# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER- 2023**

**EXAM SEAT NO.** | | | | | | |

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

COURSE CODE :- CEG301/CE201/MEG301/EEG302/EIG301/EIF301/EJ201

COURSE NAME :- Applied Mathematics

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 11/ **12** / **2023**

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 CEG301 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Evaluate : $\int (a^x + x^a + a^a)dx$ | R | 1 | |
| | b) | Evaluate : $\int \sin x.\sec^2 x\, dx$ | R | 1 | |
| | c) | Evaluate : $\int \frac{2x+1}{2x+3}.\, dx$ | U | 1 | |
| | d) | Evaluate : $\int_2^{11} \frac{1}{2x+11}.dx$ | R | 2 | |
| | e) | Evaluate : $\int_{-1}^{1} \frac{1}{1+x^2}.\, dx$ | A | 2 | |
| | f) | Find the area bounded by the curve $y = 3x^2$, x-axis and ordinates x=1, x=3 | A | 3 | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Evaluate : $\int \frac{\sin x}{\sin(x+a)}\, dx$ | U | 1 | |
| | b) | Evaluate : $\int \frac{\sec^2 x}{(1+\tan x)\,(3+\tan x)}.\, dx$ | A | 1 | |
| | c) | Evaluate : $\tan^{-1} x\, .dx$ | A | 1 | |
| | d) | Evaluate : $\frac{\cos x}{4+\sin^2 x}.dx$ | A | 1 | |
| | e) | Evaluate : $\int_3^5 \frac{\sqrt{8-x}}{\sqrt{8-x}+\sqrt{x}}.\, dx$ | A | 2 | |
| | f) | Evaluate : $\int_0^{\frac{\Pi}{4}} \cos^2 x.dx$ | U | 2 | |

P.T.O.

| Q.3 | | Attempt any **FOUR:** | | | 16 |
|---|---|---|---|---|---|
| | a) | Evaluate : $\int_0^{\frac{\Pi}{4}} x.\sec^2.\, dx$ | A | 2 | |
| | b) | Evaluate : $\int \frac{x}{\sqrt{x^4+25}}\, dx$ | U | 1 | |
| | c) | Evaluate : $\int \frac{dx}{3-2\sin x}$ | A | 1 | |
| | d) | Find the area of circle $x^2+y^2=4$ using integration method. | A | 3 | |
| | e) | Find the area enclosed by the curve $y=4-x^2$ and x-axis | A | 3 | |
| | f) | Find the area enclosed by parabola $y^2=8x$ and $y=2x$ | A | 3 | |

| QN | SQN | **SECTION –II** | R/U/A | CO CEG301 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | 08 |
| | a) | State first shifting theorem. | R | 3 | |
| | b) | Find order and degree of the differential equation : $\left[1+(\frac{dy}{dx})^3\right]^{\frac{5}{3}} = 2\frac{d^2y}{dx^2}$ | R | 2 | |
| | c) | Solve the D. E. : $\frac{dy}{dx} = \frac{1+x^2}{y}$ | U | 2 | |
| | d) | Define linear differential equation and integrating factor of linear differential equation. | R | 2 | |
| | e) | Find $L\{5\cos 6t - 3\sinh 4t\}$ | R | 2 | |
| | f) | Find $L^{-1}\{\frac{5}{(5+3)^2}\}$ | A | 3 | |
| Q.5 | | Attempt any **FOUR:** | | | 16 |
| | a) | Find $L\{e^t \sin t .\cos 2t\}$ | A | 3 | |
| | b) | Find Laplace transform of $(t+1)^3 e^t$ | U | 3 | |
| | c) | Solve: $xy\log y\, dx + (1+x^2)\, dy = 0$ | U | 2 | |
| | d) | Solve : $\frac{dy}{dx} = \frac{(x+y)^2}{xy}$ | A | 2 | |
| | e) | Solve the linear differential equation: $\frac{dy}{dx} = \frac{e^{\tan^{-1}x}}{1+x^2} - \frac{y}{1+x^2}$ | A | 2 | |
| | f) | Find $L^{-1}\{\frac{s+2}{s^2-2s+5}\}$ | A | 3 | |
| Q.6 | | Attempt any **FOUR:** | | | 16 |
| | a) | Find the particular solution of the differential equation : $(1+x^2)dy - x^2y\, dx = 0$ given that $x=1$, $y=2$. | U | 2 | |
| | b) | Solve : $\cos x\frac{dy}{dx} + 2y\sin x = \sin 2x$ | A | 2 | |
| | c) | Solve : $(e^y+1)\cos x\, dx + e^y \sin x dy = 0$ | A | 2 | |
| | d) | Find : $L^{-1}\{\frac{s^2+9s+2}{(s-1)^2(s+3)}\}$ | U | 3 | |
| | e) | Find $L^{-1}\{\frac{27-12s}{(s+4)(s^2+9)}\}$ | A | 3 | |
| | f) | Find $L\{e^{2t}\sin^2 t\}$ | A | 3 | |

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**WINTER- 2023**

**EXAM SEAT NO.** | | | | | | |

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

COURSE CODE :- CEG301/CE201/MEG301/EEG302/EIG301/EIF301/EJ201

COURSE NAME :- Applied Mathematics

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 11/ **12** / **2023**

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 CEG301 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Evaluate : $\int (a^x + x^a + a^a)dx$ | R | 1 | |
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| | d) | Evaluate : $\int_2^{11} \frac{1}{2x+11}.dx$ | R | 2 | |
| | e) | Evaluate : $\int_{-1}^{1} \frac{1}{1+x^2}.\, dx$ | A | 2 | |
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| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Evaluate : $\int \frac{\sin x}{\sin(x+a)}\, dx$ | U | 1 | |
| | b) | Evaluate : $\int \frac{\sec^2 x}{(1+\tan x)\,(3+\tan x)}.\, dx$ | A | 1 | |
| | c) | Evaluate : $\tan^{-1} x\, .dx$ | A | 1 | |
| | d) | Evaluate : $\frac{\cos x}{4+\sin^2 x}.dx$ | A | 1 | |
| | e) | Evaluate : $\int_3^5 \frac{\sqrt{8-x}}{\sqrt{8-x}+\sqrt{x}}.\, dx$ | A | 2 | |
| | f) | Evaluate : $\int_0^{\frac{\Pi}{4}} \cos^2 x.dx$ | U | 2 | |

P.T.O.

| Q.3 | | Attempt any **FOUR:** | | | 16 |
|---|---|---|---|---|---|
| | a) | Evaluate : $\int_0^{\frac{\Pi}{4}} x.\sec^2.\, dx$ | A | 2 | |
| | b) | Evaluate : $\int \frac{x}{\sqrt{x^4+25}}\, .dx$ | U | 1 | |
| | c) | Evaluate : $\int \frac{dx}{3-2\sin x}$ | A | 1 | |
| | d) | Find the area of circle $x^2+y^2= 4$ using integration method. | A | 3 | |
| | e) | Find the area enclosed by the curve $y= 4-x^2$ and x-axis | A | 3 | |
| | f) | Find the area enclosed by parabola $y^2=8x$ and $y= 2x$ | A | 3 | |

