GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER-2025

EXAM SEAT NO. | | | | | | |

LEVEL : First PROGRAM :ALL COURSE CODE:CCH105/CCG105

COURSE NAME :-BASIC MATHEMATICS

MAX. MARKS : 70 TIME : **03 Hrs** DATE :-07/05/2025

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	SQN	Question Text	R/U/A	Co	Marks
Q.1		Attempt any **THREE: (2 X 3)**			**06**
	a)	Find x if $\log_3(x+4) = 4$	R	1	
	b)	If $A = \begin{bmatrix} 4 & 2 \\ 8 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 6 \\ -4 & -12 \end{bmatrix}$, show that AB is null matrix.	U	1	
	c)	$2x + 3y + 7 = 0$ and $4x + 6y + 2 = 0$ are two straight lines. Are they parallel to each other	R	3	
	d)	Find mean of following distribution Class: 00-10 | 10-20 | 20-30 | 30-40 | 40-50 Frequency: 5 | 8 | 15 | 16 | 6	U	2	
	e)	Find range and coefficient of range of following distribution Class: 60-62 | 63-65 | 66-68 | 69-71 | 72-74 Frequency: 5 | 18 | 42 | 27 | 8	R	2	
Q.2		Attempt any **FOUR: (4 X 4)**			**16**
	a)	If $A = \left\{3\begin{bmatrix} 3 & 1 \\ 4 & 0 \\ 3 & -3 \end{bmatrix} - 2\begin{bmatrix} 0 & 2 \\ -2 & 3 \\ -5 & 3 \end{bmatrix}\right\}\begin{bmatrix} -1 \\ 2 \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$, Find x, y, z	U	1	
	b)	If $A = \begin{bmatrix} 2 & -3 \\ 1 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -1 & 2 \\ 1 & 0 & 1 \end{bmatrix}$ then verify that $(AB)^T = B^T A^T$	U	1	
	c)	Calculate mean deviation about mean of the following distribution x_i: 10 | 11 | 12 | 13 | 14 f_i: 3 | 12 | 18 | 12 | 3	A	2	
	d)	Resolve into partial fraction $\frac{e^x}{e^{2x}+4e^x+3}$	A	1	
	e)	Resolve into partial fraction $\frac{x}{(x+1)(x^2+2)}$	U	1	
	f)	Find the length of perpendicular from the point (5,4) on the straight line $2x + y = 34$	A	3	
Q.3		Attempt any **TWO: (6 X 2)**			**12**
	a)	i) Find acute angle between the lines $3x - 4y = 420$ *and* $4x + 3y = 420$ ii) Find the equation of line passing through (1,7) and having slope 2 units	A	3	
	b)	Solve the following equation by matrix Inversion method $x + y + z = 2, y + z = 1, z + x = 3$	A	1	
	c)	The runs scored by two batsman A and B in 5 one day matches are given below A: 48 | 50 | 39 | 46 | 37 B: 50 | 52 | 60 | 55 | 53 Who is more consistent batsman?	A	2	

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WINTER / SUMMER- 2025

EXAM SEAT NO. | | | | | | |

EVEL : - First PROGRAM : All

OURSE CODE :- CCH105 / CCG105

OURSE NAME :- Basic Mathematics

1AX. MARKS : 70. TIME : **03 Hrs** DATE :-07/05/2025

QN	SQN	Question Text	R/U/A	Co CCH 105	Marks
Q.4		Attempt any **FOUR: (2 X 4)**			**08**
	a)	Evaluate: $2 \cos 75^0 \cos 15^0$.	R	5	
	b)	If $y = \sec x \cdot \tan x$ then find $\frac{dy}{dx}$.	R	5	
	c)	If $f(x) = x^2 + 5$, find $f(x+2) - f(x-2)$.	R	5	
	d)	If $y = \sin(2x + 1)$, then find $\frac{dy}{dx}$.	A	5	
	e)	If $tan^{-1}(1) + tan^{-1}(x) = 0$ find the value of x	U	4	
	f)	Without using calculator find the value of $\sin(390^0)$.	U	4	
Q.5		Attempt any **FOUR: (4 X 4)**			**16**
	a)	If $f(x) = \log\left(\frac{x}{x+1}\right)$ *then show that* $f(a+1) + f(a) = \log\left(\frac{a+1}{a-1}\right)$	U	5	
	b)	Differentiate $(\sin x)^{\cos x}$ w. r. t x	A	5	
	c)	Find $\frac{dy}{dx}$, if $x^2 + y^2 + 2xy - y = 0$	A	5	
	d)	If $A = 30^0$, verify that : $\cos 2A = \frac{1 - \tan 2A}{1 + \tan 2A}$	A	4	
	e)	If $x = a \sec t$ and $y = b \tan t$, then find $\frac{dy}{dx}$.	U	5	
	f)	Find radius of curvature of the curve $y = x^3$ at (2,8) .	U	4	
Q.6		Attempt any **TWO: (6 X 2)**			**12**
	a)	Prove that $\frac{\sin 4A + \sin 5A + \sin 6A}{\cos 4A + \cos 5A + \cos 6A} = \tan 5A$.	A	4	
	b)	Find the maximum and minimum values of $y = 2x^3 - 3x^2 - 36x + 10$.	A	5	
	c)	If A and B both are obtuse angles and $\sin A = \frac{5}{13}$, $\cos B = \frac{-4}{5}$, evaluate $\cos(A+B)$ and $\sin(A+B)$.	A	4	

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WINTER / SUMMER-2025

EXAM SEAT NO. | | | | | | |

LEVEL : - Third PROGRAM : ME/EE/ET/IE

COURSE CODE :- CCH301/MEG301/EEG302/EIG301/CCG106/CCG118/EJ201

COURSE NAME :- APPLIED MATHEMATICS

MAX. MARKS : 70 TIME : **03 Hrs** DATE :-08/05/2025

Instruction :-

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QN	SQN	SECTION -I	R/U/A	Co	Marks
Q.1		Attempt any **THREE: (2 X 3)**			**06**
	a)	Evaluate, $\int \left(\frac{1}{1+x^2} + 5^x\right) dx$	R	1	
	b)	Evaluate, $\int \frac{1}{1+\cos 2x} dx$	A	1	
	c)	Evaluate, $\int_{-1}^{1} \frac{1}{1+x^2} dx$	U	1	
	d)	Evaluate, $\int_2^3 \frac{1}{x} dx$	U	1	
	e)	Find order and degree of differential equation $\sqrt{1+\left(\frac{dy}{dx}\right)^2} = 5\frac{d^2y}{dx^2}$	R	2	
Q.2		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Evaluate, $\int \frac{dx}{4cos^2x+9sin^2x}$	U	1	
	b)	Evaluate, $\int \frac{dx}{x^2+4x+25}$	R	1	
	c)	Evaluate, $\int_0^{\pi/2} sin^3x \cdot \cos x \, dx$	A	1	
	d)	Evaluate, $\int_0^{\pi/2} \frac{1}{1+\sqrt{\tan x}} dx$	A	1	
	e)	Solve the D.E. , $x(1+y^2)dx + y(1+x^2)dy = 0$	U	2	
	f)	Solve the D.E. , $(x+1)\frac{dy}{dx} - y = e^x(1+x)^2$	A	2	
Q.3		Attempt any **TWO: (6 X 2)**			**12**
	a)	Evaluate, $\int \frac{2x+1}{(x+1)(2x-1)} dx$	U	1	
	b)	Evaluate, $\int \frac{x \cdot sin^{-1}x}{\sqrt{1-x^2}} dx$	A	1	
	c)	Solve the differential equation, $(x^2 - 4xy - 2y^3)dx + (y^3 - 2x^2 - 6xy^2)dy = 0$	A	2	

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COURSE NAME :- APPLIED MATHEMATICS

MAX. MARKS : 70 TIME : **03 Hrs** DATE :-08/05/2025

QN	SQN	Question Text	R/U/A	Co	Marks
Q.4		Attempt any **FOUR: (2 X 4)**			**08**
	a)	Show that the root of $x^3 - 2x - 5 = 0$ lies in the interval (2 , 3).	R	3	
	b)	Find the first iteration by using Jacobi's method for the following system of equations.$15x + 2y + z = 18; 2x + 20y - 3z = 19; 3x - 6y + 25z = 22.$	R	3	
	c)	An unbiased coin is tossed 5 times. Find the probability of getting a head.	U	4	
	d)	Obtain $L\{3cos6t - 5sin6t\}$.	R	5	
	e)	Obtain $L\{te^{3t}\}$.	U	5	
	f)	Obtain $L^{-1}\left\{\frac{6}{3s-2} + \frac{s}{s^2+2}\right\}$..	R	5	
Q.5		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Using Bisection method, find the approximate root of $x^4 - x - 10 = 0$. (Take three iterations only)	U	3	
	b)	Obtain approximate root of $xe^x - 2 = 0$ by Newton Raphson method by taking $x_0 = 0$. Perform three iterations only.	A	3	
	c)	If the probability of bad reaction from a certain injection is 0.001, determine the chance that out of 2000 individuals more than two will get a bad reaction.	U	4	
	d)	Solve by Jacobi's method. (Three iterations only) $20x + y - 2z = 17; 3x + 20y - z = -18; 2x - 3y + 20z = 25.$	A	3	
	e)	Obtain $L^{-1}\left\{\frac{2s-1}{s^3-s}\right\}$.	U	5	
	f)	Obtain $L\{e^{3t}sin2tcos3t\}$	U	5	
Q.6		Attempt any **TWO: (6 X 2)**			**12**
	a)	i) Using Regula Falsi method, find the root of the equation $xlog_{10}x = 1.2$ which lies between (2 , 3). (Carry out two iterations only) ii) Solve the following system of equations by Gauss-Seidal method (Two iterations only. $10x + 2y + 4z = 20; x + 10y + 4z = 6; 2x - 4y + 10z = -15.$	A	3	
	b)	i) The probability that a man age 65 will live to 75 is 0.65. What is the probability that out of 10men which are now 65, 7 will live to 75? ii) Fit a Poisson's distribution to set of observations.	A	4	

x_i	0	1	2	3	4
f_i	30	82	64	92	86

	c)	(i) Obtain $L\{tcos3t\}$. (ii) Obtain $L^{-1}\left\{\frac{1}{s^2+4s+1}\right\}$.	A	5		

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COURSE CODE :- CCH301/MEG301/EEG302/EIG301/CCG106/CCG118/EI201

