

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: FIRST

PROGRAM: COMMON

COURSE CODE: CCF106/0108/X110/CCE106/R108 COURSE NAME: ENGINEERING MATHEMATICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 13/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome**

QN	S Q N	Question Text	R U A	CO CCF106	Marks
Q.1		Attempt any FOUR			(08)
	a)	Find centroid of a triangle whose vertices are (-1, 2), (3, 2), (4, 5)	R	1	
	b)	Find the distance between parallel lines $3x+2y-6=0$ and $3x+2y-12=0$	U	1	
	c)	Find equation of line passing through (-4, 6) and (8, -3)	R	1	
	d)	Find center and radius of circle $2x^2+2y^2+5x-6y+4=0$	U	1	
	e)	Find equation of circle having center (-1, -2) and radius $\sqrt{15}$	R	1	
	f)	Show that the root of equation $x^3 - 2x - 5 = 0$ lies between 2 and 3	R	2	
Q.2		Attempt any FOUR			(16)
	a)	Find area of quadrilateral whose vertices are (4, 1), (-3, 0), (-2, 3) and (3, 4)	A	1	
	b)	Find the equation of straight line passing through (4, 5) and perpendicular to the line $7x - 5y = 420$	U / A	1	
	c)	Find the equation of circle whose center is at point of intersection of lines $2x+3y=13$, $5x-y=7$ and passing through the point (1, -1).	A	1	
	d)	Using Bisection method, find the approximate root of $x^2 + x - 3 = 0$ (Three iteration only)	A	2	
	e)	Using Regula falsi method find real root of the equation $xe^x = 3$ (Two iteration)	A	2	
	f)	Using Bisection method find value of $\sqrt{10}$ by performing three iteration	A	2	
Q.3		Attempt any FOUR			(16)
	a)	Find the angle between the lines $y = 5x + 6$, $y = x$	A	1	
	b)	Find the equation of circle whose center is at (-1, 3) and which touches the line $2x+y=4$	U / A	1	
	c)	Solve the following equation by Jacobi's method $20x + y - 2z = 17$, $3x + 20y - z = -18$, $2x - 3y + 20z = 25$	A	2	
	d)	Solve the equation by using Gauss-seidal method, $4x + y + 2z = 12$, $-x + 11y + 4z = 33$, $2x - 3y + 8z = 20$	A	2	

P.T.O

	e)	Solve the following equations by Gauss –seidal method $5x - y = 9$, $x - 5y + z = -4$, $y - 5z = 6$	A	2	
	f)	Solve the following equations by Jacobis method $10x + y + z = 12$, $x + 10y + z = 12$, $x + y + 10z = 12$	A	2	
Q.4		Attempt any FOUR			(08)
	a)	If $f(x) = \frac{x^2 + 2x + 5}{x^3 + 8}$ find $f(1) + f(-1)$	U	3	
	b)	Define odd and even functions	R	3	
	c)	Evaluate $\lim_{x \rightarrow 1} \frac{x^3 - 1}{x - 1}$	U / A	3	
	d)	Evaluate $\lim_{x \rightarrow 0} \frac{3 \sin x + 4x}{7x - 2 \tan x}$	U / A	3	
	e)	State the Quotient Rule of the Derivative.	U	4	
	f)	Find the slope of the tangent to the circle $x^2 + y^2 = 25$ at $(-3, 4)$	A	4	
Q.5		Attempt any FOUR			(16)
	a)	If $f(x) = \frac{1}{1-x}$ then show that $f(f(f(x))) = x$	U	3	
	b)	Evaluate $\lim_{x \rightarrow \infty} \left(\sqrt{x^2 + 3x + 2} - \sqrt{x^2 + x + 1} \right)$	A	3	
	c)	If $x\sqrt{1+y} + y\sqrt{1+x} = 0$ then show that $\frac{dy}{dx} = -\frac{1}{(1+x)^2}$	U	4	
	d)	Find $\frac{dy}{dx}$ if $y = \tan^{-1} \sqrt{\frac{1-x}{1+x}}$	A	4	
	e)	Find $\frac{dy}{dx}$ if $y = (x)^{\sin x} + (\sin x)^x$	A	4	
	f)	Find the equations of the tangents to the curve $y = x^2 - 2x - 3$ where it meets the x-axis	A	4	
Q.6		Attempt any FOUR			(16)
	a)	Evaluate $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin x - \cos x}{x - \frac{\pi}{4}}$	A	3	
	b)	Find $\frac{dy}{dx}$ if $\sin y = \log(x + y)$	A	4	
	c)	If $y = \cos^{-1} \left(\frac{\cos x + \sqrt{3} \sin x}{2} \right)$ show that $\frac{dy}{dx} = -1$	U	4	
	d)	If $x = 3 \cos \theta - 2 \cos^3 \theta$ and $y = 3 \sin \theta - 2 \sin^3 \theta$ find $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$	A	4	
	e)	If $y = (\sin^{-1} x)^2$ prove that $(1-x^2) \frac{d^2 y}{dx^2} - x \frac{dy}{dx} - 2 = 0$	U	4	
	f)	A metal wire 36 cm long is bent to form a rectangle. Find its dimensions when its area is maximum.	A	4	

P.T.O.

Q.3	Attempt any FOUR			(16)
a)	Solve by Cramer's Rule $\frac{2}{x-1} + \frac{3}{y-2} = 5, \frac{4}{x-1} - \frac{1}{y-2} = 3$	A	1	
b)	Resolve into partial fractions : $\frac{x^4 - x^5 + 1}{x^3(1-x)}$	A	2	
c)	By using Binomial theorem expand $\left(\frac{4}{3x} + \frac{y^2}{2}\right)^6$	A	4	
d)	If $A = \begin{pmatrix} 1 & -2 \\ -3 & 1 \end{pmatrix}$, $B = \begin{pmatrix} 4 & 2 & -5 \\ 1 & 0 & 3 \end{pmatrix}$ and $C = \begin{bmatrix} 6 & -7 & 0 \\ -1 & 2 & 5 \\ 1 & 0 & 3 \end{bmatrix}$ verify that $A(BC) = (AB)C$	U	3	
e)	If $A = \begin{bmatrix} -1 & -2 & -2 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ show that $\text{adj } A = 3A^T$	U	3	
f)	Solve by matrix method $\begin{matrix} x + y + z = 3 \\ x + 2y + 3z = 4 \\ x + 4y + 9z = 6 \end{matrix}$	A	3	
Q.4	Attempt any FOUR			(08)
a)	Prove that $\cos^2 \theta - \cos^2 \theta \operatorname{cosec}^2 \theta = 1$	U	5	
b)	Without using calculator, find the value of $\sec(3660^\circ)$	A	5	
c)	Prove that $\cos 2\theta = 1 - 2\sin^2 \theta$	U	5	
d)	Without using calculator find $\sin(15^\circ)$	A	5	
e)	If $2\sin 40^\circ \cos 10^\circ = \sin A + \sin B$ find A and B	U	5	
f)	Find principal value of $\cos \left[\frac{\pi}{2} - \sin^{-1} \left(\frac{1}{2} \right) \right]$	U	5	
Q.5	Attempt any FOUR			(16)
a)	Prove that $\frac{1 + 2\sin^2 \theta}{1 + 3\tan^2 \theta} = \cos^2 \theta$	U	5	
b)	Without using calculator, find the value of $\frac{\sec^2(135^\circ)}{\cos(-240^\circ) - 2\sin(930^\circ)}$	U	5	
c)	If $\tan(x+y) = \frac{3}{4}$, and $\tan(x-y) = \frac{8}{15}$ then show that $\tan 2x = \frac{77}{36}$	A	5	
d)	Prove that $\frac{1 - \tan 2\theta \tan \theta}{1 + \tan 2\theta \tan \theta} = \frac{\cos 3\theta}{\cos \theta}$	A	5	
e)	Prove that $\cos 10^\circ \cos 50^\circ \cos 70^\circ = \frac{\sqrt{3}}{8}$	A	5	
f)	Prove that $\cos^{-1} \left(\frac{4}{5} \right) + \tan^{-1} \left(\frac{3}{5} \right) = \tan^{-1} \left(\frac{27}{11} \right)$	A	5	
Q.6	Attempt any FOUR			(16)
a)	Without using calculator find the value of $\sin 150^\circ - \tan 315^\circ + \cos 300^\circ + \sec 3660^\circ$	U	5	
b)	If A and B are obtuse angle such that $\sin A = \frac{5}{13}$, $\cos B = -\frac{4}{5}$ find $\tan(A+B)$	U	5	
c)	prove that $\frac{\cos 3A - \cos 7A}{\sin 9A + \sin A} = \cos 2A \tan 4A - \sin 2A$	A	5	
d)	Prove that $\cos C + \cos D = 2 \cos \left(\frac{C+D}{2} \right) \cos \left(\frac{C-D}{2} \right)$	A	5	
e)	Prove that $\cos^{-1} \left(\frac{4}{5} \right) - \sin^{-1} \left(\frac{5}{13} \right) = \cos^{-1} \left(\frac{63}{65} \right)$	A	5	
f)	Prove that $2 \tan^{-1} \left(\frac{1}{3} \right) + \tan^{-1} \left(\frac{4}{3} \right) = \frac{\pi}{2}$	A	5	

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: **THIRD**

PROGRAM: **CE/ME/SM/MT**

COURSE CODE: **CEF 313/MEF313/MEE313/ME214** COURSE NAME: **HIGHER MATHEMATICS**

MAX. MARKS: **80**

TIME: **3 HRS.**

DATE: **24/05/2019**

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
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- 7) **QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome**

S QN	Question Text	R U A	CO CEF A 313	Marks												
Q.1	Attempt any FOUR			(08)												
a)	Define forward and backward difference operator.	R	1													
b)	Prove that $EV = \nabla E = \Delta$	U	1													
c)	Find $\left(\frac{\Delta^2}{E}\right)x^3$	A	1													
d)	If $z = 3^x \tan y$ find $\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}$	R	2													
e)	If $u = e^{xyz}$ find $\frac{\partial^3 u}{\partial x \partial y \partial z}$	A	2													
f)	If $u = \sin^{-1}\left(\frac{x}{y}\right)$ prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 0$	U	2													
Q.2	Attempt any FOUR			(16)												
a)	Using Lagrange's interpolation formula estimate u_4 and u_6 with $u_0 = -18, u_1 = 0, u_5 = -248$	A	1													
b)	Express $y = 3x^3 + x^2 + x + 1$ in the factorial notation. Hence find $\Delta^3 y$	A	1													
c)	Find missing term in the following table <table><tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>y</td><td>2</td><td>5</td><td>7</td><td>-</td><td>32</td></tr></table>	x	1	2	3	4	5	y	2	5	7	-	32	A	1	
x	1	2	3	4	5											
y	2	5	7	-	32											
d)	Using Newton's forward interpolation formula find $f(8)$ <table><tr><td>x</td><td>5</td><td>10</td><td>15</td><td>20</td></tr><tr><td>f(x)</td><td>50</td><td>70</td><td>100</td><td>145</td></tr></table>	x	5	10	15	20	f(x)	50	70	100	145	A	1			
x	5	10	15	20												
f(x)	50	70	100	145												
e)	If $u = \log(\tan x + \tan y + \tan z)$ prove that $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = 6u$	U	2													
f)	If $u = \frac{x^3 y + y^3 x}{y - x}$ prove that $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = 6u$	U	2													
Q.3	Attempt any FOUR			(16)												
a)	Given <table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>y</td><td>7</td><td>17</td><td>45</td><td>103</td><td>203</td></tr></table> Find y when $x = 3.6$ using suitable interpolation.	x	0	1	2	3	4	y	7	17	45	103	203	A	1	
x	0	1	2	3	4											
y	7	17	45	103	203											
b)	Using Newton's forward interpolation formula find $\sin 45^\circ$ <table><tr><td>x</td><td>0°</td><td>30°</td><td>60°</td><td>90°</td></tr><tr><td>sinx</td><td>0</td><td>0.5</td><td>0.87</td><td>1</td></tr></table>	x	0°	30°	60°	90°	sinx	0	0.5	0.87	1	A	1			
x	0°	30°	60°	90°												
sinx	0	0.5	0.87	1												
P.T.O																

	c)	If $x = u \cos v$, $y = u \sin v$ prove that $JJ' = 1$	U	2	
	d)	if $u = \tan^{-1}(x^2 + 2y^2)$ prove that i) $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \sin 2u$ ii) $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = 2 \sin u \cos 3u$	U	2	
	e)	If $u = \log \left(\frac{x^3 + y^3}{x^2 + y^2} \right)$ prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = 1$	U	2	
	f)	If $z^3 - xz - y = 0$ Find $\frac{\partial z}{\partial x}, \frac{\partial z}{\partial y}$	A	2	
Q.4		Attempt any FOUR			(08)
	a)	Define Laplace transform of $f(t)$	R	3	
	b)	Solve: $\frac{d^3 y}{dx^3} - 5 \frac{d^2 y}{dx^2} + 8 \frac{dy}{dx} - 4y = 0$	R	4	
	c)	Show that, the solution of differential equation : $\frac{d^3 y}{dx^3} - \frac{3d^2 y}{dx^2} + \frac{3dy}{dx} - y = 0$ is $y = (c_1 + c_2 x + c_3 x^2) e^x$	U	4	
	d)	State Convolution theorem for inverse Laplace transform.	R	3	
	e)	Prove that, $L\{\cos at\} = \frac{s}{s^2 + a^2}$	U	3	
	f)	Define linear differential equation of degree 'n' with constant coefficient.	R	4	
Q.5		Attempt any FOUR			(16)
	a)	Prove that, $L\left\{\frac{2 \sin t \sin 2t}{t}\right\} = \frac{1}{2} \log \left(\frac{s^2 + 9}{s^2 + 1} \right)$	U	3	
	b)	Solve: $\frac{d^3 y}{dx^3} + 27y = 0$	A	4	
	c)	Solve: $\frac{d^4 y}{dx^4} + \frac{2d^3 y}{dx^3} + \frac{3d^2 y}{dx^2} + \frac{2dy}{dx} = 0$	A	4	
	d)	Using the method of Partial fraction find $L^{-1}\left\{\frac{s+29}{(s+4)(s^2+9)}\right\}$	A	3	
	e)	Show that, the solution of differential equation : $\frac{d^4 y}{dx^4} + \frac{8d^2 y}{dx^2} + 16y = 0$ is $y = (c_1 + c_2 x) \cos 2x + (c_3 + c_4 x) \sin 2x$	U	4	
	f)	Solve using Laplace transform: $\frac{dy}{dx} + y = e^{-3x}$; $y(0) = 1$	A	3	
Q.6		Attempt any FOUR			(16)
	a)	Find: $L\{\cos 2t \cosh t\}$	A	3	
	b)	Using method of partial fraction prove that $L^{-1}\left\{\frac{2s^2 - 4}{(s+1)(s-2)(s-3)}\right\} = \frac{-1}{6}e^{-t} - \frac{4}{3}e^{2t} + \frac{7}{2}e^{3t}$	U	3	
	c)	Using Convolution theorem for inverse Laplace transform. find: $L^{-1}\left\{\frac{s^2}{(s^2+1)(s^2+4)}\right\}$	A	3	
	d)	Prove that solution of differential equation $\frac{d^4 y}{dx^4} + a^4 y = 0$ is $y = e^{\frac{a}{\sqrt{2}}x} \left[c_1 \cos\left(\frac{a}{\sqrt{2}}x\right) + c_2 \sin\left(\frac{a}{\sqrt{2}}x\right) \right] + e^{\frac{-a}{\sqrt{2}}x} \left[c_3 \cos\left(\frac{a}{\sqrt{2}}x\right) + c_4 \sin\left(\frac{a}{\sqrt{2}}x\right) \right]$	U	4	
	e)	Solve: $\frac{d^4 y}{dx^4} + \frac{18d^2 y}{dx^2} + 81y = 0$			
	f)	Solve: $\frac{d^3 y}{dx^3} + \frac{3d^2 y}{dx^2} + \frac{4dy}{dx} + 2y = 0$			

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EXAM SEAT NO.

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LEVEL: FIRST

PROGRAM: COMMON

COURSE CODE: CCF106/0108/X110/CCF106/R108 COURSE NAME: ENGINEERING MATHEMATICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 13/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
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7) **QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome**

QN	S	Question Text	R U A	CO CCF106	Marks
Q.1		Attempt any FOUR			(08)
	a)	Find centroid of a triangle whose vertices are (-1, 2), (3, 2), (4, 5)	R	1	
	b)	Find the distance between parallel lines $3x+2y-6=0$ and $3x+2y-12=0$	U	1	
	c)	Find equation of line passing through (-4, 6) and (8,-3)	R	1	
	d)	Find center and radius of circle $2x^2+2y^2+5x-6y+4=0$	U	1	
	e)	Find equation of circle having center (-1, -2) and radius $\sqrt{15}$	R	1	
	f)	Show that the root of equation $x^3 - 2x - 5 = 0$ lies between 2 and 3	R	2	
Q.2		Attempt any FOUR			(16)
	a)	Find area of quadrilateral whose vertices are (4, 1), (-3, 0), (-2, 3) and (3, 4)	A	1	
	b)	Find the equation of straight line passing through (4, 5) and perpendicular to the line $7x - 5y = 420$	U / A	1	
	c)	Find the equation of circle whose center is at point of intersection of lines $2x+3y=13$, $5x-y=7$ and passing through the point (1, -1).	A	1	
	d)	Using Bisection method, find the approximate root of $x^2 + x - 3 = 0$ (Three iteration only)	A	2	
	e)	Using Regula falsi method find real root of the equation $xe^x = 3$ (Two iteration)	A	2	
	f)	Using Bisection method find value of $\sqrt{10}$ by performing three iteration	A	2	
Q.3		Attempt any FOUR			(16)
	a)	Find the angle between the lines $y = 5x + 6$, $y = x$	A	1	
	b)	Find the equation of circle whose center is at (-1, 3) and which touches the line $2x+y=4$	U / A	1	
	c)	Solve the following equation by Jacobi's method $20x + y - 2z = 17$, $3x + 20y - z = -18$, $2x - 3y + 20z = 25$	A	2	
	d)	Solve the equation by using Gauss-seidal method, $4x + y + 2z = 12$, $-x + 11y + 4z = 33$, $2x - 3y + 8z = 20$	A	2	

