave rectifier with necessary diagrams. Derive an expression for:
 - 1) Average value of DC voltage
 - 2) RMS value of DC voltage
 - 3) Rectification efficiency
 - 4) Ripple factor
- **b)** Draw and explain input-output characteristics for CE configuration. Compare different transistor configurations.
- c) Explain symbol, equation and truth table for NAND and NOR gate. Derive Basic Gates using NOR gate.

SLR-FJ-3

Set

12

Seat No.

F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination March/April-2019 BASIC ELECTRICAL & ELECTRONICS ENGINEERING

Day & Date: Saturday, 04-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Make suitable assumptions, if necessary.

- 2) Figures to the right indicate fill marks.
- Q. No. 1 is compulsory; it should be solved in first 30 minutes in answer Book.
- Answer MCQ/Objective type question on Page No.3 only. Don't forget to mention Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Q.1 MCQ/Objective Questions A crystal diode is a <u>device</u>. 1) Non-linear a) b) Bilateral Linear none of the above d) c) 2) LED do not require ____ Heating b) warm up time a) both a and b none of the above d) C) 3) The element that has biggest size in a transistor is . Collector a) b) Base c) Emitter d) collector-base junction 4) Photovoltaic cell is a _____ transducer. Active b) Passive a) Reactive None c) d) 5) Which of the following device cannot be used for temperature measurement? a) RTD b) Thermocouple LVDT Thermistor C) d) 6) In Boolean algebra, the dot sign (.) indicates _ OR operation AND operation a) b) NOT operation d) none of the above c) The decimal no. (25.O2)₁₀ is equivalent to binary no _ 7) $(11000.000001)_2$ b) $(10100.000)_2$ a) $(11001.000001)_2$ $(11100.000001)_2$ d) c) 8) Power factor is defined as Cosine of angle between voltage and current a) Ratio of true power to apparent power b) C) Both a and b d) R/C

Set Q

SLR-FJ-3

Max. Marks: 70

Marks: 14

9) Which of the following statements is true? For the circuit shown in Figure



- a) E1 + E2 + E3 = Ir1 + Ir2 + I3r3
- b) E2 + E3 E1 I(r1 + r2 + r3) = 0
- c) I(r1 + r2 + r3) = E1 E2 E3
- d) E2 + E3 = E1 = Ir1 + Ir2 + Ir3
- 10) The relation between the line and phase voltage of a delta connected circuit is given by _____.

a)	$V_{\rm L} = V_{\rm P}$	b)	$V_{\rm L} = \sqrt{3} * V_{\rm P}$
C)	$V_{\rm L} = V_{\rm P}/\sqrt{2}$	d)	$V_L = 2V_{p/r}$

11) Four identical resistors are first connected in parallel and then in series. The resultant resistance of the first combination to the second will be

a)	1/16 times	b)	1/4 times
c)	4 times	d)	16 times

- 12) While comparing magnetic and electrical circuits, the permeance of magnetic circuit is compared with which parameter of electrical circuit?
 - a) Resistance b) Conductance
 - b) Conductivity d) Resistivity
- 13) Form factor for sinusoidal alternating current is _____.

a)	$\pi/2NZ$	D)	1
C)	1.11	d)	0.634

a)

- 14) The peak value of a sinusoidal waveform is equal to _____.
 - 0.637 V _{average} b) 0.637 V _{rms}
 - c) $0.707 \text{ V}_{\text{rms}}$ d) $1.414 \text{ V}_{\text{rms}}$

Page	7	of	16
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Set

Seat No.

F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination March/April-2019 BASIC ELECTRICAL & ELECTRONICS ENGINEERING

Day & Date: Saturday, 04-05-2019 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

a) What is the value of unknown resistor R in figure below if the voltage drop across the 500 Ω resistor is 2.5 volts? All resistances are in ohm.

- b) The load to a 3 phase supply consists of 3 similar coils connected in star. The line currents are 25A and KVA and KW inputs are 20 and 11 respectively. Find
 - 1) Phase and line voltage
 - 2) KVAR input
 - 3) resistance and reactance of each coil
- c) A single phase transformer has 350 primary & 1050 secondary turns. The primary is connected to 400 V, 50 Hz supply. If net cross sectional area of core is 50 cm². Find:
 - 1) Maximum Value of Flux density in core
 - 2) Voltage induced in secondary winding
- d) Compare electric circuit and magnetic circuit with their similarities and dissimilarities.
- e) Derive an expression for average value of an AC quantity.
- f) Find RAB in the circuit, given in fig.



Max. Marks: 56

16

Q

Q.3 Solve any two:

- a) Derive the equation for converting delta resistances into equivalent star resistances.
- A coil of 500 turns and resistance of 20 ohms is wound uniformly on an iron ring of mean circumference 50 cm & cross sectional area 4 cm². It is connected to 24 V DC supply. Relative permeability of material is 800. Find:
 - 1) MMF
 - 2) Magnetic field strength
 - 3) Total flux
 - 4) Reluctance
- c) A coil of resistance of R = 50 Ω and inductance L = 29.8 mH and capacitance of C=3.4 μ F are connected in series and supplied by 200 V, 50 Hz supply. Find :
 - 1) The impedance of the circuit
 - 2) Current flowing through the circuit
 - 3) Power consumed in the circuit
 - 4) Power factor of the circuit

Section II

Q.4 Attempt any FOUR

- a) State and explain intrinsic and extrinsic semiconductor.
- **b)** Explain Avalanche and Zener breakdown mechanism in reverse biased diode with suitable circuit diagram.
- c) Explain working of BJT as a switch.
- d) Explain photoelectric pick up with suitable application.
- e) Explain wire type strain gauge in details. What is gauge factor?
- f) State and prove Demorgan's theorem.

Q.5 Attempt any two:

- a) Explain half wave rectifier with necessary diagrams. Derive an expression for:
 - 1) Average value of DC voltage
 - 2) RMS value of DC voltage
 - 3) Rectification efficiency
 - 4) Ripple factor
- **b)** Draw and explain input-output characteristics for CE configuration. Compare different transistor configurations.
- c) Explain symbol, equation and truth table for NAND and NOR gate. Derive Basic Gates using NOR gate.

SLR-FJ-3

Set

12

F.Y.	(B. 1	Fech BA) (Semester - I) (SIC ELECTRICA	(New) (CBC L & ELEC	CS) E FRO	Examination March	/April-2019 G
Day & Time:	& Date : 10:00	e: Sat D AM	urday, 04-05-2019 To 01:00 PM			Ν	/ax. Marks: 70
Instru	uctior	ns: 1) 2) 3) 4)	Make suitable assu Figures to the right Q. No. 1 is compute Book. Answer MCQ/Object mention Q.P. Set (F	imptions, if ne indicate fill n sory; it should ctive type que P/Q/R/S) on ⁻	ecess narks d be s estior Fop o	sary. solved in first 30 minute n on Page No.3 only. De f Page.	s in answer on't forget to
			MCQ/C	bjective Typ	be Qi	lestions	
Durat	ion: 3	0 Mir	utes				Marks: 14
Q.1	MCQ	/ Ob Phot	ective Questions	transduce	er.		14
	,	a) c)	Active Reactive		b) d)	Passive None	
	2)	Whio mea a) c)	ch of the following do surement? RTD Thermistor	evice cannot	be us b) d)	sed for temperature Thermocouple LVDT	
	3)	In Bo a) c)	oolean algebra, the OR operation NOT operation	dot sign (.) in	dicato b) d)	es AND operation none of the above	
	4)	The a) c)	decimal no. (25.O2) (11000.000001) ₂ (11100.000001) ₂	10 is equivale	ent to b) d)	binary no (10100.000) ₂ (11001.000001) ₂	
	5)	Pow a) b) c) d)	er factor is defined a Cosine of angle bet Ratio of true power Both a and b R/C	as tween voltage to apparent	e and powe	current r	
	6)	Whi	ch of the following st	eatements is t		For the circuit shown in $\frac{E_2}{1}$	n Figure

- a) E1 + E2 + E3 = Ir1 + Ir2 + I3r3b) E2 + E3 - E1 - I(r1 + r2 + r3) = 0
- I(r1 + r2 + r3) = E1 E2 E3c)
- E2 + E3 = E1 = Ir1 + Ir2 + Ir3d)
- The relation between the line and phase voltage of a delta connected 7) circuit is given by _____.
 - $\begin{array}{l} V_L = \sqrt{3} * V_P \\ V_L = 2 V_{p/r} \end{array}$ a) $V_L = V_P$ b)
 - c) $V_{\rm L} = V_{\rm P} / \sqrt{2}$ d)

Seat

No.

Set R

			SLR-FJ-3
			Set R
8)	Four identical resistors are first control The resultant resistance of the first	necteo combi	l in parallel and then in series. nation to the second will be
	a) 1/16 times c) 4 times	b) d)	1/4 times 16 times
9)	While comparing magnetic and elect magnetic circuit is compared with w a) Resistance b) Conductivity	ctrical (hich p b) d)	circuits, the permeance of arameter of electrical circuit? Conductance Resistivity
10)	Form factor for sinusoidal alternatin a) $\pi/2\sqrt{2}$ c) 1.11	g curro b) d)	ent is 1 0.634
11)	The peak value of a sinusoidal wave a) 0.637 V _{average} c) 0.707 V _{rms}	eform b) d)	is equal to 0.637 V _{rms} 1.414 V _{rms}
12)	A crystal diode is adevice. a) Non-linear c) Linear	b) d)	Bilateral none of the above
13)	LED do not require a) Heating c) both a and b	b) d)	warm up time none of the above
14)	The element that has biggest size ir a) Collector	n a tra b)	nsistor is Base

c) Emitter d) collector-base junction

Page	11	of	16
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Seat No.

F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination March/April-2019 **BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

Day & Date: Saturday, 04-05-2019 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

What is the value of unknown resistor R in figure below if the voltage drop a) across the 500 Ω resistor is 2.5 volts? All resistances are in ohm.

- b) The load to a 3 phase supply consists of 3 similar coils connected in star. The line currents are 25A and KVA and KW inputs are 20 and 11 respectively. Find
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 - Maximum Value of Flux density in core 1)
 - Voltage induced in secondary winding 2)
- Compare electric circuit and magnetic circuit with their similarities and d) dissimilarities.
- Derive an expression for average value of an AC quantity. e)
- Find RAB in the circuit, given in fig. **f**)



550A 50 n 500 n 12 V R B



16

Set R

Q.3 Solve any two:

- a) Derive the equation for converting delta resistances into equivalent star resistances.
- b) A coil of 500 turns and resistance of 20 ohms is wound uniformly on an iron ring of mean circumference 50 cm & cross sectional area 4 cm². It is connected to 24 V DC supply. Relative permeability of material is 800. Find:
 - 1) MMF
 - 2) Magnetic field strength
 - 3) Total flux
 - 4) Reluctance
- c) A coil of resistance of R = 50 Ω and inductance L = 29.8 mH and capacitance of C=3.4 μ F are connected in series and supplied by 200 V, 50 Hz supply. Find :
 - 1) The impedance of the circuit
 - 2) Current flowing through the circuit
 - 3) Power consumed in the circuit
 - 4) Power factor of the circuit

Section II

Q.4 Attempt any FOUR

- a) State and explain intrinsic and extrinsic semiconductor.
- **b)** Explain Avalanche and Zener breakdown mechanism in reverse biased diode with suitable circuit diagram.
- c) Explain working of BJT as a switch.
- d) Explain photoelectric pick up with suitable application.
- e) Explain wire type strain gauge in details. What is gauge factor?
- f) State and prove Demorgan's theorem.

Q.5 Attempt any two:

- a) Explain half wave rectifier with necessary diagrams. Derive an expression for:
 - 1) Average value of DC voltage
 - 2) RMS value of DC voltage
 - 3) Rectification efficiency
 - 4) Ripple factor
- **b)** Draw and explain input-output characteristics for CE configuration. Compare different transistor configurations.
- c) Explain symbol, equation and truth table for NAND and NOR gate. Derive Basic Gates using NOR gate.

SLR-FJ-3

Set

12

		3	 B) Q. No. 1 is compulsory; it sh 	nould be	solved in first 30 minutes i	n answer
		4) Answer MCQ/Objective type mention Q.P. Set (P/Q/R/S)	e question on Top c	n on Page No.3 only. Don [*] of Page.	't forget to
			MCQ/Objective	Type Q	uestions	
Dura	ation: 3	30 Mi	nutes			Marks: 1
Q.1	MCC	Q∕Ob	bjective Questions			1
	1)	For	m factor for sinusoidal alterna	ting curre	ent is	
		a)	$\pi/2\sqrt{2}$	b)	1	
		C)	1.11	d)	0.634	
	2)	The	e peak value of a sinusoidal wa	aveform	is equal to	
		a)	0.637 V _{average}	b)	0.637 V _{rms}	
		c)	0.707 V _{rms}	d)	1.414 V _{rms}	
	3)	Аc	rystal diode is adevice.			
	,	a)	Non-linear	b)	Bilateral	
		c)	Linear	d)	none of the above	
	4)	LE	D do not require .			
	,	a)	Heating	b)	warm up time	
		c)	both a and b	d)	none of the above	
	5)	The	e element that has biggest size	e in a trai	nsistor is	
	,	a)	Collector	b)	Base	
		c)	Emitter	d)	collector-base junction	
	6)	Pho	otovoltaic cell is a transc	ducer.		
	-,	a)	Active	b)	Passive	
		c)	Reactive	d)	None	
	7)	Wh	ich of the following device can asurement?	not be u	sed for temperature	
		a)	RTD	b)	Thermocouple	
		c)	Thermistor	d)	LVDT	
	8)	In E	Boolean algebra, the dot sign (.) indicat	es .	
	-,	a)	OR operation	b)	AND operation	
		c)	NOT operation	d)	none of the above	
	9)	The	e decimal no. (25.O2)₁₀ is equi	valent to	binarv no	
	-,	a)	(11000.000001)2	b)	(10100.000)2	
		c)	(11100.000001) ₂	d)	(11001.000001)2	

No. F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination March/April-2019 **BASIC ELECTRICAL & ÉLECTRONICS ENGINEERING**

Seat

Day & Date: Saturday, 04-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Make suitable assumptions, if necessary.

2) Figures to the right indicate fill marks

SLR-FJ-3

Set

Max. Marks: 70

S

4

- 10) Power factor is defined as .
 - Cosine of angle between voltage and current a)
 - Ratio of true power to apparent power b)
 - Both a and b c)
 - R/C d)
- 11) Which of the following statements is true? For the circuit shown in Figure



- E1 + E2 + E3 = Ir1 + Ir2 + I3r3a)
- b) E2 + E3 - E1 - I(r1 + r2 + r3) = 0
- I(r1 + r2 + r3) = E1 E2 E3C)
- E2 + E3 = E1 = Ir1 + Ir2 + Ir3d)
- The relation between the line and phase voltage of a delta connected 12) circuit is given by _____.

a)
$$V_L = V_P$$

c) $V_L = V_P / \sqrt{2}$
b) $V_L = \sqrt{3} * V_P$
d) $V_L = 2V_{p/r}$

13) Four identical resistors are first connected in parallel and then in series. The resultant resistance of the first combination to the second will be

a)	1/16 times	b)	1/4 times
``	A	1)	10.1

- C) 4 times d) 16 times
- While comparing magnetic and electrical circuits, the permeance of 14) magnetic circuit is compared with which parameter of electrical circuit?
 - Resistance a)

.

Conductance b)

Conductivity b)

Resistivity d)

Page	15	of	16
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Max. Marks: 56

F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination March/April-2019 BASIC ELECTRICAL & ELECTRONICS ENGINEERING

Day & Date: Saturday, 04-05-2019 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

Seat

No.

a) What is the value of unknown resistor R in figure below if the voltage drop across the 500 Ω resistor is 2.5 volts? All resistances are in ohm.

- b) The load to a 3 phase supply consists of 3 similar coils connected in star. The line currents are 25A and KVA and KW inputs are 20 and 11 respectively. Find
 - 1) Phase and line voltage
 - 2) KVAR input
 - 3) resistance and reactance of each coil
- c) A single phase transformer has 350 primary & 1050 secondary turns. The primary is connected to 400 V, 50 Hz supply. If net cross sectional area of core is 50 cm². Find:
 - 1) Maximum Value of Flux density in core
 - 2) Voltage induced in secondary winding
- d) Compare electric circuit and magnetic circuit with their similarities and dissimilarities.
- e) Derive an expression for average value of an AC quantity.
- f) Find RAB in the circuit, given in fig.







Q.3 Solve any two:

- a) Derive the equation for converting delta resistances into equivalent star resistances.
- b) A coil of 500 turns and resistance of 20 ohms is wound uniformly on an iron ring of mean circumference 50 cm & cross sectional area 4 cm². It is connected to 24 V DC supply. Relative permeability of material is 800. Find:
 - 1) MMF
 - 2) Magnetic field strength
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Q.4 Attempt any FOUR

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- d) Explain photoelectric pick up with suitable application.
- e) Explain wire type strain gauge in details. What is gauge factor?
- f) State and prove Demorgan's theorem.