COURSE NAME :- APPLIED MATHEMATICS

MAX. MARKS : 70 TIME : **03 Hrs** DATE :-08/05/2025

Instruction :-

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QN	SQN	SECTION -I	R/U/A	Co	Marks
Q.1		Attempt any **THREE: (2 X 3)**			**06**
	a)	Evaluate, $\int \left(\frac{1}{1+x^2} + 5^x\right) dx$	R	1	
	b)	Evaluate, $\int \frac{1}{1+\cos 2x} dx$	A	1	
	c)	Evaluate, $\int_{-1}^{1} \frac{1}{1+x^2} dx$	U	1	
	d)	Evaluate, $\int_2^3 \frac{1}{x} dx$	U	1	
	e)	Find order and degree of differential equation $\sqrt{1+\left(\frac{dy}{dx}\right)^2} = 5\frac{d^2y}{dx^2}$	R	2	
Q.2		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Evaluate, $\int \frac{dx}{4\cos^2 x + 9\sin^2 x}$	U	1	
	b)	Evaluate, $\int \frac{dx}{x^2+4x+25}$	R	1	
	c)	Evaluate, $\int_0^{\pi/2} \sin^3 x \cdot \cos x \, dx$	A	1	
	d)	Evaluate, $\int_0^{\pi/2} \frac{1}{1+\sqrt{\tan x}} dx$	A	1	
	e)	Solve the D.E. , $x(1+y^2)dx + y(1+x^2)dy = 0$	U	2	
	f)	Solve the D.E. , $(x+1)\frac{dy}{dx} - y = e^x(1+x)^2$	A	2	
Q.3		Attempt any **TWO: (6 X 2)**			**12**
	a)	Evaluate, $\int \frac{2x+1}{(x+1)(2x-1)} dx$	U	1	
	b)	Evaluate, $\int \frac{x \cdot \sin^{-1} x}{\sqrt{1-x^2}} dx$	A	1	
	c)	Solve the differential equation, $(x^2 - 4xy - 2y^3)dx + (y^3 - 2x^2 - 6xy^2)dy = 0$	A	2	

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QN	SQN	Question Text	R/U/A	Co	Marks
Q.4		Attempt any **FOUR: (2 X 4)**			**08**
	a)	Show that the root of $x^3 - 2x - 5 = 0$ lies in the interval (2 , 3).	R	3	
	b)	Find the first iteration by using Jacobi's method for the following system of equations.$15x + 2y + z = 18; 2x + 20y - 3z = 19; 3x - 6y + 25z = 22.$	R	3	
	c)	An unbiased coin is tossed 5 times. Find the probability of getting a head.	U	4	
	d)	Obtain $L\{3cos6t - 5sin6t\}$.	R	5	
	e)	Obtain $L\{te^{3t}\}$.	U	5	
	f)	Obtain $L^{-1}\left\{\frac{6}{3s-2} + \frac{s}{s^2+2}\right\}$..	R	5	
Q.5		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Using Bisection method, find the approximate root of $x^4 - x - 10 = 0$. (Take three iterations only)	U	3	
	b)	Obtain approximate root of $xe^x - 2 = 0$ by Newton Raphson method by taking $x_0 = 0$. Perform three iterations only.	A	3	
	c)	If the probability of bad reaction from a certain injection is 0.001, determine the chance that out of 2000 individuals more than two will get a bad reaction.	U	4	
	d)	Solve by Jacobi's method. (Three iterations only) $20x + y - 2z = 17; 3x + 20y - z = -18; 2x - 3y + 20z = 25.$	A	3	
	e)	Obtain $L^{-1}\left\{\frac{2s-1}{s^3-s}\right\}$.	U	5	
	f)	Obtain $L\{e^{3t}sin2tcos3t\}$	U	5	
Q.6		Attempt any **TWO: (6 X 2)**			**12**
	a)	i) Using Regula Falsi method, find the root of the equation $xlog_{10}x = 1.2$ which lies between (2 , 3). (Carry out two iterations only) ii) Solve the following system of equations by Gauss-Seidal method (Two iterations only. $10x + 2y + 4z = 20; x + 10y + 4z = 6; 2x - 4y + 10z = -15.$	A	3	
	b)	i) The probability that a man age 65 will live to 75 is 0.65. What is the probability that out of 10men which are now 65, 7 will live to 75? ii) Fit a Poisson's distribution to set of observations.	A	4	

x_i	0	1	2	3	4
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	c)	(i) Obtain $L\{tcos3t\}$. (ii) Obtain $L^{-1}\left\{\frac{1}{s^2+4s+1}\right\}$.	A	5		

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EXAM SEAT NO. | | | | | | |

LEVEL : - Third PROGRAM : CE/IT/MT

COURSE CODE :- CCH301/CEG301/ITG301/CE201/CCG106/CCG118/X110

COURSE NAME :- APPLIED MATHEMATICS

MAX. MARKS : **70** TIME : **03 Hrs** DATE :-08/05/2025

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Q.1		Attempt any **THREE: (2 X 3)**			**06**
	a)	Evaluate : $\int \frac{dx}{3x^2+4}$	R	1	
	b)	Evaluate : $\int \cos 8x \, . \, cos2x \; dx$	R	1	
	c)	Evaluate : $\int \frac{x^2-1}{x^2+1} dx$	R	1	
	d)	Evaluate : $\int_2^1 \frac{1}{2x+11} dx$	A	1	
	e)	Show that the differential equation $(2xy + y^2)dx + (x^2 + 2xy + siny)dy = 0$ is an exact	U	2	
Q.2		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Evaluate : $\int \frac{dx}{4+5\cos^2 x}$	U	1	
	b)	Evaluate : $\int \frac{sec^2 x}{(1-\tan x)(2+\tan x)} dx$	U	1	
	c)	Solve : $\int \frac{1}{\sqrt{13-6x-x^2}} dx$	U	1	
	d)	Solve : $\int_1^2 \frac{\sqrt{x}}{\sqrt{x}+\sqrt{3-x}} dx$	A	1	
	e)	Solve : : $\frac{dy}{dx} + y \tan x = cos^2 x$	U	2	
	f)	Solve : $\frac{dy}{dx} = e^{3x-2y} + x^2 e^{-2y}$	U	2	
Q.3		Attempt any **TWO: (6 X 2)**			**12**
	a)	Solve : $\int e^x \sin 4x \; dx$	U	1	
	b)	Solve : $\int_0^{\pi/2} \log(\sin x) dx$	A	1	
	c)	Solve the differential equation $y^3 sec^2 x dx + (3y^2 \tan x - sec^2 y)dy = 0$	A	2	

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EXAM SEAT NO. | | | | | | |

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COURSE NAME :- APPLIED MATHEMATICS

MAX. MARKS : 70 TIME : **03 Hrs** DATE :- 8/5/2025

QN	SQN	Question Text	R/U/A	Co	Marks
Q.4		Attempt any **FOUR: (2 X 4)**			**08**
	a)	Show that the root of the equation $x^3 - 9x + 1 = 0$ lies between 2 and 3.	R	3	
	b)	Solve by using Jacobi's method(only one iteration) $10x + y + 2z = 13, 3x + 10y + z = 14, 2x + 3y + 10z = 15$	U	3	
	c)	Fit a Poisson's Distribution for set of observations x: 0, 1, 2, 3, 4 f(x): 30, 82, 64, 92, 86	U	4	
	d)	Find $L\{2 - e^{-3t} + sin2t\}$	R	5	
	e)	Find $L\{e^{-t}(sint + cost)\}$	U	5	
	f)	Find $L^{-1}\left\{\frac{2}{(s-4)^2} + \frac{s}{(s^2-9)}\right\}$	U	5	
Q.5		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Find the root of the equation $e^{-x} - x = 0$ by using Bisection method (Take 3 iterations only)	A	3	
	b)	Using Regula-Falsi method to find the approximate root of the equation $x^3 - x - 1 = 0$ (Take 3 iterations only)	A	3	
	c)	Using Newton Raphson method find the approximate root of the equation $x^3 - 3x - 5 = 0$.	U	3	
	d)	An automatic machine makes paper clips from coils of wire. On the average, 1 in 400 paper clips is defective. If the paper clips are packed in boxes of 100,what is the probability that any given box of clips will contain at least one defective clip?	U	4	
	e)	Find $L\{t \cdot e^t \cdot cos2t\}$	U	5	
	f)	Find $L^{-1}\left\{\frac{s}{s^2+4s+5}\right\}$	A	5	
Q.6		Attempt any **TWO: (6 X 2)**			**12**
	a)	Solve by using Gauss-seidel method (Take only 3 iterations) $8x + 2y + 3z = 30, x - 9y + 2z = 1, 2x + 3y + 6z = 31$	A	3	
	b)	i) If 2% of the electric bulbs manufactured by a company are defective, then find the probability that in a sample of 5 bulbs 3 bulbs will be defective. ii) The probability of getting an item defective is 0.005. What is the probability that exactly 3 items in a sample of 200 are defective?	A	4	
	c)	i) Find $L\{t \cdot cosh2t\}$ ii) Find $L^{-1}\left\{\frac{2s+1}{s(s+1)}\right\}$	A	5	

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	b)	Evaluate : $\int \cos 8x \,.\, cos2x \; dx$	R	1	
	c)	Evaluate : $\int \frac{x^2-1}{x^2+1} dx$	R	1	
	d)	Evaluate : $\int_2^1 \frac{1}{2x+11} dx$	A	1	
	e)	Show that the differential equation $(2xy + y^2)dx + (x^2 + 2xy + siny)dy = 0$ is an exact	U	2	
Q.2		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Evaluate : $\int \frac{dx}{4+5\cos^2 x}$	U	1	
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	e)	Solve : : $\frac{dy}{dx} + y \tan x = cos^2 x$	U	2	
	f)	Solve : $\frac{dy}{dx} = e^{3x-2y} + x^2 e^{-2y}$	U	2	
Q.3		Attempt any **TWO: (6 X 2)**			**12**
	a)	Solve : $\int e^x \sin 4x \; dx$	U	1	
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	c)	Solve the differential equation $y^3 sec^2 x dx + (3y^2 \tan x - sec^2 y)dy = 0$	A	2	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER- 2025

EXAM SEAT NO. | | | | | | |

EVEL : - Third PROGRAM : CE/IT/MT

OURSE CODE :- CCH301/CEG301/ITG301/CE201/CCG106/CCG118/X110.