P.T.O

	e)	Solve the following equations by Gauss –seidal method $5x - y = 9$, $x - 5y + z = -4$, $y - 5z = 6$	A	2	
	f)	Solve the following equations by Jacobis method $10x + y + z = 12$, $x + 10y + z = 12$, $x + y + 10z = 12$	A	2	
Q.4		Attempt any FOUR			(08)
	a)	If $f(x) = \frac{x^2 + 2x + 5}{x^3 + 8}$ find $f(1) + f(-1)$	U	3	
	b)	Define odd and even functions	R	3	
	c)	Evaluate $\lim_{x \rightarrow 1} \frac{x^3 - 1}{x - 1}$	U / A	3	
	d)	Evaluate $\lim_{x \rightarrow 0} \frac{3 \sin x + 4x}{7x - 2 \tan x}$	U / A	3	
	e)	State the Quotient Rule of the Derivative.	U	4	
	f)	Find the slope of the tangent to the circle $x^2 + y^2 = 25$ at $(-3, 4)$	A	4	
Q.5		Attempt any FOUR			(16)
	a)	If $f(x) = \frac{1}{1-x}$ then show that $f(f(f(x))) = x$	U	3	
	b)	Evaluate $\lim_{x \rightarrow \infty} \left(\sqrt{x^2 + 3x + 2} - \sqrt{x^2 + x + 1} \right)$	A	3	
	c)	If $x\sqrt{1+y} + y\sqrt{1+x} = 0$ then show that $\frac{dy}{dx} = -\frac{1}{(1+x)^2}$	U	4	
	d)	Find $\frac{dy}{dx}$ if $y = \tan^{-1} \sqrt{\frac{1-x}{1+x}}$	A	4	
	e)	Find $\frac{dy}{dx}$ if $y = (x)^{\sin x} + (\sin x)^x$	A	4	
	f)	Find the equations of the tangents to the curve $y = x^2 - 2x - 3$ where it meets the x-axis	A	4	
Q.6		Attempt any FOUR			(16)
	a)	Evaluate $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin x - \cos x}{\frac{\pi}{4} - x}$	A	3	
	b)	Find $\frac{dy}{dx}$ if $\sin y = \log(x + y)$	A	4	
	c)	If $y = \cos^{-1} \left(\frac{\cos x + \sqrt{3} \sin x}{2} \right)$ show that $\frac{dy}{dx} = -1$	U	4	
	d)	If $x = 3 \cos \theta - 2 \cos^3 \theta$ and $y = 3 \sin \theta - 2 \sin^3 \theta$ find $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$	A	4	
	e)	If $y = (\sin^{-1} x)^2$ prove that $(1-x^2) \frac{d^2 y}{dx^2} - x \frac{dy}{dx} - 2 = 0$	U	4	
	f)	A metal wire 36 cm long is bent to form a rectangle. Find its dimensions when its area is maximum.	A	4	

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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: THIRD

PROGRAM: CE/ME/SM/MT

COURSE CODE:

CEF301/MEF301/MTE301/SMF310/1201/C201/CEE301/2201/M201/ME201/MEE301/MG201/SM201/SME301

COURSE NAME: APPLIED MATHEMATICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 10/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
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- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

S Q N	Question Text	R U A	CO CEF301	Marks
Q.1	Attempt any FOUR			(08)
a)	Evaluate $\int \frac{x+3}{x-2} dx$	U	1	
b)	Find the area under the curve $y = \cos x$ & $x = 0$ & $x = \pi$	A	1	
c)	Evaluate $\int_0^{\frac{1}{2}} \frac{dx}{\sqrt{1-x^2}}$	R	1	
d)	Evaluate $\int \sqrt{1-\cos 2x} dx$	R	1	
e)	Find the mean value of the function $y = 3e^{-x}$ over the range from $x = 0$ to $x = 1$	A	1	
f)	Evaluate $\int \frac{3-5x^2+9x^4-10x^6}{x^6} dx$	R	1	
Q.2	Attempt any FOUR			(16)
a)	Evaluate $\int \frac{x^5}{1+x^{12}} dx$	U	1	
b)	Find the area of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ by integration method.	A	1	
c)	Evaluate $\int \frac{1-\tan x}{1+\tan x} dx$	U	1	
d)	Evaluate $\int_0^{\frac{\pi}{2}} \cos^2 x dx$	A	1	
e)	Evaluate $\int \cot^{-1} x dx$	A	1	
f)	Evaluate $\int_2^6 \frac{\sqrt{1-x} dx}{\sqrt{1-x} + \sqrt{x-7}}$	A	1	
Q.3	Attempt any FOUR			(16)
a)	Evaluate $\int \frac{(x^2+1)dx}{x(2x-1)(1-x)}$	A	1	
b)	Evaluate $\int_{-1}^1 \frac{x+x^2}{x^2+1} dx$	A	1	
c)	Find the area enclosed between the parabola $y^2 = 4x$ and the line $2x - y = 4$	A	1	
P.T.O				

	d)	Evaluate $\int \cos(\sqrt{x}) dx$	U	1										
	e)	If $i_1 = 10 \sin wt$ & $i_2 = 20 \cos wt$ Find $i_1 + i_2$ in the form $r \sin(wt + \alpha)$ & calculate the R.M.S value over the range from $t = 0$ to $t = \frac{\pi}{w}$	A	1										
	f)	Evaluate $\int \frac{dx}{(x+1)(x^2+4)}$	A	1										
Q.4		Attempt any FOUR			(08)									
	a)	Define order and degree of a differential equation.	R	2										
	b)	What is the solution of a linear differential equation $\frac{dy}{dx} + Py = Q$. Where P and Q are functions of x only or constants.	R	2										
	c)	Show that the differential equation $(ye^{xy} - 2y^2)dx + (xe^{xy} - 6xy^2 - 2y)dy = 0$ is exact.	U	2										
	d)	If C.V of a distribution is 4 with mean 80 find S.D.	R	3										
	e)	The two sets of observations are given below: <table><tr><td>Set I</td><td>Set II</td></tr><tr><td>$\bar{x} = 82.5$</td><td>$\bar{x} = 48.75$</td></tr><tr><td>$\sigma = 73$</td><td>$\sigma = 8.35$</td></tr></table> Which of the two sets is more consistent?	Set I	Set II	$\bar{x} = 82.5$	$\bar{x} = 48.75$	$\sigma = 73$	$\sigma = 8.35$						
Set I	Set II													
$\bar{x} = 82.5$	$\bar{x} = 48.75$													
$\sigma = 73$	$\sigma = 8.35$													
	f)	Two coins tossed simultaneously. Find the probability of getting at least one head.	R	4										
Q.5		Attempt any FOUR			(16)									
	a)	Solve $(1+y^2)dx = (\tan^{-1} y - x)dy$	A	2										
	b)	Show that the solution of D.E $\left(4 - \frac{y^2}{x^2}\right)dx + \frac{2y}{x} dy = 0$ is $4x^2 + y^2 = cx$	U	2										
	c)	Solve $x \log x \frac{dy}{dx} + y = 2 \log x$	A	2										
	d)	Solve $x(x+y)dy - y^2 dx = 0$	A	2										
	e)	Find the particular solution of D.E $y\sqrt{1-x^2} dy + x\sqrt{1-y^2} dx = 0$ When $x = \frac{3}{4}, y = \frac{4}{5}$	A	2										
	f)	A set of 18 items has mean and variance 7 and 16 respectively. But one number was taken 21 instead of 12 by mistake. Calculate correct mean and correct S.D.	U	3										
Q.6		Attempt any FOUR			(16)									
	a)	Two kinds of electric bulbs of the same wattage manufactured by a factory have mean life and S.D as given below: <table><tr><td>Sample</td><td>Mean life</td><td>S.D</td></tr><tr><td>A</td><td>1620hrs</td><td>300hrs</td></tr><tr><td>B</td><td>1940hrs</td><td>345hrs</td></tr></table> Which of the two bulbs has a greater variability?	Sample	Mean life	S.D	A	1620hrs	300hrs	B	1940hrs	345hrs	U	3	
Sample	Mean life	S.D												
A	1620hrs	300hrs												
B	1940hrs	345hrs												

b)	The following data gives the age in years of 100 voters of certain constituency.								A	3																																
<table><tr><td>Age less than or equal to</td><td>30</td><td>40</td><td>50</td><td>60</td><td>70</td><td>80</td><td>90</td></tr><tr><td>No of Voters</td><td>13</td><td>40</td><td>68</td><td>80</td><td>90</td><td>97</td><td>100</td></tr></table>											Age less than or equal to	30	40	50	60	70	80	90	No of Voters	13	40	68	80	90	97	100																
Age less than or equal to	30	40	50	60	70	80	90																																			
No of Voters	13	40	68	80	90	97	100																																			
Find mean and S.D																																										
c)	Find the mean deviation from the mean for the following data								A	3																																
<table><tr><td>C.I</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td><td>50-60</td><td>60-70</td></tr><tr><td>Frequency</td><td>4</td><td>6</td><td>10</td><td>18</td><td>9</td><td>3</td></tr></table>											C.I	10-20	20-30	30-40	40-50	50-60	60-70	Frequency	4	6	10	18	9	3																		
C.I	10-20	20-30	30-40	40-50	50-60	60-70																																				
Frequency	4	6	10	18	9	3																																				
d)	The weights in gms of the tins are given below.								A	3																																
<table><tr><td>Wt in gms</td><td>900-920</td><td>920-940</td><td>940-960</td><td>960-980</td><td>980-1000</td><td>1000-1020</td><td>1020-1040</td></tr><tr><td>No of tins</td><td>4</td><td>11</td><td>63</td><td>90</td><td>73</td><td>38</td><td>10</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>1020</td><td>1040</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>10</td><td>05</td></tr></table>											Wt in gms	900-920	920-940	940-960	960-980	980-1000	1000-1020	1020-1040	No of tins	4	11	63	90	73	38	10							1020	1040							10	05
Wt in gms	900-920	920-940	940-960	960-980	980-1000	1000-1020	1020-1040																																			
No of tins	4	11	63	90	73	38	10																																			
						1020	1040																																			
						10	05																																			
Calculate S.D by using step deviation method.																																										
e)	A box contains 10 radio valves of which 4 are defective. Show that the probability is $\frac{2}{15}$ if two of them valves are taken from the box such that both are defective.								U	4																																
f)	The probability that a student passes H.S.C examination is $\frac{2}{3}$ and the probability that he passes both H.S.C and IIT entrance examinations is $\frac{14}{45}$. The probability that he passes atleast one examination is $\frac{4}{5}$. What is the probability that he passes the IIT entrance examination?								A	4																																

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FIRST**PROGRAM : CE/ME/SM/MT****COURSE CODE :- CCF103/X103/X109/CCE103****COURSE NAME :- CHEMISTRY OF ENGINEERING MATERIALS /
ENGINEERING CHEMISTRY****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 09/05/2019****Instruction :-**

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co CCF 103	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Write electronic configuration of 20Ca^{40} , 7N^{14}	U	1	
	b)	State Aufbau principle.	R	1	
	c)	Define electroplating.	R	2	
	d)	State Faraday's first law of electrolysis.	R	2	
	e)	What is corrosion?	R	3	
	f)	Mention factors affecting Wet corrosion.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Explain Bohr's theory of atom.	U	1	
	b)	On the basis of electrovalency explain the formation of NaCl molecule.	A	1	
	c)	Distinguish between atom and ion.	U	2	
	d)	What is degree of ionization? Explain any three factors affecting on it	U	2	
	e)	With neat labelled diagram explain the process of galvanizing.	U	2	
	f)	Name and explain the process used to protect the large sized and irregular shaped articles.	U	3	
Q.3		Attempt any FOUR :			16
	a)	Distinguish between i) Soft water and Hard water ii) Temporary Hardness and permanent hardness.	U	4	
	b)	Write any four reactions of hard water with soap.	A	4	
	c)	If hard water is used for drinking and cooking purpose then write its disadvantages.	U	4	
	d)	What is meant by scale formation in boilers? Explain its causes.	U	4	
	e)	How will you sterilize impure water by using bleaching powder? Explain with the help of chemical reactions.	U	4	
	f)	With the help of chemical reactions explain the regeneration of both the types of resins.	A	4	

P.T.O.

Q.4	Attempt any FOUR :			08
	a)	Distinguish between mineral and ore (any two points)	U	6
	b)	Define alloy and Gangue.	R	6
	c)	Select lubricants for sewing machine and state its properties.	A	7
	d)	State functions of Drying oil and pigment. (Each two functions)	R	7
	e)	Define Adhesive and composite materials.	R	7
	f)	Write preparation of Glass Wool.	R	7
Q.5	Attempt any FOUR :			16
	a)	With example state four purposes of making alloy.	R	6
	b)	With diagram explain extreme pressure lubrication.	U	7
	c)	Distinguish between paint and varnish (any four points)	U	7
	d)	State four engineering properties and their related applications of plastic	U	7
	e)	Explain with chemical reactions vulcanization of rubber.	U	7
	f)	Classify composite materials and state its applications.	U	7
Q.6	Attempt any FOUR :			16
	a)	Distinguish between calcination and roasting (any four points)	U	6
	b)	With diagram explain Electromagnetic separation method.	U	6
	c)	Define lubricant. Write functions of lubricants.	U	7
	d)	Write characteristics of oil paint. Write functions of plasticizer and Thinner (two each)	R	7
	e)	With example explain condensation polymerization.	U	7
	f)	Define i) Tack ii) Elasticity iii) Rebound iv) Abrasion resistance.	R	5

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FIRST**PROGRAM : COMMON****COURSE CODE :- CCF107/CCCE107/X105****COURSE NAME :- ENGINEERING DRAWING - I****MAX. MARKS : 80 TIME : 4 HRS. DATE :- 16/05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co CCF 107	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Draw the convention of short break line and cutting plane line.	U	1	
	b)	Define “Representative fraction”.	R	1	
	c)	Draw the projection of point P which is in VP and 30mm above HP.	U	3	
	d)	A peg is rammed in a wall having length 30cm and 150cm above the floor. Draw its projections.	U	3	
	e)	Draw the projection of point R, 25mm above HP and 20mm in front of VP.	U	3	
	f)	Write the applications of parabolic curve in practice.	A	2	
Q.2		Attempt any FOUR :			16
	a)	A distance of 10cm on the machine part has to be represented by a line of 30cm on the drawing. Draw a diagonal scale capable of measure upto 5 cm. Mark on it 3.75cm.	U	1	
	b)	Distance between Delhi and Madras is 1800km; on a railway map it is represented by 36cm. Calculate RF and draw diagonal scale to read upto a single kilometer. Mark on it the distance of 337km.	U	1	
	c)	Draw the parabola by rectangle method having base 50mm and axis 70mm.	U	2	
	d)	The foci of an ellipse are 90mm apart and minor axis 65mm long. Determine the length of major axis and draw ellipse by concentric circle method.	U	2	
	e)	A line PQ, 70mm long is inclined to 45° to VP and parallel to HP. The nearest point P of the line is 30mm above HP and 20mm in front of VP. Draw its projections.	U	3	

P.T.O.

	f)	A line RS, 60mm long is in HP. Point R is 20mm in front of VP and point S, 50mm in front of VP. Draw the projections of line and measure the inclination of line with VP.	U	3	
Q.3		Attempt any TWO :			16
	a)	A circle of 40mm diameter rolls on another circle of 160mm diameter with internal contact. Draw the locus of a point P on the circumference of the rolling circle for one revolution and name the curve.	U	2	
	b)	A thin rod PR of 120mm length revolves about point Q on it, 20mm from end P. A point 'S' located on PR at 20mm distance from end R moves along the rod and reaches point P during the period, the rod completes one revolution. Draw the locus of point S if both motions are uniform. Name the curve.	U	2	
	c)	i) The distance between the end projections of line AB is 50mm. Its end A is 20mm above HP & 15mm in front of VP. The line is parallel to VP and true length of line is 70mm. Draw its three views and determine its inclination with HP. ii) The end 'R' of line RS, 70mm long, is in both planes. Draw its projections when the line is in V.P. and inclined at 60° to H.P. Find the distance of end 'S' from H.P. Assume the line is in first quadrant.	U U	3 3	
Q.4		Attempt any TWO :			08
	a)	A hexagonal lamina of 30mm side, is resting on one of its corner in the H.P. Its plane is inclined at an angle of 30° to HP and perpendicular to V.P. Draw its projection.	U	4	
	b)	Draw the projections of a rhombus having diagonals 60mm and 40mm long. The bigger diagonal is inclined at 40° to H.P. with one of the end point in H.P. and the smaller diagonal is parallel to both the planes.	U	4	
	c)	A circular plate of diameter 50mm is resting on one point on circumference on H.P. The plate is inclined at 45° with V.P. and perpendicular to H.P. The centre of plate is 40mm in front of V.P. Draw its projections.	U	4	

Q.5	Attempt any TWO :			16
	a) A pentagonal prism, side of base 30mm and axis length 65mm, is kept on one of its base edge on V.P. such that the rectangular face containing that edge makes an angle of 30° with V.P. Draw the projection of prism when its axis is parallel to H.P.	U	5	
	b) A tetrahedron of 60mm long edge is resting on one of its edge on H.P. and face containing that edge is perpendicular to H.P. Draw the projection of tetrahedron when axis is parallel to V.P.	U	5	
	c) A cone, base 60mm diameter and axis 80mm long is resting on a point on the circumference of its base in H.P., with its base inclined at 45° to H.P. Draw its projections when its axis is parallel to V.P.	U	5	
Q.6	Attempt any TWO :			16
	a) A square pyramid, side of base 30mm and height 50mm is resting on its base with one of the side of the base perpendicular to the V.P. It is cut by cutting plane, inclined at 45° to the H.P. in such a way that it bisects the axis. Draw front view, sectional top view, sectional left hand side view and true shape of the section.	U	6	
	b) A cube of 60mm long edges is kept on the H.P. on one of its faces with all sides of that face equally inclined to V.P. It is cut by an auxiliary inclined plane in such a way that true shape of the section is regular hexagon. Draw front view, sectional top view and true shape of the section.	U	6	
	c) A cone, base 60mm diameter and height 70mm, is resting on the base on H.P. It is cut by a vertical section plane, inclined at 30° to V.P. and 12 mm in front of the axis. Draw top view, sectional front view, sectional side view and true shape of the section.	U	6	

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EXAM SEAT NO.