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- a) Explain half wave rectifier with necessary diagrams. Derive an expression for:
 - 1) Average value of DC voltage
 - 2) RMS value of DC voltage
 - 3) Rectification efficiency
 - 4) Ripple factor
- **b)** Draw and explain input-output characteristics for CE configuration. Compare different transistor configurations.
- c) Explain symbol, equation and truth table for NAND and NOR gate. Derive Basic Gates using NOR gate.

SLR-FJ-3

Set

12

								SLR-F、	J-4
Seat No.								Set	Ρ
F.Y. ((B. T	[ech]) (Semest BAS	ter - I) (Nev SIC MECHA	v) (CBCS NICAL E) E NG	xamination Mar	ch/April-20)19
Day & Time:	Date 10:00	e: Mor D AM	nday, 06-05 To 01:00 P	-2019 M				Max. Marks	: 70
Instru	ction	n s: 1) 3)	Q.1 is com Figures to	pulsory. the right indic	cate full ma	rks.			
	0	0 N I		MCQ/Objec	tive Type	Que	estions		
Duratio	on: 30	0 Min	utes					Marks	: 14
Q.1 1	nuiti 1)	ple c In a a) c)	noice ques refrigeratior Evaporator Compresso	n cycle the he	eat is reject	ed b b) d)	oy refrigerant in Condenser Expansion valve		14
2	2)	For a and a) c)	a closed sys work done b enthalpy internal end	stem, the diffe by the gas, is ergy	erence betw equal to th	veei ie cl b) d)	n the heat added to nange in entropy temperature	the system	
3	3)	Joule a) c)	es experime third first	ent gives us v	vhich law o	f the b) d)	ermodynamics second zeroth	·	
	4)	Equa equa a) c)	al volume of I number of Charle's lav Joule's law	all gases, at f molecules. w	the same This is acco	tem ordir b) d)	perature and pressung to Avagadro's law Gay Lussac law	ure, contain	
Ę	5)	Durir a) c)	ng throttling internal en entropy do	process ergy does no es not chang	 t change e	b) d)	pressure does not enthalpy does not	change change	
6	6)	A pro heat a) c)	ocess, in wh to its surrou isothermal polytropic (nich the work undings durin process process	ing substar ig its expar	nce nsioi b) d)	neither receives nor n or contraction, is k isentropic process adiabatic process	r gives out nown as	
7	7)	For v a) c)	/iscous disc Reciprocat Gear pump	harge like oil ing pumps	which one	pur b) d)	np is used Rotary-(centrifugal depend on type of) pump compressor	
8	3)	For r a) c)	eaction wat pelton turb Kaplan turl	er turbine wh ine pine	nich turbine	is u b) d)	ised Francis turbine both b and c		
ç	€)	Draft a) b) c) d)	tube is use To increas To decreas To increas None of the	ed for e kinetic ener se pressure e e pressure er ese	rgy water s energy wate nergy wate	trikii er le r lea	ng to turbine aving tailrace aving tailrace		

- 10) In a four stroke engine maximum temperature inside the engine cylinder is
 - a) beginning of power stroke
 - b) end of power stroke
 - c) beginning compression stroke
 - d) end of exhaust stroke
- 11) Idler pulley is used for _____
 - a) maintaining belt tension
 - c) stopping motion completely
- b) changing direction of rotation

aesthetic considerations

- d) all of the above
- 12) The gears used to connect two non-parallel and intersecting are known as
 - a) spiral gears

c)

spur gears

- b) bevel gearsd) helical gears
- 13) The persons height, weight is considered while designing product for persons easy handling with easiness and comfortness in following:
 - a) ergonomic consideration
 - c) air condition
- 14) Which of the following is unitless
 - a) Stress
 - c) young's modulus

- .
- b) Strain

d)

d) none of the above

b) thermodynamics





No.

F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination March/April-2019 **BASIC MECHANICAL ENGINEERING**

Day & Date: Monday, 06-05-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) Neat diagrams must be drawn whenever necessary.

2) Make suitable assumptions, if necessary and mention them clearly.

- 3) Figures to the right indicate full marks.
- 4) Q. No. 2 and. Q. No. 4 are short answer type question.
- 5) Q. 3 and Q. 5 are long answer type question.
- 6) Use of log tables and non-programmable single memory calculator is Allowed.

Section I

Q.2 Answer any five of the following:

- State and explain Kelvin Plank and Clausius statement. a)
- Enlist different forms of work. Explain displacement work briefly. b)
- Define Thermodynamic system. State the types of system. Explain any c) one of them with example.
- For reversible adiabatic process prove that $P V^{\gamma} = C$ d)
- Compare Impulse and Reaction Turbine. e)
- **f**) Explain with neat sketch Reciprocating type compressor.
- Compare between PWR and BWR. g)

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

- In a steady flow machine 420kW of work is done by the machine. The 05 a) flow rate of fluid is 8 kg/sec. The Specific Volume of the fluid, pressure and velocity at the inlet are 0.35m³/kg, 8 bar and 28 m/sec. The inlet is 32m above the floor and discharge is at the floor level. The discharge conditions are 0.65 m³/kg, 2 bar and 280 m/sec respectively. The total heat loss between inlet and discharge is 14 kJ/kg of the fluid. Find the change in Specific internal energy.
- Explain with neat sketch working of Hydro-Electric Power plant. State its 05 b) advantage and disadvantages.
- Volume of 0.2 m³ of air at pressure of 1.5 bar is expanded isothermally to c) 04 0.5 m³. Calculate final pressure of gas and heat supplied during process. 04
- Explain with neat sketch, construction and working of Francis Turbine. d)
- Explain function of economizer, super heater and air preheater in a Boiler. 04 e)
- During certain reversible process volume changes from 0.5m³ to 1.5m³ **f**) The law of the process is P = (3/V) + 15, where 'p' is in bar and 'V' is m³. System rejects 40 KJ heat. Determine work done and change in internal energy.

Section II

Q.4 Solve any five out of seven:

- Classification of I.C. engine. a)
- Diesel engine has compression ratio of 15 and heat addition at constant b) pressure take place at 6% of stroke. Find the air standard efficiency of the engine. Take ν for air as 1.4
- Write difference between open belt drive and chain drive. C)
- Derive an expression for length of belt for open belt drive. d)

Max. Marks: 56

13

04

15

Set



		SLR-FJ	J-4
		Set	Ρ
	e)	Explain the following terms (any three): i) Tensile stress ii) Compressive stress iii) Shear stress iv) Shear modulus.	
	f) g)	Write note on selection of material for engineering application. Compare electric resistance and electric arc welding.	
Q.5	Solv a)	ve any one out of (a) and (b) and solve any two out of (c) to (f): In an SI engine working on the ideal Otto cycle, the compression ratio is 5.5. The pressure and temperature at the beginning of compression are 1 bar and 27° C respectively. The maximum pressure in cycle is 30 bar. Determine pressure, temperature at the salient points, the air standard officiency.	12 05
	b)	Explain the construction, working and application of Horizontal Milling machine.	05
	c)	An open belt drives whose shafts are separated by a distance of 5 m. The diameter of the large pulley is 1.5 m and that of smaller pulley is 1m. The initial tension in the belt when stationary is 3 kN. The mass of belt is 1.5 kg/m length. The coefficient of friction between belt and pulley is 0.3. Taking centrifugal tension in to account calculate power transmitted when the smaller pulley rotates at 450 rpm	04
	d)	Explain ergonomic consideration in design of mechanical component.	04
	e)	Explain with neat sketch Pillar type of drilling machine.	04
	f)	Explain with neat sketch oxyacetylene gas welding.	04

Explain with neat sketch oxyacetylene gas welding. f)

F.Y	. (B. 1	Fech) (Semester - I) (New) (CBCS) Examination March/Ap BASIC MECHANICAL ENGINEERING	oril-2019
Day Time	& Date	e: Monday, 06-05-2019 Max.	Marks: 70
Instr	uctior	 1) Q.1 is compulsory. 3) Figures to the right indicate full marks. 	
		MCQ/Objective Type Questions	
Dura	tion: 3	0 Minutes	Marks: 14
Q.1	Multi 1)	ple choice questions:For reaction water turbine which turbine is useda) pelton turbineb) Francis turbinec) Kaplan turbined) both b and c	14
	2)	 Draft tube is used for a) To increase kinetic energy water striking to turbine b) To decrease pressure energy water leaving tailrace c) To increase pressure energy water leaving tailrace d) None of these 	
	3)	 In a four stroke engine maximum temperature inside the engine cylind a) beginning of power stroke b) end of power stroke c) beginning compression stroke d) end of exhaust stroke 	ler is
	4)	Idler pulley is used fora) maintaining belt tensionb) changing direction of rotac) stopping motion completelyd) all of the above	ition
	5)	The gears used to connect two non-parallel and intersecting are knowa) spiral gearsb) bevel gearsc) spur gearsd) helical gears	n as
	6)	The persons height, weight is considered while designing product for persons easy handling with easiness and comfortness in following:a)ergonomic considerationb)thermodynamicsc)air conditiond)aesthetic considerations	
	7)	Which of the following is unitlessa) Stressb) Strainc) young's modulusd) none of the above	
	8)	In a refrigeration cycle the heat is rejected by refrigerant ina) Evaporatorb) Condenserc) Compressord) Expansion valve	
	9)	For a closed system, the difference between the heat added to the systemand work done by the gas, is equal to the change ina) enthalpyb) entropyc) internal energyd) temperature	stem

10) Joules experiment gives us which law of thermodynamics _____. b) second

d) zeroth

- third a)
- first C)

SLR-FJ-4

Set

Q

Seat

No.

1- \ 10 - - -_ . .

- a) Charle's law
- c) Joule's law

- b) Avagadro's law
- d) Gay Lussac law
- 12) During throttling process ____
 - a) internal energy does not change
 - c) entropy does not change
- 13) A process, in which the working substance neither receives nor gives out heat to its surroundings during its expansion or contraction, is known as
 - a) isothermal process
- b) isentropic process
- c) polytropic process
- d) adiabatic process
- 14) For viscous discharge like oil which one pump is used _
 - a) Reciprocating pumps
 - c) Gear pump

b) Rotary-(centrifugal) pump

b) pressure does not change

d) enthalpy does not change

d) depend on type of compressor

SLR-FJ-4

Set

Seat No.

F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination March/April-2019 **BASIC MECHANICAL ENGINEERING**

Day & Date: Monday, 06-05-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) Neat diagrams must be drawn whenever necessary.

2) Make suitable assumptions, if necessary and mention them clearly.

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- 4) Q. No. 2 and. Q. No. 4 are short answer type question.
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- Enlist different forms of work. Explain displacement work briefly. b)
- Define Thermodynamic system. State the types of system. Explain any c) one of them with example.
- For reversible adiabatic process prove that $P V^{\gamma} = C$ d)
- Compare Impulse and Reaction Turbine. e)
- **f**) Explain with neat sketch Reciprocating type compressor.
- Compare between PWR and BWR. g)

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

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- Explain with neat sketch, construction and working of Francis Turbine. d)
- Explain function of economizer, super heater and air preheater in a Boiler. 04 e) 04
- During certain reversible process volume changes from 0.5m³ to 1.5m³ **f**) The law of the process is P = (3/V) + 15, where 'p' is in bar and 'V' is m³. System rejects 40 KJ heat. Determine work done and change in internal energy.

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- Diesel engine has compression ratio of 15 and heat addition at constant b) pressure take place at 6% of stroke. Find the air standard efficiency of the engine. Take ν for air as 1.4
- Write difference between open belt drive and chain drive. C)
- Derive an expression for length of belt for open belt drive. d)

Max. Marks: 56

15

13

15

SLR-FJ-4

Set

		SLR-F.	J-4
		Set	Q
	e)	Explain the following terms (any three): i) Tensile stress ii) Compressive stress iii) Shear stress iv) Shear modulus.	
	f) g)	Write note on selection of material for engineering application. Compare electric resistance and electric arc welding.	
Q.5	Solv a)	ve any one out of (a) and (b) and solve any two out of (c) to (f): In an SI engine working on the ideal Otto cycle, the compression ratio is 5.5. The pressure and temperature at the beginning of compression are 1 bar and 27° C respectively. The maximum pressure in cycle is 30 bar. Determine pressure, temperature at the salient points, the air standard officiency.	12 05
	b)	Explain the construction, working and application of Horizontal Milling machine.	05
	c)	An open belt drives whose shafts are separated by a distance of 5 m. The diameter of the large pulley is 1.5 m and that of smaller pulley is 1m. The initial tension in the belt when stationary is 3 kN. The mass of belt is 1.5 kg/m length. The coefficient of friction between belt and pulley is 0.3. Taking centrifugal tension in to account calculate power transmitted when the smaller pulley rotates at 450 rpm	04
	d)	Explain ergonomic consideration in design of mechanical component.	04
	e)	Explain with neat sketch Pillar type of drilling machine.	04
	f)	Explain with neat sketch oxyacetylene gas welding.	04

Explain with neat sketch oxyacetylene gas welding. f)

No.							Jei	IX
F.Y.	. (В. 1	Tech)	(Semest BAS	ter - I) (New) (SIC MECHANI	CBCS) CAL EN	Ex NG	xamination March/April-20 INEERING	19
Day & Time	& Date : 10:0	e: Mon 0 AM T	day, 06-05 o 01:00 P	-2019 M			Max. Marks:	70
Instr	uctio	n s: 1) (3) I	Q.1 is com Figures to	pulsory. the right indicate	full mark	۲S.		
D	1 O			MCQ/Objective	e Type Q	ue	estions	
Dura	tion: 3		ites				Marks:	14
Q.1	Muit 1)	ldler p a) r c) s	olice ques oulley is us maintaining stopping m	stions: sed for g belt tension otion completely	b d))	changing direction of rotation all of the above	14
	2)	The g a) s c) s	ears used piral gears pur gears	to connect two n	on-paral b d	lel))	and intersecting are known as bevel gears helical gears	
	3)	The p perso a) e c) a	ersons he ns easy ha ergonomic air conditio	ight, weight is co andling with easir consideration n	nsidered ness and b d	wl cc))	nile designing product for omfortness in following: thermodynamics aesthetic considerations	
	4)	Which a) S c) y	n of the foll Stress /oung's mo	owing is unitless odulus	b d))	Strain none of the above	
	5)	Inare a) E c) (efrigeratior Evaporator Compresso	n cycle the heat is or	s rejected b d	d b))	y refrigerant in Condenser Expansion valve	
	6)	For a and w a) e c) i	closed sys ork done b enthalpy nternal end	stem, the differen by the gas, is equ ergy	ice betwe ual to the b d	eer ch)	n the heat added to the system nange in entropy temperature	
	7)	Joule: a) t c) f	s experime hird irst	ent gives us whic	h law of t b d	the))	rmodynamics second zeroth	
	8)	Equal equal a) (c) (volume of number of Charle's lav Joule's law	f all gases, at the f molecules. This w	same te is accor b d	emp dir)	perature and pressure, contain ng to Avagadro's law Gay Lussac law	
	9)	Durine a) i c) e	g throttling internal en entropy do	process ergy does not ch es not change	ange b d))	pressure does not change enthalpy does not change	
	10)	A proc heat t a) i c) i	cess, in wł o its surro sothermal oolytropic j	nich the working s undings during its process process	substanc s expans b d	e r ior)	neither receives nor gives out n or contraction, is known as isentropic process adiabatic process	

Seat

polytropic process d) adiabatic process SLR-FJ-4 Set R

- 11) For viscous discharge like oil which one pump is used _____
 - a) Reciprocating pumps

Kaplan turbine

b) Rotary-(centrifugal) pump
 d) depend on type of compressor

- c) Gear pump
- 12) For reaction water turbine which turbine is used _____
 - a) pelton turbine

- b) Francis turbine
- d) both b and c

13) Draft tube is used for ____

C)

- a) To increase kinetic energy water striking to turbine
- b) To decrease pressure energy water leaving tailrace
- c) To increase pressure energy water leaving tailrace
- d) None of these
- 14) In a four stroke engine maximum temperature inside the engine cylinder is
 - a) beginning of power stroke
 - b) end of power stroke
 - c) beginning compression stroke
 - d) end of exhaust stroke

Set R

SLR-FJ-4

No. F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination March/April-2019

BASIC MECHANICAL ENGINEERING

Day & Date: Monday, 06-05-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) Neat diagrams must be drawn whenever necessary.