OURSE NAME :- APPLIED MATHEMATICS

AX. MARKS : 70 TIME : **03 Hrs** DATE :- 8/5/2025

QN	SQN	Question Text	R/U/A	Co	Marks
.4		Attempt any **FOUR: (2 X 4)**			**08**
	a)	Show that the root of the equation $x^3 - 9x + 1 = 0$ lies between 2 and 3.	R	3	
	b)	Solve by using Jacobi's method(only one iteration) $10x + y + 2z = 13, 3x + 10y + z = 14, 2x + 3y + 10z = 15$	U	3	
	c)	Fit a Poisson's Distribution for set of observations x: 0, 1, 2, 3, 4 f(x): 30, 82, 64, 92, 86	U	4	
	d)	Find $L\{2 - e^{-3t} + sin2t\}$	R	5	
	e)	Find $L\{e^{-t}(sint + cost)\}$	U	5	
	f)	Find $L^{-1}\left\{\frac{2}{(s-4)^2} + \frac{s}{(s^2-9)}\right\}$	U	5	
.5		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Find the root of the equation $e^{-x} - x = 0$ by using Bisection method (Take 3 iterations only)	A	3	
	b)	Using Regula-Falsi method to find the approximate root of the equation $x^3 - x - 1 = 0$ (Take 3 iterations only)	A	3	
	c)	Using Newton Raphson method find the approximate root of the equation $x^3 - 3x - 5 = 0$.	U	3	
	d)	An automatic machine makes paper clips from coils of wire. On the average, 1 in 400 paper clips is defective. If the paper clips are packed in boxes of 100,what is the probability that any given box of clips will contain at least one defective clip?	U	4	
	e)	Find $L\{t \cdot e^t \cdot cos2t\}$	U	5	
	f)	Find $L^{-1}\left\{\frac{s}{s^2+4s+5}\right\}$	A	5	
.6		Attempt any **TWO: (6 X 2)**			**12**
	a)	Solve by using Gauss-seidel method (Take only 3 iterations) $8x + 2y + 3z = 30, x - 9y + 2z = 1, 2x + 3y + 6z = 31$	A	3	
	b)	i) If 2% of the electric bulbs manufactured by a company are defective, then find the probability that in a sample of 5 bulbs 3 bulbs will be defective. ii) The probability of getting an item defective is 0.005. What is the probability that exactly 3 items in a sample of 200 are defective?	A	4	
	c)	i) Find $L\{t \cdot cosh2t\}$ ii) Find $L^{-1}\left\{\frac{2s+1}{s(s+1)}\right\}$	A	5	

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WINTER / SUMMER-2025

EXAM SEAT NO. | | | | | | |

LEVEL : First PROGRAM :ALL COURSE CODE:CCH105/CCG105

COURSE NAME :-BASIC MATHEMATICS

MAX. MARKS : 70 TIME : **03 Hrs** DATE :-07/05/2025

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	SQN	Question Text	R/U/A	Co	Marks
Q.1		Attempt any **THREE: (2 X 3)**			**06**
	a)	Find x if $\log_3(x+4) = 4$	R	1	
	b)	If $A = \begin{bmatrix} 4 & 2 \\ 8 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 6 \\ -4 & -12 \end{bmatrix}$, show that AB is null matrix.	U	1	
	c)	$2x + 3y + 7 = 0$ and $4x + 6y + 2 = 0$ are two straight lines. Are they parallel to each other	R	3	
	d)	Find mean of following distribution Class: 00-10 | 10-20 | 20-30 | 30-40 | 40-50 Frequency: 5 | 8 | 15 | 16 | 6	U	2	
	e)	Find range and coefficient of range of following distribution Class: 60-62 | 63-65 | 66-68 | 69-71 | 72-74 Frequency: 5 | 18 | 42 | 27 | 8	R	2	
Q.2		Attempt any **FOUR: (4 X 4)**			**16**
	a)	If $A = \left\{3\begin{bmatrix} 3 & 1 \\ 4 & 0 \\ 3 & -3 \end{bmatrix} - 2\begin{bmatrix} 0 & 2 \\ -2 & 3 \\ -5 & 3 \end{bmatrix}\right\}\begin{bmatrix} -1 \\ 2 \end{bmatrix} = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$, Find x, y, z	U	1	
	b)	If $A = \begin{bmatrix} 2 & -3 \\ 1 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -1 & 2 \\ 1 & 0 & 1 \end{bmatrix}$ then verify that $(AB)^T = B^T A^T$	U	1	
	c)	Calculate mean deviation about mean of the following distribution x_i: 10 | 11 | 12 | 13 | 14 f_i: 3 | 12 | 18 | 12 | 3	A	2	
	d)	Resolve into partial fraction $\frac{e^x}{e^{2x}+4e^x+3}$	A	1	
	e)	Resolve into partial fraction $\frac{x}{(x+1)(x^2+2)}$	U	1	
	f)	Find the length of perpendicular from the point (5,4) on the straight line $2x + y = 34$	A	3	
Q.3		Attempt any **TWO: (6 X 2)**			**12**
	a)	i) Find acute angle between the lines $3x - 4y = 420$ *and* $4x + 3y = 420$ ii) Find the equation of line passing through (1,7) and having slope 2 units	A	3	
	b)	Solve the following equation by matrix Inversion method $x + y + z = 2, y + z = 1, z + x = 3$	A	1	
	c)	The runs scored by two batsman A and B in 5 one day matches are given below A: 48 | 50 | 39 | 46 | 37 B: 50 | 52 | 60 | 55 | 53 Who is more consistent batsman?	A	2	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER- 2025

EXAM SEAT NO. | | | | | | |

LEVEL : - First PROGRAM : All

COURSE CODE :- CCH105 / CCG105

COURSE NAME :- Basic Mathematics

MAX. MARKS : 70. TIME : **03 Hrs** DATE :-07/05/2025

QN	SQN	Question Text	R/U/A	Co CCH 105	Marks
Q.4		Attempt any **FOUR: (2 X 4)**			**08**
	a)	Evaluate: $2 \cos 75^0 \cos 15^0$.	R	5	
	b)	If $y = \sec x \cdot \tan x$ then find $\frac{dy}{dx}$.	R	5	
	c)	If $f(x) = x^2 + 5$, find $f(x+2) - f(x-2)$.	R	5	
	d)	If $y = \sin(2x + 1)$, then find $\frac{dy}{dx}$.	A	5	
	e)	If $tan^{-1}(1) + tan^{-1}(x) = 0$ find the value of x	U	4	
	f)	Without using calculator find the value of $\sin(390^0)$.	U	4	
Q.5		Attempt any **FOUR: (4 X 4)**			**16**
	a)	If $f(x) = \log\left(\frac{x}{x+1}\right)$ *then show that* $f(a+1) + f(a) = \log\left(\frac{a+1}{a-1}\right)$	U	5	
	b)	Differentiate $(\sin x)^{\cos x}$ w. r. t x	A	5	
	c)	Find $\frac{dy}{dx}$, if $x^2 + y^2 + 2xy - y = 0$	A	5	
	d)	If $A = 30^0$, verify that : $\cos 2A = \frac{1 - \tan 2A}{1 + \tan 2A}$	A	4	
	e)	If $x = a \sec t$ and $y = b \tan t$, then find $\frac{dy}{dx}$.	U	5	
	f)	Find radius of curvature of the curve $y = x^3$ at (2,8) .	U	4	
Q.6		Attempt any **TWO: (6 X 2)**			**12**
	a)	Prove that $\frac{\sin 4A + \sin 5A + \sin 6A}{\cos 4A + \cos 5A + \cos 6A} = \tan 5A$.	A	4	
	b)	Find the maximum and minimum values of $y = 2x^3 - 3x^2 - 36x + 10$.	A	5	
	c)	If A and B both are obtuse angles and $\sin A = \frac{5}{13}$, $\cos B = \frac{-4}{5}$, evaluate cos (A+B) and sin (A+B).	A	4	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER - 2025

EXAM SEAT NO. | | | | | | |

LEVEL : - First PROGRAM : COMMON

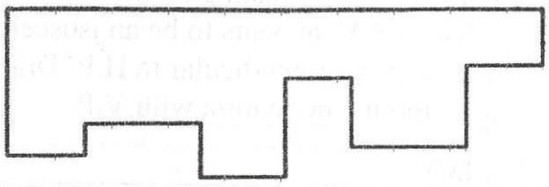
COURSE CODE :- CCH107 / CCF107 / CCG107

COURSE NAME :- ENGINEERING GRAPHICS

MAX. MARKS : 70 TIME : **04 Hrs** DATE :- 19/05/2025

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	SQN	Question Text	R/U/A	Co	Marks
Q.1		Attempt any **THREE: (2 X 3)**			**06**
	a)	Draw convention of line - long chain thin and thick at both ends.	R	CO1	02
	b)	Draw Pentagon having side 40mm.	R	CO1	02
	c)	List applications of Mini drafter (any two)	U	CO1	02
	d)	Redraw the figure and give dimension using chain dimensioning system. (Assume dimension) 	R	CO1	02
	e)	Divide circle of diameter 60mm in 8 equal parts.	R	CO1	02
Q.2		Attempt any **TWO: (6 X 3)**			**18**
	a)	Two fixed points F1 and F2 are 75mm apart. Draw the curve traced out by a point P, moving in such a way that difference between its distance from F1 and F2 is always constant and equal to 44mm.	U	CO2	06
	b)	A circle of 40mm diameter rolls along the circumference of another circle of 120mm diameter from outside. Trace the path of a point on the circumference of the rolling circle for one complete revolution.	U	CO2	06
	c)	Draw involute of a Pentagon of 25mm side.	U	CO2	06
	d)	Draw an Archimedean spiral of one revolution, the maximum and minimum radii being 80mm and 20mm respectively.	U	CO2	06
Q.3		Attempt any **TWO: (5 X 2)**			**10**
	a)	A line AB of length 75mm has its end 10mm above H.P. Line is parallel to V.P. and 20mm infront of it and plan length of line is 50mm. Draw the projection of line.	U	CO2	05
	b)	A line AB of length 60 mm has its mid-point M 10 mm above the HP and 30 mm infront of the VP. Line is parallel to HP and is inclined at 35° to the VP. Draw three views of the line and find its elevation length	U	CO3	05
	c)	A line AB having true length 70mm has its end A 20mm above H.P. and line is 35mm front of the V.P. Draw the projection of the line AB if it is perpendicular to H.P.	U	CO3	05