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LEVEL :- FIRST PROGRAM : COMMON

COURSE CODE :- CCF107/CCE107/X105

COURSE NAME :- ENGINEERING DRAWING - I

MAX. MARKS : 80 TIME : 4 HRS. DATE :- 16/05/2019

Instruction :-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co CCF 107	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Draw the convention of short break line and cutting plane line.	U	1	
	b)	Define "Representative fraction".	R	1	
	c)	Draw the projection of point P which is in VP and 30mm above HP.	U	3	
	d)	A peg is rammed in a wall having length 30cm and 150cm above the floor. Draw its projections.	U	3	
	e)	Draw the projection of point R, 25mm above HP and 20mm in front of VP.	U	3	
	f)	Write the applications of parabolic curve in practice.	A	2	
Q.2		Attempt any FOUR :			16
	a)	A distance of 10cm on the machine part has to be represented by a line of 30cm on the drawing. Draw a diagonal scale capable of measure upto 5 cm. Mark on it 3.75cm.	U	1	
	b)	Distance between Delhi and Madras is 1800km; on a railway map it is represented by 36cm. Calculate RF and draw diagonal scale to read upto a single kilometer. Mark on it the distance of 337km.	U	1	
	c)	Draw the parabola by rectangle method having base 50mm and axis 70mm.	U	2	
	d)	The foci of an ellipse are 90mm apart and minor axis 65mm long. Determine the length of major axis and draw ellipse by concentric circle method.	U	2	
	e)	A line PQ, 70mm long is inclined to 45° to VP and parallel to HP. The nearest point P of the line is 30mm above HP and 20mm in front of VP. Draw its projections.	U	3	

P.T.O.

	f)	A line RS, 60mm long is in HP. Point R is 20mm in front of VP and point S, 50mm in front of VP. Draw the projections of line and measure the inclination of line with VP.	U	3	
Q.3		Attempt any TWO:			16
	a)	A circle of 40mm diameter rolls on another circle of 160mm diameter with internal contact. Draw the locus of a point P on the circumference of the rolling circle for one revolution and name the curve.	U	2	
	b)	A thin rod PR of 120mm length revolves about point Q on it, 20mm from end P. A point 'S' located on PR at 20mm distance from end R moves along the rod and reaches point P during the period, the rod completes one revolution. Draw the locus of point S if both motions are uniform. Name the curve.	U	2	
	c)	i) The distance between the end projections of line AB is 50mm. Its end A is 20mm above HP & 15mm in front of VP. The line is parallel to VP and true length of line is 70mm. Draw its three views and determine its inclination with HP. ii) The end 'R' of line RS, 70mm long, is in both planes. Draw its projections when the line is in V.P. and inclined at 60° to H.P. Find the distance of end 'S' from H.P. Assume the line is in first quadrant.	U	3	
Q.4		Attempt any TWO:			08
	a)	A hexagonal lamina of 30mm side, is resting on one of its corner in the H.P. Its plane is inclined at an angle of 30° to HP and perpendicular to V.P. Draw its projection.	U	4	
	b)	Draw the projections of a rhombus having diagonals 60mm and 40mm long. The bigger diagonal is inclined at 40° to H.P. with one of the end point in H.P. and the smaller diagonal is parallel to both the planes.	U	4	
	c)	A circular plate of diameter 50mm is resting on one point on circumference on H.P. The plate is inclined at 45° with V.P. and perpendicular to H.P. The centre of plate is 40mm in front of V.P. Draw its projections.	U	4	

Q.5	Attempt any TWO :			16
	a) A pentagonal prism, side of base 30mm and axis length 65mm, is kept on one of its base edge on V.P. such that the rectangular face containing that edge makes an angle of 30° with V.P. Draw the projection of prism when its axis is parallel to H.P.	U	5	
	b) A tetrahedron of 60mm long edge is resting on one of its edge on H.P. and face containing that edge is perpendicular to H.P. Draw the projection of tetrahedron when axis is parallel to V.P.	U	5	
	c) A cone, base 60mm diameter and axis 80mm long is resting on a point on the circumference of its base in H.P., with its base inclined at 45° to H.P. Draw its projections when its axis is parallel to V.P.	U	5	
Q.6	Attempt any TWO :			16
	a) A square pyramid, side of base 30mm and height 50mm is resting on its base with one of the side of the base perpendicular to the V.P. It is cut by cutting plane, inclined at 45° to the H.P. in such a way that it bisects the axis. Draw front view, sectional top view, sectional left hand side view and true shape of the section.	U	6	
	b) A cube of 60mm long edges is kept on the H.P. on one of its faces with all sides of that face equally inclined to V.P. It is cut by an auxiliary inclined plane in such a way that true shape of the section is regular hexagon. Draw front view, sectional top view and true shape of the section.	U	6	
	c) A cone, base 60mm diameter and height 70mm, is resting on the base on H.P. It is cut by a vertical section plane, inclined at 30° to V.P. and 12 mm in front of the axis. Draw top view, sectional front view, sectional side view and true shape of the section.	U	6	

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LEVEL :- SECOND PROGRAM : COMMON**COURSE CODE :- CCF 202 /CCE202****COURSE NAME :- COMMUNICATION SKILLS****MAX. MARKS : 40 TIME : 2 HRS. DATE :- 10/05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co CCF 202	Ma rks
Q.1		Attempt any FOUR :			08
	a)	State importance of oral communication for engineers.	R	2	
	b)	Write examples of oral and written communication. (two each)	U	2	
	c)	State advantages and disadvantages of written communication. (each one)	R	3	
	d)	Define the term 'Haptics'.	R	4	
	e)	Define panel interview.	U	6	
	f)	Write two uses of L C D projector.	U	4	
Q.2		Attempt any FOUR :			16
	a)	State communication process with diagram.	U	1	
	b)	Elaborate physical and mechanical barriers.	U	1	
	c)	Discuss 'media plays an important role in the communication process'.	U	4	
	d)	Write strengths of media aided presentation.	A	4	
	e)	Write a brief note on mock interview.	U	6	
	f)	State advantages and disadvantages of oral communication.	U	2	
Q.3		Attempt any TWO :			16
	a)	Write four principles of effective communication.	U	1	
	b)	Write a letter of application for the post of Production Engineer in Mahindra Tech, Aundh, Pune- 420004, with your resume.	A	3	
	c)	Draw a pie chart indicating the given below quantities, in given percentage of five senses of perception Sight – 65% Audio – 18% Touch – 07% Smell – 05% Taste – 05%	A	4	

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- THIRD PROGRAM : CIVIL ENGINEERING**COURSE CODE :- CEF310/CEE310****COURSE NAME :- TRANSPORTATION ENGINEERING****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 14/05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co CEF 310	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Define major district road.	R	1	
	b)	State IRC value recommendations for road camber.	U	2	
	c)	Distinguish between 'Asphalt' and 'Tar' in brief.	U	3	
	d)	What are the types of joint in concrete road? Explain in brief any one.	R	3	
	e)	State any two disadvantages of tunnel.	U	5	
	f)	Write any two purpose of shaft in tunnel.	U	4	
Q.2		Attempt any FOUR :			16
	a)	Draw the cross-section of National highway in cutting and label the parts.	A	2	
	b)	Define super elevation and state it's any two purposes.	U	2	
	c)	Write any four advantages and any four disadvantages of flexible pavement.	U	3	
	d)	Explain construction procedure of Alternate bay method.	U	2	
	e)	Draw line sketch and suitability of any four types of tunnel according to shapes.	A	4	
	f)	Describe full face heading method of tunneling in hard rock with neat sketch.	A	6	
Q.3		Attempt any FOUR :			16
	a)	State any four purposes of lining of tunnels.	U	6	
	b)	What point should be kept in mind while deciding the alignment of tunnel.	A	5	
	c)	Write any four advantages and any four disadvantages of concrete road.	A	3	
	d)	Explain construction procedure of W.B.M. road.	U	3	
	e)	Enlist types of sight distance and explain any one in detail.	U	2	
	f)	State importance of Transportation Engineering.	U	1	

P.T.O.

Q.4	Attempt any FOUR :		08
	a) Define permanent way. State its any two requirements.	R/ U	7
	b) Draw a neat labelled sketch of flat footed rail with dimensions.	R	7
	c) State the necessity of point and crossing in railway tracks.	U	8
	d) Give any four purposes of providing railway station.	U	9
	e) Define Bridge Alignment. State any two factors affecting on it.	R/ U	10
	f) Define 'Approaches'.	R	11
Q.5	Attempt any FOUR :		16
	a) Define coning of wheel. Explain its necessity with a neat labelled sketch.	U	7
	b) If wooden sleepers are laid on the railway track then what are the precautions to be taken while fixing rails on sleeper. Explain with a neat labelled sketch.	A	7
	c) Define i) Tongue rail ii) Wing rail iii) Check rail iv) Nose of crossings.	A	8
	d) If a railway line ends at a station then identify the type of railway station. Explain with a neat labelled sketch.	A	9
	e) i) Define Wing wall. Give its any two functions. ii) Enlist types of Wing wall and draw a labelled sketch of any two types of Wing wall.	R U	11 11
	f) Classify the bridge according to span length, purpose; alignment and acc. to level of bridge floor.	R	12
Q.6	Attempt any FOUR :		16
	a) Define creep of rail. State any eight causes of creep of rail.	U	7
	b) Which type of fish plate you will use for joining Bull headed rails. Draw a neat labelled sketch of identified type of fish plate.	A	7
	c) Draw a neat labelled sketch of left hand turnout and explain in short.	U	8
	d) Illustrate the neat sketch of layout of wayside station showing the double lien track and write its necessity.	A	9
	e) State any two functions of bridge bearings. Draw a neat sketch of fixed bearing for RCC slab bridge.	U	11
	f) Draw a neat labelled sketch of simple suspension bridge. Write any two merits and demerits of it.	U	12

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL:- THIRD**PROGRAM : CIVIL ENGINEERING****COURSE CODE :- CEF303/CEE303****COURSE NAME :- BUILDING DRAWING****MAX. MARKS : 80 TIME : 4 HRS. DATE :- 17/05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Question Text	R/ U/ A	Co CEF 303	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Draw the following lines used in drawing. i) Construction line ii) Section line.	A	1	
	b)	Differentiate between one point and two point perspective. (any two differences)	A	5	
	c)	What do you mean by building bye laws?	R	2	
	d)	State minimum dimensions required for following i) Kitchen cum dining ii) Water closer	A	3	
	e)	Enlist various types of drawings.	R	1	
	f)	Enlist the documents required while submitting plan for sanctioning.	R	2	
Q.2		Attempt any FOUR :			16
	a)	Draw the symbols for following i) Single shutter double swing door. ii) Stirrups iii) Sink iv) Glass in elevation.	A	1	
	b)	Explain the role of contractor and owner in building construction work.	U	2	
	c)	Define privacy. State its type and state methods of achieving privacy during planning of a building.	R	3	
	d)	What are the preliminary requirements of good drawing?	U	1	
	e)	Define the following i) Building line ii) Floor area ratio iii) Carpet area iv) Super built up area.	R	2	
	f)	Explain the concept of vastushastra for building planning.	U	3	
Q.3		Attempt any TWO :			16
	a)	Explain the concept of one point and two point perspective with suitable examples for both cases.	U	5	
	b)	Draw to a suitable scale a line plan of a 'canteen' containing various units such as manager cabin, store, kitchen, cashier, dinning, washing, sanitary unit etc.	A	4	
	c)	Draw the two point perspective view of a small monumental object shown in following figure 1. Retain all construction lines. Assume eyelevel is at 2.0m above the G.L.	A	5	

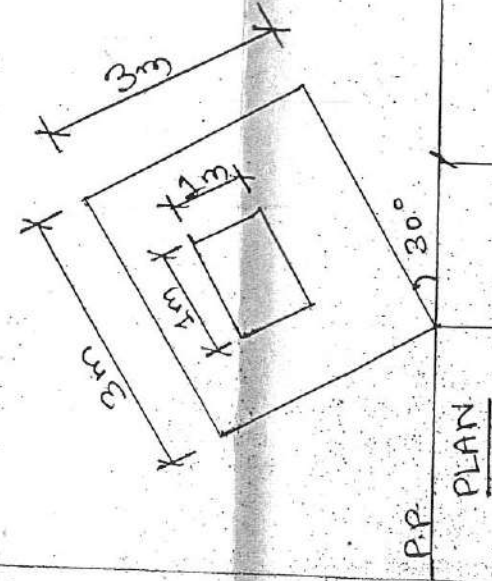
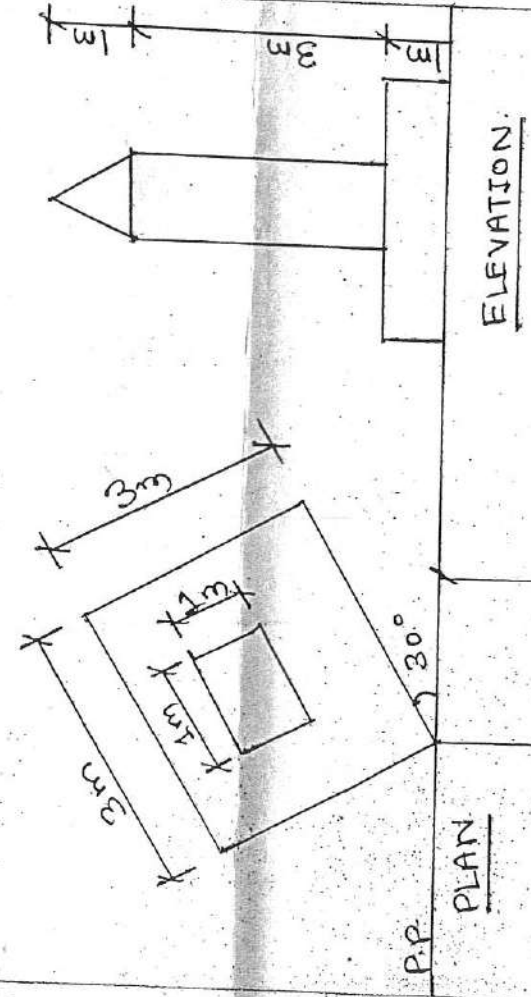
Q.4	Figure 2 shows line plane of residential building. Draw to suitable scale the following views	A	6	40
	a) Detailed plan			10
	b) Front elevation			06
	c) Section along A-B			12
	d) Schedule of doors and windows			06
	e) Area statement			05
	f) North line. Note :- Show all dimensions in plan, elevation and section. Use following construction notes i) Hard strata is available at 900mm below G.L ii) Concrete bed PPC (1:4.8) 150 thick and 900 mm width. iii) Foundation masonry 600mm in width in CM(1:6) iv) UCR masonry in plinth, width 450mm & height 600 mm. Above G.L. in CM1:6 v) Superstructure consists of B.B masonry in C.M. (1:6) 300 mm thick main walls and 200mm thick partition walls of sanitary block. vi) Ceiling height is 3000mm. vii) RCC slab (1:2:4) thickness 120mm viii) Dado upto 1200mm height is provided with glazed tiles for bath and W.C. walls. ix) Assume suitable data if necessary.			01

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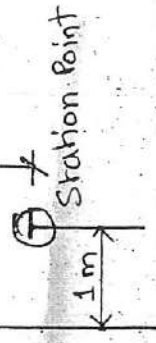
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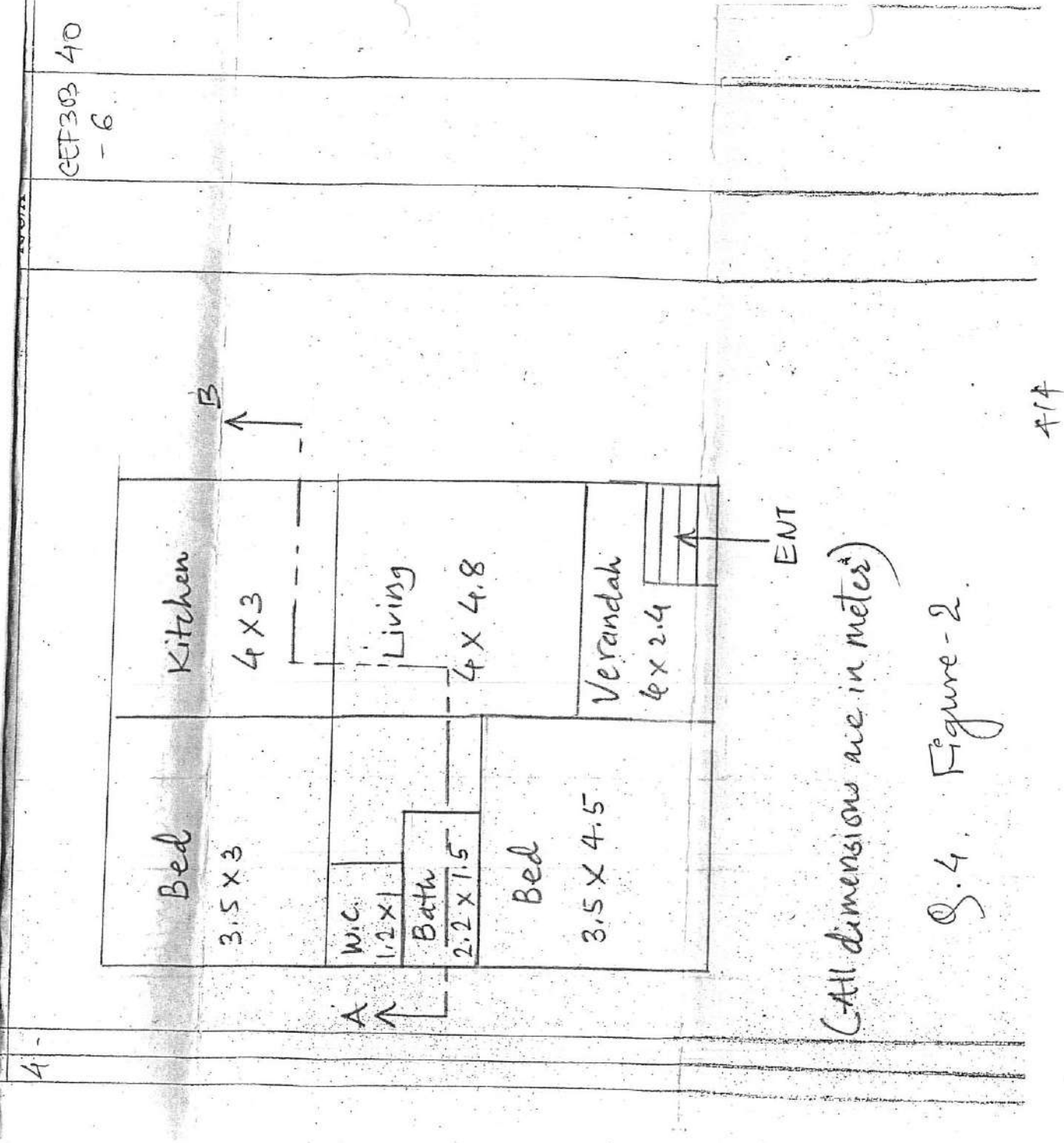


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Question No 3 (c)

Figure - 1



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EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: FIRST