| QN | SQN | **SECTION –II** | R/U/A | CO CEG301 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | State first shifting theorem. | R | 3 | |
| | b) | Find order and degree of the differential equation : $\left[1+(\frac{dy}{dx})^3\right]^{\frac{5}{3}} = 2\frac{d^2y}{dx^2}$ | R | 2 | |
| | c) | Solve the D. E. : $\frac{dy}{dx} = \frac{1+x^2}{y}$ | U | 2 | |
| | d) | Define linear differential equation and integrating factor of linear differential equation. | R | 2 | |
| | e) | Find $L\{5\cos 6t - 3\sinh 4t\}$ | R | 2 | |
| | f) | Find $L^{-1}\{\frac{5}{(5+3)^2}\}$ | A | 3 | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Find L { $e^t \sin t .\cos 2t$} | A | 3 | |
| | b) | Find Laplace transform of $(t+1)^3 e^t$ | U | 3 | |
| | c) | Solve: $xy \log y\, dx + (1+x^2)\, dy = 0$ | U | 2 | |
| | d) | Solve : $\frac{dy}{dx} = \frac{(x+y)^2}{xy}$ | A | 2 | |
| | e) | Solve the linear differential equation: $\frac{dy}{dx} = \frac{e^{\tan^{-1}x}}{1+x^2} - \frac{y}{1+x^2}$ | A | 2 | |
| | f) | Find $L^{-1}\{\frac{s+2}{s^2-2s+5}\}$ | A | 3 | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Find the particular solution of the differential equation : $(1+x^2)\, dy - x^2 y\, dx = 0$ given that $x=1$, $y=2$. | U | 2 | |
| | b) | Solve : $\cos x \frac{dy}{dx} + 2y\sin x = \sin 2x$ | A | 2 | |
| | c) | Solve : $(e^y+1)\cos x\, dx + e^y \sin x dy = 0$ | A | 2 | |
| | d) | Find : $L^{-1}\{\frac{s^2+9s+2}{(s-1)^2(s+3)}\}$ | U | 3 | |
| | e) | Find $L^{-1}\{\frac{27-12s}{(s+4)(s^2+9)}\}$ | A | 3 | |
| | f) | Find L $\{e^{2t} \sin^2 t\}$ | A | 3 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL: - First PROGRAM: ME

COURSE CODE: - CCH107

COURSE NAME: - ENGINEERING GRAPHICS

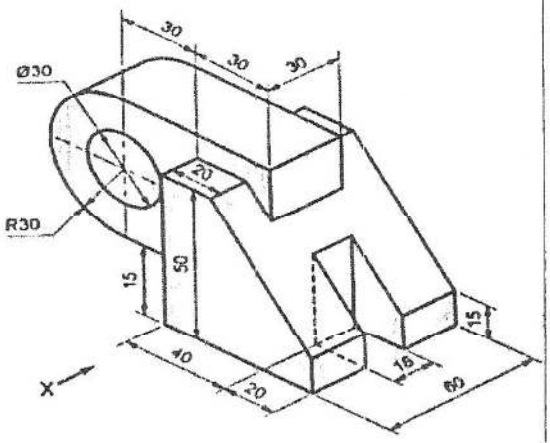
MAX. MARKS: 70 TIME: **04 Hrs.** DATE: -18/12/23

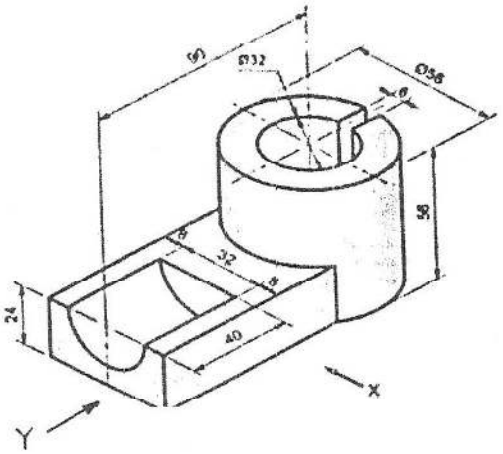
Instruction :-

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.

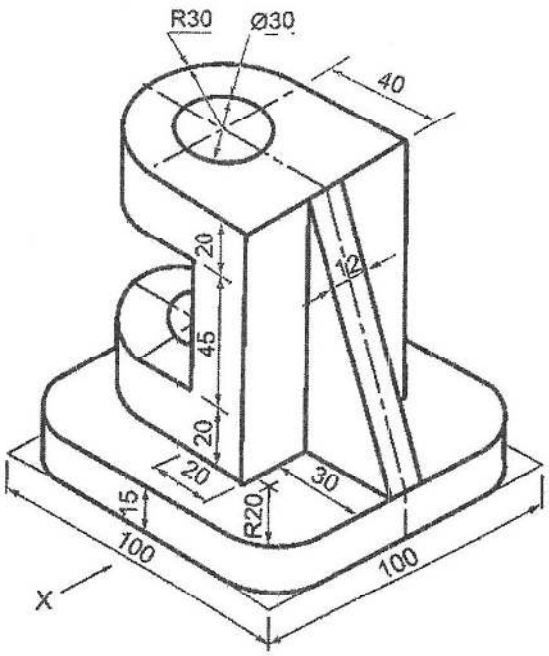
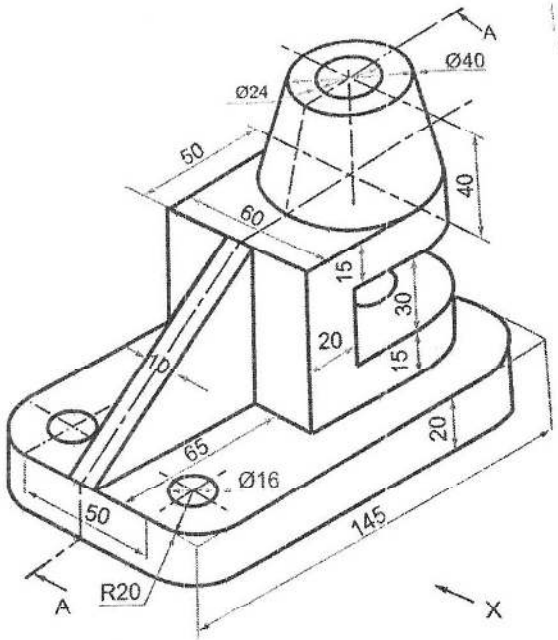
| QN | SQN | Question Text | R/U/A | CO CCH 107- | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **THREE: (2 X 3)** | | | **06** |
| | a) | Daw any four types of line with application | R | CO1 | 02 |
| | b) | Divide the 65 mm line into eight Equal parts | U | CO1 | 02 |
| | c) | Draw the Pentagon of side 30 mm | U | CO1 | 02 |
| | d) | Write any two Methods to draw Ellipse | R | CO2 | 02 |
| | e) | Calculate length of scale if RF is 1:400 to measure maximum length of 60 meters. | R | CO1 | 02 |
| | | | | | |
| Q.2 | | Attempt any **TWO: (6 X 3)** | | | **18** |
| | a) | Construct a parabola when the distance of a focus from the directrix is 50mm by using directrix focus method. | U | CO2 | 06 |
| | b) | Draw an involute of pentagon having side 50 mm. | U | CO2 | 06 |
| | c) | Construct an ellipse when major axis is 120mm and minor axis is 70mm by using concentric circles method. | U | CO2 | 06 |
| | d) | Draw an epicycloid with rolling circle diameter 60 mm and directing circle diameter 160 mm | U | CO2 | 06 |
| | | | | | |
| Q.3 | | Attempt any **TWO: (5 X 2)** | | | **10** |
| | a) | A line AB length 65 mm has its end A 15 mm in front of VP line is Parallel to HP and 30 mm Above it. Draw three views of line when elevation length is 55 mm. Find inclination of line with VP. | U | CO3 | 05 |
| | b) | A straight line AB of length 70mm as its end A on HP and 30mm In Front of VP Line is parallel to VP and inclined at 45 ° to HP draw three views of Line AB | U | CO3 | 05 |
| | c) | A line AB makes an angle of 45° with V.P. and is situated on the H.P. End A and B of the line are 50 mm and 20 mm respectively Infront of the V.P. Draw three views of the line and find true length and elevation length. | U | CO3 | 05 |
| | | | | | |