- 2) Make suitable assumptions, if necessary and mention them clearly.
 - 3) Figures to the right indicate full marks.
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 - 5) Q. 3 and Q. 5 are long answer type question.
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- Compare Impulse and Reaction Turbine. e)
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- Compare between PWR and BWR. g)

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

- In a steady flow machine 420kW of work is done by the machine. The a) flow rate of fluid is 8 kg/sec. The Specific Volume of the fluid, pressure and velocity at the inlet are 0.35m³/kg, 8 bar and 28 m/sec. The inlet is 32m above the floor and discharge is at the floor level. The discharge conditions are 0.65 m³/kg, 2 bar and 280 m/sec respectively. The total heat loss between inlet and discharge is 14 kJ/kg of the fluid. Find the change in Specific internal energy.
- Explain with neat sketch working of Hydro-Electric Power plant. State its 05 b) advantage and disadvantages.
- Volume of 0.2 m³ of air at pressure of 1.5 bar is expanded isothermally to c) 04 0.5 m³. Calculate final pressure of gas and heat supplied during process. 04
- Explain with neat sketch, construction and working of Francis Turbine. d)
- Explain function of economizer, super heater and air preheater in a Boiler. 04 e) 04
- During certain reversible process volume changes from 0.5m³ to 1.5m³ **f**) The law of the process is P = (3/V) + 15, where 'p' is in bar and 'V' is m³. System rejects 40 KJ heat. Determine work done and change in internal energy.

Section II

Q.4 Solve any five out of seven:

- Classification of I.C. engine. a)
- Diesel engine has compression ratio of 15 and heat addition at constant b) pressure take place at 6% of stroke. Find the air standard efficiency of the engine. Take ν for air as 1.4
- Write difference between open belt drive and chain drive. C)
- Derive an expression for length of belt for open belt drive. d)

Max. Marks: 56

Set

SLR-FJ-4

13 05

15



		SLR-F.	J-4
		Set	R
	e)	Explain the following terms (any three): i) Tensile stress ii) Compressive stress iii) Shear stress iv) Shear modulus.	
	f) g)	Write note on selection of material for engineering application. Compare electric resistance and electric arc welding.	
Q.5	Solv a)	ve any one out of (a) and (b) and solve any two out of (c) to (f): In an SI engine working on the ideal Otto cycle, the compression ratio is 5.5. The pressure and temperature at the beginning of compression are 1 bar and 27° C respectively. The maximum pressure in cycle is 30 bar. Determine pressure, temperature at the salient points, the air standard efficiency.	12 05
	b)	Explain the construction, working and application of Horizontal Milling machine.	05
	c)	An open belt drives whose shafts are separated by a distance of 5 m. The diameter of the large pulley is 1.5 m and that of smaller pulley is 1m. The initial tension in the belt when stationary is 3 kN. The mass of belt is 1.5 kg/m length. The coefficient of friction between belt and pulley is 0.3. Taking centrifugal tension in to account calculate power transmitted when the smaller pulley rotates at 450 rpm	04
	d)	Explain ergonomic consideration in design of mechanical component.	04
	e)	Explain with neat sketch Pillar type of drilling machine.	04
	f)	Explain with neat sketch oxyacetylene gas welding.	04

Explain with neat sketch oxyacetylene gas welding. f)

Seat No.

F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination March/April-2019 **BASIC MECHANICAL ENGINEERING**

Day & Date: Monday, 06-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.1 is compulsory.

3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

3)

a)

c)

Q.1 Multiple choice questions:

- A process, in which the working substance neither receives nor gives out 1) heat to its surroundings during its expansion or contraction, is known as b) isentropic process
 - isothermal process a)
 - polytropic process C)
- 2) For viscous discharge like oil which one pump is used b) Rotary-(centrifugal) pump
 - Reciprocating pumps a)
 - Gear pump c)

pelton turbine

Kaplan turbine

For reaction water turbine which turbine is used _ b) Francis turbine

d) adiabatic process

depend on type of compressor

d) both b and c

d)

- 4) Draft tube is used for
 - To increase kinetic energy water striking to turbine a)
 - To decrease pressure energy water leaving tailrace b)
 - To increase pressure energy water leaving tailrace c)
 - None of these d)
- 5) In a four stroke engine maximum temperature inside the engine cylinder is
 - beginning of power stroke a)
 - end of power stroke b)
 - c) beginning compression stroke
 - end of exhaust stroke d)
- 6) Idler pulley is used for _
 - maintaining belt tension a)
 - stopping motion completely C)
- 7) The gears used to connect two non-parallel and intersecting are known as b) bevel gears
 - spiral gears a)
 - spur gears c)
- The persons height, weight is considered while designing product for 8) persons easy handling with easiness and comfortness in following:
 - ergonomic consideration a)
 - air condition C)

b) thermodynamics

d) all of the above

d) helical gears

aesthetic considerations d)

b) changing direction of rotation

- 9) Which of the following is unitless
 - Stress a)
 - young's modulus C)
- b) Strain
- d) none of the above
- 10) In a refrigeration cycle the heat is rejected by refrigerant in ____
 - Evaporator a)
 - Compressor c)

- b) Condenser d) Expansion valve



SLR-FJ-4

Max. Marks: 70

Set

- 11) For a closed system, the difference between the heat added to the system and work done by the gas, is equal to the change in ____ .
 - a) enthalpy

b) entropy

internal energy C)

- d) temperature
- 12) Joules experiment gives us which law of thermodynamics _____.
 - third a) c) first
- b) second d) zeroth
- 13) Equal volume of all gases, at the same temperature and pressure, contain equal number of molecules. This is according to _
 - Charle's law a)

b) Avagadro's law

C) Joule's law

- d) Gay Lussac law
- 14) During throttling process
 - internal energy does not change b) pressure does not change a)
 - entropy does not change c)
- d) enthalpy does not change

Seat No. F.Y. (B. Tech) (Semester - I) (New) (CBCS) Examination March/April-2019

BASIC MECHANICAL ENGINEERING

Day & Date: Monday, 06-05-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) Neat diagrams must be drawn whenever necessary.

- 2) Make suitable assumptions, if necessary and mention them clearly.
 - 3) Figures to the right indicate full marks.
 - 4) Q. No. 2 and. Q. No. 4 are short answer type question.
 - 5) Q. 3 and Q. 5 are long answer type question.
 - 6) Use of log tables and non-programmable single memory calculator is Allowed.

Section I

Q.2 Answer any five of the following:

- State and explain Kelvin Plank and Clausius statement. a)
- Enlist different forms of work. Explain displacement work briefly. b)
- Define Thermodynamic system. State the types of system. Explain any c) one of them with example.
- For reversible adiabatic process prove that $P V^{\gamma} = C$ d)
- Compare Impulse and Reaction Turbine. e)
- **f**) Explain with neat sketch Reciprocating type compressor.
- Compare between PWR and BWR. g)

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

- In a steady flow machine 420kW of work is done by the machine. The 05 a) flow rate of fluid is 8 kg/sec. The Specific Volume of the fluid, pressure and velocity at the inlet are 0.35m³/kg, 8 bar and 28 m/sec. The inlet is 32m above the floor and discharge is at the floor level. The discharge conditions are 0.65 m³/kg, 2 bar and 280 m/sec respectively. The total heat loss between inlet and discharge is 14 kJ/kg of the fluid. Find the change in Specific internal energy.
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- Explain with neat sketch, construction and working of Francis Turbine. d)
- Explain function of economizer, super heater and air preheater in a Boiler. 04 e) 04
- During certain reversible process volume changes from 0.5m³ to 1.5m³ **f**) The law of the process is P = (3/V) + 15, where 'p' is in bar and 'V' is m³. System rejects 40 KJ heat. Determine work done and change in internal energy.

Section II

Q.4 Solve any five out of seven:

- Classification of I.C. engine. a)
- Diesel engine has compression ratio of 15 and heat addition at constant b) pressure take place at 6% of stroke. Find the air standard efficiency of the engine. Take ν for air as 1.4
- Write difference between open belt drive and chain drive. C)
- Derive an expression for length of belt for open belt drive. d)

Max. Marks: 56

Set

15

15

13

SLR-FJ-4

		Set	S
	e)	Explain the following terms (any three): i) Tensile stress ii) Compressive	
	f) g)	Write note on selection of material for engineering application. Compare electric resistance and electric arc welding.	
Q.5	Sol a)	Ive any one out of (a) and (b) and solve any two out of (c) to (f): In an SI engine working on the ideal Otto cycle, the compression ratio is 5.5. The pressure and temperature at the beginning of compression are 1 bar and 27° C respectively. The maximum pressure in cycle is 30 bar. Determine pressure, temperature at the salient points, the air standard efficiency	12 05
	b)	Explain the construction, working and application of Horizontal Milling machine.	05
	c)	An open belt drives whose shafts are separated by a distance of 5 m. The diameter of the large pulley is 1.5 m and that of smaller pulley is 1m. The initial tension in the belt when stationary is 3 kN. The mass of belt is 1.5 kg/m length. The coefficient of friction between belt and pulley is 0.3. Taking centrifugal tension in to account calculate power transmitted when the smaller pulley rotates at 450 rpm	04
	d) e) f)	Explain ergonomic consideration in design of mechanical component. Explain with neat sketch Pillar type of drilling machine. Explain with neat sketch oxyacetylene gas welding.	04 04 04

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

Page 1 of 1

Seat	
No.	

F.Y. (B.Tech.) (Semester - II) (New)(CBCS) Examination March/April-2019 ENGINEERING MATHEMATICS - II

Day & Date: Friday, 10-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Use of non programmable calculator is allowed.
- 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+1

 $m \atop m$

m+n

1

4) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Multiple choice questions

- 1) The integrating factor of the differential equation $x \frac{dy}{dx} + (1 + x) y = e^x$ is
 - a) $x \log x$ c) xe^{-x} b) $x + e^x$ d) xe^x

	-			
2)	The	solution of $\frac{dy}{dx} = -\frac{x^2}{y^2}$ at $x = 1$ and	y =	0 is
	a)	$x^{3}_{0} + y^{3}_{0} = 0$	b)	$x^{3} - y^{3} = 1$
	c)	$x^3 + y^3 = 3$	d)	$x^3 + y^3 = 1$
3)	The	series $\Sigma \frac{1}{n^p}$, $P > 1$ is		
	a)	Convergent	b)	Divergent
	c)	Oscillatory	d)	absolutely convergent
4)	In D	'Alemberts ratio test if $\lim_{n\to\infty} \frac{u_n}{u_{n+1}} =$	1 ther	ı
	a)	Σu_n converges	b)	Σu_n diverges
	c)	the test fail	d)	Σu_n is oscillatory
5)	[cos	$\theta - i\sin\theta]^4 = \underline{\qquad}.$		
	a)	$\sin 4\theta - i \cos 4\theta$	b)	$\cos 4\theta + i \sin 4\theta$
	C)	$\cos 4\theta - i \sin 4\theta$	d)	$\sin 4\theta + i \cos 4\theta$
6)	sin i	<i>x</i> =		
	a)	sin hx	b)	<i>i</i> sin <i>x</i>

- c) sin *ix*d) *i* sin*hx*7) Analytic function is also called as _____.
 a) holomorphic
 b) irregular
 - c) harmonic d) Laplace
- 8) $\frac{B(m+1,n)}{B(m,n)}$ is equal to _____. a) $\frac{m}{n}$ b) c) $\frac{m-1}{n}$ d)
- 9) The value of $\int_{0}^{\infty} \frac{e^{-x}}{x} dx$ is _____. a) 0 b) ∞
 - c) -1 d)

Max. Marks: 70

Marks: 14

14

SLR-FJ-5

Set

			SLR-FJ-5
			Set P
10)	For the curve $y^2(1 + x) = x^2(1 - x)$ a) node c) conjugate point	– x), the or b) d)	rigin is a cusp isolated point
11)	The numbers of loops of $r = a \sin a$ a) two c) four	n2θ are b) d)	three eight
12)	For $\int_0^\infty \int_x^\infty f(x,y) dy dx$ by the a) $\int_0^\infty \int_0^x f(x,y) dx dy$ c) $\int_0^\infty \int_y^\infty f(x,y) dx dy$	change of b) d)	order of integration we get $\int_{x}^{\infty} \int_{0}^{\infty} f(x, y) dx dy$ $\int_{0}^{\infty} \int_{0}^{y} f(x, y) dx dy$
13)	The value of $\int_{0}^{\pi/2} \int_{0}^{\pi/2} \sin (x + a) = 0$ c) π	y) <i>dx dy</i> b) d)	is 2 -2
14)	The total mass of the lamina $0 \le$ equal to xy is a) 4	x ≤ 1, 0 ≤ b)	$x \le y \le 1$ with density at any point 2

a)	4	b)	2
c)	1	d)	1
-)	2		4

Seat	
No.	

F.Y. (B.Tech.) (Semester - II) (New)(CBCS) Examination March/April-2019 **ENGINEERING MATHEMATICS - II**

Day & Date: Friday, 10-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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

Section - I

Q.2 Attempt any three:

- a) Solve: (x 3y + 4)dx = (2x 6y + 1)dyb) Solve: $\frac{dy}{dx} = \frac{y}{2y \log y + y x}$ c) Solve: $\frac{dy}{dx} + (2x \tan^{-1}y x^3)(1 + y^2) = 0$ d) Solve: $x^5 = 1 + i$
- e) Test the convergence of $\sum \frac{3^n}{2^{n+3}}$

Q.3 Attempt any three:

- a) Find the orthogonal trajectories of $x^2 + y^2 + 2gx + c = 0$, where g is a parameter.
- **b)** Solve : $y(x^2y + e^x)dx e^xdy = 0$
- Examine the convergence of $\sum \frac{n!3^n}{(n+1)^n}$ C)
- **d)** Find the analytic function whose imaginary part is $tan^{-1}(\frac{y}{x})$.
- e) Determine whether the function $\sin z$ is analytic; if so find its derivative.

Q.4 Attempt any two:

Q.5

- At a room temperature of 25°, the temperature of a body is 75°. After 15 a) seconds the temperature of the body was found to be 65°. Find its temperature after 90 seconds.
- Examine for absolute and conditional convergence of b)

1)
$$\Sigma \frac{\cos n\pi}{n^2+1}$$
 2) $\Sigma (-1)^n \frac{2^{3n}}{3^{2n}}$

Prove that the function $u = x^3 - 3xy^2 + 3x^2 - 3y^2 + 1$ satisfies Laplace c) equation and construct the analytic function f(z)

Section – II

Attempt any three: a) Evaluate : $\int_{0}^{1} x^{3} \left[log \frac{1}{x} \right]^{4} dx$ Evaluate : $\int_{0}^{\infty} \frac{e^{-\alpha x} sinx}{x} dx$ b) Trace the curve $x = a \cos^3 t$, $y = a \sin^3 t$ with justification. c) d) $\int_{y^2} \int_0 x \, dz \, dx \, dy$ Evaluate : $\iint_{x=0, y=0, x+y=1}^{y=3x+4y} dxdy$ over the triangle. e) Evaluate :

Max. Marks: 56

09

09

10

09

SLR-FJ-5

Set

Q.6 Attempt any three:

b)

- Evaluate : $\int_{0}^{3} \frac{x^{3/2}}{\sqrt{3-x}} dx$ Evaluate : $\int_{0}^{a\sqrt{3}} \int_{0}^{\sqrt{x^{2}+a^{2}}} \frac{x \, dy dx}{y^{2}+x^{2}+a^{2}}$ Trace the curve $r^{2} = 4\cos 2\theta$, with justification C) cation.
- Find the mass of the lamina in the form of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, if density d) at any point varies as the product of distances from the axes of ellipse.
- Find the area which is inside the cardiod $r = 2(1 + cos\theta)$ and outside the e) circle r = 2.

Q.7 Attempt any two:

a)

- Prove that : $\int_{0}^{\infty} \frac{x^{m-1}}{(1+x)^{m+n}} dx = B(m,n) \text{ and hence evaluate}$ b)
- $\int_{0}^{\infty} \frac{\sqrt{x}}{(1+x)^2} dx$ Trace the curve $xy^2 = a(x^2 a^2)$ with full justification. Change the order of Integration in $\int_{0}^{1} \int_{x^2}^{2-x} xy dy dx$ and hence evaluate. c)
| Th | e value of $\int_{0}^{\infty} \frac{e^{-x}}{x} dx$ is | | |
|------------------------------|--|--------------------------|---|
| a)
c) | 0
-1 | b)
d) | ∞
1 |
| Fo
a)
c) | the curve $y^2(1 + x) = x^2(1 - x)$,
node
conjugate point | the or
b)
d) | rigin is a
cusp
isolated point |
| The
a)
c) | e numbers of loops of $r = a \sin 2\theta$
two
four | are
b)
d) | three
eight |
| For
a)
c) | $\int_{0}^{\infty} \int_{x}^{\infty} f(x, y) dy dx \text{by the char}$ $\int_{0}^{\infty} \int_{0}^{x} f(x, y) dx dy$ $\int_{0}^{\infty} \int_{y}^{\infty} f(x, y) dx dy$ | nge of
b)
d) | order of integration we get
$\int_{x}^{\infty} \int_{0}^{\infty} f(x, y) dx dy$ $\int_{0}^{\infty} \int_{0}^{y} f(x, y) dx dy$ |
| The
a) | e value of $\int_{0}^{\pi/2} \int_{0}^{\pi/2} \sin (x + y) dx$ | lx dy
b) | is
2
-2 |
| C)
The
equ
a)
C) | to tal mass of the lamina $0 \le x \le$
ual to xy is
4
$\frac{1}{2}$ | u,
1, 0 ≤
b)
d) | $y \le 1$ with density at any point
2
$\frac{1}{4}$ |

1)

2)

3)

4)

5)

6)

7)

Seat

No.