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WINTER / SUMMER- 2025

EXAM SEAT NO. | | | | | | |

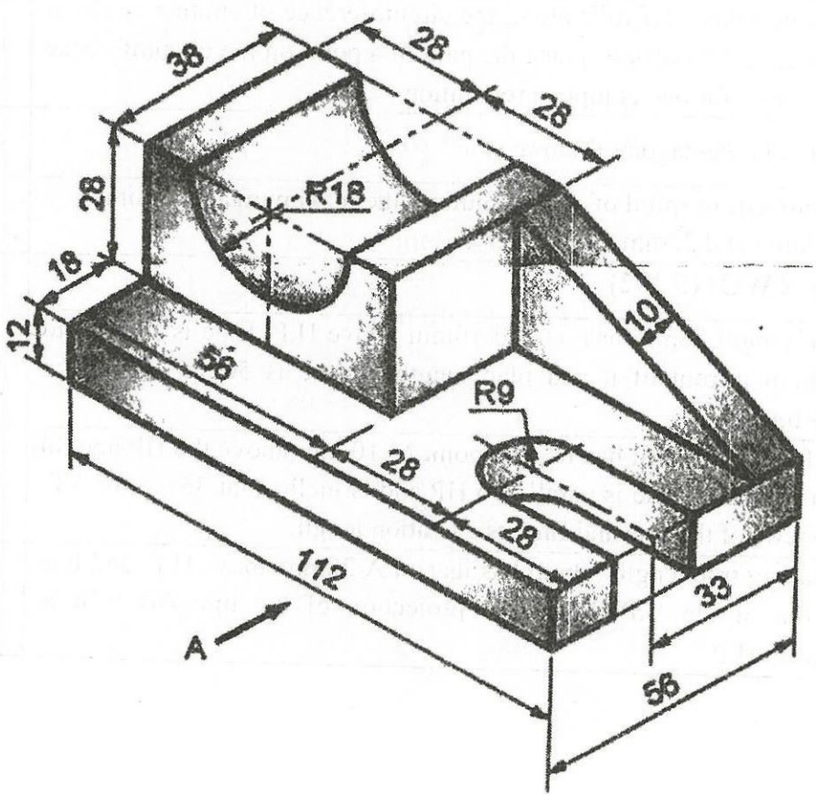
LEVEL : - First PROGRAM : COMMON

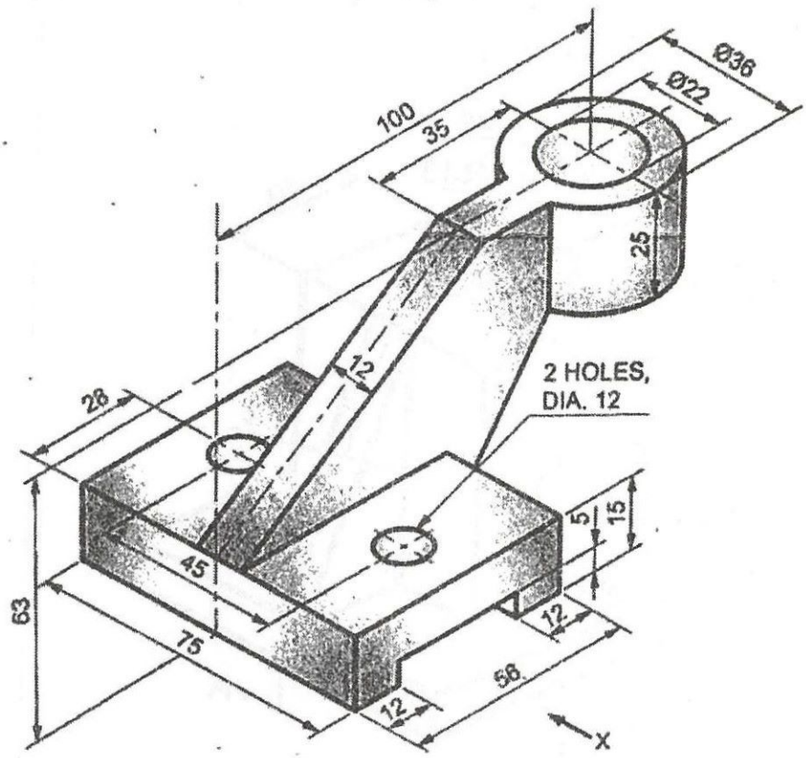
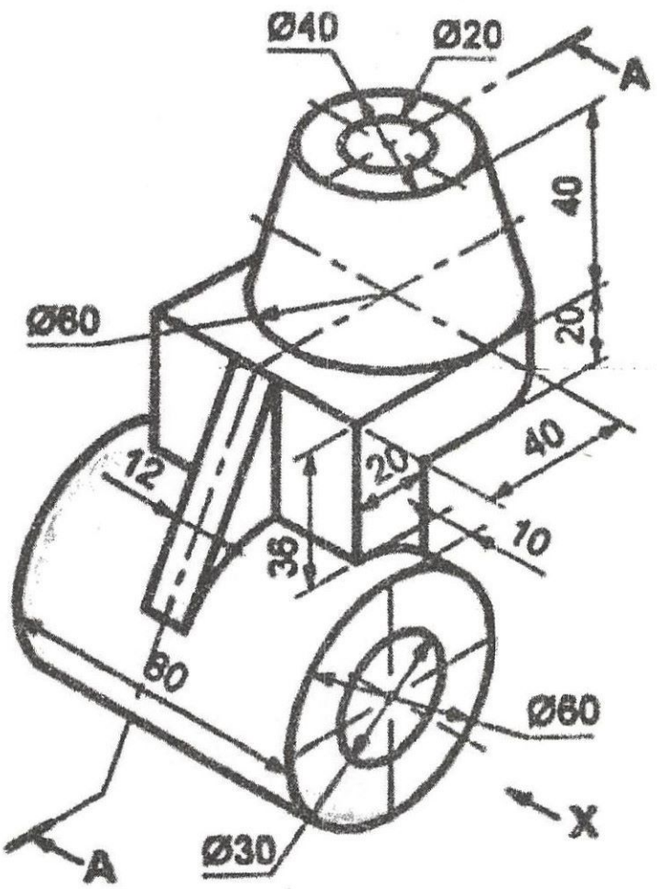
COURSE CODE :- CCH106 /CCE107/ CCG107

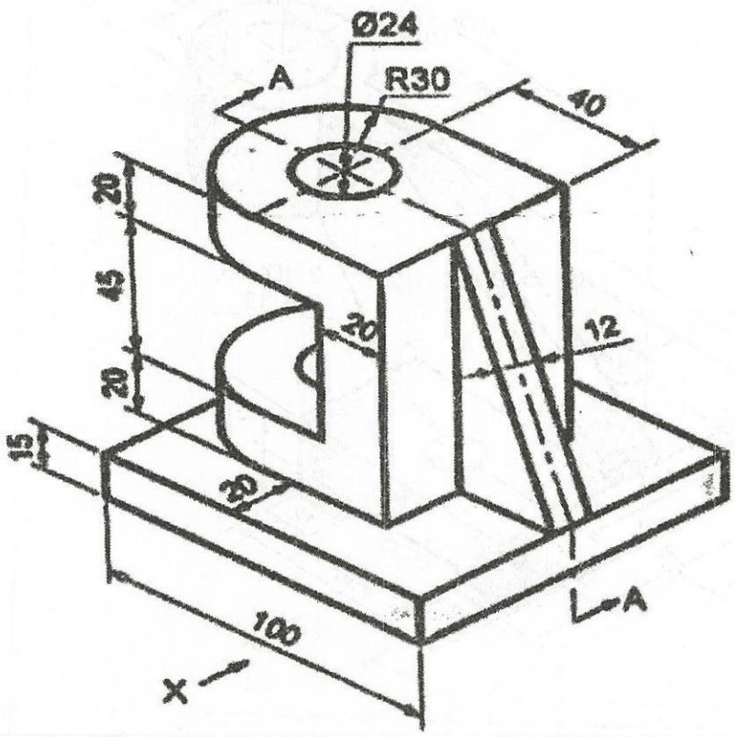
COURSE NAME :- ENGINEERING GRAPHICS

MAX. MARKS : 70 TIME : 02 Hrs DATE :-19 / 05 /2025

QN	SQN	Question Text	R/U/A	CO CCH106 -	Marks
Q.4		Attempt any **TWO: (2 X 5M)**			**10**
	a)	A pentagonal plane of side 35 mm is kept on the H.P. on one of its comers with the side opposite to the corner is 30 mm above H.P. and perpendicular to V.P. Draw three views of the pentagonal plane and find its inclination with the H.P.	A	04	
	b)	A circular plate of diameter 60 mm is resting on the V.P. on a point of its circumference. The plate is inclined to V.P. in such a way that the elevation length of diameter passing through the point on V.P. is 35 mm. The plate is perpendicular to H.P. Draw three views of the plate and find its inclination with V.P.	A	04	
	c)	An equilateral triangle of side 50 mm is resting on the V.P. on one of its sides in such a way that its F.V. appears to be an isosceles triangle of altitude 25 mm. Plane is perpendicular to H.P. Draw three views of the plane and find its inclination with V.P.	A	04	
Q.5		Attempt any **ONE: (1 X 14M)**			**14**
	a)	Figure given below shows an isometric view of an object. Draw i) Front View looking in direction A (5 M) ii) Top View (4 M) iii) Right Hand Side View (5 M)	A	05	



	b)	Figure given below shows an isometric view of an object. Draw i) Front View looking in direction X (5 M) ii) Top View (4 M) iii) Left Hand Side View (5 M)  	A	05	
Q.6		Attempt any **ONE: (1 X 12M)**			**12**
	a)	Figure given below shows an isometric view of an object. Draw i) Sectional Front View looking in direction X along A-A (6M) ii) Left Hand Side View (6 M)  	A	05	

	b)	Figure given below shows an isometric view of an object. Draw i) Sectional Front View looking in direction X along A-A (4M) ii) Top View (4M) iii) Right Hand Side View (4M)  	A	05	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/WINTER - 2025