| QN | SQN | | R/U/A | CO CCH107- | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **TWO: (2 X 6)** | | | 12 |
| | a) | Draw the projection of a circular plane having a diameter of 75 mm. The plane is perpendicular to HP and inclined to VP at 45 degrees. Draw its three views. | U | 04 | |
| | b) | A Hexagonal plate of side 30 mm rests on HP on one of its corners. Plane is perpendicular to VP & inclined with HP at 35 degrees. Draw its three views. | A | 04 | |
| | c) | Draw the projection of rectangular plane PQRS, having sides 60 mm & 40 mm. The plane is perpendicular to VP and inclined to HP in such a way that its TV appears to be a square. Find its inclination with HP. | U | 04 | |
| | | | | | |
| Q.5 | | Attempt any **ONE: (12X 1)** | | | 12 |
| | a) | Using the First angle method of projection. Draw following views.<br>i) FV, (Looking in the direction of X)<br>ii) TV,<br>iii) RHS | A | 05 | |
| | b) | Using the First angle method of projection. Draw following views.<br>i) FV, (Looking in the direction of X)<br>ii) TV,<br>iii) LHSV (Looking in the direction of Y) | A | 05 | |




P.T.O

| Q.6 | | Attempt any **ONE: (12 X 1)** | | | **12** |
|---|---|---|---|---|---|
| | a) | Using the First angle method of projection. Draw following views.<br>i) Sectional FV,<br>ii) TV,<br>iii) LHSV<br>  <br> | A | 05 | |
| | b) | Using the First angle method of projection. Draw following views.<br>i) Sectional F.V. along section A-A.<br>ii) TV,<br>  <br> | A | 05 | |



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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

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**WINTER 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL: - First PROGRAM: ME

COURSE CODE: - CCH107

COURSE NAME: - ENGINEERING GRAPHICS

MAX. MARKS: 70 TIME: **04 Hrs.** DATE: -18/12/23

Instruction :-

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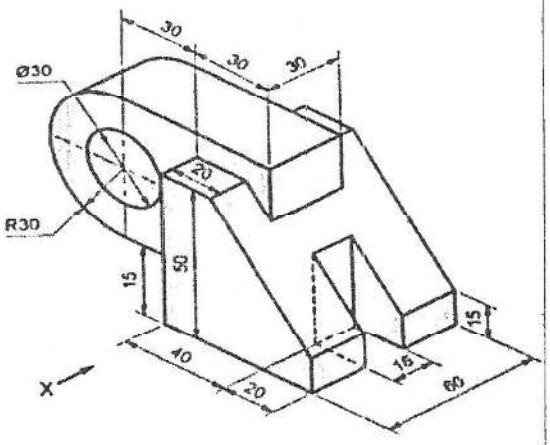
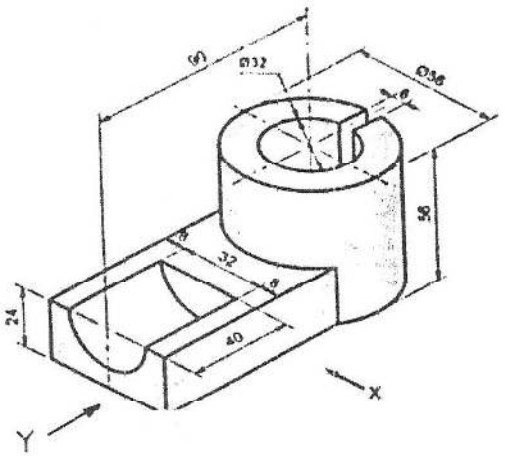
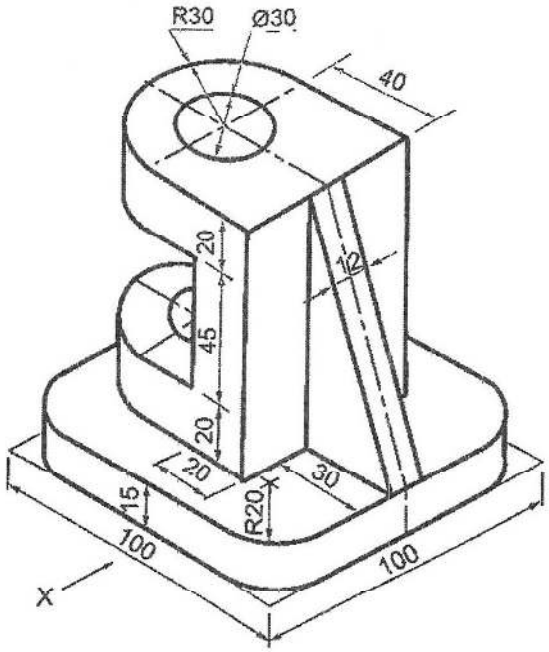
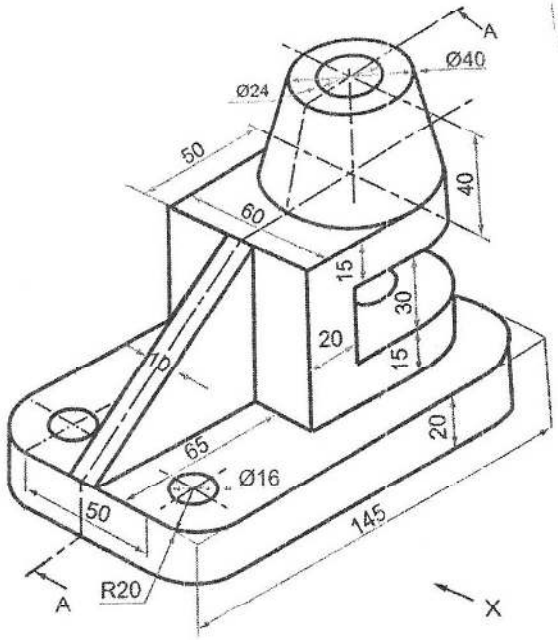
3) Use of non-programmable pocket calculator is permissible.
4) Mathematical and other tables shall be made available on request.
5) Assume and mention suitable additional data if necessary.
6) Use of Mobile is strictly prohibited.
7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding,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

| QN | SQN | Question Text | R/U/A | CO CCH 107- | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **THREE: (2 X 3)** | | | **06** |
| | a) | Daw any four types of line with application | R | CO1 | 02 |
| | b) | Divide the 65 mm line into eight Equal parts | U | CO1 | 02 |
| | c) | Draw the Pentagon of side 30 mm | U | CO1 | 02 |
| | d) | Write any two Methods to draw Ellipse | R | CO2 | 02 |
| | e) | Calculate length of scale if RF is 1:400 to measure maximum length of 60 meters. | R | CO1 | 02 |
| | | | | | |
| Q.2 | | Attempt any **TWO: (6 X 3)** | | | **18** |
| | a) | Construct a parabola when the distance of a focus from the directrix is 50mm by using directrix focus method. | U | CO2 | 06 |
| | b) | Draw an involute of pentagon having side 50 mm. | U | CO2 | 06 |
| | c) | Construct an ellipse when major axis is 120mm and minor axis is 70mm by using concentric circles method. | U | CO2 | 06 |
| | d) | Draw an epicycloid with rolling circle diameter 60 mm and directing circle diameter 160 mm | U | CO2 | 06 |
| | | | | | |
| Q.3 | | Attempt any **TWO: (5 X 2)** | | | **10** |
| | a) | A line AB length 65 mm has its end A 15 mm in front of VP line is Parallel to HP and 30 mm Above it. Draw three views of line when elevation length is 55 mm. Find inclination of line with VP. | U | CO3 | 05 |
| | b) | A straight line AB of length 70mm as its end A on HP and 30mm In Front of VP Line is parallel to VP and inclined at 45 ° to HP draw three views of Line AB | U | CO3 | 05 |
| | c) | A line AB makes an angle of 45° with V.P. and is situated on the H.P. End A and B of the line are 50 mm and 20 mm respectively Infront of the V.P. Draw three views of the line and find true length and elevation length. | U | CO3 | 05 |
| | | | | | |