PROGRAM: COMMON

COURSE CODE: CCF110/X111/CCE110

COURSE NAME: APPLIED MECHANICS

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 20/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S	Question Text	R	CO	Marks
	Q		U	CCF	
	N		A	110	
Q.1		Attempt any FOUR			(08)
	a)	Different between particle & body. (any two)	U	1	
	b)	State principle of transmissibility.	R	1	
	c)	Give field examples of i) Concurrent force system. ii) Parallel force system.	R	1	
	d)	Define equilibrant & state its effect on body.	R	2	
	e)	Define i) Angle of friction ii) Angle of Repose.	R	2	
	f)	State laws of friction. (any two)	R	2	
Q.2		Attempt any FOUR			(16)
	a)	Determine the components of the force 500KN at 20° & 30° at either side of it.	A	1	
	b)	Two forces acts at an angle 120° , The bigger force is 50 N and resultant of both is perpendicular to smaller force. Find smaller force.	A	1	
	c)	Determine the magnitude & direction of resultant force of forces away from point 8 N, 10 N, 20 N and 12 N making an angle 30° , 120° , 200° & 310° with the x-axis measured in clockwise direction respectively. (solve by Analytical method)	A	1	
	d)	Three forces of 20 N, 40 N, & 60 N along the sides of equilateral triangle of side 30 cm respectively in order. Calculate the magnitude & position of resultant of force system from apex point.	A	1	
	e)	A light string ABCDE whose extremity 'A' is fixed, has 'W ₁ ' and 'W ₂ ' attached at 'B' & 'C'. It passes frictionless pulley at 'D' carrying a weight of 200 N at free end 'E'. If in equilibrium position BC is horizontal & AB & CD makes an angle 150° & 100° respectively with BC, Determine magnitudes 'W ₁ ' & 'W ₂ '	A	2	
	f)	Solve Q.No.2(C) by Graphical method.	U	3	
Q.3		Attempt any FOUR			(16)
	a)	Simply supported beam of 5m span carries UDL of 12 KN/m over half span from left side support & vertically downward point load of 27KN acting 1 m from right side support. Determine support reaction by analytical method.	A	2	
	b)	Solve Q. No 3(a) by graphical method.	U	3	
	c)	State advantages & limitations of graphical method over analytical method.	R	3	
	d)	A heavy stone of mass 400 kg is on hill of 45° inclined with horizontal. If coefficient of friction between stone & hill is 0.50, is stone stable?	A	2	

e)	A block weighing 40KN resting on rough horizontal plane can be moved by a force of 22 KN applied at an angle 35° with the horizontal. Determine coefficient of friction.	A	2	
f)	A ladder of 3 m weighing 100 N is kept 30° inclined with smooth horizontal ground and rough wall. If the man weighing 700 N is standing on mid of ladder, what is the force 'P', horizontal to ground contact surface, required to keep the ladder in rest. Take μ for ladder & wall is 0.3.	A	2	
Q.4	Attempt any FOUR			(08)
a)	Define Kinematics.	R	5	
b)	Define momentum.	R	5	
c)	Define angular acceleration.	R	5	
d)	State law of conservation of energy.	R	5	
e)	Define work & power.	R	5	
f)	Define velocity ratio.	R	6	
Q.5	Attempt any FOUR			(16)
a)	Determine the co-ordinates of the centroid of the shaded area with respect to the axes shown in figure. no.1 in which a quarter circle of radius 80 mm is cut-off from a rectangle of size 120 mm x 80 mm.	A	4	
b)	Determine the centroid of an unequal angle from the reference axes X & Y as shown in figure No.2.	A	4	
c)	A ball is dropped from the top of a tower 30 m high. At the same instant a second ball is thrown upward from the ground with an initial velocity 15 m/sec when & where they cross?	A	5	
d)	Power supply was cut off to a power driven wheel when it was rotating at a speed of 900 rpm. It was observed to come to rest after making 360 revolutions. Determine its angular retardation & time it took to come to rest after power supply cut-off.	A	5	
e)	A stone is released from a height 30 m. Calculate velocity of stone when it strikes to the ground using law of conservation of energy.	A	5	
f)	In a lifting machine an effort of 500 N is to be raise a load 10,000 N, velocity ratio of machine is 25. Determine efficiency of machine, ideal effort, effort lost in friction & load lost in friction.	A	6	
Q.6	Attempt any FOUR			(16)
a)	A solid right circular cone of height 40 cm & diameter 20 cm is placed on a cylinder of diameter 20 cm & height 30 cm. Locate the position of center of gravity from the base of the cone.	A	4	
b)	A railway wagon is moving at 108 kmph. The driver observes the red signal & applies brakes to stop the train & it covers a distance of 300 meter before coming to rest. Calculate the retardation produced & time taken to rest.	A	5	
c)	A wheel starts from the rest & accelerates at 12 rad/sec^2 until it reaches a speed of 200 rpm. With this speed it rotates for 2 minutes & then retards uniformly for 150 seconds & stops. Determine total number of revolutions made, Acceleration time & angular retardation.	A	5	
d)	Determine the power required to raise a lift containing 15 persons to a height of 150 m in 10 minutes. The average weight of each person may be taken as 650 N. The weight of lift is 2.5 KN.	A	5	
e)	In a machine an effort of 15 N can lift a load of 300 N & an effort of 25 N can lift a load of 500N. Determine the law of machine & also effort required to lift a load of 1000N.	A	6	
f)	In a lifting machine law of machine is $P = (0.025 W + 0.05) \text{ KN}$ & velocity ratio is 44.44. Calculate efficiency of machine at load 20 KN. and state machine is reversible or not at load 20 KN. Also determine maximum M.A & maximum efficiency of machine.	A	6	

Q.5) a) Figure NO.1

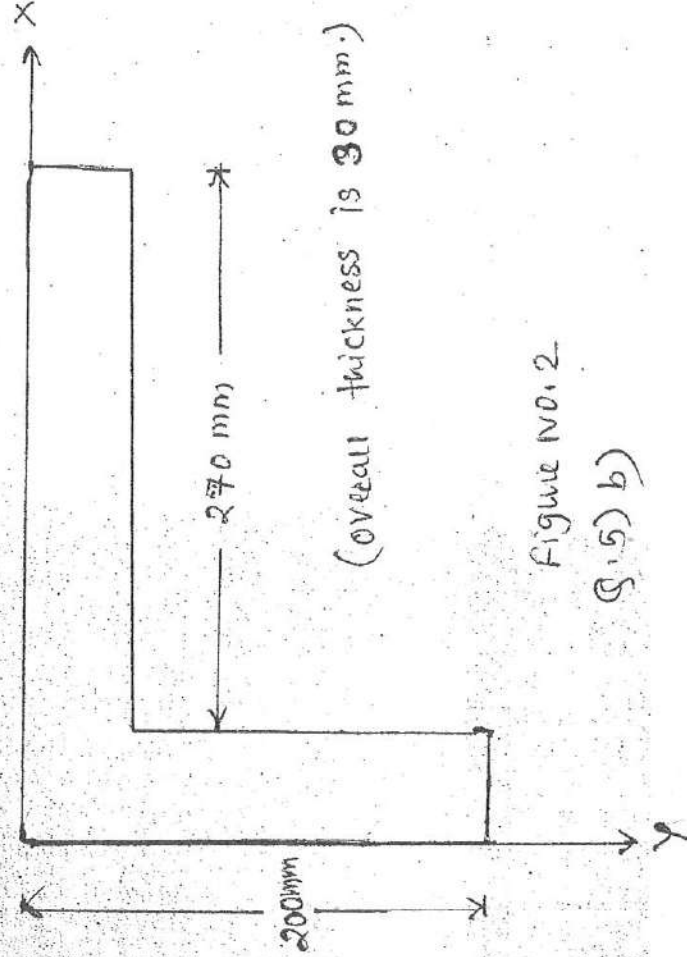
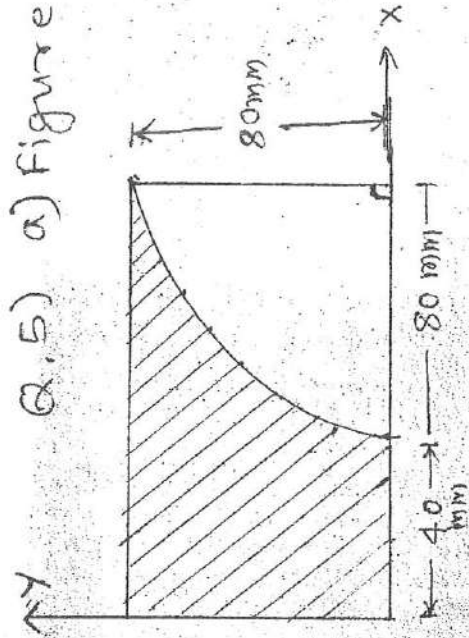


Figure NO.2

Q.5) b)

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FIFTH **PROGRAM : CIVIL ENGINEERING**
COURSE CODE :- CEF506/CEE505/CE403
COURSE NAME ENVIRONMENTAL ENGINEERING
MAX. MARKS : 80 **TIME : 3 HRS.** **DATE :- 20/05/2019**

Instruction :-

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Section- I	R/ U/ A	Co CEF 506	Mar ks
Q.1		Attempt any FOUR :			08
	a)	State any two factors governing the location of intake.	R	1	
	b)	State any four types of water demand.	R	2	
	c)	Define pH and give pH scale.	U	3	
	d)	State any two precautions to be taken during collection of water sample.	R	3	
	e)	Define screening.	R	4	
	f)	Define detention period.	R	4	
Q.2		Attempt any FOUR :			16
	a)	Explain the necessity of water supply scheme.	U	1	
	b)	Define design period and state factors affecting on it.	U	2	
	c)	Enlist all types of tests conducted for raw water.	R	3	
	d)	State necessity and importance of low cost water treatments in rural areas	U	4	
	e)	Explain in brief theory of sedimentation.	U	4	
	f)	Differentiate between dead end system and circular system.	U	5	
Q.3		Attempt any FOUR :			16
	a)	Draw a sketch of river-intake and label it.	U	1	
	b)	Enlist the various methods of population forecasting and state the necessity of it..	U	2	
	c)	Describe Electrolysis Process in advance water treatment.	U	4	
	d)	Explain with sketch rapid sand gravity filter.	U	4	
	e)	Enlist the systems of water distribution and explain any one.	R	5	
	f)	State the location and function of the following pipe fittings i) Air valve ii) Reflux valve iii) Scour valve iv) sluice valve.	R	5	

P.T.O.

QN		S Q N	Section- II		R/ U/ A	Co CEF 506	Mar ks
Q.4			Attempt any FOUR :				08
	a)		Define trap. State its function.	R	7		
	b)		What do you mean by house drainage system?	U	6		
	c)		Define 'Rubbish & Garabage'.	R	6		
	d)		What do you mean by 'Dry weather flow'?	U	9		
	e)		What is self cleansing velocity?	U	9		
	f)		Define BOD.	U	6		
Q.5			Attempt any FOUR :				16
	a)		Enlist and explain the principle of sanitation.	R	6		
	b)		State any eight principles of Houses drainage.	R	9		
	c)		Enlist and explain the methods of collection of solid waste.	R	8		
	d)		Draw typical layout of sewage treatment plant.	R	11		
	e)		Define the term Hazardous waste. Give classification.	R	8		
	f)		What are the various methods of plumbing system, explain one pipe system with labeled sketch.	U	7		
Q.6			Attempt any FOUR :				16
	a)		Explain the trickling filter with neat sketch.	U	11		
	b)		State any four objects of sewage treatment.	R	11		
	c)		Enlist the various systems of sewerage and explain 'combined system' with any two advantages and two disadvantages.	R	7		
	d)		Explain with sketch activated sludge process.	U	11		
	e)		Differentiate between aerobic and anaerobic process of decomposition.	U	10		
	f)		Write requirement of good trap.	U	7		

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.:**

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LEVEL :- THIRD**PROGRAM : CIVIL ENGINEERING****COURSE CODE :- CEF302/CE206/CE302****COURSE NAME :- BUILDING CONSTRUCTION****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 15/05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Question Text	R/ U/ A	Co CEF 302	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Define superstructure and enlist it's any four components.	R/ U	1	
	b)	State any four requirements of good foundation.	U	1	
	c)	Compare any two points between load bearing structure and framed structure.	U	1	
	d)	Define the term scaffolding.	R	3	
	e)	Draw a neat sketch of details of door frame,	U	4	
	f)	Write the suitability of i) Revolving door. Ii) Glazed door.	A	4	
Q.2		Attempt any FOUR :			16
	a)	Write the functions of following i) Wall ii) Roof iii) Plinth iv) Chajja.	U	1	
	b)	Suggest the type o motor for following type of work i) Fire places like chimneys ii) RCC work iii) Plastering and pointing work of external walls. iv) Brickwork of low quality wall constructed in rural area.	A	1	
	c)	Give the conditions when you will use the following type of foundation i) Raft foundation ii) Pile foundation iii) Spread footing iv) Combined footing.	A	2	
	d)	Explain, how the layout plane is transferred on ground? State any two precautions to be taken while making layout on ground.	A	2	
	e)	Define the term i) queen closer ii) Through stone iii) Hearting iv) King closer	R	3	
	f)	i) Define the terms related to scaffolding 1) Standards 2) Raker ii) Suggest the type of scaffolding for following type of work 1) Painting work 2) stone masonry work	R A	3 3	

P.T.O.

Q.3	Attempt any FOUR :			16
a)	A owner having his own land in a city area. ^{Now} how, he wish to construct a G+1 residential building on the land. The hard strata available at 1.2m depth. Suggest the type of structure for proposed building and draw a neat c/s of suggested wall structure showing all component parts of building.	A	1	
b)	Draw a neat labelled sketch of collapsible door. State its suitability.	U	4	
c)	With the help of neat labelled sketch describe the vertical sheeting method of excavation by timbering.	U	2	
d)	A land owner wants to construct a building on black cotton soil. Suggest the type of foundation. Explain the suggested type of foundation with a neat sketch.	A	2	
e)	Draw a neat sketch of labelled elevation with its suitability i) English bond ii) Flemish bond.	U	3	
f)	Suggest the type of brick masonry bond for load bearing type of structure. Explain the suggested type of bond with a neat sketch.	A	3	
Q.4	Attempt any FOUR :			08
a)	Enlist types of staircase.	R	5	
b)	Enlist various types of flooring.	R	6	
c)	What is role of POP in plastering work?	U	7	
d)	State the importance of waterproofing work.	A	8	
e)	Define Guniting.	R	R	8
f)	State any four causes of cracks in building.	R	8	
Q.5	Attempt any FOUR :			16
a)	Write any four means of vertical communication with their suitability.	R	5	
b)	State the factors affecting selection of flooring.	U	6	
c)	Explain the procedure of surface preparation for white wash.	U	7	
d)	Explain the term termite proofing.	R	8	
e)	State the uses of epoxy resins. How these are used for filling cracks	A	8	
f)	Explain with neat sketch of formwork used for column.	A	8	
Q.6	Attempt any FOUR :			16
a)	Draw a neat labelled sketch of staircase and show following component parts. i) Newel post ii) going iii) Nosing iv) Waist slab v) Ballaster vi) Landing vii) Riser viii) Trade	R	5	
b)	i) State necessity of roof ^{roof} ii) Define : 1) Purlin 2) Rafter	A	6	
c)	Enlist any four types of external finishes. Explain any one.	A	7	
d)	State the factors to be considered for selection of suitable types of painting material.	U	7	
e)	Explain the procedure of waterproofing work for RCC slab.	R	8	
f)	State requirements of good form work	R	8	

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EVEN TERM END EXAM MAY -2019**EXAM SEAT NO.**

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LEVEL: THIRD**PROGRAM: CIVIL****COURSE CODE: CEF306/CEE306/CE304** **COURSE NAME: HYDRAULICS****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 16/05/2019****Instruction:-**

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.

7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S Q N	Question Text	R U A	CO CEF306	Marks
Q.1		Attempt any FOUR			(08)
	a)	Define i) Surface tension ii) Viscosity.	R	1	
	b)	Write any two uses of pressure diagram for immersed surfaces.	R	3	
	c)	Name and sketch the instrument used for measuring atmosphere pressure.	R	2	
	d)	Determine the intensity of pressure at a depth of 1.50 km below the sea water surface having specific gravity 1.10.	R	3	
	e)	Define i) Uniform flow ii) Laminar flow	R	4	
	f)	Express zero-gauge pressure in terms of meter of absolute pressure.	R	2	
Q.2		Attempt any FOUR			(16)
	a)	The volume of a liquid was reduced by 5%, when the pressure increased by 50 N/mm ² . Calculate the Bulk modulus of the liquid.	U	4	
	b)	The specific weight of a liquid is 10 KN/m ³ . Determine its i) specific gravity ii) mass density	U	1	
	c)	Convert the following as directed: i) Express 12m (absolute) pressure head into gauge pressure head. ii) Express 10 m of oil specific gravity 0.85 into pressure head of liquid having specific gravity 1.50.	A	2	
	d)	A cylindrical water tank 12 m diameter & 6 m high is filled with oil of specific gravity 0.85. Determine i) Total force on bottom of tank. ii) Total force on side of tank.	A	3	
	e)	An isosceles triangular plate 5 m base 5 m height is immersed vertically in water such that its base is at a depth of 5 m from the free surface. The apex of the plate is below the base. Determine the total pressure and center of pressure.	A	3	
	f)	A rectangular concrete dam 12 m high and 3.50 m wide contain 10 m deep water. Calculate the water pressure per meter length of dam where the resultant cuts the base. Assume the weight of concrete as 24 KN/m ³	A	3	
Q.3		Attempt any FOUR			(16)
	a)	i) Write two advantages of pyrometers. ii) Write two advantages of U-tube manometer.	R	3	
	b)	Draw pressure diagram for horizontally and vertically immersed surface in a liquid and write when CP & CG will coincide each other.	U	2	

P.T.O

	c)	Identify the nature of flow of water when flowing through a pipe of 300 mm diameter & having actual discharge $4 \times 10^{-6} \text{ m}^3/\text{sec}$. Take the dynamic viscosity as $0.82 \times 10^{-3} \text{ N}\cdot\text{sec}/\text{m}^2$.	A	4	
	d)	Water flow through a tapering vertical pipe is having diameters 600 mm and 300 mm at bottom and upper end respectively. The intensity of pressure at the bottom end is $400 \text{ KN}/\text{m}^2$ and $100 \text{ KN}/\text{m}^2$ at the upper end. Determine the difference in datum head, if the discharge is 50 liters/sec.	A	4	
	e)	Define following terms i) Steady flow ii) Uniform flow iii) Streamline flow iv) Equipotential lines.	R	4	
	f)	Write the expression for three forms of energies of a flowing liquid. And also write their units of measurement.	R	4	
Q.4		Attempt any FOUR			(08)
	a)	Write the phenomenon of flow through a syphon pipe.	A	5	
	b)	State the meaning of hydraulic radius.	U	6	
	c)	Define most economical section.	R	6	
	d)	Write the use of pitot tube with their equation for calculation.	U / A	7	
	e)	State the meaning of term priming.	R / U	8	
	f)	Define the term 'pump'.	R	8	
Q.5		Attempt any FOUR			(16)
	a)	Enlist different minor losses of pipe flow? State the expression for any four.	U	5	
	b)	Discuss the term water hammer in pipes also write any two remedial measures of it.	U	5	
	c)	Find the loss of head due to friction in a pipe of 1 m diameter & 15 km long. The velocity of water in pipe is 1 m/s. Take coefficient of friction as 0.005.	U / A	5	
	d)	A compound pipe 1650 m long is made up of 30 cm for 300 m, 40 cm for 450 m & 45 cm for 900 m is required to be replaced by a pipe of uniform diameter. Find the diameter of new pipe, assuming the length to remain the same.	A	5	
	e)	Enlist different types of channels. Draw sketches also explain prismatic channel section.	U	6	
	f)	A rectangular channel having hydraulic mean depth of 2 m discharges water with velocity 1 m/sec. find the value of Chezy's constant if the bed slope is 1 in 8000	A	6	
Q.6		Attempt any FOUR			(16)
	a)	A trapezoidal channel of most economical section has side slopes 1:1. It is required to discharge $10 \text{ m}^3/\text{s}$ of water with a slope of 1 in 3000. Design the section using Manning's formula. Take $M=74$	A	6	
	b)	Explain the term current meter with a neat sketch.	U	7	
	c)	Enlist any four hydraulic coefficients of an orifice? Write their expression & relation between them.			
	d)	A rectangular notch 2.5 m wide has a constant head of 40 cm. Find the discharge over the notch in lit/s if C_d for notch is 0.62.	A	7	
	e)	A reservoir has a catchment area of 25 km^2 . The max. rainfall is 2.5 cm per hour; 40 % of which flows to the reservoir over a weir using Francis formula. Find the length of weir. The head of water over the weir should not exceed 0.80 m.	A	7	
	f)	Enlist different types of pumps? Sketch one of them.	U	8	

GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.
(An Autonomous Institute of Govt. of Maharashtra)
EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: First

COURSE CODE:CCF 102/CCE 102

MAX. MARKS: 80

PROGRAM: EE/IE/IT/ET

COURSE NAME: Engineering Physics

TIME: 3 HRS.