EXAM SEAT NO. | | | | | | |

LEVEL : - First PROGRAM : COMMON

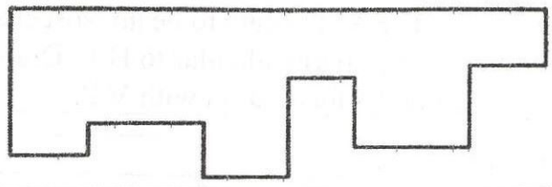
COURSE CODE :- CCH107 / CCF107 / CCG107

COURSE NAME :- ENGINEERING GRAPHICS

MAX. MARKS : 70 TIME : **04 Hrs** DATE :-19/05/2025

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	SQN	Question Text	R/U/A	Co	Marks
Q.1		Attempt any **THREE: (2 X 3)**			**06**
	a)	Draw convention of line - long chain thin and thick at both ends.	R	CO1	02
	b)	Draw Pentagon having side 40mm.	R	CO1	02
	c)	List applications of Mini drafter (any two)	U	CO1	02
	d)	Redraw the figure and give dimension using chain dimensioning system. (Assume dimension) 	R	CO1	02
	e)	Divide circle of diameter 60mm in 8 equal parts.	R	CO1	02
Q.2		Attempt any **TWO: (6 X 3)**			**18**
	a)	Two fixed points F1 and F2 are 75mm apart. Draw the curve traced out by a point P, moving in such a way that difference between its distance from F1 and F2 is always constant and equal to 44mm.	U	CO2	06
	b)	A circle of 40mm diameter rolls along the circumference of another circle of 120mm diameter from outside. Trace the path of a point on the circumference of the rolling circle for one complete revolution.	U	CO2	06
	c)	Draw involute of a Pentagon of 25mm side.	U	CO2	06
	d)	Draw an Archimedean spiral of one revolution, the maximum and minimum radii being 80mm and 20mm respectively.	U	CO2	06
Q.3		Attempt any **TWO: (5 X 2)**			**10**
	a)	A line AB of length 75mm has its end 10mm above H.P. Line is parallel to V.P. and 20mm infront of it and plan length of line is 50mm. Draw the projection of line.	U	CO2	05
	b)	A line AB of length 60 mm has its mid-point M 10 mm above the HP and 30 mm infront of the VP. Line is parallel to HP and is inclined at 35° to the VP. Draw three views of the line and find its elevation length	U	CO3	05
	c)	A line AB having true length 70mm has its end A 20mm above H.P. and line is 35mm front of the V.P. Draw the projection of the line AB if it is perpendicular to H.P.	U	CO3	05

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WINTER / SUMMER- 2025

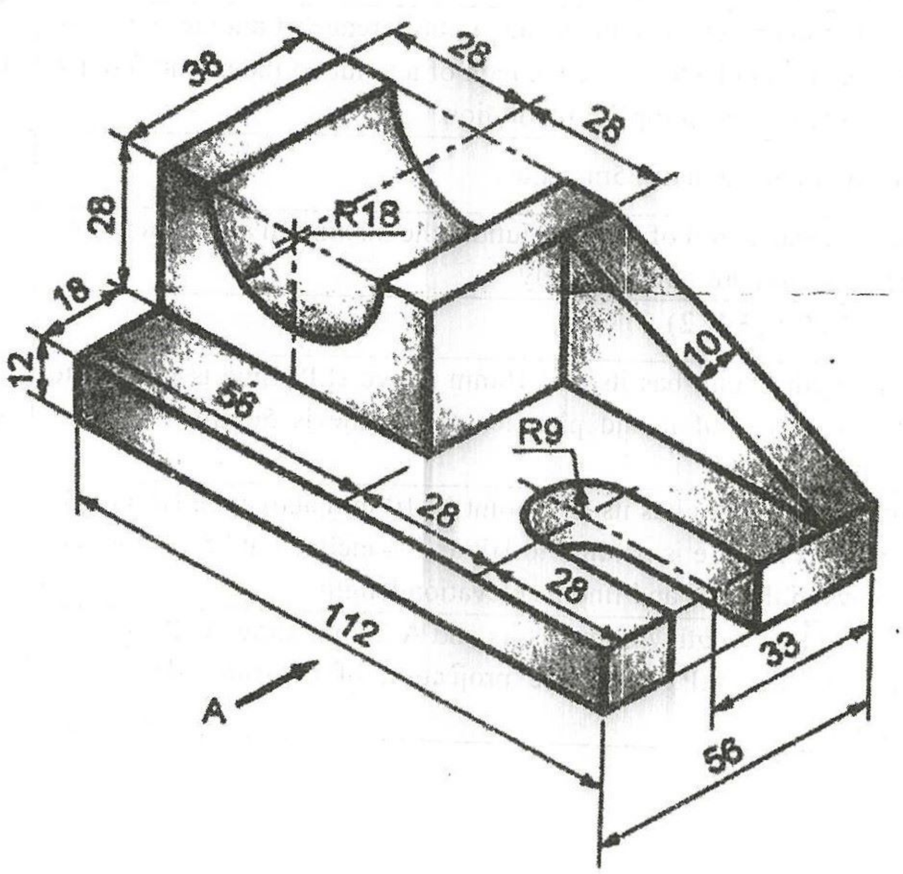
EXAM SEAT NO.

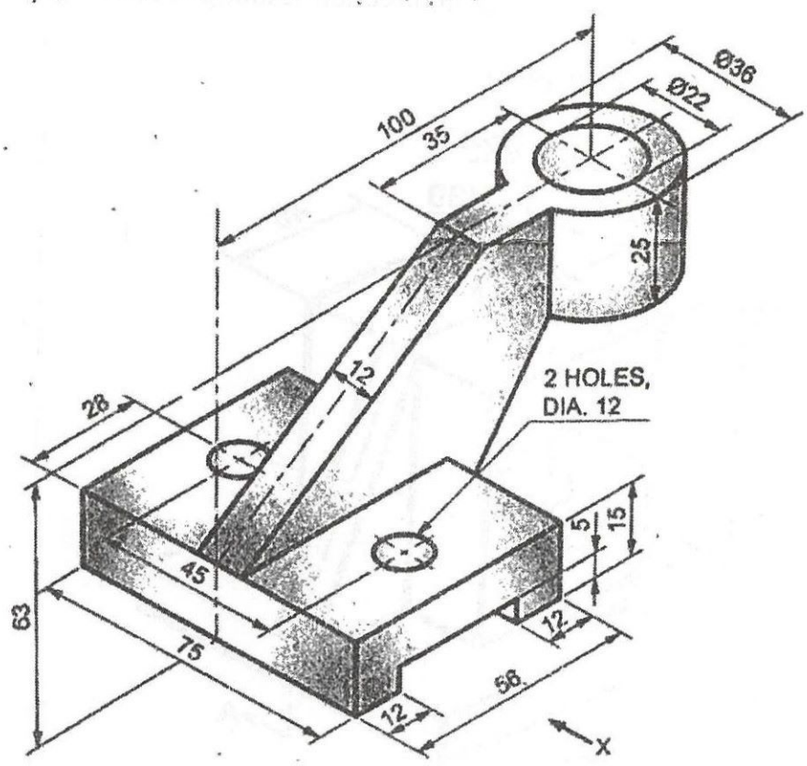
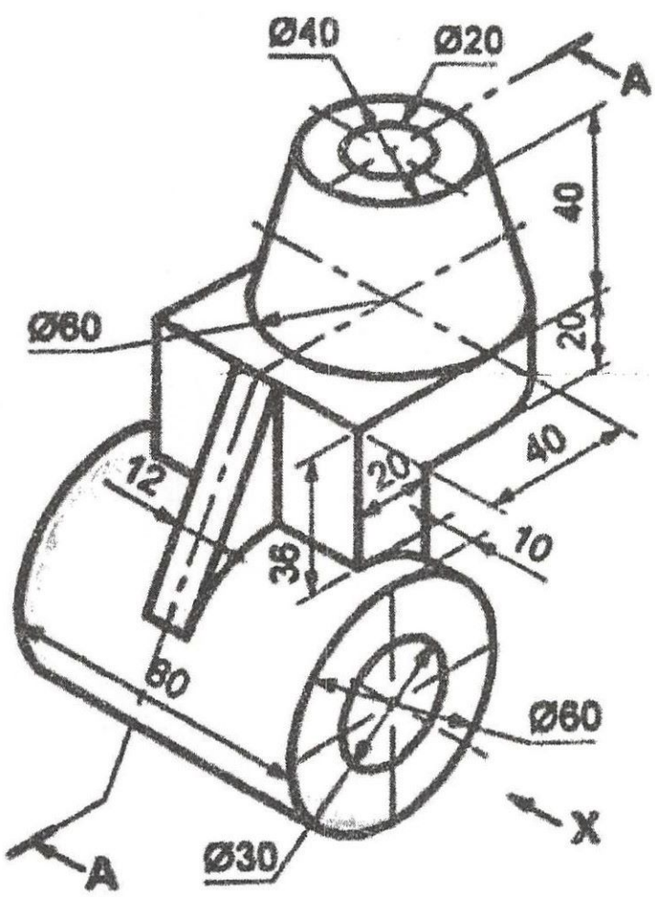
LEVEL : - First PROGRAM : COMMON

COURSE CODE :- CCH106 /CCF107/ CCG107

COURSE NAME :- ENGINEERING GRAPHICS

MAX. MARKS : 70 TIME : 02 Hrs DATE :-19 / 05 /2025

QN	SQN	Question Text	R/U/A	CO CCH106 -	Marks
Q.4		Attempt any **TWO: (2 X 5M)**			**10**
	a)	A pentagonal plane of side 35 mm is kept on the H.P. on one of its comers with the side opposite to the corner is 30 mm above H.P. and perpendicular to V.P. Draw three views of the pentagonal plane and find its inclination with the H.P.	A	04	
	b)	A circular plate of diameter 60 mm is resting on the V.P. on a point of its circumference. The plate is inclined to V.P. in such a way that the elevation length of diameter passing through the point on V.P. is 35 mm. The plate is perpendicular to H.P. Draw three views of the plate and find its inclination with V.P.	A	04	
	c)	An equilateral triangle of side 50 mm is resting on the V.P. on one of its sides in such a way that its F.V. appears to be an isosceles triangle of altitude 25 mm. Plane is perpendicular to H.P. Draw three views of the plane and find its inclination with V.P.	A	04	
Q.5		Attempt any **ONE: (1 X 14M)**			**14**
	a)	Figure given below shows an isometric view of an object. Draw i) Front View looking in direction A (5 M) ii) Top View (4 M) iii) Right Hand Side View (5 M) 	A	05	

	b)	Figure given below shows an isometric view of an object. Draw i) Front View looking in direction X (5 M) ii) Top View (4 M) iii) Left Hand Side View (5 M)  	A	05	
Q.6		Attempt any **ONE: (1 X 12M)**			**12**
	a)	Figure given below shows an isometric view of an object. Draw i) Sectional Front View looking in direction X along A-A (6M) ii) Left Hand Side View (6 M)  	A	05	