Q.1

Duration: 30 Minutes

a)

c)

B(m,n)'n

п

m-1

п

Day & Date: Friday, 10-05-2019 Time: 10:00 AM To 01:00 PM

Multiple choice questions

Instructions: 1) All questions are compulsory.

 $\frac{B(m+1,n)}{m}$ is equal to _____.

- 2) Use of non programmable calculator is allowed.
- 3) Q. no. 1 is compulsory & it should be solved in first 30 minutes in answer book page no.3. Each question carries one mark.

b)

d)

m+1

n m

m+n

4) Figures to the right indicate full marks.

MCQ/Objective Type Questions

F.Y. (B.Tech.) (Semester - II) (New)(CBCS) Examination March/April-2019 **ENGINEERING MATHEMATICS - II**

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SLR-FJ-5

Max. Marks: 70

Q

Set

Marks: 14

The integrating factor of the differential equation $x \frac{dy}{dx} + (1 + x) y = e^x$ is 8) b) $x + e^{x}$ a) $x \log x$ xe^{-x} d) xe^x c) The solution of $\frac{dy}{dx} = -\frac{x^2}{y^2}$ at x = 1 and y = 0 is 9) $x^3 - y^3 = 1$ $x^3 + y^3 = 1$ a) $x^3 + y^3 = 0$ c) $x^3 + y^3 = 3$ b) d) 10) The series $\Sigma \frac{1}{n^p}$, P > 1 is Convergent Divergent a) b) absolutely convergent Oscillatory C) d) 11) In D'Alemberts ratio test if $\lim_{n\to\infty} \frac{u_n}{u_{n+1}} = 1$ then Σu_n converges a) b) Σu_n diverges Σu_n is oscillatory the test fail c) d) 12) $[\cos\theta - i\sin\theta]^4 =$ ____ $\sin 4\theta - i \cos 4\theta$ b) a) $\cos 4\theta + i \sin 4\theta$ c) $\cos 4\theta - i \sin 4\theta$ d) $\sin 4\theta + i \cos 4\theta$ 13) $\sin ix =$ sin hx b) a) $i \sin x$ C) $-\sin ix$ d) *i* sinhx 14) Analytic function is also called as _____ b) holomorphic irregular a) c) harmonic d) Laplace

SLR-FJ-5

Set | Q

Seat	
No.	

F.Y. (B.Tech.) (Semester - II) (New)(CBCS) Examination March/April-2019 **ENGINEERING MATHEMATICS - II**

Day & Date: Friday, 10-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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

Section - I

Q.2 Attempt any three:

- a) Solve: (x 3y + 4)dx = (2x 6y + 1)dyb) Solve: $\frac{dy}{dx} = \frac{y}{2y \log y + y x}$ c) Solve: $\frac{dy}{dx} + (2x \tan^{-1}y x^3)(1 + y^2) = 0$ d) Solve: $x^5 = 1 + i$
- e) Test the convergence of $\sum \frac{3^n}{2^{n+3}}$

Q.3 Attempt any three:

- a) Find the orthogonal trajectories of $x^2 + y^2 + 2gx + c = 0$, where g is a parameter.
- **b)** Solve : $y(x^2y + e^x)dx e^xdy = 0$
- Examine the convergence of $\sum \frac{n!3^n}{(n+1)^n}$ C)
- **d)** Find the analytic function whose imaginary part is $tan^{-1}(\frac{y}{x})$.
- e) Determine whether the function $\sin z$ is analytic; if so find its derivative.

Q.4 Attempt any two:

Q.5

- At a room temperature of 25°, the temperature of a body is 75°. After 15 a) seconds the temperature of the body was found to be 65°. Find its temperature after 90 seconds.
- Examine for absolute and conditional convergence of b)

1)
$$\Sigma \frac{\cos n\pi}{n^2+1}$$
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Prove that the function $u = x^3 - 3xy^2 + 3x^2 - 3y^2 + 1$ satisfies Laplace C) equation and construct the analytic function f(z)

Section – II

Attempt any three: a) Evaluate : $\int_{0}^{1} x^{3} \left[log \frac{1}{x} \right]^{4} dx$ Evaluate : $\int_{0}^{\infty} \frac{e^{-\alpha x} sinx}{x} dx$ b) Trace the curve $x = a \cos^3 t$, $y = a \sin^3 t$ with justification. c) d) $\int_{y^2} \int_0 x \, dz \, dx \, dy$ Evaluate : $\iint_{x=0, y=0, x+y=1}^{y=3x+4y} dxdy \text{ over the triangle.}$ e) Evaluate :

Max. Marks: 56

SLR-FJ-5

Set

10

09

09

Page 8 of 16

- Q.6 Attempt any three:
 - a)

b)

- Evaluate : $\int_{0}^{3} \frac{x^{3/2}}{\sqrt{3-x}} dx$ Evaluate : $\int_{0}^{a\sqrt{3}} \int_{0}^{\sqrt{x^{2}+a^{2}}} \frac{x \, dy dx}{y^{2}+x^{2}+a^{2}}$ Trace the curve $r^{2} = 4\cos 2\theta$, with justification C) ication.
- Find the mass of the lamina in the form of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, if density d) at any point varies as the product of distances from the axes of ellipse.
- Find the area which is inside the cardiod $r = 2(1 + cos\theta)$ and outside the e) circle r = 2.

 $\int_{0}^{\infty} \frac{\sqrt{x}}{(1+x)^2} dx$ Trace the curve $xy^2 = a(x^2 - a^2)$ with full justification. Change the order of Integration in $\int_{0}^{1} \int_{x^2}^{2-x} xy dy dx$ and hence evaluate.

Q.7 Attempt any two: Prove that : $\int_{0}^{\infty} \frac{x^{m-1}}{(1+x)^{m+n}} dx = B(m,n) \text{ and hence evaluate}$

a)

b) c)

		3	B) Q. no. 1 is compulsory & it sho	uld be	solved in first 30 minutes in answer
		4	book page no.3. Each question) Figures to the right indicate full	marks	s one mark.
			MCQ/Objective Ty	pe Qu	lestions
Dura	tion: 3	30 Mi	nutes		Marks: 1
Q.1	Mult	iple (choice questions		1
	1)	ne a) c)	two four $r = a \sin 2\theta$	are b) d)	 three eight
	2)	For a) c)	$\int_{0}^{\infty} \int_{x}^{\infty} f(x, y) dy dx \text{ by the cha}$ $\int_{0}^{\infty} \int_{0}^{x} f(x, y) dx dy$ $\int_{0}^{\infty} \int_{y}^{\infty} f(x, y) dx dy$	nge of b) d)	order of integration we get $\int_{x}^{\infty} \int_{0}^{\infty} f(x, y) dx dy$ $\int_{0}^{\infty} \int_{0}^{y} f(x, y) dx dy$
	3)	The a) c)	value of $\int_{0}^{\pi/2} \int_{0}^{\pi/2} \sin (x + y) dx$ 0 π	<i>lx dy</i> b) d)	is 2 -2
	4)	The equa a) c)	total mass of the lamina $0 \le x \le$ al to xy is 4 $\frac{1}{2}$	i 1, 0 ≤ b) d)	$\leq y \leq 1$ with density at any point 2 $\frac{1}{4}$
	5)	The a) c)	integrating factor of the different $x \log x$ xe^{-x}	ial equ b) d)	uation $x \frac{dy}{dx} + (1 + x) y = e^x$ is $x + e^x$ xe^x
	6)	The a) c)	solution of $\frac{dy}{dx} = -\frac{x^2}{y^2}$ at $x = 1$ and $x^3 + y^3 = 0$ $x^3 + y^3 = 3$	nd y = b) d)	0 is $x^{3} - y^{3} = 1$ $x^{3} + y^{3} = 1$
	7)	The a) c)	series $\Sigma \frac{1}{n^p}$, $P > 1$ is Convergent Oscillatory	b) d)	Divergent absolutely convergent

Seat No.

F.Y. (B.Tech.) (Semester - II) (New)(CBCS) Examination March/April-2019 **ENGINEERING MATHEMATICS - II**

Day & Date: Friday, 10-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Use of non programmable calculator is allowed.

SLR-FJ-5

Set

Max. Marks: 70

R

4

In D'Alemberts ratio test if $\lim_{n\to\infty} \frac{u_n}{u_{n+1}} = 1$ then 8) Σu_n converges a) b) Σu_n diverges Σu_n is oscillatory c) the test fail d) $[\cos\theta - i\sin\theta]^4 =$ 9) $\sin 4\theta - i \cos 4\theta$ b) $\cos 4\theta + i \sin 4\theta$ a) C) $\cos 4\theta - i \sin 4\theta$ d) $\sin 4\theta + i \cos 4\theta$ 10) $\sin ix =$ _ b) *i* sin*x* a) sin hx c) $-\sin ix$ d) *i* sinhx 11) Analytic function is also called as ____ b) irregular holomorphic a) c) harmonic d) Laplace $\frac{B(m+1,n)}{B(m,n)}$ is equal to _____. 12) m+1b) п $_m^n$ m-1d) c) m+nп The value of $\int_{x}^{\infty} \frac{e^{-x}}{x} dx$ is _____ 13) 0 b) a) ∞ c) -1 d) 1 14) For the curve $y^2(1 + x) = x^2(1 - x)$, the origin is a _____ node a) b) cusp conjugate point isolated point c) d)

SLR-FJ-5

Set R

Page 11 of 16

)	Determine whether the function $\sin z$ is analytic; if so find i
tt	empt any two:
)	At a room temperature of 25°, the temperature of a body
	seconds the temperature of the body was found to be 65°
	temperature after 90 seconds.
)	Examine for absolute and conditional convergence of
	1) $\Sigma \frac{\cos n\pi}{n^2+1}$ 2) $\Sigma (-1)^n \frac{2^{3n}}{3^{2n}}$
)	Prove that the function $u = x^3 - 3xy^2 + 3x^2 - 3y^2 + 1$ satisfies
	equation and construct the analytic function $f(z)$
	Section – II
tt	empt any three:

- Q.3
 - a) Find the orthogonal trajectories of $x^2 + y^2 + 2gx + c = 0$, where g is a

 - C

 - `
 - its derivative.

Q.5

- is 75°. After 15 a) ². Find its
- b)
- c) atisfies Laplace

Seat No.

F.Y. (B.Tech.) (Semester - II) (New)(CBCS) Examination March/April-2019 **ENGINEERING MATHEMATICS - II**

Day & Date: Friday, 10-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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

Section - I

Q.2 Attempt any three:

- a)
- b)
- Solve: (x 3y + 4)dx = (2x 6y + 1)dySolve: $\frac{dy}{dx} = \frac{y}{2y \log y + y x}$ Solve: $\frac{dy}{dx} + (2x \tan^{-1}y x^3)(1 + y^2) = 0$ c)
- Solve: $\tilde{x}^5 = 1 + i$ d)
- Test the convergence of $\sum \frac{3^n}{2^{n+3}}$ e)

Attempt any three:

b) Solve :
$$y(x^2y + e^x)dx - e^xdy = 0$$

) Examine the convergence of
$$\sum \frac{n! 3^n}{(n+1)^n}$$

Examine the convergence of
$$\sum \frac{n!3^n}{(n+1)^n}$$

d) Find the englytic function where imaginary part is
$$tag = \frac{1}{2} \frac{y}{2}$$

Find the analytic function whose imaginary part is
$$tan^{-1}(\frac{y}{x})$$
.

Attempt any three:
a)
Evaluate :
$$\int_{0}^{1} x^{3} \left[log \frac{1}{x} \right]^{4} dx$$

b)
Evaluate : $\int_{0}^{\infty} \frac{e^{-ax} sinx}{x} dx$
c) Trace the curve $x = a cos^{3}t$, $y = a sin^{3}t$ with justification.
d)
Evaluate : $\int_{0}^{1} \int_{y^{2}}^{1} \int_{0}^{1-x} x dz dx dy$
e)
Evaluate : $\int_{0}^{1} e^{3x+4y} dx dy$ over the triangle.
 $x = 0, y = 0, x + y = 1$

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Set

R

Max. Marks: 56

09

09

10

10

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SLR-FJ-5 Set 09

Q.6 Attempt any three:

b)

a)

Evaluate : $\int_{0}^{3} \frac{x^{3/2}}{\sqrt{3-x}} dx$

- Evaluate : $\int_{0}^{0} a\sqrt{3} \int_{0}^{\sqrt{x^{2}+a^{2}}} \frac{x \, dy dx}{y^{2}+x^{2}+a^{2}}$ Trace the curve $r^{2} = 4cos2\theta$, with justification C) iustification.
- Find the mass of the lamina in the form of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, if density d) at any point varies as the product of distances from the axes of ellipse.
- Find the area which is inside the cardiod $r = 2(1 + cos\theta)$ and outside the e) circle r = 2.

Q.7 Attempt any two:

Prove that : $\int_{0}^{\infty} \frac{x^{m-1}}{(1+x)^{m+n}} dx = B(m,n) \text{ and hence evaluate}$

$$\int_{0}^{\infty} \frac{\sqrt{x}}{(1+x)^2} dx$$

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

Change the order of Integration in $\int_{0}^{1} \int_{x^2}^{2-x} xy dy dx$ and hence evaluate. C)

Seat	
No.	

F.Y. (B.Tech.) (Semester - II) (New)(CBCS) Examination March/April-2019 ENGINEERING MATHEMATICS - II

Day & Date: Friday, 10-05-2019 Time: 10:00 AM To 01:00 PM

Duration: 30 Minutes

Instructions: 1) All questions are compulsory.

- 2) Use of non programmable calculator is allowed.
- 3) Q. no. 1 is compulsory & it should be solved in first 30 minutes in answer book page no.3. Each question carries one mark.
- 4) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Q.1	Mult 1)	tiple choice questions $\sin ix = $		
	,	a) $\sin hx$ c) $-\sin ix$	b) d)	i sinx i sinhx
	2)	Analytic function is also called as a) holomorphic c) harmonic	b) d)	irregular Laplace
	3)	$\frac{\frac{B(m+1,n)}{B(m,n)}}{a} \text{ is equal to } \underline{\qquad}.$ a) $\frac{m}{n}$ c) $\frac{m-1}{n}$	b) d)	$\frac{\frac{m+1}{n}}{\frac{m}{m+n}}$
	4)	The value of $\int_{0}^{0} \frac{e^{-x}}{x} dx$ is a) 0 c) -1	 b) d)	∞ 1
	5)	For the curve $y^2(1 + x) = x^2(1 - x)$, a) node c) conjugate point	the or b) d)	igin is a cusp isolated point
	6)	The numbers of loops of $r = a \sin 2\theta$ a a) two c) four	are b) d)	 three eight
	7)	For $\int_0^\infty \int_x^\infty f(x,y) dy dx$ by the chan a) $\int_0^\infty \int_0^x f(x,y) dx dy$ c) $\int_0^\infty \int_y^\infty f(x,y) dx dy$	ge of b) d)	order of integration we get $\int_{x}^{\infty} \int_{0}^{\infty} f(x, y) dx dy$ $\int_{0}^{\infty} \int_{0}^{y} f(x, y) dx dy$
	8)	The value of $\int_{0}^{\pi/2} \int_{0}^{\pi/2} \sin (x + y) dx$	x dy	is
		a) 0 c) π	b) d)	2 -2

Max. Marks: 70

Marks: 14

14

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9)	The equa	total mass of the lamina $0 \le x \le x$ al to xy is	1, 0 ≤	$y \leq 1$ with density at any point	
	a) c)	$\frac{1}{2}$	b) d)	$\frac{2}{\frac{1}{4}}$	
10)	The	integrating factor of the differentia	al equa	ation $x \frac{dy}{dx} + (1+x) y = e^x$ is	
	a) c)	$\frac{x \log x}{x e^{-x}}$	b) d)	$\begin{array}{l} x + e^{x^{x}} \\ x e^{x} \end{array}$	
11)	The	solution of $\frac{dy}{dx} = -\frac{x^2}{y^2}$ at $x = 1$ and	y = 0) is	
	a) c)	$x^{3} + y^{3} = 0$ $x^{3} + y^{3} = 3$	b) d)	$x^{3} - y^{3} = 1$ $x^{3} + y^{3} = 1$	
12)	The	series $\Sigma \frac{1}{n^p}$, $P > 1$ is			
	a) c)	Convergent Oscillatory	b) d)	Divergent absolutely convergent	
13)	In D'	Alemberts ratio test if $\lim_{n \to \infty} \frac{u_n}{u_{n+1}} =$	1 then	1	
	a) c)	Σu_n converges the test fail	b) d)	Σu_n diverges Σu_n is oscillatory	
14)	[cost a)	$\theta - i \sin \theta$] ⁴ = $\sin 4\theta - i \cos 4\theta$	b)	$\cos 4\theta + i \sin 4\theta$	
	c)	$\cos 4\theta - i \sin 4\theta$	d)	$\sin 4\theta + i \cos 4\theta$	

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F.Y. (B.Tech.) (Semester - II) (New)(CBCS) Examination March/April-2019 **ENGINEERING MATHEMATICS - II**

Day & Date: Friday, 10-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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

Section - I

Q.2 Attempt any three:

- a) Solve: (x 3y + 4)dx = (2x 6y + 1)dyb) Solve: $\frac{dy}{dx} = \frac{y}{2y \log y + y x}$ c) Solve: $\frac{dy}{dx} + (2x \tan^{-1}y x^3)(1 + y^2) = 0$ d) Solve: $x^5 = 1 + i$
- e) Test the convergence of $\sum \frac{3^n}{2^{n+3}}$

Q.3 Attempt any three:

- a) Find the orthogonal trajectories of $x^2 + y^2 + 2gx + c = 0$, where g is a parameter.
- **b)** Solve : $y(x^2y + e^x)dx e^xdy = 0$
- Examine the convergence of $\sum \frac{n!3^n}{(n+1)^n}$ C)
- **d)** Find the analytic function whose imaginary part is $tan^{-1}(\frac{y}{x})$.
- e) Determine whether the function $\sin z$ is analytic; if so find its derivative.