| QN | SQ N | | R/ U/ A | CO CCHT 07- | Mark s |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **TWO: (2 X 6)** | | | **12** |
| | a) | Draw the projection of a circular plane having a diameter of 75 mm. The plane is perpendicular to HP and inclined to VP at 45 degrees. Draw its three views. | U | 04 | |
| | b) | A Hexagonal plate of side 30 mm rests on HP on one of its corners. Plane is perpendicular to VP & inclined with HP at 35 degrees. Draw its three views. | A | 04 | |
| | c) | Draw the projection of rectangular plane PQRS, having sides 60 mm & 40 mm. The plane is perpendicular to VP and inclined to HP in such a way that its TV appears to be a square. Find its inclination with HP. | U | 04 | |
| Q.5 | | Attempt any **ONE: (12X 1)** | | | **12** |
| | a) | Using the First angle method of projection. Draw following views.<br>i) FV, (Looking in the direction of X)<br>ii) TV,<br>iii) RHS<br>  | A | 05 | |
| | b) | Using the First angle method of projection. Draw following views.<br>i) FV, (Looking in the direction of X)<br>ii) TV,<br>iii) LHSV (Looking in the direction of Y)<br>  | A | 05 | |

P.T.O

| Q.6 | | Attempt any **ONE: (12 X 1)** | | | **12** |
|---|---|---|---|---|---|
| | a) | Using the First angle method of projection. Draw following views.<br>i) Sectional FV,<br>ii) TV,<br>iii) LHSV<br>  | A | 05 | |
| | b) | Using the First angle method of projection. Draw following views.<br>i) Sectional F.V. along section A-A.<br>ii) TV,<br>  | A | 05 | |



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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **EE/IT/IE/E&TC**

COURSE CODE :- **CCG102**

COURSE NAME **ENGINEERING PHYSICS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **13/ 12 / 2023**

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 | SQN | Question Text | R/U/A | Co CCG 102 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Write SI unit of i) Weight ii) Density. | R | 1 | |
| | b) | Differentiate between plastic body and elastic body. ( any two points) | U | 2 | |
| | c) | Obtain relation between CGS and SI units of coefficient of viscosity. | R | 1 | |
| | d) | Define fundamental physical quantity and derived quantity. | R | 1 | |
| | e) | Arrange following medium in increasing order of their viscosity Glycerine, Water, Honey, Air. | A | 2 | |
| | f) | Define linear SHM & give one example of liner SHM. | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | A wire of length 1.5m extends by 1.5 mm. When Force is applied to it calculate stress Produced in it. Given $\left(Y = 2X10^{11}\ N/m^2\right)$ | A | 2 | |
| | b) | Explain any two types of errors in measurement. | U | 1 | |
| | c) | State any four applications of elasticity. | A | 2 | |
| | d) | Define Resonance and its three applications. | A | 3 | |
| | e) | Derive an expression for coefficient of viscosity by Stoke's method. | A | 2 | |
| | f) | Differentiate between free and Forced Oscillation(any four points) | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Define three modulus of elasticity and obtain its S.I. Unit. | R | 2 | |
| | b) | Distinguish between transverse wave and longitudinal wave( any four points) | U | 3 | |
| | c) | State and explain Newton's Law of Viscosity, coefficient of viscosity and state its SI unit. | U | 2 | |
| | d) | The length of an object is measured by means of Vernier Calliper as 3.56cm. If least count of Vernier Calliper is 0.01cm, calculate Percentage error. | A | 1 | |
| | e) | Explain types of system of units. | U | 1 | |
| | f) | Define i) Period ii) Wavelength iii) Frequency iv) Amplitude. | R | 3 | |
| | | | | | |

**P.T.O**

| QN | SQN | Question Text | R/U/A | Co ITG 305 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Give the Basic principle of optical fiber. | U | 6 | |
| | b) | Define electric current. Give its unit. | R | 2 | |
| | c) | Define criticle angle and write its formula. | R | 6 | |
| | d) | Define specific resistance. Give its unit. | R | 4 | |
| | e) | Give any two applications of X-rays. | U | 5 | |
| | f) | Define nanostructural materials. | R | 5 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Define the terms :- i) Refraction ii) Dispersion iii)Dispersive power iv) Angular dispersion. | R | 4 | |
| | b) | Draw the Wheatstone's network. Obtain the balancing condition for Wheatstone's network. | A | 4 | |
| | c) | Explain with diagram propogation of light through optical fiber. | U | 6 | |
| | d) | State any four applications of laser. | A | 5 | |
| | e) | State any four properties of X-rays. | R | 5 | |
| | f) | The refractive index of glass with respects to air is 1.51 & velocity of light in air is $3 \times 10^8$ m/s. Calculate velocity of light in glass. | A | 4 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Distinguish between spontaneous and stimulated emission( any four points) | U | 5 | |
| | b) | Derive prism formula for refractive index. | A | 4 | |
| | c) | Give any four applications of optical fiber. | U | 6 | |
| | d) | State and prove parallel law of resistance. | A | 4 | |
| | e) | State any four applications of nanotechnology. | R | 5 | |
| | f) | A wire of length 240cm, radius 0.036cm has a resistance of 12Ω. Calculate the specific resistance. | A | 4 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **EE/IT/IE/E&TC**

COURSE CODE :- **CCG102**

COURSE NAME **ENGINEERING PHYSICS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **13/ 12 / 2023**

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 | SQN | Question Text | R/U/A | Co CCG 102 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Write SI unit of i) Weight ii) Density. | R | 1 | |
| | b) | Differentiate between plastic body and elastic body. ( any two points) | U | 2 | |
| | c) | Obtain relation between CGS and SI units of coefficient of viscosity. | R | 1 | |
| | d) | Define fundamental physical quantity and derived quantity. | R | 1 | |
| | e) | Arrange following medium in increasing order of their viscosity Glycerine, Water, Honey, Air. | A | 2 | |
| | f) | Define linear SHM & give one example of liner SHM. | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | A wire of length 1.5m extends by 1.5 mm. When Force is applied to it calculate stress Produced in it. Given $\left(Y = 2X10^{11}\ N/m^2\right)$ | A | 2 | |
| | b) | Explain any two types of errors in measurement. | U | 1 | |
| | c) | State any four applications of elasticity. | A | 2 | |
| | d) | Define Resonance and its three applications. | A | 3 | |
| | e) | Derive an expression for coefficient of viscosity by Stoke's method. | A | 2 | |
| | f) | Differentiate between free and Forced Oscillation(any four points) | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Define three modulus of elasticity and obtain its S.I. Unit. | R | 2 | |
| | b) | Distinguish between transverse wave and longitudinal wave( any four points) | U | 3 | |
| | c) | State and explain Newton's Law of Viscosity, coefficient of viscosity and state its SI unit. | U | 2 | |
| | d) | The length of an object is measured by means of Vernier Calliper as 3.56cm. If least count of Vernier Calliper is 0.01cm, calculate Percentage error. | A | 1 | |
| | e) | Explain types of system of units. | U | 1 | |
| | f) | Define i) Period ii) Wavelength iii) Frequency iv) Amplitude. | R | 3 | |
| | | | | | |