DATE: 09/05/2019

Instruction:-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application**

QN	S. Q. N	Question Text	Cognition Level	Co Code CCF	Marks
Q.1		Attempt any FOUR	R/U/A	102	(08)
	a)	Define specific mass and give its SI unit.	R	01	
	b)	Shape of a liquid drop is spherical. Explain.	U	01	
	c)	Define coefficient of viscosity & give its SI unit.	R	01	
	d)	State any two applications of nanotechnology in the field of automobile.	R	03	
	e)	Define surface tension. Give its SI unit.	R	01	
	f)	Define 1) Nanotechnology 2) Nanoparticle	R	03	
Q.2		Attempt any FOUR			(16)
	a)	Explain the behavior of wire under continuously increasing load.	U	01	
	b)	Derive an expression for coefficient of viscosity using Stoke's method.	A	01	
	c)	Define capillary action. Give any three examples of capillary action.	R	01	
	d)	State any four points of distinction between longitudinal and transverse waves.	U	02	
	e)	Mention any two applications each of nanotechnology in the field of textile and environment.	R	03	
	f)	A wire of diameter 2mm and length 2.5m extends by 1.5mm when a force of 15N is applied to it. Find the Young's modulus of the wire.	A	01	
Q.3		Attempt any FOUR			(16)
	a)	Explain the molecular theory of surface tension.	U	01	
	b)	Define 1) Amplitude 2) Period 3) Frequency 4) Wavelength of a wave.	R	02	
	c)	Derive expression $h_1 r_1 = h_2 r_2$ for capillary action.	A	01	
	d)	Define stress and explain the three types of stress.	R	01	
	e)	State any four applications of viscosity.	R	01	
	f)	Define resonance. Give any three examples of resonance.	R	02	

Q.4	Attempt any FOUR			(08)
a)	Define refraction of light.	R	04	
b)	State Ohm's law for electricity.	R	04	
c)	Define photoelectric effect.	R	05	
d)	State two properties of laser.	R	05	
e)	State the principle of production of X-rays.	R	05	
f)	Define critical angle.	R	06	
Q.5	Attempt any FOUR			(16)
a)	Derive prism formula to calculate refractive index of given prism.	A	04	
b)	A 6 m long copper wire has diameter 0.45 mm. If its resistance is $18\ \Omega$, calculate its resistivity.	A	04	
c)	State any four characteristics of photoelectric effect.	R	05	
d)	Distinguish between spontaneous and stimulated emission. (any four points.)	U	05	
e)	State any four applications of X-rays.	R	05	
f)	State any four applications of optical fibre.	R	06	
Q.6	Attempt any FOUR			(16)
a)	How long will light take in travelling a distance 500 m in water ? R.I. of water is $4/3$ and velocity of light in vacuum is 3×10^8 m/s.	A	04	
b)	Derive equation of equivalent resistance for parallel combination of three resistors.	A	04	
c)	Explain construction and working of photoelectric cell.	U	05	
d)	Describe the term population inversion.	U	05	
e)	Explain the term total internal reflection.	U	06	
f)	Obtain balancing condition for Wheatstone's network.	A	04	

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GOVERNMENT POLYTECHNIC, KOLHAPUR 416004.

(An Autonomous Institute of Govt. of Maharashtra)

EVEN TERM END EXAM MAY -2019

EXAM SEAT NO.

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LEVEL: FIFTH

PROGRAM: CIVIL

COURSE CODE: CEE504/CE402

COURSE NAME: CONSTRUCTION MANAGEMENT

MAX. MARKS: 80

TIME: 3 HRS.

DATE: 09 /05/2019

Instruction:-

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Figure to the right indicates marks.
- 3) Illustrate your answers with sketches wherever necessary.
- 4) Use of non-programmable pocket calculator is permissible.
- 5) Mathematical and other tables shall be made available on request.
- 6) Assume additional suitable data necessary.
- 7) Use of Mobile is strictly prohibited.

Section – I

Marks

Q.1 Attempt any **FOUR**

(08)

- a) Enlist any four agencies associated with construction work.
- b) Define management.
- c) List any four desirable qualities of Leader.
- d) Define i) EST ii) EFT iii) LST iv) LFT
- e) What is critical path?
- f) State the need of organisation.

Q.2 Attempt any **FOUR**

(16)

- a) List any eight special characteristics of civil engineering works.
- b) Describe any two principles of management.
- c) State the types of leadership & explain any one in detail.
- d) Differentiate between CPM & PERT any four point.
- e) Enlist & describe various types of floats.
- f) State the various types of organization and explain any one with advantages & disadvantages.

Q.3 A Attempt any **TWO**

(16)

- a) Enlist & describe stages in construction work.
- b) What do you mean by MBO? State any four advantages of MBO.

B

- a) State & describe any four advantages of Bar chart.
- b) Enlist the various forms of contracting firms and describe any one.

P.T.O

- C Draw the network for the following activities & calculate EST, EFT, LST, LFT & mark critical path & Find out project duration.

Activity	Duration (weeks)
1-2	4
2-3	3
3-4	4
2-7	21
3-5	2
4-6	6
5-7	6
5-9	4
6-7	6
6-8	5
7-9	8
8-9	6
9-10	7

Marks

Section – II

Q.4 Attempt any **FOUR**

(08)

- State the meaning of 'productivity'.
- What do you mean by Global purchasing?
- State any two reasons for necessity of training workers.
- Give any four precautions to be taken while stacking of cement bags at site.
- Enlist any four safety devices.
- Define- Injury frequency rate.

Q.5 Attempt any **FOUR**

(16)

- State any four factors affecting the job layout.
- Prepare a job layout for a multistoried building to be built on a plot measuring 40 m x 50 m size.
- State different stages involved in work measurement.
- Explain ABC Technique of material management.
- State any for labour welfare activities' you will do for labour at your construction site.
- Describe workmen's compensation ACT.

Q.6 Attempt any **FOUR**

(16)

- State any four objectives of method study.
- Draw and give description of symbols used in motion study.
- State the meaning of inventory management. Give its any four objectives.
- State any eight important points to ensure safety at construction project.
- State the important provisions in factory ACT.
- Explain in short i) On job training ii) Apprenticeship.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FIRST**PROGRAM : CE/ME/SM/MT****COURSE CODE :- CCF103/X103/X109/CCE103****COURSE NAME :- CHEMISTRY OF ENGINEERING MATERIALS /
ENGINEERING CHEMISTRY****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 09/05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Question Text	R/ U/ A	Co CCF 103	Ma rks
Q.1		Attempt any FOUR :			08
	a)	Write electronic configuration of 20Ca^{40} , 7N^{14}	U	1	
	b)	State Aufbau principle.	R	1	
	c)	Define electroplating.	R	2	
	d)	State Faraday's first law of electrolysis.	R	2	
	e)	What is corrosion?	R	3	
	f)	Mention factors affecting Wet corrosion.	R	3	
Q.2		Attempt any FOUR :			16
	a)	Explain Bohr's theory of atom.	U	1	
	b)	On the basis of electrovalency explain the formation of NaCl molecule.	A	1	
	c)	Distinguish between atom and ion.	U	2	
	d)	What is degree of ionization? Explain any three factors affecting on it	U	2	
	e)	With neat labelled diagram explain the process of galvanizing.	U	2	
	f)	Name and explain the process used to protect the large sized and irregular shaped articles.	U	3	
Q.3		Attempt any FOUR :			16
	a)	Distinguish between i) Soft water and Hard water ii) Temporary Hardness and permanent hardness.	U	4	
	b)	Write any four reactions of hard water with soap.	A	4	
	c)	If hard water is used for drinking and cooking purpose then write its disadvantages.	U	4	
	d)	What is meant by scale formation in boilers? Explain its causes.	U	4	
	e)	How will you sterilize impure water by using bleaching powder? Explain with the help of chemical reactions.	U	4	
	f)	With the help of chemical reactions explain the regeneration of both the types of resins.	A	4	

P.T.O.

Q.4	Attempt any FOUR :			08
	a)	Distinguish between mineral and ore (any two points)	U	6
	b)	Define alloy and Gangue.	R	6
	c)	Select lubricants for sewing machine and state its properties.	A	7
	d)	State functions of Drying oil and pigment. (Each two functions)	R	7
	e)	Define Adhesive and composite materials.	R	7
	f)	Write preparation of Glass Wool.	R	7
Q.5	Attempt any FOUR :			16
	a)	With example state four purposes of making alloy.	R	6
	b)	With diagram explain extreme pressure lubrication.	U	7
	c)	Distinguish between paint and varnish (any four points)	U	7
	d)	State four engineering properties and their related applications of plastic	U	7
	e)	Explain with chemical reactions vulcanization of rubber.	U	7
	f)	Classify composite materials and state its applications.	U	7
Q.6	Attempt any FOUR :			16
	a)	Distinguish between calcination and roasting (any four points)	U	6
	b)	With diagram explain Electromagnetic separation method.	U	6
	c)	Define lubricant. Write functions of lubricants.	U	7
	d)	Write characteristics of oil paint. Write functions of plasticizer and Thinner (two each)	R	7
	e)	With example explain condensation polymerization.	U	7
	f)	Define i) Tack ii) Elasticity iii) Rebound iv) Abrasion resistance.	R	5

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

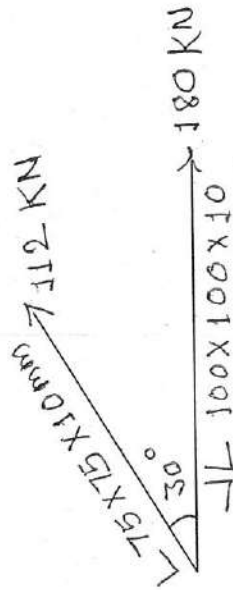
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LEVEL :- FOURTH**PROGRAM : CIVIL ENGINEERING****COURSE CODE :- CEF403/CEE403****COURSE NAME DESIGN AND DRAFTING OF STEEL STRUCTURE****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 13/05 /2019****Instruction :-**

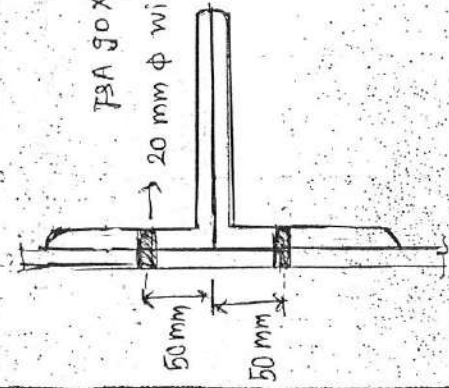
- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN		Section-I		R/ U/ A	Co CEF 403	Mar ks
S Q N						
Q.1		Attempt any FOUR :				08
	a)	Draw a neat sketch of unequal angle showing all components with geometrical properties.		U	1	
	b)	State full form of ISMC & ISWB of rolled steel section.		R	1	
	c)	Draw a neat diagram of lap joint showing plan and section with two plates connected together using 4 Bolts in a line with pitch distance 'P'.		U	2	
	d)	Define pitch distance and gauge distance of Bolt.		R	2	
	e)	State function of lacing in column.		R	3	
	f)	State formula of block shear strength for shear yielding and tension fracture with meaning of each term.		R	3	
Q.2		Attempt any FOUR :				16
	a)	Enlist physical and mechanical properties of structural steel and draw stress-strain curve for mild steel with salient features.		R	1	
	b)	Differentiate between bolted connection and welded connection for any four points.		U	2	
	c)	An unequal angle of size 90 X 60 X 10 mm is connected to the gusset plate with 3 bolts of 20mm diameter at the pitch 60mm and gauge dist is 50mm and end dist also 50mm. Determine block shear strength of tension member.		A	3	
	d)	A tension member consist of 2 ISA 90 X 90 X 8 mm connected as shown in Fig. No. 1 with 10mm thick gusset plate by 20mm diameter using 14 Bolts. (7 bolts each side) determine design tensile of member,. Take $A_g = 1379 \text{ mm}^2$.		U	2	
	e)	State meaning of built up sections and draw following buildup sections. i) Two channels placed back to back. ii) Two channels placed toe to toe. iii) Two unequal angles placed on the each side of the gusset plate with shorter leg connected to gusset plate, with two bolts of 20mm diameter in single line.		A	3	

P.T.O.

f)	Determine compressive strength of single angle strut of length 3 m and size 90 X 90 X 10 mm. It is connected to gusset plate 10 mm with more than two bolts. (consider $l_{eff} = 0.85 \ell$). Properties of angle are as below. $A_g = 1703 \text{ mm}^2$, $r_{xx} = r_{yy} = 27.3 \text{ mm}$, $r_{uu} = 34.4 \text{ mm}$, $r_{vv} = 17.4 \text{ mm}$.	A	3															
	<table><tr><th></th><th>Slenderness Ratio</th><th>$f_{cd} \text{ N/mm}^2$</th></tr><tr><td>1</td><td>130</td><td>74.3</td></tr><tr><td>2</td><td>140</td><td>66.2</td></tr><tr><td>3</td><td>150</td><td>59.2</td></tr><tr><td>4</td><td>160</td><td>53.3</td></tr></table>		Slenderness Ratio	$f_{cd} \text{ N/mm}^2$	1	130	74.3	2	140	66.2	3	150	59.2	4	160	53.3		
	Slenderness Ratio	$f_{cd} \text{ N/mm}^2$																
1	130	74.3																
2	140	66.2																
3	150	59.2																
4	160	53.3																
Q.3	Attempt any TWO:		16															
a)	i) Describe classification of cross-sections of steel sections in accordance with their behaviors in bending as per IS 800-2007. ii) Classify the section ISMB 500. Properties of ISMB 500- $b_f = 180 \text{ mm}$, $t_f = 17.2 \text{ mm}$, $t_w = 12.2 \text{ mm}$, $r_i = 17 \text{ mm}$.	U A	1 1															
b)	Design the joint with 16mm diameter bolt of 4.6 grade to the gusset plate 12mm thick . 	A	2															
c)	A discontinuous double angle strut is composed of two ISA 90 X 60 X 8 mm connected to the gusset plate 10mm thickness. The effective length of the strut is 2.550 m. Calculate compressive design strength, when longer leg of the angle is connected on either side of the gusset plate. Properties of single angle ISA 90 X 60 8 mm $A_g = 1137 \text{ mm}^2$ $I_{xx} = 91.5 \times 10^4 \text{ mm}^4$ $I_{yy} = 32.4 \times 10^4 \text{ mm}^4$ $C_{xx} = 29.6 \text{ mm}$ $C_{yy} = 14.8 \text{ mm}$ <table><tr><th>Slenderness ratio</th><th>$f_{cd} \text{ N/mm}^2$</th></tr><tr><td>80</td><td>136</td></tr><tr><td>90</td><td>121</td></tr><tr><td>100</td><td>107</td></tr></table>	Slenderness ratio	$f_{cd} \text{ N/mm}^2$	80	136	90	121	100	107	A	3							
Slenderness ratio	$f_{cd} \text{ N/mm}^2$																	
80	136																	
90	121																	
100	107																	

Section- II					R/ U/ A	Co CEF 403	Mar ks
QN	S Q N						08
Q.4		Attempt any FOUR :					
	a)	Draw the two common sections used as compound beam.					4
	b)	State the situations where plate girder is used.					4
	c)	State the types of column bases with their suitability.					5
	d)	Draw sketch of Gusseted base (Front view)					5
	e)	State the type of roof truss suitable for span i) 6m ii) 17m.					6
	f)	State load combinations for design of purlin.					6
Q.5		Attempt any TWO :					16
	a)	An ISMB 350@ 514 N/m is used as simply supported beam for 5m span is laterally supported. Determine design flexural strength of beam. Also calculate working UDL the beam can carry per m span and also check member for deflection. Given – $Z_p = 889.6 \times 10^3 \text{ mm}^3$ $I_{xx} = 13630 \times 10^4 \text{ mm}^4$ $E = 2 \times 10^5 \text{ MPa}$, $b_f = 140 \text{ mm}$, $t_f = 14.2 \text{ mm}$, $t_w = 8.1 \text{ mm}$, $r_1 = 14 \text{ mm}$, $Z_{xx} = 779 \times 10^3 \text{ mm}^3$.					4
	b)	i) State the classification of sections of beam based on moment rotation behavior. ii) Draw sketches of laterally supported and laterally unsupported beam sections.					4 4
	c)	Calculate panel point load of dead load and live load for truss with span = 16m, rise = 3m, spacing of truss = 3.8 m c/c, No. of panels = 8, wt. of covering = 120 N/m^2 , combined wt. of purlin and bracing = 150 N.m^2 .					6
Q.6		Attempt any TWO :					16
	a)	i) Draw neat sketch showing components of plate girder. ii) State the advantages and disadvantages of tubular structure.					4 6
	b)	Design slab base for a column ISHB 350 with $b_f = 250 \text{ mm}$ and $t_f = 11.6 \text{ mm}$. to carry factored axial load of 1500KN. The base rest on concrete pedestal M20. Also design concrete pedestal if safe bearing capacity of soil is 300 KN/m^2 .					5
	c)	A roof truss of span 16m and rise 3.5m with spacing between the trusses are 4m c/c having 10 No. of panels. Calculate live load and wind load per panel if $C_{pe} = -0.7$ for critical case and $C_{pi} = \pm 0.2$ design wind pressure = 1200 N/m^2 .					6



73A 90 X 90 X 8 mm

→ 20 mm ϕ with 40 mm pitch $\angle$ c & 30 mm end dist.

Q. No. 2 (d)

Fig. No. 2

P.T.O

Q.4	Attempt any FOUR			(08)
a)	Define i) Refraction ii) Dispersion	R	4	
b)	State any two properties of photons.	R	5	
c)	Define i) Photoelectric effect ii) Threshold frequency	R	5	
d)	Mention any two properties of x-ray.	R	5	
e)	Define i) Echo ii) Reverberation	R	6	
f)	Define ultrasonic waves.	R	6	
Q.5	Attempt any FOUR			(16)
a)	For refraction of light through a prism show that $A + \delta = i + e$	A	4	
b)	With the help of a neat circuit diagram of meter-bridge, derive an expression for unknown resistance.	A	4	
c)	Explain the concept of population inversion with the help of neat diagrams.	U	5	
d)	Find the refractive index of a prism, if its refracting angle is 60° and the angle of minimum deviation is $48^\circ 36'$	A	4	
e)	With the help of a neat diagram explain the construction of a photo-cell.	U	5	
f)	When two resistances are connected in series their effective resistance is 100Ω but when they are connected in parallel the effective resistance is 24Ω . Calculate the two resistances.	A	4	
Q.6	Attempt any FOUR			(16)
a)	i) State and explain Ohms law. ii) Define specific resistance and give its SI unit.	R	4	
b)	State and explain four properties of laser.	U	5	
c)	Mention any four applications of x-rays.	R	5	
d)	Explain any one method of production of ultrasonic waves.	U	6	
e)	Mention the requirements of good acoustics for an auditorium (any four points)	R	6	
f)	Calculate kinetic energy of ejected photoelectrons, if light of frequency 1.39×10^{15} Hz is made incident on a metal plate of threshold frequency 1.12×10^{15} Hz. Given $h = 6.63 \times 10^{-34}$ Js.	A	5	

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EXAM SEAT NO.