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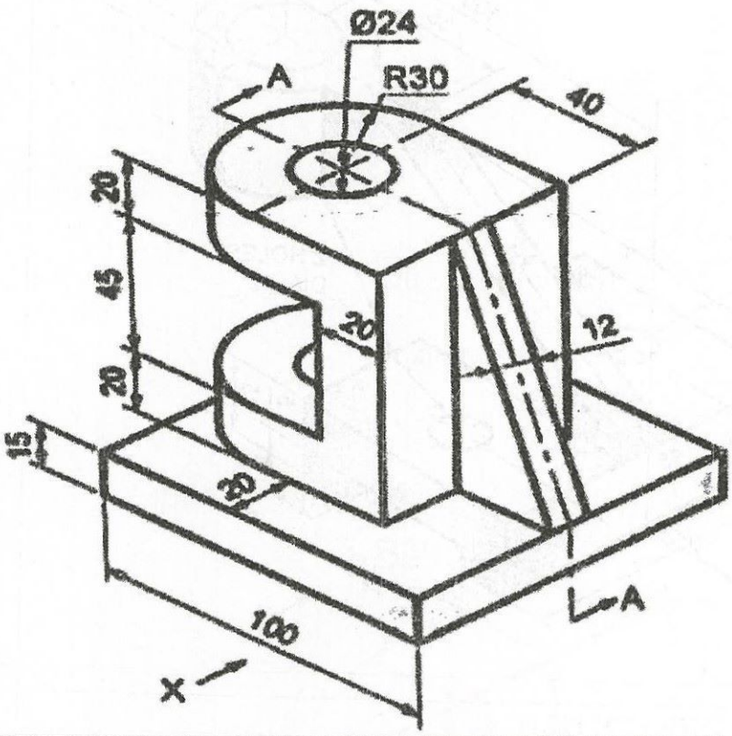
	b)	Figure given below shows an isometric view of an object. Draw i) Sectional Front View looking in direction X along A-A (4M) ii) Top View (4M) iii) Right Hand Side View (4M)  	A	05	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER- 2025

EXAM SEAT NO. | | | | | | |

LEVEL: - First PROGRAM: COMMON

COURSE CODE: - CCH201

COURSE NAME: - Communication skills in English

MAX. MARKS: 70 TIME: **03 Hrs** DATE: 24/5/25

Instructions: -

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	SQN	Question Text	R/U/A	Co	Marks
Q.1		Attempt any **THREE: (2 X 3)**			06
	a)	Give two words starting with- 1.Pro--, 2.Infra--.	R	CCH201-1	02
	b)	Give two words ending with-1. --tion, 2.--ful	R	CCH201-1	02
	c)	Write synonyms of 1. Begin 2. Quiet	R	CCH201-1	02
	d)	Write antonyms of 1. Cheap 2. Natural	R	CCH201-1	02
	e)	Mention types of media aids used for any presentation event.	A	CCH201-6	02
Q.2		Attempt any **FOUR: (4 X 4)**			16
	a)	'Communication is a two -way process' Explain with diagram and one example?	U	CCH201-2	04
	b)	Distinguish between Formal and Informal communication.	U	CCH201-2	04
	c)	Identify the types of barriers in given the following phrases/ sentences. 1. Spread ink on the Newspaper page. 2. Prejudice in mind of a person. 3. When a public speaker is addressing a large gathering, there is a power failure. 4. Inferiority complex in an employee.	A	CCH201-2	04
	d)	Identify the words given in the phonetic transcription (I.P.A. Symbols) and rewrite them in English spelling accordingly. 1. /ðæt/ 2. /meni/ 3. /sɪstəm/ 4. /pɔɪnt/	A	CCH201-3	04
	e)	Develop a short dialogue between a doctor and a patient.	A	CCH201-3	04
	f)	Explain the importance of eye contact in communication with one example.	U	CCH201-4	04
Q.3		Attempt any **TWO: (6 X 2)**			12
	a)	Write a letter of application to 'Softouch, Delhi-13' for the post of Junior Engineer. Attach your resume to this letter also.	A	CCH201-5	06
	b)	Draft an accident report which took place in workshop of your college. Suggest preventive measures.	A	CCH201-5	06
	c)	Draft a short dialogue between friends about the movie watched recently.	A	CCH201-3	06

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER / SUMMER- 2025

EXAM SEAT NO. | | | | | | |

LEVEL: - First PROGRAM: Common

COURSE CODE: - CCH106

COURSE NAME: - Communication Skills

MAX. MARKS: 70 TIME: **03 Hrs.** DATE: -24/5/25

QN	SQN	Question Text	R/U/A	Co CCH106	Marks
Q.4		Attempt any **FOUR: (2 X 4)**			**08**
	a)	Write the full forms of 'cc' and 'bcc' in email communication.	R	5	
	b)	Give a short information about Vocalics.	R	4	
	c)	What do you mean by written communication?	U	5	
	d)	Define the term 'Haptics'.	U	4	
	e)	What is Résumé?	R	5	
	f)	Write the importance of written communication for employees.	U	5	
Q.5		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Write a note on Email.	R	5	
	b)	Explain the Advantages and Disadvantages of Graphical Communication.	U	4	
	c)	What is a Media Presentation?	R	6	
	d)	Write advantages of Written Communication.	R	5	
	e)	Write a short note on P. P. T.	U	6	
	f)	Elucidate. Non-Verbal communication has different purposes.	U	5	
Q.6		Attempt any **TWO: (6 X 2)**			**12**
	a)	Imagine that a minor accident took place while one of your friends experimenting in your college laboratory. Prepare a report including the points of Observation and Recommendation to avoid such accident in future. Submit the report to your college principal.	A	4	
	b)	Write an application letter with Resume, for the post of Junior Civil Engineer to The Manager, IRB Infrastructure Pvt. Ltd., Industrial Estate, Gat no-11, Pune, Maharashtra -416112.	A	5	
	c)	Write an Enquiry letter for Bulk Purchase of Materials-Fabrics for your business. Address to The Manager, Mahalaxmi Textiles, T 49/50, Kagal M.I.D.C, Kolhapur, Maharashtra- 416216	A	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER- 2025

EXAM SEAT NO. | | | | | | |

LEVEL: - First• PROGRAM: COMMON

COURSE CODE: - CCH201

COURSE NAME: - Communication skills in English

MAX. MARKS: 70 TIME: **03 Hrs** DATE: 24/5/25

Instructions: -

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	SQN	Question Text	R/U/A	Co	Marks
Q.1		Attempt any **THREE: (2 X 3)**			**06**
	a)	Give two words starting with- 1.Pro--, 2.Infra--.	R	CCH201-1	02
	b)	Give two words ending with-1. --tion, 2.--ful	R	CCH201-1	02
	c)	Write synonyms of 1. Begin 2. Quiet	R	CCH201-1	02
	d)	Write antonyms of 1. Cheap 2. Natural	R	CCH201-1	02
	e)	Mention types of media aids used for any presentation event.	A	CCH201-6	02
Q.2		Attempt any **FOUR: (4 X 4)**			**16**
	a)	'Communication is a two -way process' Explain with diagram and one example?	U	CCH201-2	04
	b)	Distinguish between Formal and Informal communication.	U	CCH201-2	04
	c)	Identify the types of barriers in given the following phrases/ sentences. 1. Spread ink on the Newspaper page. 2. Prejudice in mind of a person. 3. When a public speaker is addressing a large gathering, there is a power failure. 4. Inferiority complex in an employee.	A	CCH201-2	04
	d)	Identify the words given in the phonetic transcription (I.P.A. Symbols) and rewrite them in English spelling accordingly. 1. /ðæt/ 2. /meni/ 3. /sɪstəm/ 4. /pɔɪnt/	A	CCH201-3	04
	e)	Develop a short dialogue between a doctor and a patient.	A	CCH201-3	04
	f)	Explain the importance of eye contact in communication with one example.	U	CCH201-4	04
Q.3		Attempt any **TWO: (6 X 2)**			**12**
	a)	Write a letter of application to 'Softouch, Delhi-13' for the post of Junior Engineer. Attach your resume to this letter also.	A	CCH201-5	06
	b)	Draft an accident report which took place in workshop of your college. Suggest preventive measures.	A	CCH201-5	06
	c)	Draft a short dialogue between friends about the movie watched recently.	A	CCH201-3	06

P.T.O.

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER / SUMMER- 2025

EXAM SEAT NO. | | | | | | |

LEVEL: - First PROGRAM: Common

COURSE CODE: - CCH106

COURSE NAME: - Communication Skills

MAX. MARKS: 70 TIME: **03 Hrs.** DATE: -24/5/25

QN	SQN	Question Text	R/U/A	Co CCH106	Marks
Q.4		Attempt any **FOUR: (2 X 4)**			**08**
	a)	Write the full forms of 'cc' and 'bcc' in email communication.	R	5	
	b)	Give a short information about Vocalics.	R	4	
	c)	What do you mean by written communication?	U	5	
	d)	Define the term 'Haptics'.	U	4	
	e)	What is Résumé?	R	5	
	f)	Write the importance of written communication for employees.	U	5	
Q.5		Attempt any **FOUR: (4 X 4)**			**16**
	a)	Write a note on Email.	R	5	
	b)	Explain the Advantages and Disadvantages of Graphical Communication.	U	4	
	c)	What is a Media Presentation?	R	6	
	d)	Write advantages of Written Communication.	R	5	
	e)	Write a short note on P. P. T.	U	6	
	f)	Elucidate. Non-Verbal communication has different purposes.	U	5	
Q.6		Attempt any **TWO: (6 X 2)**			**12**
	a)	Imagine that a minor accident took place while one of your friends experimenting in your college laboratory. Prepare a report including the points of Observation and Recommendation to avoid such accident in future. Submit the report to your college principal.	A	4	
	b)	Write an application letter with Resume, for the post of Junior Civil Engineer to The Manager, IRB Infrastructure Pvt. Ltd., Industrial Estate, Gat no-11, Pune, Maharashtra -416112.	A	5	
	c)	Write an Enquiry letter for Bulk Purchase of Materials-Fabrics for your business. Address to The Manager, Mahalaxmi Textiles, T 49/50, Kagal M.I.D.C, Kolhapur, Maharashtra- 416216	A	5	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER / WINTER -2025