**P.T.O**

| QN | SQN | Question Text | R/U/A | Co ITG 305 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Give the Basic principle of optical fiber. | U | 6 | |
| | b) | Define electric current. Give its unit. | R | 2 | |
| | c) | Define criticle angle and write its formula. | R | 6 | |
| | d) | Define specific resistance. Give its unit. | R | 4 | |
| | e) | Give any two applications of X-rays. | U | 5 | |
| | f) | Define nanostructural materials. | R | 5 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Define the terms :- i) Refraction ii) Dispersion iii)Dispersive power iv) Angular dispersion. | R | 4 | |
| | b) | Draw the Wheatstone's network. Obtain the balancing condition for Wheatstone's network. | A | 4 | |
| | c) | Explain with diagram propogation of light through optical fiber. | U | 6 | |
| | d) | State any four applications of laser. | A | 5 | |
| | e) | State any four properties of X-rays. | R | 5 | |
| | f) | The refractive index of glass with respects to air is 1.51 & velocity of light in air is $3 \times 10^8$ m/s. Calculate velocity of light in glass. | A | 4 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Distinguish between spontaneous and stimulated emission( any four points) | U | 5 | |
| | b) | Derive prism formula for refractive index. | A | 4 | |
| | c) | Give any four applications of optical fiber. | U | 6 | |
| | d) | State and prove parallel law of resistance. | A | 4 | |
| | e) | State any four applications of nanotechnology. | R | 5 | |
| | f) | A wire of length 240cm, radius 0.036cm has a resistance of 12Ω. Calculate the specific resistance. | A | 4 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **CE/ME/MT**

COURSE CODE :- **CCG101**

COURSE NAME **ENGINEERING PHYSICS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **13/ 12 / 2023**

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 | SQN | Question Text | R/U/A | Co CCG 101 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define plasticity and rigidity. | R | 2 | |
| | b) | Classify the following into derived and fundamental quantity/quantities: Volume, Luminous intensity, force, Temperature. | U | 1 | |
| | c) | Define velocity Gradient. Give its SI unit. | R | 2 | |
| | d) | The Mass of an object is 37.6 $\pm$ 0.02gm. Estimate percentage error in the measurement. | A | 1 | |
| | e) | Define periodic motion and periodic time of a wave. | R | 3 | |
| | f) | State any two applications of phenomenon of resonance. | U | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Distinguish between transverse wave and longitudinal wave ( any four points of difference) | U | 3 | |
| | b) | Derive an expression for coefficient of viscosity by Stoke's method. | A | 2 | |
| | c) | Define ultimate stress, breaking stress, factor of safety, working stress. | R | 2 | |
| | d) | Explain the instrumental error, systematic error with one example of each. | A | 1 | |
| | e) | Mention any four characteristics of linear S.H.M. | 3 | 2 | |
| | f) | The length of an object measured by Vernier caliper is 4.78cm. If the least count of Vernier caliper is 0.01cm, calculate percentage error in the measurement. | A | 1 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Distinguish between free and forced oscillations.( any four points) | U | 3 | |
| | b) | Explain any four rules for determining the number of significant figures. | U | 1 | |
| | c) | A wire extends by 0.02cm when loaded with 2kg. If its length is 2m and radius is 0.05cm, calculate Young's Modulus of material of wire. | A | 2 | |
| | d) | Explain Newton's Law of viscosity. State any two applications of viscosity. | A | 2 | |
| | e) | Define i) Frequency ii) Amplitude iii) Phase iv) Wavelength | R | 3 | |
| | f) | Explain the Young's Modulus, Bulk Modulus, and Modulus of rigidity. Give the relation between them. | U | 2 | |
| | | P.T.O. | | | |

| QN | SQN | Question Text | R/U/A | Co CCG 101 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Draw a neat ray diagram showing refraction of light through glass prism. | R | 4 | |
| | b) | Calculate R.I. of a glass if a ray of light enters in it such that $i = 30^0$ and $r = 20^0$. | A | 4 | |
| | c) | Define :- i) Current ii) Resistance. | R | 4 | |
| | d) | State the principle of production of laser. | A | 5 | |
| | e) | State the principle of production of X-rays. | A | 5 | |
| | f) | Define : i) Nanoscale ii) Nanoparticle. | R | 5 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | For a prism, the angles of minimum deviation for violet and red colours are $38^0$ and $36^0$ respectively. Find dispersive power of prism. | A | 4 | |
| | b) | With the help of a neat circuit diagram, explain construction of Wheatstone's network. | U | 4 | |
| | c) | A P.D. of 220 volt is applied between ends of a lamp having a resistance of 110ohm. Find current flowing through it. | A | 4 | |
| | d) | Distinguish between ordinary light and laser ( any four points) | U | 5 | |
| | e) | State any four applications of nanotechnology. | R | 5 | |
| | f) | Explain production of ultrasonic waves by piezoelectric method. | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | State any four laws of refraction of light. | U | 4 | |
| | b) | Show how three resistances of 3 ohm, 6 ohm and 8 ohm should be connected to get a net resistance of 10ohm. | A | 4 | |
| | c) | Explain population inversion with the help of neat diagrams. | A | 5 | |
| | d) | State applications of X-rays in medical field. ( any four) | U | 5 | |
| | e) | State any four requirements of good acoustics. | R | 6 | |
| | f) | The volume of an auditorium is $6000m^3$ and reverberation time is 2 seconds. Find the area of sound absorbing material if the coefficient of absorption is 0.12 OWU. | A | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **CE/ME/MT**

COURSE CODE :- **CCG101**

COURSE NAME **ENGINEERING PHYSICS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **13/ 12 / 2023**

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 | SQN | Question Text | R/U/A | Co CCG 101 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define plasticity and rigidity. | R | 2 | |
| | b) | Classify the following into derived and fundamental quantity/quantities: Volume, Luminous intensity, force, Temperature. | U | 1 | |
| | c) | Define velocity Gradient. Give its SI unit. | R | 2 | |
| | d) | The Mass of an object is 37.6 $\pm$ 0.02gm. Estimate percentage error in the measurement. | A | 1 | |
| | e) | Define periodic motion and periodic time of a wave. | R | 3 | |
| | f) | State any two applications of phenomenon of resonance. | U | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Distinguish between transverse wave and longitudinal wave ( any four points of difference) | U | 3 | |
| | b) | Derive an expression for coefficient of viscosity by Stoke's method. | A | 2 | |
| | c) | Define ultimate stress, breaking stress, factor of safety, working stress. | R | 2 | |
| | d) | Explain the instrumental error, systematic error with one example of each. | A | 1 | |
| | e) | Mention any four characteristics of linear S.H.M. | 3 | 2 | |
| | f) | The length of an object measured by Vernier caliper is 4.78cm. If the least count of Vernier caliper is 0.01cm, calculate percentage error in the measurement. | A | 1 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Distinguish between free and forced oscillations.( any four points) | U | 3 | |
| | b) | Explain any four rules for determining the number of significant figures. | U | 1 | |
| | c) | A wire extends by 0.02cm when loaded with 2kg. If its length is 2m and radius is 0.05cm, calculate Young's Modulus of material of wire. | A | 2 | |
| | d) | Explain Newton's Law of viscosity. State any two applications of viscosity. | A | 2 | |
| | e) | Define i) Frequency ii) Amplitude iii) Phase iv) Wavelength | R | 3 | |
| | f) | Explain the Young's Modulus, Bulk Modulus, and Modulus of rigidity. Give the relation between them. | U | 2 | |
| | | P.T.O. | | | |