Q.4 Attempt any two:

Q.5

- At a room temperature of 25°, the temperature of a body is 75°. After 15 a) seconds the temperature of the body was found to be 65°. Find its temperature after 90 seconds.
- Examine for absolute and conditional convergence of b)

1)
$$\Sigma \frac{\cos n\pi}{n^2+1}$$
 2) $\Sigma (-1)^n \frac{2^{3n}}{3^{2n}}$

Prove that the function $u = x^3 - 3xy^2 + 3x^2 - 3y^2 + 1$ satisfies Laplace c) equation and construct the analytic function f(z)

Section – II

Attempt any three: a) Evaluate : $\int_{0}^{1} x^{3} \left[log \frac{1}{x} \right]^{4} dx$ Evaluate : $\int_{0}^{\infty} \frac{e^{-\alpha x} sinx}{x} dx$ b) Trace the curve $x = a \cos^3 t$, $y = a \sin^3 t$ with justification. c) d) $\int_{y^2} \int_0 x \, dz \, dx \, dy$ Evaluate : $\iint_{x=0, y=0, x+y=1}^{y=3x+4y} dxdy \text{ over the triangle.}$ e) Evaluate :

Max. Marks: 56

SLR-FJ-5

Set

09

09

09

Attempt any three: a)

Q.6

Evaluate :
$$\int_{0}^{3} \frac{x^{3/2}}{\sqrt{3-x}} dx$$

Evaluate :
$$\int_{0}^{a\sqrt{3}} \int_{0}^{\sqrt{x^{2}+a^{2}}} \frac{x \, dy dx}{y^{2}+x^{2}+a^{2}}$$

Trace the curve $r^{2} = 4cos2\theta$, with justification

- Trace the curve $\tilde{r}^2 = 4\cos 2\theta$, with justification. C)
- Find the mass of the lamina in the form of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, if density d) at any point varies as the product of distances from the axes of ellipse.
- Find the area which is inside the cardiod $r = 2(1 + cos\theta)$ and outside the e) circle r = 2.

Q.7 Attempt any two:

10

a)

Prove that : $\int_{0}^{\infty} \frac{x^{m-1}}{(1+x)^{m+n}} dx = B(m,n) \text{ and hence evaluate}$ $\int_{0}^{\infty} \frac{\sqrt{x}}{(1+x)^{2}} dx$ Trace the curve $xy^{2} = a(x^{2} - a^{2})$ with full justification. Change the order of Integration in $\int_{0}^{1} \int_{x^{2}}^{2-x} xy dy dx$ and hence evaluate. b) c)

14

SLR-FJ-6

Seat	
No.	

F.Y. (B. Tech.) (Semester - II) (New) (CBCS) Examination March/April-2019 **ENGINEERING GRAPHICS & DESIGNS**

Day & Date: Monday, 13-05-2019 Time: 10:00 AM To 02:00 PM

Instructions: 1) All questions from each section are compulsory.

- 2) Figures to the right indicate fill marks.
- 3) Assume suitable dimensions, wherever required and mention it clearly.
- 4) Retain all construction lines.
- 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

Q.1 Solve any FOUR: (Objective Type)

- Refer Fig.1. Complete the projections of line AB having grade +90% with 03 a) respect to A and bearing S40°E with respect to A. The true length is 80mm.
- Refer Fig.2. Complete the projections of line RS which is perpendicular to b) 04 line PQ at point S. Find true length of line RS.
- Refer Fig.3. Horizontal line AB intersects frontal line CD. Complete the 03 c) projections.
- Refer Fig.4. Complete the projections of horizontal line CD 40mm long; d) 03 intersecting profile line AB at point D. Line CD makes 45° angle with VP. 04
- Refer Fig.5. Find strike and dip of given plane SDK. e)
- Refer Fig.6. Complete the projections of plane CDE if it strikes S45⁰W and **f**) 03 dips 45° North Westerly.

Max. Marks: 70

Set

Seat	
No.	

F.Y. (B. Tech.) (Semester - II) (New) (CBCS) Examination March/April-2019 ENGINEERING GRAPHICS & DESIGNS

Day & Date: Monday, 13-05-2019 Time: 10:00 AM To 02:00 PM

Instructions: 1) All questions from each section are compulsory.

- 2) Figures to the right indicate fill marks.
- 3) Assume suitable dimensions, wherever required and mention it clearly.
- 4) Retain all construction lines.
- 5) All dimensions are in 'mm'.
- 6) Return all the answer-sheet supplied irrespective of their use.

Section I

Q.2 Solve the following:

- a) Complete the projections of line AB if point A is 10mm above HP and 17mm 04 in front of VP.
 - 1) Its bearing is S 40° E w.r.t. A
 - 2) Its gradient is + 75% w.r.t. A
 - 3) Its front view length is 60 mm
- b) A line AB, 80 mm long is inclined at 40° to FRP and its front view makes an angle of 60° to HRP. The end A is in FRP and 14 mm above HRP. Complete the projections.
- c) An isosceles triangle of base side 40 mm and height 70 mm rests on its base side in V.P in such a way that its front view looks like as an equilateral triangle. Complete the projections and find the angle made by plane with V.P.
- Q.3 A hexagonal plane ABCDEF of 40mm side has its side AB in HRP and the side opposite to resting side is 30mm above the HRP. Complete the projections if resting side makes 40° with FRP.
- Q.4 An equilateral triangular prism of 40mm side of base and 70mm height of axis is 10 kept on its HP on one of its base side. It is tilted in such a way that the lateral surface containing resting side makes 40° with HP. Complete the projections if resting side makes 50° with VP.

OR

A pentagonal pyramid of base side 40 mm and axis 70 mm long is resting on one of its corner in HP, in such a way that the slant edge containing that corner is vertical, and plane containing axis and slant edge is perpendicular to VP. Draw the projection of pyramid.

Max. Marks: 56

Set

Section II

- Q.5 Figure shows a pictorial view of an object. Draw the following views, by using 14 first angle method of projection.
 - a) Sectional Elevation in X direction along A-A;
 - b) Plan; and c) left hand side view



Q.6 A square pyramid with side of base 45 mm and axis of 70 mm is kept in HRP on 07 its base such that all sides of base are equally inclined to FRP. It is to be cut by an auxiliary inclined plane in such a way that true shape of section is an equilateral triangle with base 40 mm. Find inclination of cutting plane with HRP.

OR

A hexagonal pyramid having 35mm and 70mm long axis is lying on ground on one of triangular faces with its axis parallel to VP. A vertical section plane, which makes 30° to VP, cuts the solid and pass through center of base. Draw sectional front view and true shape of section.

Q.7 A pentagonal prism of base 40 mm and axis 70 mm is kept on it base in HRP 07 such that one its base edge is perpendicular to VP. It is cut by section plane making an angle of 45° and passing through midpoint of axis of prism. Draw development of lateral surface of cut pentagonal prism.

Draw the development of lateral surfaces of cut Hexagonal Pyramid.



Day a Time	& Date : 10:00	e: We D AM	dnesday, 15-05-2019 To 01:00 PM		Max. Marks: 70
Instr	uctior	ns: 1) 2) 3) 4)	All questions are compulsory. Use of non programmable scien Figures to right indicate full man Assume suitable data if necessa	tific c ks. ary an	alculator is allowed. Id state it clearly.
Duro	tion: 2		MCQ/Objective Typ	be Qu	lestions
	uon. 3				Marks. 14
Q. 1	1)	Soil follo a) c)	and its behaviour under the appl wing sub branch of civil engineer Geotechnical Engineering Surveying	cation ing b) d)	n of load is studied under the Environmental Engineering Town planning
	2)	Zerc a) c)	reading of the graduated arc of North end East end	prism b) d)	atic compass is marked near. South end West end
	3)	Cont redu a) c)	tour Map consisting of no. of clos ced level increasing inwards indi Hill Ridge	ed lo cates b) d)	ops around each other with Valley Pond
	4)	Tota a) c)	l number of links in Günter's cha 150 16	in are b) d)	66 100
	5)	The a) c)	most efficient method of irrigation Furrow Check bund	n is b) d)	Border strip Drip
	6)	The calle a) c)	water stored in between full rese d as Dead storage Surcharge storage	rvoir∣ b) d)	level and high flood level is Useful storage None of these
	7)	Gen a) b) c) d)	erally the dry dock is used For loading and unloading As Road stead For repair and maintenance of s All of these	 hips	
	8)	In a a) c)	mortar, the binding material is Cement Surkhi	b) d)	Sand Cinder
	9)	Line exte a) c)	up to which the plinth of a buildin nded is called? Building line Building extend	ng adj b) d)	joining a street may be law-fully Building boundary Building plan

F.Y. (B. Tech) (Semester - II) (New) (CBCS) Examination March/April-2019 **BASIC CIVIL ENGINEERING**

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- - 4

Building extend d)

SLR-FJ-7

- 10) For a good building stone how much is the required crushing strength?
 - Less than 50 N/mm² a)
- Greater than 100 N/mm² b)

Set P

155 N/mm² C)

- 10 N/mm^2
- d)
- Final setting Time of Ordinary Portland Cement (OPC) is _____. 11)
 - 20 Min a) C) 30 Min
- 400 Min b) d) 600 Min

- GPS stands for ____ 12)
 - Government Public System a)
 - **Global Positioning System** b)
 - **Global Police System** C)
 - **Geographic Positioning Sharing** d)
- The study of something without making actual contact with the object of 13) study is _____.
 - Remote sensing a)
- b) Contouring
- Triangulation d) GPS C)
- 14) Building bye-laws are laid
 - To prevent haphazard growth of city a)
 - To avoid air and noise pollution b)
 - C) To ensure proper light of ventilation, parking etc
 - All of above d)

Set P

F.Y. (B. Tech) (Semester - II) (New) (CBCS) Examination March/April-2019 BASIC CIVIL ENGINEERING

Day & Date: Wednesday, 15-05-2019 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 of the following

- a) With neat sketch of road in embankment explain its various components.
- **b)** Define contour and draw contour for Saddle and valley.
- c) What are the different roles those civil engineer plays during construction activity. Explain briefly.
- d) Write a short note on solid waste management? Why it is essential.
- e) With neat sketch explain rooftop water harvesting method. What are its merits and demerits?
- f) Differentiate between Collimation plane method and Rise fall method.
- **g)** Explain how the knowledge of civil engineering is important to other branches of engineering.

Q.3 Attempt any two of the following

- a) 1) Explain different types of irrigation canals stating their carrying capacity.
 - 2) With the neat sketch explain various components of railway.
- **b)** The following bearings were taken with a prismatic compass for a closed traverse. Draw rough Traverse, Calculate the induced angles, check for the local attraction and angular error. Calculate the corrected bearings. Give the sample calculations.

Stations	A	В	C	D	E
F.B	293°30'	25°	90°	140°30'	206°
B.B	23°30'	114°	204°30'	269°	319°

c) A level field book was found to be tampered. Some of the readings could not be read reliably. Fill in the missing readings and calculate R.L. of all stations on this page. Support your calculation by suitable checks.

Stn	BS	IS	FS	Rise	Fall	R.L	Remarks
Α	3.250						BM
В		1.880					
С		2.250					
D			1.920				CP-I
E		2.540			0.015		
F				1.000			
G	1.175		2.115			225.305	CP-II
Н		1.625					
I			1.895				CP-III
J			1.255		0.750		Last
							station

Max. Marks: 56

12

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Seat

No.

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Section II

Q.4 Solve any Four

- a) Write various Grades of concrete and their uses.
- b) Note on Requirements of earthquake resistant buildings.
- c) Write Ideal Engineering Properties and uses of following building materials.
 - 1) Steel
 - 2) Brick
- d) Write note on Green Building.
- e) Write Applications of Remote Sensing in various fields.
- f) Explain principle of load transfer mechanism in framed structure.

Q.5 Solve any Two

- 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) What is the building bye law? Explain Building line, open space requirement, Carpet area, Built-up area.

16

12

SLR-FJ-7 Set P

11150	uction	1 5. 1) 2)	Use of non programmable scier	tific c	alculator is allowed.
		3) 4)	Figures to right indicate full mar Assume suitable data if necessa	ks. arv ar	nd state it clearly.
		-,	MCQ/Objective Typ	be Qu	lestions
Dura	tion: 3	0 Min	nutes		Marks: 1
Q.1		/Ob	jective type question paper		1
	1)	a) c)	Cement Surkhi	b) d)	Sand Cinder
	2)	Line exte a)	up to which the plinth of a buildin nded is called? Building line	ng adj b)	joining a street may be law-fully Building boundary
		c)	Building extend	d)	Building plan
	3)	For a a) c)	a good building stone how much Less than 50 N/mm ² 155 N/mm ²	is the b) d)	required crushing strength? Greater than 100 N/mm ² 10 N/mm ²
	4)	Fina a) c)	I setting Time of Ordinary Portlar 20 Min 30 Min	nd Ce b) d)	ment (OPC) is 400 Min 600 Min
	5)	GPS a) b) c) d)	S stands for Government Public System Global Positioning System Global Police System Geographic Positioning Sharing		
	6)	The	study of something without maki	ng ac	tual contact with the object of
		stud a) c)	y is Remote sensing Triangulation	b) d)	Contouring GPS
	7)	Build a) b) c) d)	ding bye-laws are laid To prevent haphazard growth of To avoid air and noise pollution To ensure proper light of ventila All of above	f city tion,	parking etc
	8)	Soil follo a) c)	and its behaviour under the appl wing sub branch of civil engineer Geotechnical Engineering Surveying	icatio ing b) d)	n of load is studied under the Environmental Engineering Town planning
	9)	Zero a) c)	reading of the graduated arc of North end East end	prism b) d)	atic compass is marked near. South end West end

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Seat No.

F.Y. (B. Tech) (Semester - II) (New) (CBCS) Examination March/April-2019 **BASIC CIVIL ENGINEERING**

Day & Date: Wednesday, 15-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory

Q.'

4

Max. Marks: 70

Set Q

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10) Contour Map consisting of no. of closed loops around each other with reduced level increasing inwards indicates _____.

- a)Hillb)Valleyc)Ridged)Pond
- 11) Total number of links in Günter's chain are _____
 - a) 150 b) 66
 - c) 16 d) 100

12) The most efficient method of irrigation is _____

- a) Furrow b) Border strip
- c) Check bund d) Drip
- 13) The water stored in between full reservoir level and high flood level is called as _____.

_.

- a) Dead storage b) Us
 - Surcharge storage
- b) Useful storaged) None of these

SLR-FJ-7

Set Q

- 14) Generally the dry dock is used _
 - a) For loading and unloading
 - b) As Road stead
 - c) For repair and maintenance of ships
 - d) All of these

C)

Set

F.Y. (B. Tech) (Semester - II) (New) (CBCS) Examination March/April-2019 BASIC CIVIL ENGINEERING

Day & Date: Wednesday, 15-05-2019 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 of the following

- a) With neat sketch of road in embankment explain its various components.
- **b)** Define contour and draw contour for Saddle and valley.
- c) What are the different roles those civil engineer plays during construction activity. Explain briefly.
- d) Write a short note on solid waste management? Why it is essential.
- e) With neat sketch explain rooftop water harvesting method. What are its merits and demerits?
- f) Differentiate between Collimation plane method and Rise fall method.
- **g)** Explain how the knowledge of civil engineering is important to other branches of engineering.

Q.3 Attempt any two of the following

- a) 1) Explain different types of irrigation canals stating their carrying capacity.
 - 2) With the neat sketch explain various components of railway.
- **b)** The following bearings were taken with a prismatic compass for a closed traverse. Draw rough Traverse, Calculate the induced angles, check for the local attraction and angular error. Calculate the corrected bearings. Give the sample calculations.