EXAM SEAT NO. | | | | | | |

LEVEL: First **program : CE/ME/MT**

Course code : CCH108/CCF110/CCG110

Couse name – Applied Mechanics

MAX. MARKS : 70 TIME : **03 Hrs** DATE :-22/05/2025

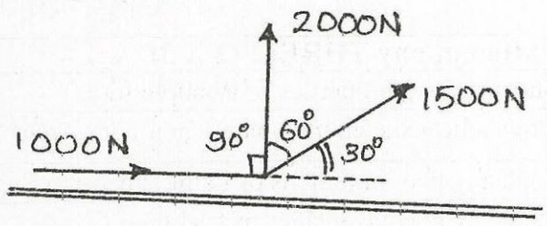
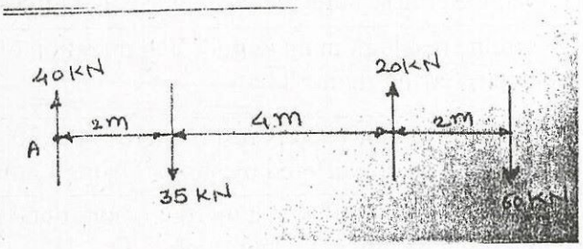
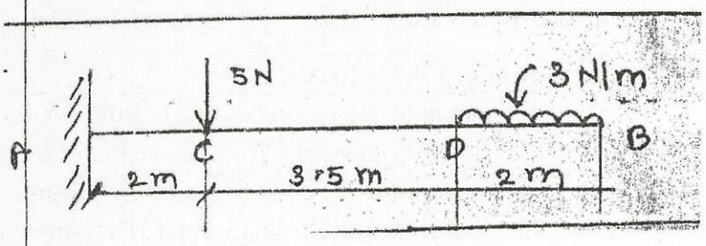
Instruction :-

1) Illustrate your answers with sketches wherever necessary.
2) Use of non-programmable pocket calculator is permissible.
3) Assume and mention suitable additional data if necessary.
4) Use of Mobile is strictly prohibited.
5) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

QN	SQN	Question Text	R/U/A	Co	Marks
Q.1		**Attempt any THREE: (2 X 3)**			**0**
	a)	State any two properties of a couple force.	R	CCH108-1	
	b)	Draw a neat sketch of coplanar non-concurrent force system.	U	CCH108-1	
	c)	State any two limitations of Lami's theorem.	R	CCH108-2	
	d)	State any two advantages of friction.	R	CCH108-3	
	e)	Draw any two types of loads on a simply supported beam and name it.	U	CCH108-3	
Q.2		**Attempt any FOUR: (4 X 4)**			**1**
	a)	A square ABCD clockwise in order with AB as bottom side, each side of 1m is acted by forces 10 KN,20KN,10KN direction along sides AB, BC, CD taken in anticlockwise order. Determine resultant in magnitude and direction and its position from 'A' by analytical method.	A	CCH108-1	
	b)	If two concurrent force P each are required to be equivalent to a single force P,then Determine angle between these two forces.	A	CCH108-1	
	c)	Determine resultant in magnitude and direction of force system by graphical method referring fig no 1.	A	CCH108-2	
	d)	A sphere of weight 1000 N rest in a groove at 30° and 60° to the horizontal plane. Determine reaction offered by support using Lami's theorem.	A	CCH108-2	
	e)	A body of weight 500 N rest on rough horizontal plane. A force of 190 N required to just move it. Determine, 1)Normal reaction 2) Frictional resistance 3)Coefficient of friction 4) Resultant reaction.	A	CCH108-3	
	f)	Four unlike parallel force of 40 KN ,35KN,20KN,60KN acting as show in fig No. 2. Determine resultant in magnitude and direction and its position with respect to 40 KN force . Use analytical method. (Refer fig no 2.)	A	CCH108-2	
Q.3		**Attempt any TWO: (6 X 2)**			**1**
	a)	A regular hexagon rested on one of the its side, Six forces of 1N,2N,3N,4N,5N,6N are acting from the center of hexagon towards the angular points. 1N force is acting horizontally towards right and other forces are taken in clockwise order from1N force. Determine their resultant in magnitude and direction. Use analytical method	A	CCH108-1	
	b)	Determine centroid of unsymmetrical I-section if, 1) Top flange= (100 X 20) mm 2) Bottom flange = (200 X 20) mm 3) Web thickness= 20 mm 4) Overall depth of section = 240 mm	A	CCH108-2	
	c)	i)-Determine Support reaction of the beam Referring to **fig no 3** by analytical method. ii)-A Simply supported beam of span "L" carries point load "W" at its center . Determine support reaction of beam.	A	CCH108-3	

PTO

Fig chart

SR NO	Fig no	Question no	Fig for reference
1	Fig no.1	Q.2 c	
2	Fig no.2	Q.2 f	
3	Fig no 3	Q.3 c	

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER/ WINTER -2025

EXAM SEAT NO. | | | | | | |

LEVEL : - II Sem PROGRAM : CE/ME/MT

COURSE CODE :- CCF110/CCG110/CCH108

COURSE NAME :- Applied Mechanics

MAX. MARKS : 70 TIME : **03 Hrs** DATE :- 22/05/25

QN	SQN	Question Text	R/U/A	Co	Marks
Q.4		Attempt any **FOUR: (2 X 4)**			**08**
	a)	Define effort lost in friction with formula.	R	4	
	b)	State any two advantages of machines.	U	4	
	c)	Differentiate between rectilinear motion and angular motion.	R	5	
	d)	What is the D Alembert's principle for Dynamic equilibrium?	U	5	
	e)	Name the two forms of mechanical energy with its S.I units.	U	6	
	f)	Define power and state its S.I unit.	R	6	
Q.5		Attempt any **FOUR: (4 X 4)**			**16**
	a)	In a machine, an effort required to lift a certain load is 200 N. When efficiency is 60% find the ideal effort.	A	4	
	b)	Draw a neat labelled sketch of differential axle & wheel and state V.R. formula.	R	4	
	c)	A screw jack having 5 mm pitch and has 300 mm as diameter of effort wheel is used to lift a load of 80 kN. Find V.R. and effort required it efficiency of machine is 40%.	A	4	
	d)	Explain with field example " Potential energy and Kinetic energy."	U	5	
	e)	A body starts from rest with a constant acceleration of 0.5 m/s^2 after what time its velocity be 2.5 m/s and how much distance it will be travelling during this time.	A	5	
	f)	A locomotive pulls a train with a uniform velocity of 36 k.m.p.h and exerts a tractive pull of 12kN. Find the work done by locomotive in 10 minutes.	A	6	
Q.6		Attempt any **TWO: (6 X 2)**			**12**
	a)	i) How will you find whether machine is reversible or not ?	U	4	
		ii) In a lifting machine, a load of 10 kN is raised by effort of 300 N. If the efficiency is 75%. Calculate MA & V.R., if the machine lifts 20 kN load by effort of 550 N. Find the law of machine.	A	4	
	b)	A motor driven grinding wheel starts from rest and receives a constant acceleration of 4 rad/s^2 for 18 sec. Find: i) Speed of the wheel in rpm at the end of this interval. ii) Total angel through which the wheel is turned during this time.	A	5	
	c)	12 m^3 of water is to be lifted to a height of 30m in one hour by a pump. If efficiency of the pump is 70%, find the power required.	A	6	

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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WINTER / SUMMER- 2025

EXAM SEAT NO. | | | | | | |

LEVEL : - First PROGRAM : CE/MT

COURSE CODE :-CCH110 /CCG108

COURSE NAME :- ENGINEERING DRAWING

MAX. MARKS : **34** TIME : **04Hrs** DATE :- 06/05/2025

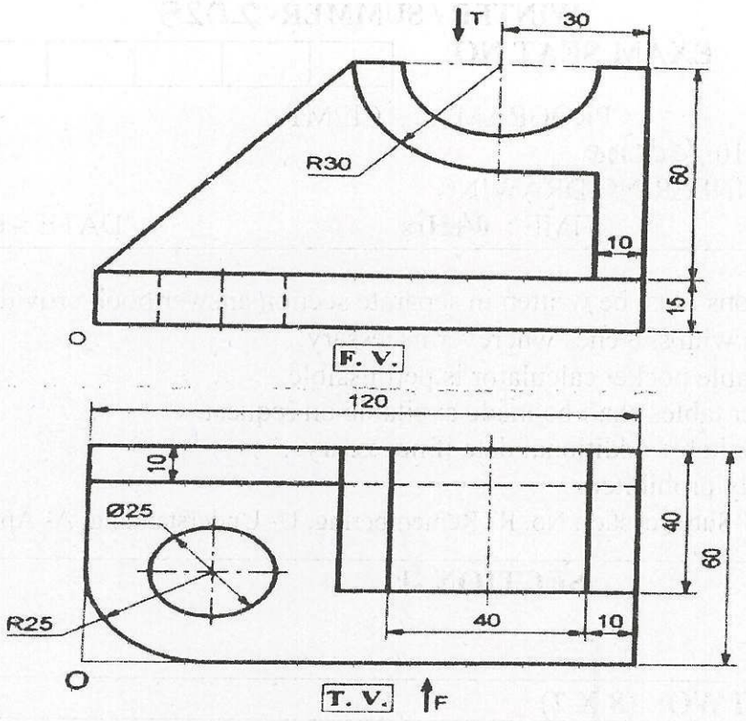
Instruction :-

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.