LEVEL: FOURTH

COURSE CODE: CEF401/1302/CE301/CEE401

MAX. MARKS: 80

TIME: 3 HRS.

COURSE NAME: ANALYSIS OF STRUCTURES

DATE: 08/05/2019

1) Answer to two sections must be written in separate section answer book provided

- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.

7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

Q.N	S Q N	Question Text	R U A	CO CEF401	Marks
Section -I					
Q.1		Attempt any FOUR			(08)
	a)	Draw Mohr's circle of any element in pure shear of 50 MPa.	R	1	
	b)	Define long column with filed example.	R	3	
	c)	Define slenderness ratio & give its formula.	R	3	
	d)	Calculate effective length of column of length 6 m with one end fixed & other end is free.	U	3	
	e)	State limitations of Euler's formula.	U	3	
	f)	State Rankine's formula with the meaning of terms in it.	U	3	
Q.2		Attempt any TWO			(16)
	a)	An element is subjected to principal stresses 150 MPa (tensile) & 300 MPa (compressive). Calculate i) Resultant stress on plane inclined at 30° clockwise with 'y' axis ii) Max shear stress with its position.	A	1	
	b)	Solve Q.2 (a) by using Mohr's circle method.	A	1	
	c)	i) State middle third rule and show core of rectangular section. ii) State eccentric loading with its field examples.	U U	2 2	
Q.3		Attempt any TWO			(16)
	a)	A rectangular strut of 230 mm x 399 mm made up with masonry having unit weight 20 KN/m ³ carries load of 60 KN at eccentrically 20 mm in a plane bisecting the thickness. Calculate the stress distribution at its base.	A	2	
	b)	A circular chimney of diameter 3 m (external) & 0.380 m thickness with 21 m high is subjected to wind pressure intensity 1.2 KN/m ² . If unit weight of material of chimney is 19 KN/m ³ , Calculate the stresses at base of chimney. Assume coefficient of wind resistance = 0.6	A	2	
					P.T.O

	c)	A hollow circular column of diameter 700 mm with thickness 50 mm & length 6.2 m is fixed at one end & free at other end. Calculated buckling load by Euler's formula. If FOS is 2 then calculate safe load. Young's modulus for column material is 200 GPa.	A	3	
Section-II					
Q.4		Attempt any FOUR			(08)
	a)	State the principle of superposition.	R	4	
	b)	State the values and nature of fixed end moments at each end for a fixed beam having i) An eccentric point load. ii) A u.d.l over entire span.	U	4	
	c)	Explain the concept of imaginary zero span w.r.t theorem of three moments.	U	4	
	d)	State stiffness factor for beam with one end fixed and other simply supported.	R	5	
	e)	Define slope and deflection of beam.	R	6	
	f)	State the value of maximum slope and deflection for a simply supported beam of span 'l' carrying a central point load W.	U	6	
Q.5		Attempt any TWO			(16)
	a)	A fixed beam of span 4 m carries a u.d.l of 7.5 KN/m and two point loads of 40 KN, and 60 KN at 1 m and 2 m from the left hand support. Determine the fixed end moments support reactions and draw S.F.D and B.M.D.	A	4	
	b)	A continuous beam ABCD 20 m long rests on simple supports AB= 6 m, BC= 8 m, and CD= 6 m. It carries two concentrated loads 40 KN and 50 KN at 3 m and 9 m from A and u.d.l of 10 KN/m over CD. Draw B.M.D by using Clapeyron's theorem & also draw S.F.D.	A	4	
	c)	Solve Q.5 (b) using Moment distribution method.	A	4	
Q.6		Attempt any TWO			(16)
	a)	A beam ABCD is fixed at A and simply supported at B and C. CD is an overhang. AB= 4 m, BC= 3 m and CD= 1 m. AB carries a point load of 40 KN at 1 m from A. BC carries a u.d.l of 20 KN/m. A load of 30 KN acts at D. EI is constant. Calculate support moment and draw B.M.D by theorem of three moments.	A	4	
	b)	Solve Q.6 (a) using Moment distribution method.	A	5	
	c)	A cantilever beam ABCD is fixed at A and free at D. It carries udl of 10 KN/m over AB and a point load of 5 KN at C. AB= 4 m, BC=CD= 2 m. Find the slope and deflection at C in terms of EI by using Macaulay's method.	A	6	

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EVEN TERM END EXAM MAY -2019**EXAM SEAT NO.**

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LEVEL: THIRD**PROGRAM: CIVIL****COURSE CODE: CEF309/CE205/CEE309****COURSE NAME: SURVEYING -II****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 09/05/2019****Instruction:-**

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S Q N	Question Text	R U A	CO CEF309	Marks															
Q.1		Attempt any FOUR			(08)															
	a)	Define transit theodolite and nontransit theodolite.	U	1																
	b)	Write situation where tachometry is suitable.	R	2																
	c)	State any four uses of theodolite.	U	1																
	d)	Define anallatical lens.	U	2																
	e)	Define the term i) Swining ii) Transiting	U	1																
	f)	Define latitude and departure.	U	1																
Q.2		Attempt any FOUR			(16)															
	a)	Draw a neat sketch of transit theodolite and show all components.	R	1																
	b)	The following observation taken with tachometry fitted with anallatic lens. <table><tr><th>Inst station</th><th>Staff station</th><th>Vertical angle</th><th>Hair reading</th><th>remark</th></tr><tr><td>A</td><td>BM</td><td>-4°40'</td><td>2.45, 1.8, 1.5</td><td>RL of BM</td></tr><tr><td>A</td><td>B</td><td>+9°10'</td><td>2.15, 1.65, 0.85</td><td>=250.00 m</td></tr></table> Calculate length AB & RL of station 'B'.	Inst station	Staff station	Vertical angle	Hair reading	remark	A	BM	-4°40'	2.45, 1.8, 1.5	RL of BM	A	B	+9°10'	2.15, 1.65, 0.85	=250.00 m	A	2	
Inst station	Staff station	Vertical angle	Hair reading	remark																
A	BM	-4°40'	2.45, 1.8, 1.5	RL of BM																
A	B	+9°10'	2.15, 1.65, 0.85	=250.00 m																
	c)	Write the stepwise procedure for temporary adjustment for transit theodolite.	R	1																
	d)	Explain fixed hair system and its different cases based on the position of line of sight and staff held position.	R	2																
	e)	Calculate the missing length and bearing for line DA <table><tr><th>Line</th><th>Length (m)</th><th>Bearing</th></tr><tr><td>AB</td><td>245.00</td><td>60°</td></tr><tr><td>BC</td><td>196.22</td><td>140°</td></tr><tr><td>CD</td><td>105.50</td><td>222°</td></tr><tr><td>DA</td><td>.....</td><td>.....</td></tr></table>	Line	Length (m)	Bearing	AB	245.00	60°	BC	196.22	140°	CD	105.50	222°	DA			A	1	
Line	Length (m)	Bearing																		
AB	245.00	60°																		
BC	196.22	140°																		
CD	105.50	222°																		
DA																				
	f)	Explain the procedure to measure the bearing of a line with theodolite.	R	1																

P.T.O

Q.3	Attempt any FOUR		(16)											
a)	State fundamental lines of theodolite also explain relationship between them.	R	1											
b)	Two distances of 55 m and 125 m measured accurately and staff intercepts are 0.445 and 1.195 respectively. Find out tachometric constants.	A	2											
c)	The co-ordinates of two points C&D are as follows <table><tr><th rowspan="2">Point</th><th colspan="2">Co-ordinates</th></tr><tr><th>N</th><th>S</th></tr><tr><td>C</td><td>988.50</td><td>827.50</td></tr><tr><td>D</td><td>1168.60</td><td>575.16</td></tr></table> Find length & bearing of CD.	Point	Co-ordinates		N	S	C	988.50	827.50	D	1168.60	575.16	A	1
Point	Co-ordinates													
	N	S												
C	988.50	827.50												
D	1168.60	575.16												
d)	Explain the principle of tachometry by with neat sketch.	R	2											
e)	Explain various sources of error in theodolite survey.	R	1											
f)	Write stepwise procedure for measuring vertical angle with transit theodolite.	R	1											
Q.4	Attempt any FOUR		(08)											
a)	What is the use of Alidade and U-fork in plane table surveying?	U	3											
b)	What do you mean by compound wave and reverse curve?	R	4											
c)	State any two uses of total station in surveying.	R	5											
d)	State any two applications of remote sensing.	R	6											
e)	Enlist different methods of plane table survey.	R	3											
f)	What do you mean by azimuth mark?	U	5											
Q.5	Attempt any FOUR		(16)											
a)	What are the sources of errors in plane tabling?	U	3											
b)	Explain the procedure of curve setting by method of offsets from long chord.	U	4											
c)	Describe the procedure of measurement of horizontal angle using digital theodolite.	R	5											
d)	State the applications of GPS in various fields.	R	6											
e)	State the component parts of micro-optic theodolite. How it is superior to a transit theodolite.	U	5											
f)	Two tangents AB and BC intersect at a point B at 150.5 m chainage. Calculate all the necessary data for setting out a circular curve of 100 m radius and deflection angle 30° by the method of offsets from the long chord.	A	4											
Q.6	Attempt any FOUR		(16)											
a)	Explain temporary adjustment of plane table survey.	R	3											
b)	What is simple curve? Describe with neat sketch the notations used in simple circular curve.	U	4											
c)	Explain the procedure of traversing by using total station.	U	5											
d)	What are the advantages and disadvantages of remote sensing?	R	6											
e)	Explain 'Intersection method' of plane table surveying with neat sketch. Also give situation when intersection method is used.	A	3											
f)	State the advantages and disadvantages of total station.	R	5											

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EVEN TERM END EXAM MAY -2019**EXAM SEAT NO.**

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LEVEL: THIRD**PROGRAM: CIVIL****COURSE CODE: CEF305/CEE305 COURSE NAME: SOIL MECHANICS AND FOUNDATION****ENGINEERING****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 30/05/2019****Instruction:-**

1) Answers must be written in the main answer book provided. (and supplements if required)

2) Illustrate your answers with sketches where ever necessary.

3) Use of non-programmable pocket calculator is permissible.

4) Mathematical and other tables will be made available on request.

5) Assume and mention suitable additional data necessary.

6) Use of Mobile is strictly prohibited.

7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S Q N	Question Text	R U A	CO CEF 305	Marks
Q.1		Attempt any FOUR			(08)
	a)	Define soil.	R	1	
	b)	Define void ratio and water content.	R	1	
	c)	Define coefficient of uniformity.	R	1	
	d)	Define equi-potential lines.	R	1	
	e)	State two methods to determine coefficient of permeability.	R	1	
	f)	Define compaction of soil.	R	1	
Q.2		Attempt any FOUR			(16)
	a)	Explain soil as construction & foundation material.	U	1	
	b)	Explain soil as a three phase and two phase system with neat sketch.	U / A	1	
	c)	Calculate dry unit weight & saturated unit weight for a soil with water content 20 % & specific gravity of soil solids is 2.65.Bulk unit weight of soil is 1.82 gm/cm ³ .	A	1	
	d)	Explain in brief Atterberg's limit of consistency.	U	1	
	e)	Find coefficient of uniformity and coefficient of curvature for a soil particle if, D ₁₀ =0.15 mm, D ₃₀ =0.74 mm, D ₆₀ =2.0 mm.	A	1	
	f)	Explain need of soil classification & criteria for classification.	U	1	
Q.3		Attempt any FOUR			(16)
	a)	Define permeability of soil and explain in brief factors affecting permeability of soil (any three)	U	2	
	b)	In a falling head permeability test on soil sample 14.0 cm high 78.54 cm ² in cross section area, the water level in the stand pipe of 10 mm internal diameter is dropped from a height of 75 cm through 20 cm in 20 minutes. Find coefficient of permeability.	A	2	

P.T.O

	c)	Draw a Mohr's circle for C-soil. Φ -soil and C- Φ soil.	A	3	
	d)	Explain direct shear test with neat diagram of apparatus.	U	3	
	e)	Define soil stabilization and state different methods of soil stabilization.	U	3	
	f)	State and explain factors affecting compaction of a soil.	U	3	
Q.4		Attempt any FOUR			(08)
	a)	State the necessity of soil investigation.	R	4	
	b)	State any four types of shallow foundation with neat diagrams.	R	5	
	c)	Define ultimate bearing capacity.	R	5	
	d)	Draw a neat diagram of pressure distribution beneath rigid footing according to type of soil.	U	5	
	e)	Draw a neat labelled diagram of Tieback support system to soil.	U	6	
	f)	Enlist any four types of machine foundation.	R	6	
Q.5		Attempt any FOUR			(7)
	a)	Enlist any four types of boring method of soil investigations & Explain any one.	R	4	
	b)	Explain geophysical method of soil investigation.	R	4	
	c)	Explain plate load test with a neat diagram.	R	5	
	d)	State any four factors deciding depth of foundation.	R	5	
	e)	Define cofferdam & state types of cofferdam.	R	6	
	f)	Explain effect of sea water on concrete under foundation.	R	6	
Q.6		Attempt any FOUR			(16)
	a)	Explain coulombs wedge theory.	R	4	
	b)	Classify the piles based on the function.	R	5	
	c)	State Indian standard equation of bearing capacity for C- Φ soil with meaning of each term.	R	5	
	d)	Explain effect of water table on bearing capacity of soil.	R	5	
	e)	Enlist any four requirements of good machine foundation.	R		
	f)	Explain precautions to be taken for foundation against ground chemical & industrial waste.	R		

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EVEN TERM END EXAM MAY -2019**EXAM SEAT NO.**

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LEVEL: FOURTH**PROGRAM: CIVIL****COURSE CODE: CEF406/CE207/CEE406 COURSE NAME: CONCRETE TECHNOLOGY****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 21/05/2019****Instruction:-**

- 1) Answer to two sections must be written in separate section answer book provided
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) **QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome**

S QN	Q N	Question Text	R U A	CO CEF 406	Marks
Section -I					
Q.1		Attempt any FOUR			(08)
	a)	Define 'concrete'	R	1	
	b)	Enlist four admixtures used for concrete.	R	1	
	c)	Define hydration of cement.	R	2	
	d)	Enlist chemical composition of Portland cement.	R	2	
	e)	Define segregation.	R	3	
	f)	Define workability.	R	3	
Q.2		Attempt any FOUR			(16)
	a)	Explain the importance of concrete as construction material.	A	1	
	b)	Explain the function of accelerator in concrete.	U	1	
	c)	State the precautions to be taken in storage of cement.	U		
	d)	Enlist the requirement of good aggregate.	U	2	
	e)	Write the procedure for determine slump value of concrete sample.	U	2	
Q.3	f)	Define bleeding. State two remedies over it.	U	3	
		Attempt any FOUR			(16)
	a)	State various methods of curing. Explain any one.	U	1	
	b)	State the importance of batching of concrete ingredients.	U	1	
P.T.O					

c)	Differentiate between "hand & machine mixing of concrete".	U	1	
d)	State the different field tests to verify quality of cement.	U	2	
e)	State the characteristics & use of sulphate resisting cement & blast furnace slag cement.	A	2	
f)	Explain bulking of sand.	U	2	

Section-II

Q.4	Attempt any FOUR			(08)
a)	Enlist four methods of concrete mix design.	R	4	
b)	Define light weight concrete. Give two applications.	U	6	
c)	Give two objectives of concrete mix design.	R	4	
d)	Enlist four applications of Ferro-Cement.	U	6	
e)	Enlist two problems encountered while cold weather concreting.	U	6	
f)	List functions of formwork.	R	4	
Q.5	Attempt any FOUR			(16)
a)	Enlist factors to be considered while stripping of form.	U	4	
b)	Discuss precautions to be taken on underwater concreting.	U	6	
c)	Explain testing of concrete by core test method.	U	5	
d)	Enlist four special concretes. Describe any one.	R	6	
e)	Discuss stages of quality control in concrete works.	U	5	
f)	Describe major parameter that determines the strength of concrete.	A	5	
Q.6	Attempt any FOUR			(16)
a)	Enlist factors considered while selecting material for formwork.	R	4	
b)	Can concrete be always made stronger by adding more cement without regards to other factors? Explain.	A	5	
c)	What type of concrete is required for high durability? Discuss.	A	6	
d)	Give step by step procedure for concrete mix design.	R	4	
e)	Discuss special problems encountered while concreting in high atmospheric temperature.	U	6	
f)	List two non-destructive methods of testing concrete. Describe any one.	U	5	

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EVEN TERM END EXAM MAY -2019**EXAM SEAT NO.**

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LEVEL: FIFTH**PROGRAM: CIVIL****COURSE CODE: CEF510/CE408/CEE509 COURSE NAME: SOLID WASTE MAGANEMENT****MAX. MARKS: 80****TIME: 3 HRS.****DATE: 27/05/2019****Instruction:-**

- 1) Answer to two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches where ever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables will be made available on request.
- 5) Assume and mention suitable additional data necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN>Question No, SQN>Sub-Question No, R> Remembering, U>Understanding, A>Application CO>Course outcome

QN	S Q N	Question Text	R U A	CO CEF A 510	Marks
Section -I					
Q.1		Attempt any FOUR			(08)
	a)	Define Toxic waste and Bio-Medical waste.	R	1	
	b)	Enlist the methods of house to house collection system.	R	2	
	c)	Give two examples of recycling of solid waste.	U	2	
	d)	State any two precautions taken while handling hospital waste.	R	3	
	e)	Enlist the various sources of solid waste.	U	1	
	f)	Define Hazardous waste.	R	1	
Q.2		Attempt any FOUR			(16)
	a)	Describe in brief storage of hospital waste.	U	4	
	b)	Explain the precautions required during the handling of hazardous waste.	U	3	
	c)	Give the composition of solid waste.	U	1	
	d)	Enlist and explain the factors affecting solid waste generation.	R	1	
	e)	Write the importance of recycling of municipal waste.	U	2	
	f)	State the health problems arising at the time of segregation and reuse of solid waste.	R	3	
Q.3		Attempt any FOUR			(16)
	a)	Write the organization pattern of solid waste management.	U	2	
	b)	State the types of hospital waste in clinical and non clinical.	R	3	
	c)	Explain segregation and salvage recovery in solid waste management.	R	2	
	d)	How health and environment depend on level of solid waste management? Explain in detail.	U	3	
	e)	Discuss the scope of services in solid waste management.	U	2	
P.T.O					

	f)	Explain the transportation of hospital waste.	R	4	
Section-II					
Q.4		Attempt any FOUR			(08)
	a)	State any four ways to control contamination of ground water.	A	5	
	b)	Enlist any four factors governing composting process.	U	6	
	c)	Define the term composting.	R	6	
	d)	Define Pyrolysis.	R	7	
	e)	Write any four advantages of incineration process.	A	7	
	f)	Enlist any two types of inorganic waste generated from industry.	R	8	
Q.5		Attempt any FOUR			(16)
	a)	Explain any four factors affecting for site selection of sanitary landfilling.	U	5	
	b)	Discuss followings landfilling methods i) Area method ii) Trench method	A	5	
	c)	Differentiate between Bangalore method and Indore method of composting.(any 4)	U	6	
	d)	Explain Dano-process of composting with neat sketch.	A	6	
	e)	Write the working of municipal incinerator with a neat labelled sketch.	A	7	
	f)	State the responsibilities of industry about disposal of industrial waste.	A	8	
Q.6		Attempt any FOUR			(16)
	a)	Discuss the term, "contamination of ground water".	A	5	
	b)	How to recover Biogas energy from organic waste?	A	6	
	c)	State any four benefits of composting.	U	6	
	d)	i) Enlist any four methods of Pyrolysis. ii) Explain any one method of Pyrolysis.	R U	7 7	
	e)	Describe the problem of disposal of fly ash from thermal power plant.	A	8	
	f)	Write the precautions taken by industries to control generation of industrial waste.	A	8	

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- THIRD **PROGRAM : CIVIL ENGINEERING**
COURSE CODE :- CEF311/CEE311
COURSE NAME :- ADV. CONSTRUCTION TECH. & EQUIPMENTS
MAX. MARKS : 80 **TIME : 3 HRS.** **DATE :- 24 / 05 / 2019**

Instruction :-

- 1) Answers must be written in the main answer book provided. (and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co CEF 311	Ma rks
Q.1		Attempt any FOUR :			08
	a)	State any two advantages of prestressed concrete.	R	1	
	b)	Define fibre reinforced concrete	R	1	
	c)	Enlist any four equipments of R.M.C.	R	1	
	d)	State any two necessities of R.M.C.	R	1	
	e)	Enlist any two grouting equipments.	R	2	
	f)	Enlist any two advantages of chemical grouting.	R	2	
Q.2		Attempt any FOUR :			16
	a)	Explain the working of transit mixer.	U	1	
	b)	State the meaning of term pretensioning and post tensioning.	A	1	
	c)	Enlist materials used for grouting.	R	2	
	d)	State any four uses of geosynthetics.	U	3	
	e)	Explain any one process of concreting with slip form.	U	4	
	f)	Explain in short Maivan form work.	U	4	
Q.3		Attempt any FOUR :			16
	a)	Explain procedure of roller compacted concrete.	U	1	
	b)	State the effect of aspect ratio & percentage of steel fibres on strength of concrete.	U	1	
	c)	Enlist any four uses of grouts in building.	U	2	
	d)	Explain stabilisation in embankment by soil reinforcing.	U	3	
	e)	State any four types of formwork used in advance construction techniques.	U	4	
	f)	Explain in short formwork of heavy structures. (bridges)	U	4	

P.T.O.