F.B 293°30' 25° 90° 140°30' 20 B.B 23°30' 114° 204°30' 269° 31	В	Stations A	С	D	E
B B 23°30' 114° 204°30' 269° 31	25°	F.B 293°30'	90°	140°30'	206°
B.B 2000 H ⁴ 2000 200 0	114°	B.B 23°30'	204°30'	269°	319°

c) A level field book was found to be tampered. Some of the readings could not be read reliably. Fill in the missing readings and calculate R.L. of all stations on this page. Support your calculation by suitable checks.

Stn	BS	IS	FS	Rise	Fall	R.L	Remarks
Α	3.250						BM
В		1.880					
С		2.250					
D			1.920				CP-I
E		2.540			0.015		
F				1.000			
G	1.175		2.115			225.305	CP-II
Н		1.625					
I			1.895				CP-III
J			1.255		0.750		Last
							station

Max. Marks: 56

12

16

Seat

No.

Section II

Q.4 Solve any Four

- a) Write various Grades of concrete and their uses.
- b) Note on Requirements of earthquake resistant buildings.
- c) Write Ideal Engineering Properties and uses of following building materials.
 - 1) Steel
 - 2) Brick
- d) Write note on Green Building.
- e) Write Applications of Remote Sensing in various fields.
- f) Explain principle of load transfer mechanism in framed structure.

Q.5 Solve any Two

- 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) What is the building bye law? Explain Building line, open space requirement, Carpet area, Built-up area.

16

12

SLR-FJ-7 Set Q

Day Time	& Date : 10:00	e: We 0 AM	dnesday, 15-05-2019 To 01:00 PM		Max. Marks: 70
Instr	uctior	ns: 1) 2) 3) 4)	All questions are compulsory. Use of non programmable scien Figures to right indicate full man Assume suitable data if necessa	itific c ks. ary an	alculator is allowed. Id state it clearly.
			MCQ/Objective Ty	be Qu	lestions
Dura	tion: 3	0 Min	nutes		Marks: 14
Q.1	MCQ	≀∕Ob	jective type question paper		14
	1)	Fina a) c)	20 Min 30 Min	nd Ce b) d)	ment (OPC) is 400 Min 600 Min
	2)	GPS a) b) c) d)	S stands for Government Public System Global Positioning System Global Police System Geographic Positioning Sharing		
	3)	The	study of something without maki	ng ac	tual contact with the object of
		stud a) c)	y is Remote sensing Triangulation	b) d)	Contouring GPS
	4)	Build a) b) c) d)	ding bye-laws are laid To prevent haphazard growth o To avoid air and noise pollution To ensure proper light of ventila All of above	f city tion, p	oarking etc
	5)	Soil	and its behaviour under the appl	icatio	n of load is studied under the
		follo	wing sub branch of civil engineer	ing	 En inconstal En sin coin a
		a) c)	Surveying	d)	Town planning
	6)	Zero a) c)	reading of the graduated arc of North end East end	prism b) d)	atic compass is marked near. South end West end
	7)	Con redu a) c)	tour Map consisting of no. of clos iced level increasing inwards indi Hill Ridge	ed lo cates b) d)	ops around each other with Valley Pond
	8)	Tota a) c)	l number of links in Günter's cha 150 16	in are b) d)	66 100
	9)	The a) c)	most efficient method of irrigation Furrow Check bund	n is b) d)	Border strip Drip

Seat No.

F.Y. (B. Tech) (Semester - II) (New) (CBCS) Examination March/April-2019 BASIC CIVIL ENGINEERING

Page **9** of **16**

Set R

SLR-FJ-7

- 4

10) The water stored in between full reservoir level and high flood level is called as _____.

.

- a) Dead storage
- c) Surcharge storage
- b) Useful storage

SLR-FJ-7

Set | R

- d) None of these
- 11) Generally the dry dock is used _____
 - a) For loading and unloading
 - b) As Road stead
 - c) For repair and maintenance of ships
 - d) All of these
- 12) In a mortar, the binding material is ____
 - a) Cement b) Sand
 - c) Surkhi d) Cinder
- 13) Line up to which the plinth of a building adjoining a street may be law-fully extended is called?
 - a) Building line

- b) Building boundary
- c) Building extend d) Building plan
- 14) For a good building stone how much is the required crushing strength?
 - Less than 50 N/mm² b) Greater than 100 N/mm²
 - c) 155 N/mm^2

a)

d) 10 N/mm^2

Set R

F.Y. (B. Tech) (Semester - II) (New) (CBCS) Examination March/April-2019 BASIC CIVIL ENGINEERING

Day & Date: Wednesday, 15-05-2019 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 of the following

- a) With neat sketch of road in embankment explain its various components.
- **b)** Define contour and draw contour for Saddle and valley.
- c) What are the different roles those civil engineer plays during construction activity. Explain briefly.
- d) Write a short note on solid waste management? Why it is essential.
- e) With neat sketch explain rooftop water harvesting method. What are its merits and demerits?
- f) Differentiate between Collimation plane method and Rise fall method.
- **g)** Explain how the knowledge of civil engineering is important to other branches of engineering.

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- a) 1) Explain different types of irrigation canals stating their carrying capacity.
 - 2) With the neat sketch explain various components of railway.
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Stations	A	В	С	D	E
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B.B	23°30'	114°	204°30'	269°	319°

c) A level field book was found to be tampered. Some of the readings could not be read reliably. Fill in the missing readings and calculate R.L. of all stations on this page. Support your calculation by suitable checks.

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E		2.540			0.015		
F				1.000			
G	1.175		2.115			225.305	CP-II
н		1.625					
I			1.895				CP-III
J			1.255		0.750		Last
							station

Max. Marks: 56

16

12

Seat

No.

Page **12** of **16**

Section II

Q.4 Solve any Four

- a) Write various Grades of concrete and their uses.
- b) Note on Requirements of earthquake resistant buildings.
- c) Write Ideal Engineering Properties and uses of following building materials.
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- c) What is the building bye law? Explain Building line, open space requirement, Carpet area, Built-up area.

16



Instr	uctior	ו s: 1) (2	 All questions are compulsory. Use of non programmable scient 	tific c	alculator is allowed.			
		3) 4)	Figures to right indicate full mar	ks.	d state it clearly			
		4)	MCQ/Objective Tvr	ny an De Qu				
Duration: 30 Minutes								
Q.1	MCQ 1)	/ Ob The calle a) c)	jective type question paper water stored in between full rese ed as Dead storage Surcharge storage	rvoir∣ b) d)	1 evel and high flood level is Useful storage None of these			
	2)	Gen a) b) c) d)	erally the dry dock is used For loading and unloading As Road stead For repair and maintenance of s All of these	 hips				
	3)	In a a) c)	mortar, the binding material is Cement Surkhi	b) d)	Sand Cinder			
	4)	Line exte a) c)	up to which the plinth of a buildir nded is called? Building line Building extend	ng adj b) d)	oining a street may be law-fully Building boundary Building plan			
	5)	For a) c)	a good building stone how much Less than 50 N/mm ² 155 N/mm ²	is the b) d)	required crushing strength? Greater than 100 N/mm ² 10 N/mm ²			
	6)	Fina a) c)	l setting Time of Ordinary Portlar 20 Min 30 Min	nd Ce b) d)	ment (OPC) is 400 Min 600 Min			
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	8)	The stud a) c)	study of something without making y is Remote sensing Triangulation	ng ac b) d)	tual contact with the object of Contouring GPS			

F.Y. (B. Tech) (Semester - II) (New) (CBCS) Examination March/April-2019 BASIC CIVIL ENGINEERING

Day & Date: Wednesday, 15-05-2019 Time: 10:00 AM To 01:00 PM

Inst

SLR-FJ-7

Set

Max. Marks: 70

S

Seat No.

4

Set S 9) Building bye-laws are laid . To prevent haphazard growth of city a) To avoid air and noise pollution b) To ensure proper light of ventilation, parking etc c) All of above d) 10) Soil and its behaviour under the application of load is studied under the following sub branch of civil engineering _ Environmental Engineering Geotechnical Engineering a) b) C) Surveying d) Town planning Zero reading of the graduated arc of prismatic compass is marked near. 11) North end South end a) b) East end d) West end C) 12) Contour Map consisting of no. of closed loops around each other with reduced level increasing inwards indicates Hill Vallev b) a) c) Ridge d) Pond 13) Total number of links in Günter's chain are 150 b) 66 a) C) 16 d) 100 The most efficient method of irrigation is _ 14) Furrow Border strip a) b) C) Check bund Drip d)

SLR-FJ-7

Set S

F.Y. (B. Tech) (Semester - II) (New) (CBCS) Examination March/April-2019 BASIC CIVIL ENGINEERING

Day & Date: Wednesday, 15-05-2019 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 of the following

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Н		1.625					
I			1.895				CP-III
J			1.255		0.750		Last
							station

Max. Marks: 56

12

16

Seat

No.

Section II

Q.4 Solve any Four

- a) Write various Grades of concrete and their uses.
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- c) What is the building bye law? Explain Building line, open space requirement, Carpet area, Built-up area.

16

No.	Seat	
	No.	

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination March/April-2019 ENGINEERING PHYSICS I / ENGINEERING PHYSICS II

Day & Date: Friday, 17-05-2019 Time: 10:00 AM To 01:00 PM

Time	: 10:00) AN	I To 01:00 PM		
Instru Cons	uction	ns: 1 2 3 4 : 1) 2)	 All questions are compulsory. Ar minutes. Figures to the right indicate full r Make suitable assumptions, if n Answer MCQ/Objective type que mention Q.P. Set (P/Q/R/S) on T Avogadro's no., N= 6.02 x 10²⁶/I Velocity of light, c = 3 x 10⁸ m/se 	nd Q. narks ecess estion op of c.mol. c.	No. 1 Should be solve in first 30 sary. on Page No.3 only. Don't forget to page.
		3)	Charge of electron, $e = 1.6 \times 10^{-1}$	⁹ C.	
Durof	ion 2	0 N/II	MCQ/Objective Typ	e Qu	estions Markey 14
Dura	.1011. 30		nutes		Marks. 14
Q.1	Choo	ose t	he correct alternative.		14
	1)	Acc a) c)	3 5	b) d) d)	adding impurity of valency 4 2
	2)	The crys a) c)	e number of died axes symmetry e stal are 4 8	lemei b) d)	nts that are present in a cubic 6 10
	3)	The a) c)	Miller indices of the plane paralle (0 0 1) (1 0 0)	l to y b) d)	& z axes are (0 1 0) (1 1 1)
	4)	The a) c)	audible range of frequency is 20 KHz to 20 MHz 200 Hz to 200 MHz	b) d)	200 KHz to 200 MHz 20 Hz to 20 KHz
	5)	Rev a) c)	verberation time is to/of vo directly proportional Independent	lume b) d)	of the hall. inversely proportional None of these
	6)	The a) c)	inertial frame of reference is An accelerated A rotating	b) d)	frame of reference. Non-accelerated None of these
	7)	The a) c)	Lorentz transformation equation to $x' = (x+vt) / \sqrt{1-v^2/c^2}$ x'= (x-vt) / $\sqrt{1-v^2/c^2}$	for x' b) d)	co-ordinate from s to s' x'= (x-ct) /1-v ² /c ² x'= x-vt ($\sqrt{1-v^2/c^2}$)
	8)	The a) c)	e resolving power of a grating havi (n+N) n/N	ng N b) d)	slits in n th order will be (n-N) n.N

SLR-FJ-8

Max. Marks: 70





Seat	
No.	

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination March/April-2019 ENGINEERING PHYSICS I / ENGINEERING PHYSICS II

Day & Date: Friday, 17-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsor

- 2) Figures to the right indicate fill marks.
- 3) Make suitable assumptions, if necessary.

Constants: 1) Avogadro's no., N= 6.02×10^{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) Show that Fermi level in an intrinsic semiconductor lies half way between a valence band & conduction band.
- **b)** Explain in detail Bragg's law.
- c) What are the acoustic requirements of a good auditorium?
- d) What is piezo-electric effect & magneto-striction effect?
- e) Derive the expression of length contraction.
- f) Derive Einstein's expression for mass-energy equivalence.
- g) A copper strip 2 cm wide and 1mm thick is placed in a magnetic field with B=1.5 wb/m². If a current of 200 A is set up in the strip, calculate hall voltage that appears across the strip. Assume $R_H = 6 \times 10^{-7} \text{ m}^3/\text{C}$.
- **h)** Molybdenum has a BCC structure. Its density is 10.2 x 10³ kg/m³ and its atomic weight is 95.94. determine the lattice constant of Molybdenum atom.

Q.3 Attempt any TWO of the following :

- a) What is Hall effect? Derive the relation for Hall voltage and Hall coefficient.
- b) Explain the term Miller indices. Derive the relation between lattice constant & interplaner spacing for cubic crystal.
- c) For an empty assembly hall of size 20x15x10 m³ the reverberation time is 3.5s. calculate the average absorption coefficient of the hall. What are of the wall should be covered by the curtain so as to reduce the reverberation time to 2.5 s. Given the absorption coefficient of curtain cloth is 0.5.
- d) Derive the expression for Lorentz transformation equations & its inverse.

Section – II

Q.4 Attempt any SIX of the following :

- a) Explain Rayleigh's criterion of resolution.
- **b)** Define:
 - 1) Spontaneous emission
 - 2) Stimulated emission
 - 3) Stimulated absorption
- c) Explain construction and reconstruction of hologram with neat diagram.
- d) Write a note on: Classification of optical fibers.
- e) State properties of matter waves.
- f) Write applications of nanotechnology.

Max. Marks: 56

Set

10

18

- g) A plane diffraction grating has the value of grating constant equal to 15×10^{-4} cm. calculate the position of the third order maximum for $\lambda = 2.4 \times 10^{-4}$ cm.
- **h)** What is the numerical aperture and fractional refractive index change of an optical fiber cable with cladding index of 1.378 and a core index of 1.546.

Q.5 Attempt any TWO of the following :

- a) With neat diagram explain construction and working of Laurent's half shade polarimeter.
- **b)** Describe He-Ne laser with its construction and working.
- c) Obtain the expression for acceptance angle, acceptance cone, numerical aperture and fractional refractive index change of an optical fiber.
- d) Find the velocity and kinetic energy of a neutron with a De Broglie wavelength of 0.30 nm. Given $h=6.634 \times 10^{-34}$ J.s and $m=1.67 \times 10^{-27}$ kg.
| Seat | |
|------|--|
| No. | |

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination March/April-2019 **ENGINEERING PHYSICS I / ENGINEERING PHYSICS II**

Day & Date: Friday, 17-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory. And Q. No. 1 Should be solve in first 30 minutes. 2) Figures to the right indicate full marks. 3) Make suitable assumptions, if necessary. 4) Answer MCQ/Objective type question on Page No.3 only. Don't forget to mention Q.P. Set (P/Q/R/S) on Top of page. **Constants:** 1) Avogadro's no., N= 6.02×10^{26} /k.mol. 2) Velocity of light, $c = 3 \times 10^8$ m/sec. 3) Charge of electron, $e = 1.6 \times 10^{-19} C$. **MCQ/Objective Type Questions Duration: 30 Minutes** Marks: 14 Q.1 Choose the correct alternative. 14 The resolving power of a grating having N slits in nth order will be . 1) a) (n+N) b) (n-N) c) n/N d) n.N 2) The substances that rotate the plane of polarization are said to be _____. a) opaque b) optically inactive c) optically active d) polaroid Stimulated absorption process is represented by equation _____. 3) a) $A^* + h\gamma \rightarrow A + 2h\gamma$ b) $A + h\gamma \rightarrow A^*$ c) $A^* \rightarrow A + h\gamma$ $A^* + h\gamma \rightarrow A + h\gamma$ d) The hologram records _____ of the object. 4) Both intensity variation & phase distribution a) Only phase distribution b) Only intensity variation c) None of these d) 5) In total internal reflection phenomenon the light ray incident from _____. a) Rarer to denser Rarer to rarer b) c) Denser to denser d) Denser to rarer The numerical aperture is given by the equation 6) $NA = (n_1^2 - n_2^2)$ a) NA = $\sqrt{(n_1^2 + n_2^2)}$ c) NA = $\sqrt{(n_1^2 - n_2^2)}$ b) NA = $\sqrt{(n_2^2 - n_1^2)}$ d) The chirality of zigzag CNT is _____ 7) a) (a, b) b) (a, 0) c) (a, a) d) (0, b) Acceptor type semiconductor is formed by adding impurity of valency ____. 8) a) 3 b) 4 c) 5 2 d)

SLR-FJ-8

Max. Marks: 70



			Set	Q
9)	The number of died axes symmetry e crystal are a) 4 c) 8	eleme b) d)	nts that are present in a cubic 6 10	
10)	The Miller indices of the plane paralle a) (0 0 1) c) (1 0 0)	el to y b) d)	& z axes are (0 1 0) (1 1 1)	
11)	The audible range of frequency is a) 20 KHz to 20 MHz c) 200 Hz to 200 MHz	b) d)	 200 KHz to 200 MHz 20 Hz to 20 KHz	
12)	Reverberation time is to/of vo a) directly proportional c) Independent	blume b) d)	of the hall. inversely proportional None of these	
13)	The inertial frame of reference is a) An accelerated c) A rotating	b) d)	frame of reference. Non-accelerated None of these	
14)	The Lorentz transformation equation a) x'= (x+vt) / $\sqrt{1-v^2/c^2}$ c) x'= (x-vt) / $\sqrt{1-v^2/c^2}$	for x' b) d)	co-ordinate from s to s' x'= (x-ct) /1-v ² /c ² x'= x-vt ($\sqrt{1-v^2/c^2}$)	

SLR-FJ-8

SLR-FJ-8

Seat	
No.	