| QN | SQN | Question Text | R/U/A | Co CCG 101 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Draw a neat ray diagram showing refraction of light through glass prism. | R | 4 | |
| | b) | Calculate R.I. of a glass if a ray of light enters in it such that $i = 30^0$ and $r = 20^0$. | A | 4 | |
| | c) | Define :- i) Current ii) Resistance. | R | 4 | |
| | d) | State the principle of production of laser. | A | 5 | |
| | e) | State the principle of production of X-rays. | A | 5 | |
| | f) | Define : i) Nanoscale ii) Nanoparticle. | R | 5 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | For a prism, the angles of minimum deviation for violet and red colours are $38^0$ and $36^0$ respectively. Find dispersive power of prism. | A | 4 | |
| | b) | With the help of a neat circuit diagram, explain construction of Wheatstone's network. | U | 4 | |
| | c) | A P.D. of 220 volt is applied between ends of a lamp having a resistance of 110ohm. Find current flowing through it. | A | 4 | |
| | d) | Distinguish between ordinary light and laser ( any four points) | U | 5 | |
| | e) | State any four applications of nanotechnology. | R | 5 | |
| | f) | Explain production of ultrasonic waves by piezoelectric method. | U | 6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | State any four laws of refraction of light. | U | 4 | |
| | b) | Show how three resistances of 3 ohm, 6 ohm and 8 ohm should be connected to get a net resistance of 10ohm. | A | 4 | |
| | c) | Explain population inversion with the help of neat diagrams. | A | 5 | |
| | d) | State applications of X-rays in medical field. ( any four) | U | 5 | |
| | e) | State any four requirements of good acoustics. | R | 6 | |
| | f) | The volume of an auditorium is $6000m^3$ and reverberation time is 2 seconds. Find the area of sound absorbing material if the coefficient of absorption is 0.12 OWU. | A | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **CE/ME/MT**

COURSE CODE :- **CCG103**

COURSE NAME **ENGINEERING CHEMISTRY**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **12/ 12 / 2023**

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 | SQN | Question Text | R/U/A | Co CCG 103 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define electrovalency and covalency. | R | 1 | |
| | b) | Define conductor and Electroplating. | R | 1 | |
| | c) | List the products deposited at cathode and anode in electrolysis of molten NaCl. | R | 1 | |
| | d) | Define homogenous and heterogenous catalyst. | R | 3 | |
| | e) | State Aufbau's principle. | R | 1 | |
| | f) | Define insulators and composite materials. | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Distinguish between thermosoftening and thermosetting plastic. | A | 3 | |
| | b) | Define Atomic number, Mass number, Isotope and Isobars. | R | 1 | |
| | c) | Explain electrorefining of impure copper. | U | 1 | |
| | d) | Explain the term catalytic promoter and autocatalyst with examples. | U | 3 | |
| | e) | Compare galvanizing and tinning. | U | 2 | |
| | f) | Define addition polymerization. Explain formation of polyethene with chemical reaction. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Two elements X & Y have atomic number 12 and 17. Explain formation of compound between X & Y. | A | 1 | |
| | b) | What is degree of ionization? Discuss factors affecting on degree of ionization. | U | 1 | |
| | c) | Discuss vulcanization of rubber. | U | 3 | |
| | d) | Explain the factors affecting rate of atmospheric corrosion. | U | 2 | |
| | e) | Explain properties and applications of composite materials. | U | 3 | |
| | f) | Define adhesives. Give characteristics of good adhesives. | U | 3 | |
| | | | | | |

**P.T.O**

| QN | SQN | Question Text | R/U/A | Co CCG 103 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define Hard water. | R | 4 | |
| | b) | How temporary hardness of water is removed? Write chemical reaction. | U | 4 | |
| | c) | Distinguish between temporary hard water and permanent hard water. | U | 4 | |
| | d) | Define i) Gangue ii) Mineral. | R | 4 | |
| | e) | State the composition of wood metal. | R | 3 | |
| | f) | Write classification of alloys with examples. | U | 3 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Write disadvantages of hard water in drinking and cooking use. | U | 4 | |
| | b) | Explain with reactions chlorination of water by bleaching powder. | U | 4 | |
| | c) | Write reactions taking place in cation exchange tower and anion exchange tower during water softening. | U | 4 | |
| | d) | Draw flow chart of metallurgical processes. | U | 5 | |
| | e) | Explain electromagnetic separation method with neat labelled diagram. | U | 5 | |
| | f) | Distinguish between roasting and calcination. | U | 5 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Define alloy. Write the purposes of making alloy. | R | 3 | |
| | b) | Write any four functions of lubricant. | R | 6 | |
| | c) | What is lubrication? Explain extreme pressure lubrication. | U | 6 | |
| | d) | State the characteristics of good lubricant. | R | 6 | |
| | e) | Define paint. Write characteristics of oil paint. | U | 2 | |
| | f) | State ingradients of paint with their functions.. | U | 2 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **CE/ME/MT**

COURSE CODE :- **CCG103**

COURSE NAME **ENGINEERING CHEMISTRY**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **12/ 12 / 2023**

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.
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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 CCG 103 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define electrovalency and covalency. | R | 1 | |
| | b) | Define conductor and Electroplating. | R | 1 | |
| | c) | List the products deposited at cathode and anode in electrolysis of molten NaCl. | R | 1 | |
| | d) | Define homogenous and heterogenous catalyst. | R | 3 | |
| | e) | State Aufbau's principle. | R | 1 | |
| | f) | Define insulators and composite materials. | R | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Distinguish between ther mosoftening and thermosetting plastic. | A | 3 | |
| | b) | Define Atomic number, Mass number, Isotope and Isobars. | R | 1 | |
| | c) | Explain electrorefining of impure copper. | U | 1 | |
| | d) | Explain the term catalytic promoter and autocatalyst with examples. | U | 3 | |
| | e) | Compare galvanizing and tinning. | U | 2 | |
| | f) | Define addition polymerization. Explain formation of polyethene with chemical reaction. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Two elements X & Y have atomic number 12 and 17. Explain formation of compound between X & Y. | A | 1 | |
| | b) | What is degree of ionization? Discuss factors affecting on degree of ionization. | U | 1 | |
| | c) | Discuss vulcanization of rubber. | U | 3 | |
| | d) | Explain the factors affecting rate of atmospheric corrosion. | U | 2 | |
| | e) | Explain properties and applications of composite materials. | U | 3 | |
| | f) | Define adhesives. Give characteristics of good adhesives. | U | 3 | |
| | | | | | |

**P.T.O**

| QN | SQN | Question Text | R/U/A | Co CCG 103 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define Hard water. | R | 4 | |
| | b) | How temporary hardness of water is removed? Write chemical reaction. | U | 4 | |
| | c) | Distinguish between temporary hard water and permanent hard water. | U | 4 | |
| | d) | Define i) Gangue ii) Mineral. | R | 4 | |
| | e) | State the composition of wood metal. | R | 3 | |
| | f) | Write classification of alloys with examples. | U | 3 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Write disadvantages of hard water in drinking and cooking use. | U | 4 | |
| | b) | Explain with reactions chlorination of water by bleaching powder. | U | 4 | |
| | c) | Write reactions taking place in cation exchange tower and anion exchange tower during water softening. | U | 4 | |
| | d) | Draw flow chart of metallurgical processes. | U | 5 | |
| | e) | Explain electromagnetic separation method with neat labelled diagram. | U | 5 | |
| | f) | Distinguish between roasting and calcination. | U | 5 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Define alloy. Write the purposes of making alloy. | R | 3 | |
| | b) | Write any four functions of lubricant. | R | 6 | |
| | c) | What is lubrication? Explain extreme pressure lubrication. | U | 6 | |
| | d) | State the characteristics of good lubricant. | R | 6 | |
| | e) | Define paint. Write characteristics of oil paint. | U | 2 | |
| | f) | State ingradients of paint with their functions.. | U | 2 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **EE/IT/ET**