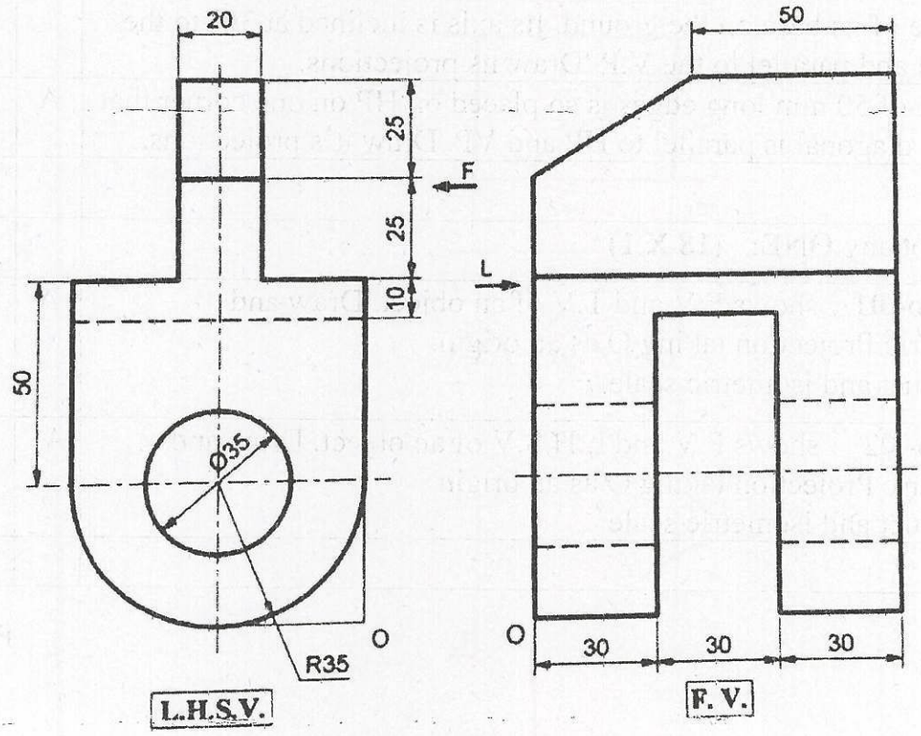
QN	SQN	**SECTION -I**	R/U/A	Co	Marks
Q.1		Attempt any **TWO: (8 X 2)**			**16**
	a)	A right circular cone, base 50 mm diameter and axis 60 mm long, is resting on its apex on H.P. Draw the projection of cone, when the axis is parallel to V.P. and inclined at 45° to H.P.	A	01	8
	b)	A hexagonal pyramid, base 25 mm side and axis 50 mm long, has an edge of its base on the ground. Its axis is inclined at 30° to the ground and parallel to the V.P. Draw its projections.	A	01	8
	c)	A cube of 50 mm long edges is so placed on HP on one corner that a body diagonal is parallel to HP and VP. Draw it's projections.	A	01	8
Q.2		Attempt any **ONE: (18 X 1)**			**18**
	a)	**Fig. No- 01** shows F.V and T.V of an object. Draw and Isometric Projection taking O as an origin. Construct and isometric scale.	A	02	16 02
	b)	Fig.No- 02 shows F.V and L.H.S.V of an object. Draw and Isometric Projection taking O as an origin. Construct and isometric scale.	A	02	16 02

P.T.O.

1/4



Q-2A-Fig.No-01



Q-2B-Fig.No-02

GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

SUMMER- ~~2024~~ 2025

EXAM SEAT NO. | | | | | | |

LEVEL: - First PROGRAM: ~~CE~~ /MT

COURSE CODE: - CCH110 / CC4108

COURSE NAME: - ENGINEERING DRAWING

MAX. MARKS: **70** TIME: ~~4~~ **Hrs** DATE: -05/05/2025

QN	SQN	SECTION –II	R/U/A	Co	Marks
Q.3		Attempt any **TWO: (7 X 2)**			**14**
	a)	Figure No. 4 shows front view and top view of an object. Draw the following views by using first angle method of projection. (i) front view (ii) Top view (iii) Left hand side view	U	3	7
	b)	Figure No. 5 shows the F.V. and S.V. of the object. Draw the following views. (i) Front view (ii) Top view (iii) Right hand side view	U	3	7

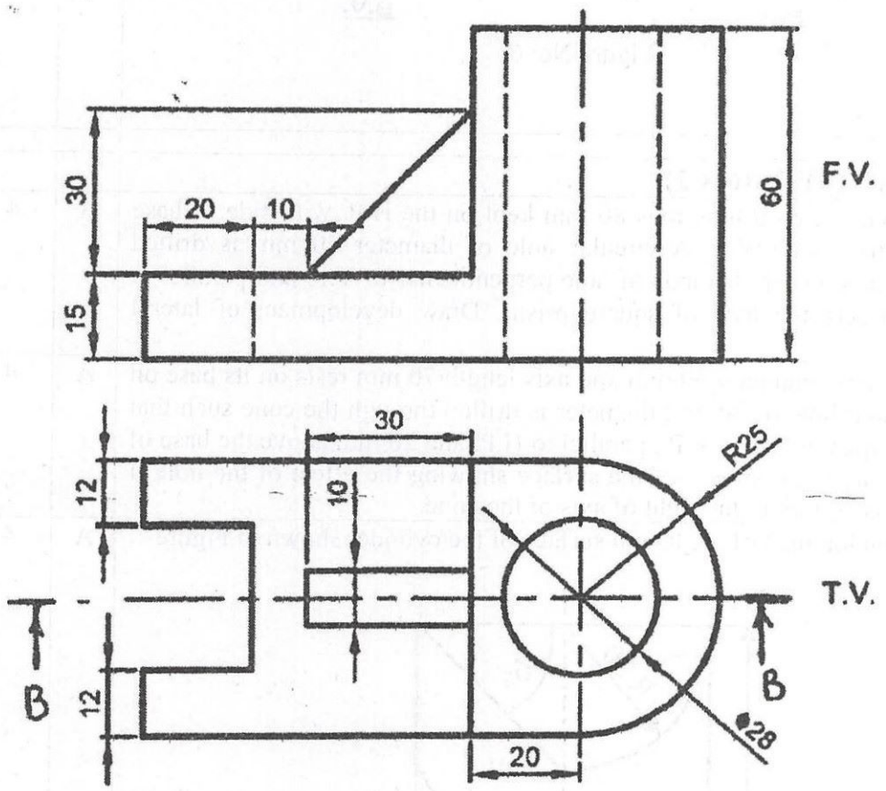


Figure No. 4

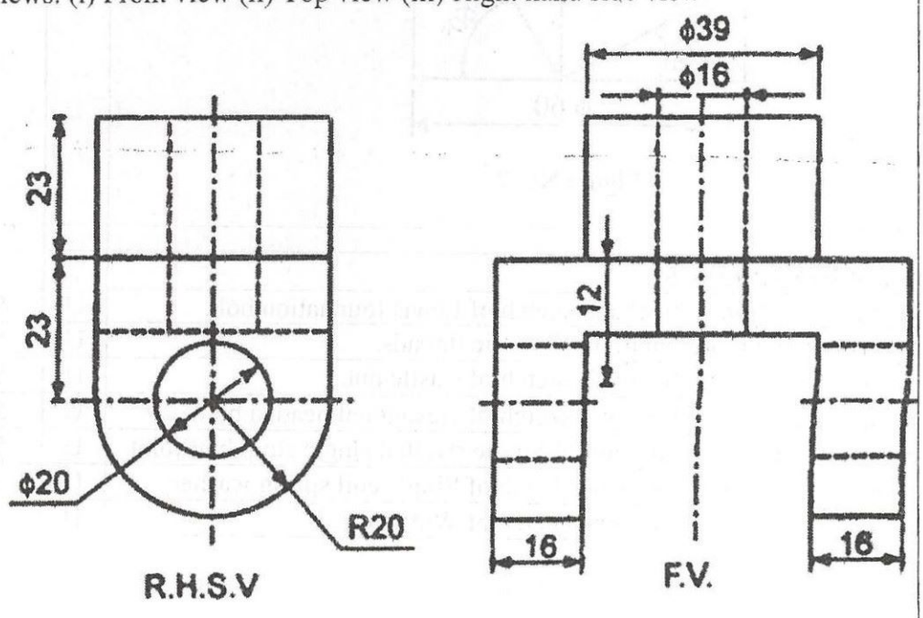
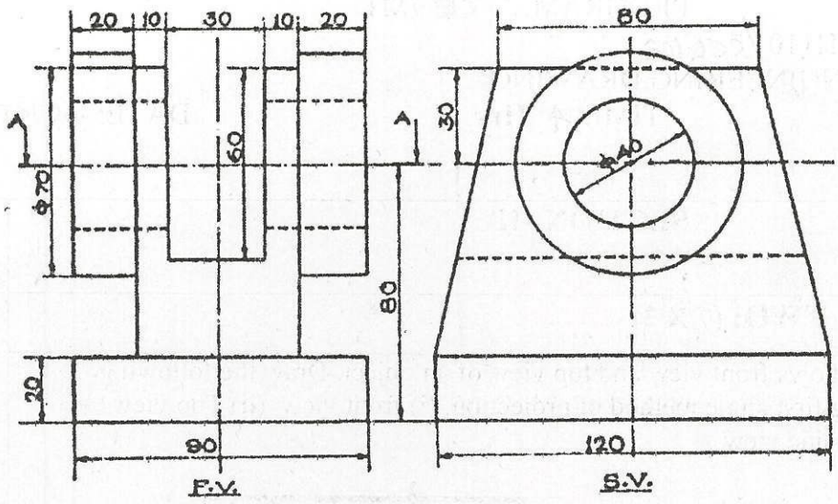
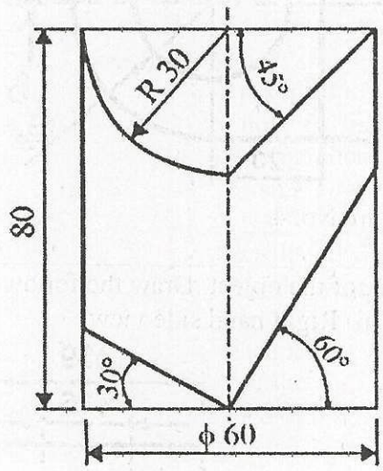


Figure No. 5

3/4

	c)	Figure No. 6 shows the Front View and Side view from left. Draw the following views of the objected using first angle method of projection: (i) Front View (ii) Left Hand Side View (iii) Top View (missing view)  Figure No. 6	U	3	7
Q.4		Attempt any **TWO: (6 X 2)**			**12**
	a)	A square prism side 40 mm, axis 80 mm kept on the H.P. with side of base equally inclined with V.P. A circular hole of diameter 40 mm is drilled through the prism such that axis of hole perpendicular to V.P. and parallel to H.P. and bisects the axis of square prism. Draw development of lateral surface.	A	4	6
	b)	A cone with base diameter 60 mm and axis length 70 mm rests on its base on H.P. A circular hole of 30 mm diameter is drilled through the cone such that its axis is perpendicular to V.P., parallel to H.P. and 20 mm above the base of cone. Draw the development of the surface showing the effect of the hole if axis of hole is 10 mm to the right of axis of the cone.	A	4	6
	c)	Draw the development of the lateral surface of the cylinder shown in Figure No. 7.  Figure No. 7	A	4	6
Q.5		Attempt any **FIVE: (2 X 5)**			**10**
	a)	Draw neat and proportionate freehand sketch of Lewis foundation bolt.	U	5	2
	b)	Draw the conventional representation of Metric threads.	U	5	2
	c)	Draw neat and proportionate freehand sketch of Castle nut.	U	5	2
	d)	Draw neat and proportionate freehand sketch of Hexagonal headed bolt.	U	5	2
	e)	Draw the conventional representation of Single rivetted single strap butt joint.	U	5	2
	f)	Draw neat and proportionate freehand sketch of Single coil spring washer.	U	5	2
	g)	Draw neat and proportionate freehand sketch of Wing nut.	U	5	2

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