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination March/April-2019 ENGINEERING PHYSICS I / ENGINEERING PHYSICS II

Day & Date: Friday, 17-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsor

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Constants: 1) Avogadro's no., N= 6.02×10^{26} / k.mol.

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- g) A copper strip 2 cm wide and 1mm thick is placed in a magnetic field with B=1.5 wb/m². If a current of 200 A is set up in the strip, calculate hall voltage that appears across the strip. Assume $R_H = 6 \times 10^{-7} \text{ m}^3/\text{C}$.
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- a) What is Hall effect? Derive the relation for Hall voltage and Hall coefficient.
- b) Explain the term Miller indices. Derive the relation between lattice constant & interplaner spacing for cubic crystal.
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Max. Marks: 56

Set

10

18

- g) A plane diffraction grating has the value of grating constant equal to 15×10^{-4} cm. calculate the position of the third order maximum for $\lambda = 2.4 \times 10^{-4}$ cm.
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Seat	
No.	

Day & Date: Friday, 17-05-2019 Time: 10:00 AM To 01:00 PM

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MCQ/Objective Type Questions

Durat	ion: 3	0 Mi	nutes		Marks: 7	14
Q.1	Choc 1)	b se t The a) b) c) d)	the correct alternative. hologram records of the Both intensity variation & phase Only phase distribution Only intensity variation None of these	objec distril	oution	14
	2)	In to a) c)	otal internal reflection phenomeno Rarer to denser Denser to denser	n the b) d)	light ray incident from Rarer to rarer Denser to rarer	
	3)	The a) c)	numerical aperture is given by the NA = $\sqrt{(n_1^2 + n_2^2)}$ NA = $\sqrt{(n_1^2 - n_2^2)}$	e equ b) d)	hation NA = $(n_1^2 - n_2^2)$ NA = $\sqrt{(n_2^2 - n_1^2)}$	
	4)	The a) c)	e chirality of zigzag CNT is (a, b) (a, a)	 b) d)	(a, 0) (0, b)	
	5)	Acc a) c)	eptor type semiconductor is forme 3 5	ed by b) d)	adding impurity of valency 4 2	
	6)	The crys a) c)	e number of died axes symmetry e stal are 4 8	lemei b) d)	nts that are present in a cubic 6 10	
	7)	The a) c)	Miller indices of the plane paralle (0 0 1) (1 0 0)	l to y b) d)	& z axes are (0 1 0) (1 1 1)	
	8)	The a) c)	audible range of frequency is 20 KHz to 20 MHz 200 Hz to 200 MHz	b) d)	200 KHz to 200 MHz 20 Hz to 20 KHz	

SLR-FJ-8

Max. Marks: 70



- **SLR-FJ-8** Set Reverberation time is _____ to/of volume of the hall. 9) a) directly proportional inversely proportional b) c) Independent None of these d) 10) The inertial frame of reference is ______ frame of reference. a) An accelerated b) Non-accelerated c) A rotating None of these d) The Lorentz transformation equation for x' co-ordinate from s to s' _____. 11) a) x'= (x+vt) / $\sqrt{1-v^2/c^2}$ $x' = (x-ct) / 1 - v^2 / c^2$ b) c) $x' = (x-vt) / \sqrt{1-v^2/c^2}$ $x' = x - vt (\sqrt{1 - v^2/c^2})$ d) The resolving power of a grating having N slits in nth order will be _____. 12) a) (n+N) b) (n-N) c) n/N d) n.N 13) The substances that rotate the plane of polarization are said to be _____. a) opaque b) optically inactive c) optically active d) polaroid
- 14) Stimulated absorption process is represented by equation _____.
 - a) $A^* + h\gamma \rightarrow A + 2h\gamma$
- b) $A + h\gamma \rightarrow A^*$
- c) $A^* \rightarrow A + h\gamma$
- d) $A^* + h\gamma \rightarrow A + h\gamma$

Seat

No.

F.Y. (B.Tech.) (Semester - II) (New) (CBCS) Examination March/April-2019 **ENGINEERING PHYSICS I / ENGINEERING PHYSICS II**

Day & Date: Friday, 17-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsor

- 2) Figures to the right indicate fill marks.
- 3) Make suitable assumptions, if necessary.

Constants: 1) Avogadro's no., N= 6.02×10^{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 :

- Show that Fermi level in an intrinsic semiconductor lies half way between a a) valence band & conduction band.
- Explain in detail Bragg's law. b)
- What are the acoustic requirements of a good auditorium? c)
- d) What is piezo-electric effect & magneto-striction effect?
- Derive the expression of length contraction. e)
- Derive Einstein's expression for mass-energy equivalence. **f**)
- A copper strip 2 cm wide and 1mm thick is placed in a magnetic field with g) B=1.5 wb/m². If a current of 200 A is set up in the strip, calculate hall voltage that appears across the strip. Assume $R_H = 6 \times 10^{-7} \text{ m}^3/\text{C}$.
- Molybdenum has a BCC structure. Its density is $10.2 \times 10^3 \text{ kg/m}^3$ and its h) atomic weight is 95.94. determine the lattice constant of Molybdenum atom.

Q.3 Attempt any TWO of the following :

- What is Hall effect? Derive the relation for Hall voltage and Hall coefficient. a)
- Explain the term Miller indices. Derive the relation between lattice constant b) & interplaner spacing for cubic crystal.
- For an empty assembly hall of size 20x15x10 m³ the reverberation time is c) 3.5s. calculate the average absorption coefficient of the hall. What are of the wall should be covered by the curtain so as to reduce the reverberation time to 2.5 s. Given the absorption coefficient of curtain cloth is 0.5.
- Derive the expression for Lorentz transformation equations & its inverse. d)

Section – II

Q.4 Attempt any SIX of the following :

- Explain Rayleigh's criterion of resolution. a)
- b) Define:
 - 1) Spontaneous emission
 - 2) Stimulated emission
 - 3) Stimulated absorption
- Explain construction and reconstruction of hologram with neat diagram. C)
- d) Write a note on: Classification of optical fibers.
- e) State properties of matter waves.
- Write applications of nanotechnology. **f**)



Max. Marks: 56

SLR-FJ-8

18

- g) A plane diffraction grating has the value of grating constant equal to 15×10^{-4} cm. calculate the position of the third order maximum for $\lambda = 2.4 \times 10^{-4}$ cm.
- **h)** What is the numerical aperture and fractional refractive index change of an optical fiber cable with cladding index of 1.378 and a core index of 1.546.

Q.5 Attempt any TWO of the following :

- a) With neat diagram explain construction and working of Laurent's half shade polarimeter.
- **b)** Describe He-Ne laser with its construction and working.
- c) Obtain the expression for acceptance angle, acceptance cone, numerical aperture and fractional refractive index change of an optical fiber.
- d) Find the velocity and kinetic energy of a neutron with a De Broglie wavelength of 0.30 nm. Given $h=6.634 \times 10^{-34}$ J.s and $m=1.67 \times 10^{-27}$ kg.

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination March/April-2019 **ENGINEERING PHYSICS I / ENGINEERING PHYSICS II**

Day & Date: Friday, 17-05-2019 Time: 10:00 AM To 01:00 PM

Instr	uctior	ns: 1) All questions are compulsory. And Q. No. 1 Should be solve	ve in first 30
Cons	stants	 a) Figures to the right indicate full marks. a) Make suitable assumptions, if necessary. b) Answer MCQ/Objective type question on Page No.3 only. mention Q.P. Set (P/Q/R/S) on Top of page. a) Avogadro's no., N= 6.02 x 10²⁶/k.mol. b) Velocity of light, c = 3 x 10⁸ m/sec. c) Charge of electron, e = 1.6 x 10⁻¹⁹ C. 	Don't forget to
		MCQ/Objective Type Questions	
Dura	tion: 3	30 Minutes	Marks: 14
Q.1	Choo 1)	ose the correct alternative.The inertial frame of reference is frame of reference.a) An acceleratedb) Non-acceleratedc) A rotatingd) None of these	14
	2)	The Lorentz transformation equation for x' co-ordinate from s to a) x'= (x+vt) / $\sqrt{1-v^2/c^2}$ b) x'= (x-ct) /1-v^2/c^2 c) x'= (x-vt) / $\sqrt{1-v^2/c^2}$ d) x'= x-vt ($\sqrt{1-v^2/c^2}$)	o s'
	3)	The resolving power of a grating having N slits in n th order will b a) (n+N) b) (n-N) c) n/N d) n.N	De
	4)	The substances that rotate the plane of polarization are said to a) opaque b) optically inactive c) optically active d) polaroid	be
	5)	Stimulated absorption process is represented by equation a) $A^* + h\gamma \rightarrow A + 2h\gamma$ b) $A + h\gamma \rightarrow A^*$ c) $A^* \rightarrow A + h\gamma$ d) $A^* + h\gamma \rightarrow A + h\gamma$	·
	6)	 The hologram records of the object. a) Both intensity variation & phase distribution b) Only phase distribution c) Only intensity variation d) None of these 	
	7)	In total internal reflection phenomenon the light ray incident from a) Rarer to denser b) Rarer to rarer c) Denser to denser d) Denser to rarer	m
	8)	The numerical aperture is given by the equation a) NA = $\sqrt{(n_1^2 + n_2^2)}$ b) NA = $(n_1^2 - n_2^2)$ c) NA = $\sqrt{(n_1^2 - n_2^2)}$ d) NA = $\sqrt{(n_2^2 - n_1^2)}$	
			Page 13 o

SLR-FJ-8

Set S

Max. Marks: 70

				Set
9)	The a) c)	e chirality of zigzag CNT is (a, b) (a, a)	 b) d)	(a, 0) (0, b)
10)	Acc a) c)	eptor type semiconductor is forme 3 5	ed by b) d)	adding impurity of valency 4 2
11)	The crys a) c)	e number of died axes symmetry e stal are 4 8	leme b) d)	nts that are present in a cubic 6 10
12)	The a) c)	Miller indices of the plane paralle (0 0 1) (1 0 0)	l to y b) d)	& z axes are (0 1 0) (1 1 1)
13)	The a) c)	e audible range of frequency is 20 KHz to 20 MHz 200 Hz to 200 MHz	b) d)	 200 KHz to 200 MHz 20 Hz to 20 KHz
14)	Re\ a) c)	verberation time is to/of vo directly proportional Independent	blume b) d)	of the hall. inversely proportional None of these

SLR-FJ-8

S

SLR-FJ-8

Seat	
No.	

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination March/April-2019 ENGINEERING PHYSICS I / ENGINEERING PHYSICS II

Day & Date: Friday, 17-05-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsor

- 2) Figures to the right indicate fill marks.
- 3) Make suitable assumptions, if necessary.

Constants: 1) Avogadro's no., N= 6.02×10^{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) Show that Fermi level in an intrinsic semiconductor lies half way between a valence band & conduction band.
- **b)** Explain in detail Bragg's law.
- c) What are the acoustic requirements of a good auditorium?
- d) What is piezo-electric effect & magneto-striction effect?
- e) Derive the expression of length contraction.
- f) Derive Einstein's expression for mass-energy equivalence.
- g) A copper strip 2 cm wide and 1mm thick is placed in a magnetic field with B=1.5 wb/m². If a current of 200 A is set up in the strip, calculate hall voltage that appears across the strip. Assume $R_H = 6 \times 10^{-7} \text{ m}^3/\text{C}$.
- **h)** Molybdenum has a BCC structure. Its density is 10.2 x 10³ kg/m³ and its atomic weight is 95.94. determine the lattice constant of Molybdenum atom.

Q.3 Attempt any TWO of the following :

- a) What is Hall effect? Derive the relation for Hall voltage and Hall coefficient.
- b) Explain the term Miller indices. Derive the relation between lattice constant & interplaner spacing for cubic crystal.
- c) For an empty assembly hall of size 20x15x10 m³ the reverberation time is 3.5s. calculate the average absorption coefficient of the hall. What are of the wall should be covered by the curtain so as to reduce the reverberation time to 2.5 s. Given the absorption coefficient of curtain cloth is 0.5.
- d) Derive the expression for Lorentz transformation equations & its inverse.

Section – II

Q.4 Attempt any SIX of the following :

- a) Explain Rayleigh's criterion of resolution.
- **b)** Define:
 - 1) Spontaneous emission
 - 2) Stimulated emission
 - 3) Stimulated absorption
- c) Explain construction and reconstruction of hologram with neat diagram.
- d) Write a note on: Classification of optical fibers.
- e) State properties of matter waves.
- f) Write applications of nanotechnology.

Max. Marks: 56

18

10

18

1

Set

- g) A plane diffraction grating has the value of grating constant equal to 15×10^{-4} cm. calculate the position of the third order maximum for $\lambda = 2.4 \times 10^{-4}$ cm.
- **h)** What is the numerical aperture and fractional refractive index change of an optical fiber cable with cladding index of 1.378 and a core index of 1.546.

Q.5 Attempt any TWO of the following :

- a) With neat diagram explain construction and working of Laurent's half shade polarimeter.
- **b)** Describe He-Ne laser with its construction and working.
- c) Obtain the expression for acceptance angle, acceptance cone, numerical aperture and fractional refractive index change of an optical fiber.
- d) Find the velocity and kinetic energy of a neutron with a De Broglie wavelength of 0.30 nm. Given $h=6.634 \times 10^{-34}$ J.s and $m=1.67 \times 10^{-27}$ kg.

	I	F.Y. (B.Tech.) (Semester – II) (New)	(CBCS) Examination
	EN	GINEERING CHEMISTRY I / E	NGIN	NEERING CHEMISTRY II
Day Time	& Date : 10:00	: Monday, 20-05-2019) AM To 01:00 PM		Max. Marks: 70
Instr	uctior	 as: 1) Solve the MCQs in first 30 min. 2) Figures to the right indicate full 3) Draw neat and labeled diagram 	marks is whe	s. erever necessary.
		MCQ/Objective Ty	pe Qı	uestions
Dura	tion: 3	0 Minutes		Marks: 14
Q.1	Choo 1)	ose the correct alternative. Tinning is the process of coating iron a) Zn c) Cu	n with b) d)	
	2)	Containers for the food should not b a) galvanized c) electroplated	e b) d)	tinned all of those
	3)	When graphite is dispersed in oil, it ia) greasec) oildag	s calle b) d)	ed aquadag blended oil
	4)	Capacity of an oil to stick onto the su conditions of heavy lead, is Called _ a) Volatility c) Acid value	urface b) d)	s of machine parts under Oiliness flash point
	5)	 Osmosis is a processes in which a) Solvent molecules move from a lower concentration through a set lower one through a semi permeters of solvent molecules move from a higher one through a semi permeters of solute molecules move from a semi permeters higher one through a semi permeters of solute molecules move from a semi permete	solutio emi pe solutio eable i solutio eable solutio eable	 on of higher concentration to ermeable membrane n of higher concentration to membrane on of lower concentration to membrane n of lower concentration to membrane
	6)	Chlorine is used in purification of drivea) disinfectionc) desalination	nking b) d)	water for coagulation none of these
	7)	A reaction in which an attacking spe radical) replace another atom or gro a) addition reaction	cies (r up in t b)	nucleophile, electrophile or free the substrate is called substitution reaction

No. ----

Seat

SLR-FJ-9

Set P

- 4
 - 4

- c) elimination reaction
- d) rearrangement reaction
- Purest form of iron is: _____ 8)
 - a) steel
 - c) pig iron

b) wrought iron d) cast iron

SLR-FJ-9 Set P

9)	The main constituent of safety glass a) CaCO ₃ c) vinyl plastic	s is b) d)	PbO boron
10)	A fuel having high ignition temperate a) Petrol c) Kerosene	ure is _ b) d)	Wood LPG
11)	An example of primary fuel is a) natural gas c) wood charcoal	b) d)	petrol coke
12)	Natural rubber is basically a polyme a) isoprene c) ethylene	r of b) d)	propylene propane
13)	Which of the following is an addition a) Bakelite c) Terylene	i polym b) d)	ner? Nylon Polyethylene
14)	Which of the following can be used	for pur	ification of substances?

- UV spectroscopy Calorimetry b)
- a) IR spectroscopyc) Gas chromatography
- d)

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination March/April-2019 ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II

Day & Date: Monday, 20-05-2019 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 wherever necessary.