COURSE CODE :- **CCG104**

COURSE NAME **ENGINEERING CHEMISTRY**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **12/ 12 / 2023**

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 | SQN | Question Text | R/U/A | Co CCG 104 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Explain why structure of atom is neutral. | U | 1 | |
| | b) | Define Electrovalency and Covalency. | R | 1 | |
| | c) | Explain why noble metals does not undergo corrosion. | A | 2 | |
| | d) | Define Homogeneous catalyst with example. | U | 3 | |
| | e) | Define –Polymer and Insulator. | R | 3 | |
| | f) | Explain two properties of good adhesives. | U | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain Lewis and Langmuir's concept of stable electronic configuration. | A | 1 | |
| | b) | Explain Electroplating process with diagram. | A | 1 | |
| | c) | Explain Arrhenius theory of Ionisation. ( any four points) | U | 1 | |
| | d) | Explain preparation and four uses of thermocole. | U | 3 | |
| | e) | Distinguish between Thermosoftening and Thermosetting plastics. ( any four points) | U | 3 | |
| | f) | Explain vulcanization process of rubber. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Distinguish between Isotopes and Isobars. ( any four points) | U | 1 | |
| | b) | Explain formation of $H_2O$ molecule. | U | 1 | |
| | c) | Explain with diagram Tinning process. | U | 2 | |
| | d) | Define corrosion. Classify corrosion in detail. | R | 2 | |
| | e) | Define catalytic promoters and catalytic Inhibitors with two examples each. | R | 3 | |
| | f) | Define composite material. Classify composite materials with examples. | U | 3 | |
| | | | | | |

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/~~SUMMER~~- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 1

PROGRAM : EEG/IEG/ETG/ITG

COURSE CODE :- CCG104

COURSE NAME :- **ENGINEERING CHEMISTRY**

MAX. MARKS : 80 TIME : 03 Hrs DATE :- 12/12/2023

| QN | SQN | Question Text | R/U/A | CO | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | 08 |
| | a | Define electrochemical cell. | R | CCG104-1 | |
| | b | Enlist any two ores of copper with their chemical formulae. | R | CCG104-5 | |
| | c | Define Hard water and soft water. | R | CCG104-4 | |
| | d | Define alloys. Give types of alloys. | R | CCG104-6 | |
| | e | List different types of impurities in water. | R | CCG104-4 | |
| | f | Name the chemicals used for the regeneration of cation and anion ion exchange resin column. | R | CCG104-1 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | 16 |
| | a | Explain the disadvantages of hard water in the textile and sugar industries. | U | CCG104-4 | |
| | b | Give construction, working, and advantages of the hydrogen-oxygen fuel cell. | A | CCG104-1 | |
| | c | Define mineral, ore, gangue and flux. | R | CCG104-5 | |
| | d | Explain the Bessemerisation process used in the extraction of copper with chemical reactions. | A | CCG104-5 | |
| | e | Distinguish between primary and secondary cells (Any four points). | A | CCG104-1 | |
| | f | Give the composition, properties and applications of Tinmann's solder. | U | CCG104-6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | 16 |
| | a | Differentiate Calcination and Roasting.(Any 4 Points). | A | CCG104-5 | |
| | b | Explain with reactions the sterilization process by using bleaching powder for softening hard water. | A | CCG104-4 | |
| | c | Explain the construction, working and applications of Dry cell. | U | CCG104-1 | |
| | d | Discuss the gravity separation method used for the concentration of ore. | A | CCG104-5 | |
| | e | Give disadvantages of hard water used for domestic purposes. | U | CCG104-4 | |
| | f | Give a flow chart presenting the extraction of metal from ore. | U | CCG104-5 | |

**GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.**

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **EE/IT/ET**

COURSE CODE :- **CCG104**

COURSE NAME **ENGINEERING CHEMISTRY**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **12/ 12 / 2023**

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 | SQN | Question Text | R/U/A | Co CCG 104 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Explain why structure of atom is neutral. | U | 1 | |
| | b) | Define Electrovalency and Covalency. | R | 1 | |
| | c) | Explain why noble metals does not undergo corrosion. | A | 2 | |
| | d) | Define Homogeneous catalyst with example. | U | 3 | |
| | e) | Define –Polymer and Insulator. | R | 3 | |
| | f) | Explain two properties of good adhesives. | U | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Explain Lewis and Langmuir's concept of stable electronic configuration. | A | 1 | |
| | b) | Explain Electroplating process with diagram. | A | 1 | |
| | c) | Explain Arrhenius theory of Ionisation. ( any four points) | U | 1 | |
| | d) | Explain preparation and four uses of thermocole. | U | 3 | |
| | e) | Distinguish between Thermosoftening and Thermosetting plastics. ( any four points) | U | 3 | |
| | f) | Explain vulcanization process of rubber. | U | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | **16** |
| | a) | Distinguish between Isotopes and Isobars. ( any four points) | U | 1 | |
| | b) | Explain formation of $H_2O$ molecule. | U | 1 | |
| | c) | Explain with diagram Tinning process. | U | 2 | |
| | d) | Define corrosion. Classify corrosion in detail. | R | 2 | |
| | e) | Define catalytic promoters and catalytic Inhibitors with two examples each. | R | 3 | |
| | f) | Define composite material. Classify composite materials with examples. | U | 3 | |
| | | | | | |

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GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

WINTER/~~SUMMER~~- 2023

EXAM SEAT NO. | | | | | | |

LEVEL : - 1

PROGRAM : EEG/IEG/ETG/ITG

COURSE CODE :- CCG104

COURSE NAME :- **ENGINEERING CHEMISTRY**

MAX. MARKS : 80 TIME : 03 Hrs DATE :- 12/12/2023

| QN | SQN | Question Text | R/U/A | CO | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR:** | | | 08 |
| | a | Define electrochemical cell. | R | CCG104-1 | |
| | b | Enlist any two ores of copper with their chemical formulae. | R | CCG104-5 | |
| | c | Define Hard water and soft water. | R | CCG104-4 | |
| | d | Define alloys. Give types of alloys. | R | CCG104-6 | |
| | e | List different types of impurities in water. | R | CCG104-4 | |
| | f | Name the chemicals used for the regeneration of cation and anion ion exchange resin column. | R | CCG104-4 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | 16 |
| | a | Explain the disadvantages of hard water in the textile and sugar industries. | U | CCG104-4 | |
| | b | Give construction, working, and advantages of the hydrogen-oxygen fuel cell. | A | CCG104-1 | |
| | c | Define mineral, ore, gangue and flux. | R | CCG104-5 | |
| | d | Explain the Bessemerisation process used in the extraction of copper with chemical reactions. | A | CCG104-5 | |
| | e | Distinguish between primary and secondary cells (Any four points). | A | CCG104-1 | |
| | f | Give the composition, properties and applications of Tinmann's solder. | U | CCG104-6 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | 16 |
| | a | Differentiate Calcination and Roasting.(Any 4 Points). | A | CCG104-5 | |
| | b | Explain with reactions the sterilization process by using bleaching powder for softening hard water. | A | CCG104-4 | |
| | c | Explain the construction, working and applications of Dry cell. | U | CCG104-1 | |
| | d | Discuss the gravity separation method used for the concentration of ore. | A | CCG104-5 | |
| | e | Give disadvantages of hard water used for domestic purposes. | U | CCG104-4 | |
| | f | Give a flow chart presenting the extraction of metal from ore. | U | CCG104-5 | |