Q.4	Attempt any FOUR :			08
	a) State the principal of crane.	U	5	
	b) Write any four types of conveying equipment.	R	5	
	c) State any two factors affecting Bulldozer.	U	6	
	d) Write any two types of needle vibrator according to its size and write its suitability.	A	7	
	e) Define the term standard equipments.	R	8	
	f) State the meaning of economic life of equipments.	R	8	
Q.5	Attempt any FOUR :			16
	a) Explain the working of crawler chain with a neat labelled sketch. Also write its suitability.	U	5	
	b) Suggest a suitable type of rollers for earthwork in canals and compaction of the grained soil. Explain it with a neat labelled sketch.	A	6	
	c) State any eight factors affecting output of a power shovel.	U	6	
	d) With the help of neat diagram explain the process of production of artificial sand.	U	7	
	e) Discuss in brief the working of automatic concrete plant.	U	7	
	f) Differentiate any four points between special equipments and standard equipments.	U	8	
Q.6	Attempt any FOUR :			16
	a) Explain the working & principle of truck mounted crane with a neat labelled sketch.	A	5	
	b) Discuss the working of sheep foot roller with a neat sketch.	U	6	
	c) Write meaning of Rammers. State any four uses of it.	U	6	
	d) Explain with a neat sketch any two types of continuous type of concrete mixer.	A	7	
	e) Write a short note on screed vibrator.	U	7	
	f) Write any four names of units of Hot Mix Bitumen plant with their functions.	U	8	

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FOURTH PROGRAM : CIVIL ENGINEERING**COURSE CODE :- CEF410 / CEE410****COURSE NAME TOWN AND COUNTRY PLANNING****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 23/05 / 2019****Instruction :-**

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Section-I	R/ U/ A	Co CEF 410	Mar ks
Q.1		Attempt any FOUR :			08
	a)	State any two objects of town planning.	U	1	
	b)	Write any four disadvantages of ribbon development.	R	1	
	c)	State the purpose of town and country planning.	U	2	
	d)	Write the importance of National survey.	U	2	
	e)	State the concept of N.H. planning.	R	4	
	f)	State the importance of neighbourhood planning.	U	4	
Q.2		Attempt any FOUR :			16
	a)	State any four principles of town planning.	U	1	
	b)	Enlist any eight data points to be collected in town survey.	U	2	
	c)	Explain housing problems in India.	A	3	
	d)	State and explain the precautions to be taken against formation of Slum.	A	3	
	e)	Explain any eight factors considered for the site selection for the industries.	R	3	
	f)	State any eight principles of neighborhood planning.	U	4	
Q.3		Attempt any FOUR :			16
	a)	Explain with a neat sketch satellite growth.	A	1	
	b)	Discuss the term 'landscape architecture'.	A	2	
	c)	Explain the stages involved in preparation of master plan.	U	3	
	d)	State any eight factors that are to be considered for selection of site for public buildings.	A	3	
	e)	Explain any four forms of recreation amenities.	R	3	
	f)	Discuss the importance of following i) State Housing Board. ii) Co-operative Housing societies.	A	4	

P.T.O.

QN		S Q N	Section- II	R/ U/ A	Co CEF 410	Mar ks
Q.4			Attempt any FOUR :			08
	a)		State any two objects of land acquisition.	U	5	
	b)		Enlist local authorities for sanctioning submission drawing.	R	5	
	c)		Define MR & TP Act.	R	5	
	d)		Define set back.	R	6	
	e)		Enlist two circumstances in which building, bye laws are applicable.	R	6	
	f)		Enlist different types of villages.	R	7	
Q.5			Attempt any FOUR :			16
	a)		Write a note on land acquisition act.	A	5	
	b)		State the contents of regional plans.	U	5	
	c)		Explain necessity of planning law and legislation.	U	5	
	d)		State any four objectives of Building Bye Laws.	U	6	
	e)		Explain the term floating F.S.I.	U	6	
	f)		Explain various rural housing problems in India.	U	7	
Q.6			Attempt any FOUR :			16
	a)		State the functions of local authorities.	U	5	
	b)		Explain importance of bye laws.	U	6	
	c)		Discuss the concept of light plane with a neat sketch.	U	6	
	d)		State the provisions made in bye laws regarding fire protections.	U	6	
	e)		Explain agro industries in India.	U	7	
	f)		Explain the term rural housing scheme.	U	7	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- THIRD**PROGRAM : CIVIL ENGINEERING****COURSE CODE :- CEF308/CE204/CEE308****COURSE NAME :- SURVEYING - I****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 23/05/2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Question Text	R/ U/ A	Co CEF 308	Ma rks
Q.1		Attempt any FOUR :			08
	a)	State any two objects of surveying.	R	1	
	b)	State the use of peg and arrow.	U	2	
	c)	Define offset.	R	3	
	d)	Enlist any four components of prismatic compass.	U	4	
	e)	Define traversing	R	4	
	f)	Define F.B. & B.B. of compass lines.	U	4	
Q.2		Attempt any FOUR :			16
	a)	Explain in brief principal of surveying.	U	1	
	b)	Explain in brief hand signal codes in ranging.	U	2	
	c)	Draw conventional symbols for embankment, cutting, lake or pond, bench mark.	R	3	
	d)	Write about selection of survey stations and survey lines in chain surveying.	U	3	
	e)	Enlist and explain any four types of errors in compass survey.	A	4	
	f)	Convert following R.B. TO W.C.B i) S $45^{\circ}30'$ E, ii) N $79^{\circ}15'$ W iii) S $60^{\circ}30'$ W iv) N $24^{\circ}15'$ E	A	4	
Q.3		Attempt any FOUR :			16
	a)	A 30 m chain was found to be 6cm too long after chaining 350m. It was found to be 10cm too long after chaining a distance of 800m. If the chain was correct before the commencement of work, find the true distance.	R	2	
	b)	How chaining is done in following obstacles? i) Pond ii) River iii) Tall Building iv) Hill.	U	3	
	c)	Draw the neat label led sketch of a chain.	U	2	

P.T.O.

	d)	Following bearings were taken in running a closed traverse.	A	4																		
		<table><tr><td>Line</td><td>F.B.</td><td>B.B.</td></tr><tr><td>AB</td><td>124°30'</td><td>304°30'</td></tr><tr><td>BC</td><td>68°15'</td><td>246°</td></tr><tr><td>CD</td><td>310°30'</td><td>135°15'</td></tr><tr><td>DA</td><td>200°15'</td><td>17°45'</td></tr></table>	Line	F.B.	B.B.	AB	124°30'	304°30'	BC	68°15'	246°	CD	310°30'	135°15'	DA	200°15'	17°45'					
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CD	310°30'	135°15'																				
DA	200°15'	17°45'																				
	e)	The following bearings were recorded in running a closed traverse ABCDEA. Calculate the included angle of traverse.	A	4																		
		<table><tr><td>Line</td><td>F.B.</td><td>B.B.</td></tr><tr><td>AB</td><td>110°</td><td>290°</td></tr><tr><td>BC</td><td>30°15'</td><td>210°15'</td></tr><tr><td>CD</td><td>244°45'</td><td>64°45'</td></tr><tr><td>DE</td><td>310°</td><td>130°</td></tr><tr><td>EA</td><td>193°</td><td>13°</td></tr></table>	Line	F.B.	B.B.	AB	110°	290°	BC	30°15'	210°15'	CD	244°45'	64°45'	DE	310°	130°	EA	193°	13°		
Line	F.B.	B.B.																				
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	f)	State different types of meridians. Explain any one in details.	A	4																		
Q.4		Attempt any FOUR :		08																		
	a)	Differentiate between simple leveling and differential leveling. (any 2 points)	U	5																		
	b)	What is meant by zero circles?	R	7																		
	c)	What is negative staff reading?	R	5																		
	d)	Differentiate between contour interval and horizontal equivalent. (any 2 points)	U	6																		
	e)	Enlist types of Bench Mark.	R	5																		
	f)	Define contour.	R	6																		
Q.5		Attempt any FOUR :		16																		
	a)	Explain temporary adjustment of dumpy level.	R	5																		
	b)	State the stepwise procedure of interpolation of contour by arithmetic method with a suitable example.	U	6																		
	c)	Explain fly leveling with neat sketch. State situation under which fly leveling is needed.	U	5																		
	d)	Draw the contour line four i) Gentle slope ii) Steep slope ii) Hill iv) Pond	U	6																		

e)	The following consecutive readings were taken with a leveling instrument and 4m staff. 2.375, 1.730, 0.615, 3.450, 2.835, 2.070, 1.835, 0.985, 0.435, 1.630, 2.255 & 3.630m. The instrument was shifted after 4 th and 8 th reading. The last reading was taken on a BM of RL 210.200m Find the RL's of all the points by Rise and Fall method. Apply usual check.	A	5																																																												
f)	Describe the procedure of measuring area using digital planimeter.	R	7																																																												
Q.6	Attempt any FOUR :		16																																																												
a)	What are various types of leveling staff? Draw a neat sketch of 4m staff.	U	5																																																												
b)	What are the uses of contour map?	R	6																																																												
c)	The following page of old level book having few staff readings missing. Find out the missing readings & rewrite the page. Apply usual checks. <table border="1"><thead><tr><th>B.S.</th><th>I.S.</th><th>F.S.</th><th>H.I.</th><th>R.L.</th><th>Remark</th></tr></thead><tbody><tr><td>2.650</td><td></td><td></td><td>X</td><td>100.0</td><td>B.M.</td></tr><tr><td></td><td>X</td><td></td><td></td><td>98.910</td><td></td></tr><tr><td></td><td>3.830</td><td></td><td></td><td>98.820</td><td></td></tr><tr><td>4.640</td><td></td><td>X</td><td>X</td><td>98.380</td><td>CP₁</td></tr><tr><td></td><td>3.800</td><td></td><td></td><td>X</td><td></td></tr><tr><td>1.640</td><td></td><td>X</td><td>103.700</td><td>102.060</td><td>CP₂</td></tr><tr><td></td><td>2.840</td><td></td><td></td><td>100.860</td><td></td></tr><tr><td>X</td><td></td><td>3.480</td><td>104.900</td><td>100.220</td><td>CP₃</td></tr><tr><td></td><td></td><td>X</td><td></td><td>102.700</td><td>End Station</td></tr></tbody></table>	B.S.	I.S.	F.S.	H.I.	R.L.	Remark	2.650			X	100.0	B.M.		X			98.910			3.830			98.820		4.640		X	X	98.380	CP ₁		3.800			X		1.640		X	103.700	102.060	CP ₂		2.840			100.860		X		3.480	104.900	100.220	CP ₃			X		102.700	End Station	A	5
B.S.	I.S.	F.S.	H.I.	R.L.	Remark																																																										
2.650			X	100.0	B.M.																																																										
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X		3.480	104.900	100.220	CP ₃																																																										
		X		102.700	End Station																																																										
d)	The following readings were recorded by a planimeter with the anchor point inside the figure: IR= 2.268, FR=4.348, M=100cm ² and C= 26.43. Calculate the area of figure when it is observed that the zero mark of the dial passed the index mark once in the clockwise direction.	A	7																																																												
e)	Explain the procedure of profile leveling with neat sketch.	R	5																																																												
f)	What are the advantages of auto level?	R	5																																																												

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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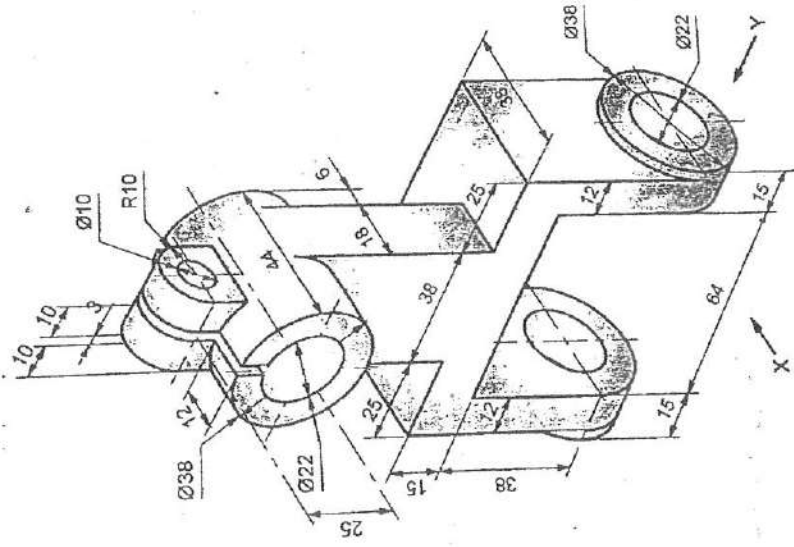
LEVEL :- FIRST**PROGRAM : CE/EE/MT/SM****COURSE CODE :- CCF108/R107/X107/CCE108/R110****COURSE NAME :- ENGINEERING DRAWING - II****MAX. MARKS : 80 TIME : 4 HRS. DATE :- 29 / 05 / 2019****Instruction :-**

- 1) Answers must be written in the main answer book provided.(and supplements if required)
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

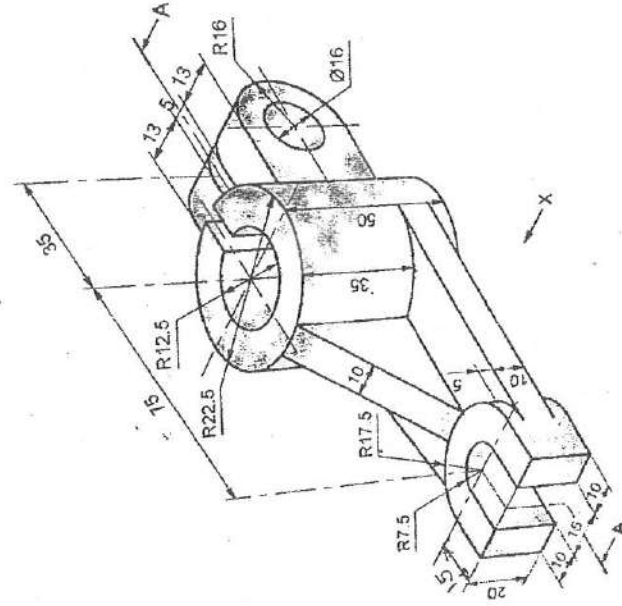
QN	S Q N	Question Text	R/ U/ A	Co CF 108	Ma rks
Q.1		Attempt any ONE:			16
	a)	Fig. (1) shows pictorial view of an object. Draw following views. i) Front view looking in the direction X. ii) Side view looking in the direction Y. iii) Top view.	U	1	
	b)	Fig. (2) shows pictorial view of an object. Draw following views. i) Front view looking in the direction X. ii) Side view looking in the direction Y. iii) Top view.	U	1	
Q.2		Attempt any ONE:			16
	a)	Fig. (3) shows isometric view of a machine component. Draw following views. i) Sectional F.V. looking in the direction X (section A-A) ii) Right hand side view. iii) Top view.	U	2	
	b)	Fig. (4) shows isometric view of a machine component. Draw following views i) Sectional F.V. looking in the direction X (section A-A) ii) Top view. iii) Left hand side view.	U	2	

P.T.O.