Section – I

Q.2 Solve any four

a) 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 ₃) ₂	95	162
Mg(HCO ₃) ₂	65	146
MgSO ₄	33	120
CaCl ₂	25	111

- b) Explain Scale and Sludge formation in water.
- c) Explain with examples the elimination and rearrangement type of reactions.
- d) Define Lubricant. Explain the semisolid lubricant.
- e) Describe the Hydrogen evolution and oxygen absorption mechanism of wet corrosion.
- f) Explain the Galvanization process for prevention of corrosion.

Q.3 Solve any four

- a) Define:-
 - 1) Acidity
 - 2) BOD
 - 3) COD
- **b)** Describe the sedimentation with coagulation process for treatment of the water.
- c) How will you synthesis the Aspirin?
- d) Numerical Acid Value In an Acid value determination experiment 13.6 gm of oil sample required 7.7 ml of N/10 KOH solution for neutralization to phenolphthalein end point. Calculate the acid value of oil sample. (Mol. wt. of KOH =56)
- e) Define:-
 - 1) Cloud point & Pour point
 - 2) Aniline point
 - 3) Saponification value
- f) Describe the electrical resistance method for measurement of rate of corrosion.

12

16

RYII

Max. Marks: 56

Set P

SLR-FJ-9

Section – II

Q.4 Attempt any four

a) Explain general method of manufacturing of glass.

b)	During the determination of calorific value	of a gaseous fuel by Boy's
	calorimeter, the following results were obta	ained:
	Volume of the gaseous fuel burnt at STP	= 0.13 m ³
	Weight of water used for cooling	= 35.6 Kg
	Weight of steam condensed	= 0.045 Kg
	Temperature of Inlet water	$= 24.1^{\circ}C$
	Temperature of Outlet water	$= 38.4^{\circ}C$
	Determine the gross and net calorific value	es of gaseous fuel.
	(Take latent heat of condensation of stean	n = 587 kcal/kg)

- c) Explain construction and working of bomb calorimeter.
- d) Define plastics. Explain thermosoftening and thermosetting plastics.
- e) Explain properties and applications of Buna-S and Thiokol rubbers.
- f) Define TGA. Explain instrumentation of TGA.

Q.5 Attempt any Four

- a) Explain composition properties and applications of cast iron and wrought iron.
- **b)** Explain any three types of glass.
- c) Explain characteristics of good fuels.
- d) Explain preparation, advantages and disadvantages of biodiesel.
- e) A polymer has following population

15 molecules have molecular weight each 8000 20 molecules have molecular weight each 10000 25 molecules have molecular weight each 12000 40 molecules have molecular weight each 18000 Calculate its number average molecular weight.

f) What weight of MgSO₄ is required to prepare 0.2 N 300 ml solution and 0.1 M 500 ml solution?
 (Mol. W/t. of MgSO = 120)

(Mol. Wt. of $MgSO_4 = 120$)

16

SLR-FJ-9

Set

	I	F.Y.	(B.Tech.) (Semester – II) (I March/Apri	Vew) 1-201	(CBCS) Examination
	EN	GIN	NEERING CHEMISTRY I / EI	NGIN	EERING CHEMISTRY
Day o Time	& Date : 10:00	: Mo) AN	onday, 20-05-2019 1 To 01:00 PM		Max.
Instr	uction	1 s: 1 2 3) Solve the MCQs in first 30 min. 2) Figures to the right indicate full 3) Draw neat and labeled diagram	marks s whe	s. rever necessary.
			MCQ/Objective Ty	be Qu	lestions
Dura	tion: 3	0 Mi	nutes		
Q.1	Choc 1)	se t Pur a) c)	the correct alternative. Test form of iron is: steel	b) d)	wrought iron cast iron
	2)	The	main constituent of safety dass	is	
	-)	a) c)	$CaCO_3$ vinyl plastic	b) d)	PbO boron
	3)	A fu a) c)	uel having high ignition temperatu Petrol Kerosene	re is _ b) d)	Wood LPG
	4)	An a) c)	example of primary fuel is natural gas wood charcoal	b) d)	petrol coke
	5)	Nat	ural rubber is basically a polymer	of	
	ŗ	a) c)	isoprene ethylene	b) d)	propylene propane
	6)	Wh a) c)	ich of the following is an addition Bakelite Terylene	polym b) d)	ier? Nylon Polyethylene
	7)	Wh a) c)	ich of the following can be used fo IR spectroscopy Gas chromatography	or pur b) d)	ification of substances? UV spectroscopy Calorimetry
	8)	Tini a) c)	ning is the process of coating iron Zn Cu	with b) d)	Sn Nil
	9)	Cor a)	ntainers for the food should not be galvanized	e b)	 tinned

all of those

aquadag

blended oil

d)

b)

d)

Seat No.

c) electroplated

a) grease

c) oildag

When graphite is dispersed in oil, it is called _____

10)

XY II ax. Marks: 70

Marks: 14

14

SLR-FJ-9

Set

Q

- SLR-FJ-9 Set Q
- 11) Capacity of an oil to stick onto the surfaces of machine parts under conditions of heavy lead, is Called _____.
 - a) Volatility

- b) Oiliness
- c) Acid value d) flash point
- 12) Osmosis is a processes in which _
 - a) Solvent molecules move from a solution of higher concentration to lower concentration through a semi permeable membrane
 - b) Solute molecules move from a solution of higher concentration to lower one through a semi permeable membrane
 - c) Solvent molecules move from a solution of lower concentration to higher one through a semi permeable membrane
 - d) Solute molecules move from a solution of lower concentration to higher one through a semi permeable membrane
- 13) Chlorine is used in purification of drinking water for
 - a) disinfection

- b) coagulation
- c) desalination d) none of these
- 14) A reaction in which an attacking species (nucleophile, electrophile or free radical) replace another atom or group in the substrate is called _____.
 - a) addition reaction
- b) substitution reaction
- c) elimination reaction
- d) rearrangement reaction

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination March/April-2019 ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II

Day & Date: Monday, 20-05-2019 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 wherever necessary.

Section – I

Q.2 Solve any four

a) 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.
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CaCl ₂	25	111

- b) Explain Scale and Sludge formation in water.
- c) Explain with examples the elimination and rearrangement type of reactions.
- d) Define Lubricant. Explain the semisolid lubricant.
- e) Describe the Hydrogen evolution and oxygen absorption mechanism of wet corrosion.
- f) Explain the Galvanization process for prevention of corrosion.

Q.3 Solve any four

- a) Define:-
 - 1) Acidity
 - 2) BOD
 - 3) COD
- **b)** Describe the sedimentation with coagulation process for treatment of the water.
- c) How will you synthesis the Aspirin?
- d) Numerical Acid Value In an Acid value determination experiment 13.6 gm of oil sample required 7.7 ml of N/10 KOH solution for neutralization to phenolphthalein end point. Calculate the acid value of oil sample. (Mol. wt. of KOH =56)
- e) Define:-
 - 1) Cloud point & Pour point
 - 2) Aniline point
 - 3) Saponification value
- f) Describe the electrical resistance method for measurement of rate of corrosion.

12

16

RYII

Max. Marks: 56

SLR-FJ-9

Set

Section – II

Q.4 Attempt any four

a) Explain general method of manufacturing of glass.

	1 0 0	5
b)	During the determination of calorific value	of a gaseous fuel by Boy's
	calorimeter, the following results were obta	ained:
	Volume of the gaseous fuel burnt at STP	= 0.13 m ³
	Weight of water used for cooling	= 35.6 Kg
	Weight of steam condensed	= 0.045 Kg
	Temperature of Inlet water	$= 24.1^{\circ}C$
	Temperature of Outlet water	$= 38.4^{\circ}C$
	Determine the gross and net calorific value	es of gaseous fuel.
	(Take latent heat of condensation of stean	n = 587 kcal/kg)
	•	•

- c) Explain construction and working of bomb calorimeter.
- d) Define plastics. Explain thermosoftening and thermosetting plastics.
- e) Explain properties and applications of Buna-S and Thiokol rubbers.
- f) Define TGA. Explain instrumentation of TGA.

Q.5 Attempt any Four

- a) Explain composition properties and applications of cast iron and wrought iron.
- **b)** Explain any three types of glass.
- c) Explain characteristics of good fuels.
- d) Explain preparation, advantages and disadvantages of biodiesel.
- e) A polymer has following population

15 molecules have molecular weight each 8000 20 molecules have molecular weight each 10000 25 molecules have molecular weight each 12000 40 molecules have molecular weight each 18000 Calculate its number average molecular weight.

f) What weight of MgSO₄ is required to prepare 0.2 N 300 ml solution and 0.1 M 500 ml solution?
 (Mol. W(t of MgSO 120))

(Mol. Wt. of MgSO₄ = 120)

16

SLR-FJ-9

Set

		2 3	 Pigures to the right indicate full Draw neat and labeled diagram 	mark s whe	s. erever necessary.	
			MCQ/Objective Ty	pe Q	uestions	
Dura	tion: 3	30 Mi	nutes			Marks: 14
Q.1	Cho 1)	ose t An	the correct alternative. example of primary fuel is			14
		a) c)	natural gas wood charcoal	b) d)	petrol coke	
	2)	Nat a) c)	ural rubber is basically a polymer isoprene ethylene	of b) d)	propylene propane	
	3)	Wh a) c)	ich of the following is an addition Bakelite Terylene	polyn b) d)	ner? Nylon Polyethylene	
	4)	Wh a) c)	ich of the following can be used f IR spectroscopy Gas chromatography	or pui b) d)	rification of substances? UV spectroscopy Calorimetry	
	5)	Tini a) c)	ning is the process of coating iror Zn Cu	n with b) d)	 Sn Nil	
	6)	Cor a) c)	ntainers for the food should not be galvanized electroplated	e b) d)	tinned all of those	
	7)	Wh a) c)	en graphite is dispersed in oil, it i grease oildag	s calle b) d)	ed aquadag blended oil	

Capacity of an oil to stick onto the surfaces of machine parts under

b)

d)

Solvent molecules move from a solution of higher concentration to

Oiliness

flash point

conditions of heavy lead, is Called _

Osmosis is a processes in which _

a) Volatility

c) Acid value

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Exam
March/April-2019

ination

ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II

Day & Date: Monday, 20-05-2019

Time: 10:00 AM To 01:00 PM

Seat

8)

9)

a)

b)

C)

d)

No.

Instructions: 1) Solve the MCQs in first 30 min.

SLR-FJ-9

Set

Max. Marks: 70

				SLR-FJ-9
				Set R
10)	Chl a) c)	lorine is used in purification of drin disinfection desalination	iking b) d)	water for coagulation none of these
11)	A ro rad a) c)	eaction in which an attacking spec ical) replace another atom or grou addition reaction elimination reaction	cies (r ıp in t b) d)	nucleophile, electrophile or free he substrate is called substitution reaction rearrangement reaction
12)	Pui a) c)	rest form of iron is: steel pig iron	b) d)	wrought iron cast iron
13)	The a) c)	e main constituent of safety glass CaCO ₃ vinyl plastic	is b) d)	PbO boron
14)	A fi a) c)	uel having high ignition temperatu Petrol Kerosene	re is ₋ b) d)	Wood LPG

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination March/April-2019 ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II

Day & Date: Monday, 20-05-2019 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 wherever necessary.

Section – I

Q.2 Solve any four

a) 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 ₃) ₂	95	162
Mg(HCO ₃) ₂	65	146
MgSO ₄	33	120
CaCl ₂	25	111

- b) Explain Scale and Sludge formation in water.
- c) Explain with examples the elimination and rearrangement type of reactions.
- d) Define Lubricant. Explain the semisolid lubricant.
- e) Describe the Hydrogen evolution and oxygen absorption mechanism of wet corrosion.
- f) Explain the Galvanization process for prevention of corrosion.

Q.3 Solve any four

- a) Define:-
 - 1) Acidity
 - 2) BOD
 - 3) COD
- **b)** Describe the sedimentation with coagulation process for treatment of the water.
- c) How will you synthesis the Aspirin?
- d) Numerical Acid Value In an Acid value determination experiment 13.6 gm of oil sample required 7.7 ml of N/10 KOH solution for neutralization to phenolphthalein end point. Calculate the acid value of oil sample. (Mol. wt. of KOH =56)
- e) Define:-
 - 1) Cloud point & Pour point
 - 2) Aniline point
 - 3) Saponification value
- f) Describe the electrical resistance method for measurement of rate of corrosion.

Max. Marks: 56

12

R

16

SLR-FJ-9

Set |

Section – II

Q.4 Attempt any four

a) Explain general method of manufacturing of glass.

b)	During the determination of calorific value of a gaseous fuel by Boy's			
	calorimeter, the following results were obta	lorimeter, the following results were obtained:		
	Volume of the gaseous fuel burnt at STP	= 0.13 m ³		
	Weight of water used for cooling	= 35.6 Kg		
	Weight of steam condensed	= 0.045 Kg		
	Temperature of Inlet water	$= 24.1^{\circ}C$		
	Temperature of Outlet water	$= 38.4^{\circ}C$		
	Determine the gross and net calorific value	es of gaseous fuel.		
	(Take latent heat of condensation of stean	n = 587 kcal/kg		

- c) Explain construction and working of bomb calorimeter.
- d) Define plastics. Explain thermosoftening and thermosetting plastics.
- e) Explain properties and applications of Buna-S and Thiokol rubbers.
- f) Define TGA. Explain instrumentation of TGA.

Q.5 Attempt any Four

- a) Explain composition properties and applications of cast iron and wrought iron.
- **b)** Explain any three types of glass.
- c) Explain characteristics of good fuels.
- d) Explain preparation, advantages and disadvantages of biodiesel.
- e) A polymer has following population

15 molecules have molecular weight each 8000 20 molecules have molecular weight each 10000 25 molecules have molecular weight each 12000 40 molecules have molecular weight each 18000 Calculate its number average molecular weight.

f) What weight of MgSO₄ is required to prepare 0.2 N 300 ml solution and 0.1 M 500 ml solution?

(Mol. Wt. of $MgSO_4 = 120$)

16

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	E	NGINEERING CHEMISTRY I	ENGI	NEERING CHEMISTRY II
Day Time	& Da e: 10:	te: Monday, 20-05-2019 00 AM To 01:00 PM		Max. Ma
Instr	ructio	ons: 1) Solve the MCQs in first 30 m 2) Figures to the right indicate f 3) Draw neat and labeled diagr	iin. [:] ull mark ams whe	s. erever necessary.
		MCQ/Objective	Type Q	uestions
Dura	ation:	30 Minutes		Ма
Q.1	Cho 1)	Dose the correct alternative. Chlorine is used in purification of a a) disinfection c) desalination	drinking b) d)	water for coagulation none of these
	2)	A reaction in which an attacking s radical) replace another atom or g a) addition reaction c) elimination reaction	pecies (group in b) d)	nucleophile, electrophile or free the substrate is called substitution reaction rearrangement reaction
	3)	Purest form of iron is:	 	wroughtirop

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No.

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination March/April-2019 NG CHEMISTRY II

S

lation of these

- wrought iron a) steel b)
- pig iron d) cast iron C)
- 4) The main constituent of safety glass is _ CaCO₃ b) PbO a)
- c) vinyl plastic d) boron A fuel having high ignition temperature is 5)
 - Wood a) Petrol b) c) Kerosene LPG d)
- 6) An example of primary fuel is _____ natural gas petrol a) b)
- wood charcoal c) coke d) Natural rubber is basically a polymer of _ 7)
 - a) isoprene propylene b) c) ethylene d) propane
- 8) Which of the following is an addition polymer?
 - a) Bakelite Nylon b) Terylene Polyethylene d) C)
- 9) Which of the following can be used for purification of substances?
 - a) IR spectroscopy UV spectroscopy b)
 - c) Gas chromatography d) Calorimetry
- Tinning is the process of coating iron with 10)
 - Sn Zn b) a) c) Cu d) Nil

SLR-FJ-9

Max. Marks: 70



Marks: 14

SLR-FJ-9 Set S

- 11) Containers for the food should not be _____
 - a) galvanized
- b) tinnedd) all of those

aquadag

- c) electroplated d)
- 12) When graphite is dispersed in oil, it is called _
 - a) grease b)
 - c) oildag d) blended oil
- 13) Capacity of an oil to stick onto the surfaces of machine parts under conditions of heavy lead, is Called _____.
 - a) Volatility b) Oiliness
 - c) Acid value d) flash point
- 14) Osmosis is a processes in which ____
 - a) Solvent molecules move from a solution of higher concentration to lower concentration through a semi permeable membrane
 - b) Solute molecules move from a solution of higher concentration to lower one through a semi permeable membrane
 - c) Solvent molecules move from a solution of lower concentration to higher one through a semi permeable membrane
 - d) Solute molecules move from a solution of lower concentration to higher one through a semi permeable membrane

F.Y. (B.Tech.) (Semester – II) (New) (CBCS) Examination March/April-2019 ENGINEERING CHEMISTRY I / ENGINEERING CHEMISTRY II

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Set S

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Section – II

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16

SLR-FJ-9

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