Q.3	Draw proportionate free hand sketches (any four) i) Internal thread (2 views) ii) Capstan Nut (2 views) iii) Eye Bolt (2 views) iv) Eye foundation Bolt. v) Double rivetted lap joint. vi) Looking by split pin (2 views)	U	3	08
Q.4	Attempt any ONE : a) Fig. 5 shows front view and top view of an object. By using 1 st angle method, draw i) Sectional F.V. section along B-B (02 Marks) ii) Top view (02 Marks) iii) Missing right hand side view. (04 Marks) b) Fig. 6 shows F.V. & T.V. of an object. Draw i) Missing left hand side view of an object use 1 st angle method. (04 Marks) ii) Top view. (02 Marks) iii) Sectional front view section along B-B. (02 Marks)	U	4	08
Q.5	Attempt any TWO : a) Fig No. 7 shows elbow joint of two pipes. Develop the lateral surfaces of two pipes. b) Fig. No. 8 shows F.V. of square prism 50mm side of base and 70mm height resting on its base on H.P. with all its rectangular faces equally inclined to V.P. A triangular hole is cut into it as shown. Develop the lateral surface with the hole in it. c) Fig. No. 9 shows F.V. of a square pyramid. Draw its development of lateral surface and also draw T.V. -	U	6	16
Q.6	Attempt any ONE : a) Fig. No. 10 shows F.V. & T.V. of an object. Draw isometric view of an object consider '0' as an origin. b) Fig No. 11 shows F.V. & T.V. of an object. Draw isometric projection of an object. Construct isometric scale. Consider '0' as an origin.	U	5	16

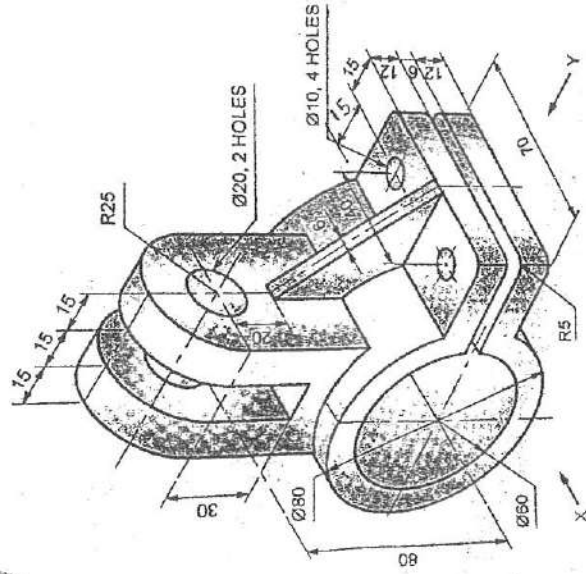


Q.1(b) Fig(2)

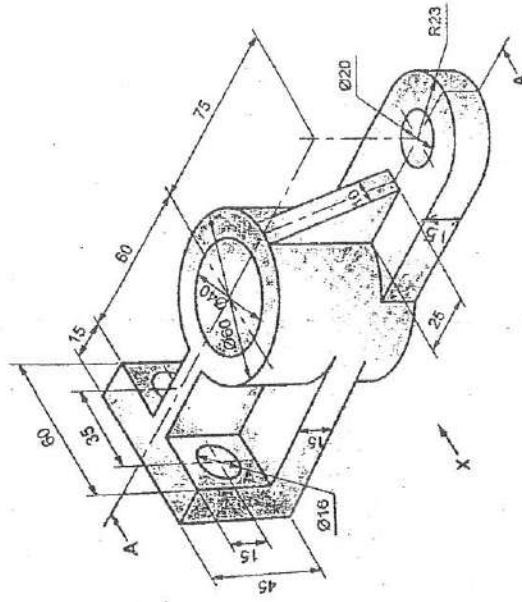


Q.2(b) Fig(4)

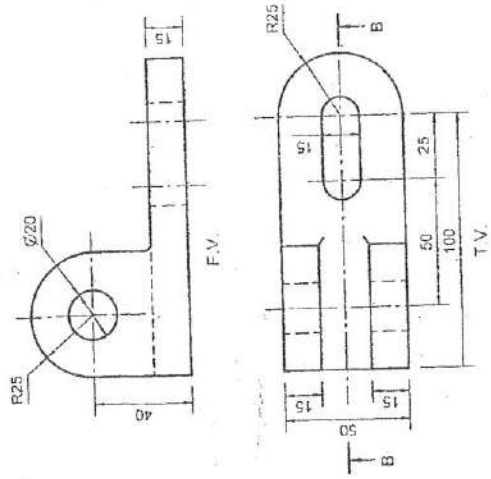
(P.T.O.) 3/5



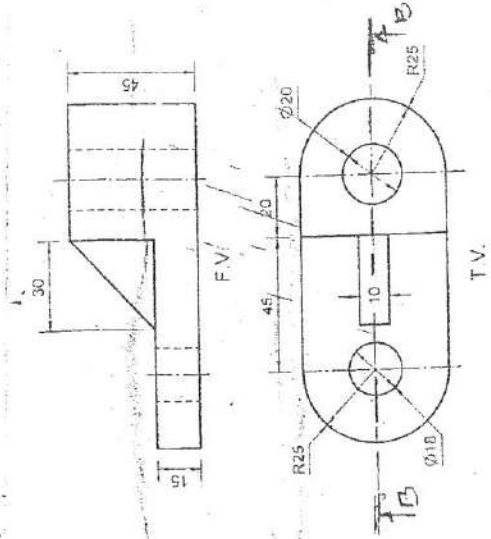
Q.1(a) Fig(1)



Q.2(a) Fig(3)



Q.4(a) Fig-5



Q.4(b) Fig-6

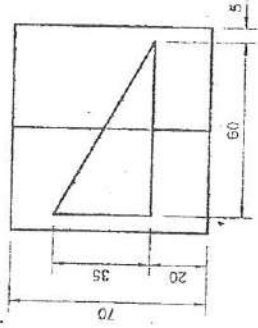
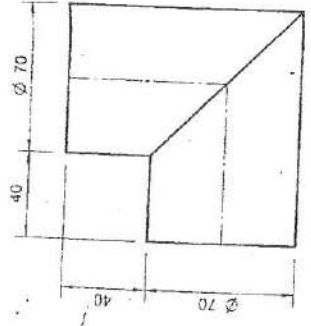


Fig 8
Q.5(b)



Q.5(a) Fig-7

(P.T.O.)

4/5

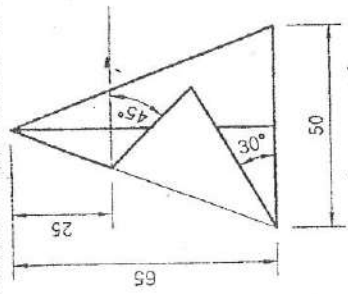
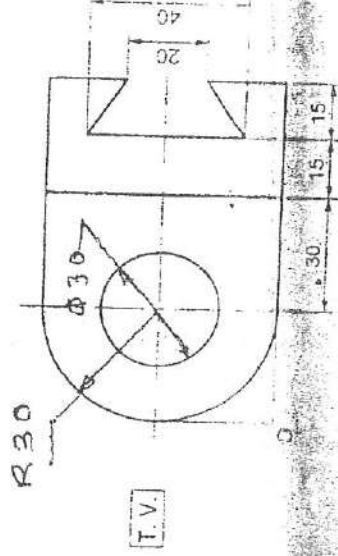
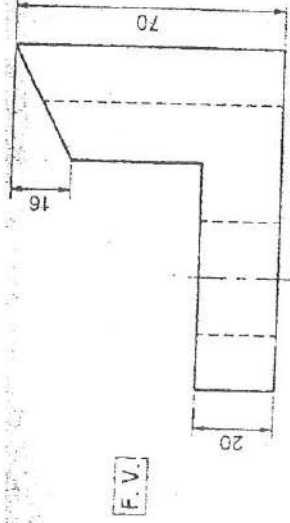
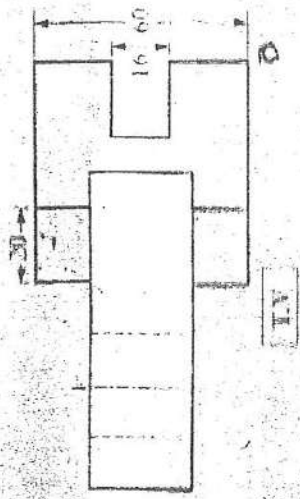
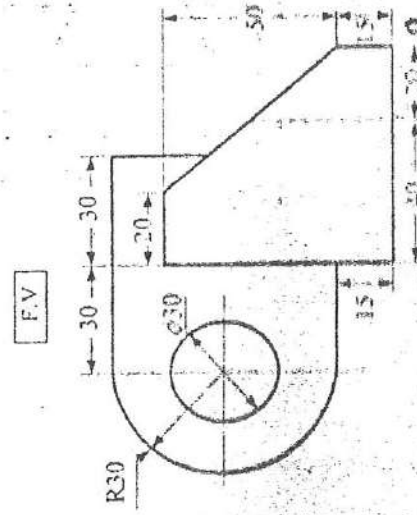


Fig-9
Q.5(c)



Q.6(a) Fig 10-11



Q.6(b)
Fig-11

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FIFTH PROGRAM : CIVIL ENGINEERING**COURSE CODE :- CEF507/CEE506/CE401****COURSE NAME IRRIGATION ENGINEERING****MAX. MARKS : 80 TIME : 3 HRS. DATE :- 22/05 / 2019****Instruction :-**

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S	Section- I	R/ U/ A	Co CEF 507	Mar ks															
Q.1		Attempt any FOUR :			08															
	a)	What is Bandhara irrigation?	R	1																
	b)	State any two eight monthly crops in Maharashtra.	R	3																
	c)	Define average rain fall.	R	2																
	d)	Define Runoff?	R	2																
	e)	State the meaning of catchment area?	R	2																
	f)	Write the meaning of multipurpose project. Name any two	1	3																
Q.2		Attempt any FOUR :			16															
	a)	Write necessity of Irrigation.	U	1																
	b)	What are different types of irrigation projects? Give example of each.	U	1																
	c)	Calculate the average rain fall by Thiessen's Polygon method from the following data: <table><tr><td>Rain gauge Strength</td><td>A</td><td>B</td><td>C</td><td>D</td></tr><tr><td>Area of Thiessen Polygon</td><td>45Sq Km</td><td>38 Sq km</td><td>32.6 Sq kg</td><td>40 Sq. km</td></tr><tr><td>Precipitation</td><td>30.8mm</td><td>34.6mm</td><td>32.6mm</td><td>24.6mm</td></tr></table>	Rain gauge Strength	A	B	C	D	Area of Thiessen Polygon	45Sq Km	38 Sq km	32.6 Sq kg	40 Sq. km	Precipitation	30.8mm	34.6mm	32.6mm	24.6mm	U	2	
Rain gauge Strength	A	B	C	D																
Area of Thiessen Polygon	45Sq Km	38 Sq km	32.6 Sq kg	40 Sq. km																
Precipitation	30.8mm	34.6mm	32.6mm	24.6mm																
	d)	State any four methods to improve duty.	U	3																
	e)	Obtain the relation between duty delta and base period.	U/ A	3																
	f)	An irrigation canal has a Gross Command Area (GCA) of 80,000 ha out of which 85% is cultivable area. The intensity of irrigation in Kharif is 30% and in Rabi is 60%. Find the discharge required at the discharge required at the head of canal if the duty at its head is 800ha/Cu.m for Kharif and 1700 ha/Cu.m in Rabi.	A	3																

P.T.O.

Q.3	Attempt any FOUR :			16																		
a)	State any four factors for site selection for Bandhara irrigation .	U	4																			
b)	Draw a neat labelled sketch of Bandhara irrigation.	U	4																			
c)	Draw a neat labelled sketch of percolation tank.	U	4																			
d)	How site is selected for construction of percolation tank?	A	4																			
e)	Write short note on well irrigation.	U	4																			
f)	Write the suitability of lift irrigation project.	A	4																			
QN	Section- II	R/ U/ A	Co CEF 507	Mar ks																		
Q.4	Attempt any FOUR :			08																		
a)	State the meaning of area capacity curve.	R	4																			
b)	Define i) Flood lift ii) Flood absorption capacity.	U	4																			
c)	State any two types of dams in your region along with any one example of each.	U	5																			
d)	State any two functions of outlet through dams.	U	5																			
e)	State any two purposes of canal lining.	U	6																			
f)	Define i) time factor ii) Capacity of canal.	R	6																			
Q.5	Attempt any FOUR :			16																		
a)	Fix control levels of medium size reservoir from the data given below. Effective storage required for crops = 2500 ha.m Tank losses – 20% effective storage. Carryover allowance = 10% effective storage. Dead storage = 10% of gross storage	A	4																			
	<table><tr><td>Contour R.L. (m)</td><td>250</td><td>253</td><td>256</td><td>272</td><td>275</td><td>278</td><td>281</td><td>284</td></tr><tr><td>Storage (Mm³)</td><td>3.00</td><td>4.00</td><td>5.10</td><td>34.6</td><td>38.9</td><td>43.2</td><td>48.5</td><td>55.2</td></tr></table>	Contour R.L. (m)	250	253	256	272	275	278	281	284	Storage (Mm ³)	3.00	4.00	5.10	34.6	38.9	43.2	48.5	55.2			
Contour R.L. (m)	250	253	256	272	275	278	281	284														
Storage (Mm ³)	3.00	4.00	5.10	34.6	38.9	43.2	48.5	55.2														
	Assume suitable flood lift & free Board.																					
b)	Draw the typical section of earthen dam and state the function of any four important components.	A	6																			
c)	Differentiate between theoretical and practical profile of gravity dam.	U	6																			
d)	Draw a labelled cross section of partial cutting and partial filling.	A	7																			
e)	Explain the term super passage with a neat sketch and write its suitability.	U	7																			
f)	State the classification of canals based on alignment and its position.	R/ U	7																			

Q.6	Attempt any FOUR :		16
a)	Give any four factors affecting sedimentation in storage reservoir.	A	5
b)	Write short note on joints in gravity dam.	U	6
c)	i) Explain the effect of seepage through earthen dam. ii) Explain controlling methods if it.	A	6
d)	State under what circumstances emergency spillway is provided.	A	6
e)	Enlist any four preventive measures you will take against water logging.	A	7
f)	i) State any four types of materials used for canal lining. ii) Define canal lining.	R	7

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EVEN TERM END EXAM MAY-2019**EXAM SEAT NO.**

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LEVEL :- FOURTH PROGRAM : CIVIL ENGINEERING**COURSE CODE :- CEF402/1303/C303/CE302/CEE402****COURSE NAME DESIGN & DRAFTING OF R.C.C. STRUCTURES****MAX. MARKS : 80 TIME : 4 HRS. DATE :- 24/05 / 2019****Instruction :-**

- 1) Answers of two sections must be written in separate section answer book provided.
- 2) Illustrate your answers with sketches wherever necessary.
- 3) Use of non-programmable pocket calculator is permissible.
- 4) Mathematical and other tables shall be made available on request.
- 5) Assume and mention suitable additional data if necessary.
- 6) Use of Mobile is strictly prohibited.
- 7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	S Q N	Section- I	R/ U/ A	Co CEF 402	Mar ks
Q.1		Attempt any FOUR :			08
	a)	Enlist any four loads which occurs on R.C.C. structures as per IS 875.	E	1	
	b)	Define characteristic strength of material and characteristic load.	R	1	
	c)	Draw stress strain block diagram for doubly reinforced rectangular beam.	U	2	
	d)	State basic span to depth ratio for cantilever slab according to limit state of serviceability.	R	2	
	e)	Draw a neat sketch of L-beam and state the effective flange width of beam as per IS 456-2000	U	3	
	f)	State any two conditions for formation of flanged beam (T & L) beam	R	3	
Q.2		Attempt any TWO :			16
	a)	State advantages and disadvantages of prestressed concrete. (any four) and explain losses in prestressed concrete	U	1	
	b)	i) Draw a net diagram showing reinforcement detailing of T shaped retaining wall. ii) Define magnitude and intensity of earth quake and differentiate between them. (any two)	U	1	
			U	2	
	c)	i) Draw typical reinforcement detailing sketch of circular water tank with flexible joint between vertical wall and bore. ii) State any four assumptions made in analysis limit state of collapse (flexure)	U	1	
			U	2	

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Q.3	Attempt any TWO:		16
a)	A simply supported beam of 4m span carries uniformly distributed load 30 KN/m inclusive of self weight. The width of the beam is 230 mm and reinforced on tension side only. Design the smallest concrete section. The material used are M20 grade and Fe415 steel. Take cover 40mm. Take neutral axis factor 0.48 and limiting moment of resistance coefficient $0.138fc K$.	A 2	
b)	Calculate the ultimate moment of resistance of R.C. section 230mm X 370mm effective in dimensions. It is reinforced by 3 bars of 12mm dia as compression steel with an effective cover of 30mm. Where as 4 bars of 16mm dia are placed on tension side use M20 & Fe 415. Take $f_{sc} = 352.75 \text{ N/mm}^2$.	A 2	
c)	A T-beam flange width of 1200 mm and an effective depth of 400mm. The slab thickness is 100mm and the breadth of web is 230mm. The beam is reinforced on tension side only with total steel area of 2000 mm^2 . Calculate limiting moment of resistance if M20 and Fe 250 is used.	A 3	
QN	Section- II	R/ U/ A	Co CEF 402
Q.4	Attempt any FOUR:		08
a)	State the formula for development length required with meaning of each notation.	R 4	
b)	State I.S. specifications for minimum shear reinforcement spacing and maximum spacing of stirrups in beam.	R 4	
c)	State I.S. specification for spacing of distribution steel in slab.	R 5	
d)	Differentiate between one way slab and two way slab for any four points.	U 5	
e)	Enlist any four types of footing with a neat diagram.	U 6	
f)	State the value of the effective length of column for effectively held in position & restrained against rotation in both the ends.	R 6	

Q.5	Attempt any TWO :			16														
a)	A rectangular beam section of 300mm width and 500mm effective depth is reinforced with 4 bars of 20mm diameter. Determine the shear reinforcement required to resist shear force of 80 KN at service state. Consider concrete M20 and steel Fe415. No bent up bars are provided $\tau_c \text{ max} = 2.8 \text{ N/mm}^2$ & Refer following table for τ_c. <table><tr><td>Pt %</td><td>≤ 0.15</td><td>0.25</td><td>0.50</td><td>0.75</td><td>1</td><td>1.25</td></tr><tr><td>τ_c N/mm²</td><td>0.28</td><td>0.36</td><td>0.48</td><td>0.56</td><td>0.62</td><td>0.67</td></tr></table> Use 8mm diameter 2 legged stirrups	Pt %	≤ 0.15	0.25	0.50	0.75	1	1.25	τ_c N/mm ²	0.28	0.36	0.48	0.56	0.62	0.67	A	4	
Pt %	≤ 0.15	0.25	0.50	0.75	1	1.25												
τ_c N/mm ²	0.28	0.36	0.48	0.56	0.62	0.67												
b)	Design a cantilever slab of 1.8m span carrying superimposed load of 5 KN/m². The slab is projecting out from a beam of 250mm X 450 mm. use Fe250 grade steel and M20 grade concrete. Assume modification factor as 1.5 for 0.9% of steel. Use 10mm diameter bar for main steel and 20mm clear cover and 8mm for distribution steel. Also draw a neat diagram of section of cantilever slab showing reinforcement details.	U	5															
c)	i) A simply supported beam to 250mm width & 450mm effective depth is reinforced with 6 bars of 18mm diameter of which 3 bars are bent up at 45° at a section. Take check for development length at support. Assuming M15 grade of concrete and Fe 415 steel. $\tau_{bd} = 1 \text{ N/mm}^2$ for plain bar. ii) A circular column of 500mm in diameter is provided with 20mm – 6 nos bars. Calculate its working load carrying capacity if M20 & Fe415 steel are used. Also take check for minimum eccentricity if unsupported length of column is 3 meter.	A	4	6														
Q.6	Attempt any TWO :			16														
a)	A Tee beam made up of M20 & Fe415 grades subjected to factored shear force 240 KN Beam is simply supported and 5 bars of 20mm diameter and 2 bars of these are bent up near the support $\tau_c \text{ max} = 2.8 \text{ N/mm}^2$, width of beam is 225 mm and effective depth is 490 mm. Refer table above in question No 5.(a) for value of τ_c. Use 8mm diameter 2 lagged stirrups.	A	5															

b)	Design a simply supported one way slab over a clear span 4 meter. It carries live load 2 KN/m^2 and floor finish 1 KN/m^2 . Assume end support 300mm. Take modification factor = 1.8. Use M20 grade of concrete and Fe 500 steel. Also show reinforcement details in cross section. Assume clear cover 15mm and diameter for main steel 10mm and 8mm for distribution steel.	A	5
c)	Design an isolated sloped square column footing under the service load 700KN acting on column size 450mm X 450mm. Safe bearing capacity of soil is 200 KN/m^2 . Use M20 and Fe415 steel. Assume effective cover 50mm & use 10mm diameter bar and take check for Bending moment and two way shears only.	A	6

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