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER / ~~SUMMER~~- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL: - First PROGRAM: Common

COURSE CODE :- CCH106

COURSE NAME :- Communication Skills

MAX. MARKS : 70 TIME : **03 Hrs** DATE :-12 / 12 / 2023

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 CCH106 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **THREE: (2 X 3)** | | | **06** |
| | a) | Define Collocation? | R | 1 | |
| | b) | Prepare keywords with the following prefixes: ( en-, em-, non-, over-) | U | 1 | |
| | c) | Write the functions of the following elements in a communication cycle: a. Sender b. Receiver | R | 2 | |
| | d) | What is Upward Communication? | R | 2 | |
| | e) | Define oral communication and give its suitable examples. | U | 3 | |
| Q.2 | | Attempt any **FOUR: (4 X 4)** | | | **16** |
| | a) | Explain the importance of vocabulary in language. | A | 1 | |
| | b) | Write a note on Informal / Grapevine Communication. | R | 2 | |
| | c) | Explain the various barriers to Communication giving examples. | A | 2 | |
| | d) | Difference between formal and informal communication. | U | 3 | |
| | e) | Define Diagonal Communication | R | 2 | |
| | f) | Write a note on importance of communication for an engineering professional. | A | 2 | |
| Q.3 | | Attempt any **TWO: (6 X 2)** | | | **12** |
| | a) | Draw a model of communication process & explain any 4 elements of it. | U | 2 | |
| | b) | Write a note on Group Discussion. | R | 3 | |
| | c) | Write a dialogue between Sudhir and his friend, Ajit, about vacation plans. | A | 3 | |

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|---|---|---|---|---|---|
| 4. | | Attempt any **TWO (2x 4)** | | | **08** |
| | a) | Define Non-Verbal communication. | R | CCH106-4 | |
| | b) | Describe any two characteristics of written communication. | R | CCH106-5 | |
| | c) | State any two examples of Haptics. | U | CCH106-4 | |
| | d) | Tell any four elements which are important to cover in your Résumé. | U | CCH106-5 | |
| | e) | Enlist in brief the strengths of Media aided presentation. | R | CCH106-6 | |
| 5. | | Attempt any **FOUR (4x4)** | | | **16** |
| | a) | Explain the four different zones of proxemics propounded by Dr. Albert Mehrabian. | U | CCH106-4 | |
| | b) | Elaborate any four aspects of body language with an example of each. | U | CCH106-4 | |
| | c) | Draw the format of E-mail writing. | R | CCH106-5 | |
| | d) | State the importance of Non-Verbal Communication. | R | CCH106-4 | |
| | e) | Bring out the advantages and disadvantages of graphical communication. | U | CCH106-4 | |
| | f) | Write down the strengths and precautions of Media-aided Presentation. | R | CCH106-6 | |
| 6. | | Attempt any **TWO (6x2)** | | | **12** |
| | a) | Design a first slide of a title page of the presentation on the topic "Solar Energy with important details on it. | A | CCH106-6 | |
| | b) | Prepare your job application with résumé for the post of Junior Engineer in the company Larsen and Tubro Pvt. Ltd. Pune. | A | CCH106-5 | |
| | c) | Draw a pie chart with the help of following data. Also write the calculations. The amount of money allotted for the sports events in a college was utilised for various purposes as below. | A | CCH106-4 | |

| **Purpose** | **Percentage** |
|---|---|
| Purchase of sports material | 40% |
| Prize | 24% |
| Refreshments | 18% |
| Miscellaneous | 18% |

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER / ~~SUMMER~~- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL: - First PROGRAM: Common

COURSE CODE :- CCH106

COURSE NAME :- Communication Skills

MAX. MARKS : 70 TIME : **03 Hrs** DATE :-12 / 12 / 2023

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 CCH106 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **THREE: (2 X 3)** | | | **06** |
| | a) | Define Collocation? | R | 1 | |
| | b) | Prepare keywords with the following prefixes: ( en-, em-, non-, over-) | U | 1 | |
| | c) | Write the functions of the following elements in a communication cycle: a. Sender b. Receiver | R | 2 | |
| | d) | What is Upward Communication? | R | 2 | |
| | e) | Define oral communication and give its suitable examples. | U | 3 | |
| Q.2 | | Attempt any **FOUR: (4 X 4)** | | | **16** |
| | a) | Explain the importance of vocabulary in language. | A | 1 | |
| | b) | Write a note on Informal / Grapevine Communication. | R | 2 | |
| | c) | Explain the various barriers to Communication giving examples. | A | 2 | |
| | d) | Difference between formal and informal communication. | U | 3 | |
| | e) | Define Diagonal Communication | R | 2 | |
| | f) | Write a note on importance of communication for an engineering professional. | A | 2 | |
| Q.3 | | Attempt any **TWO: (6 X 2)** | | | **12** |
| | a) | Draw a model of communication process & explain any 4 elements of it. | U | 2 | |
| | b) | Write a note on Group Discussion. | R | 3 | |
| | c) | Write a dialogue between Sudhir and his friend, Ajit, about vacation plans. | A | 3 | |

P.T.O.

| | | | | | |
|---|---|---|---|---|---|
| 4. | | Attempt any **TWO (2x 4)** | | | **08** |
| | a) | Define Non-Verbal communication. | R | CCH106-4 | |
| | b) | Describe any two characteristics of written communication. | R | CCH106-5 | |
| | c) | State any two examples of Haptics. | U | CCH106-4 | |
| | d) | Tell any four elements which are important to cover in your Résumé. | U | CCH106-5 | |
| | e) | Enlist in brief the strengths of Media aided presentation. | R | CCH106-6 | |
| 5. | | Attempt any **FOUR (4x4)** | | | **16** |
| | a) | Explain the four different zones of proxemics propounded by Dr. Albert Mehrabian. | U | CCH106-4 | |
| | b) | Elaborate any four aspects of body language with an example of each. | U | CCH106-4 | |
| | c) | Draw the format of E-mail writing. | R | CCH106-5 | |
| | d) | State the importance of Non-Verbal Communication. | R | CCH106-4 | |
| | e) | Bring out the advantages and disadvantages of graphical communication. | U | CCH106-4 | |
| | f) | Write down the strengths and precautions of Media-aided Presentation. | R | CCH106-6 | |
| 6. | | Attempt any **TWO (6x2)** | | | **12** |
| | a) | Design a first slide of a title page of the presentation on the topic "Solar Energy with important details on it. | A | CCH106-6 | |
| | b) | Prepare your job application with résumé for the post of Junior Engineer in the company Larsen and Tubro Pvt. Ltd. Pune. | A | CCH106-5 | |
| | c) | Draw a pie chart with the help of following data. Also write the calculations. The amount of money allotted for the sports events in a college was utilised for various purposes as below. | A | CCH106-4 | |

| **Purpose** | **Percentage** |
|---|---|
| Purchase of sports material | 40% |
| Prize | 24% |
| Refreshments | 18% |
| Miscellaneous | 18% |

GF = 27, 28, 29, 30
GG - 10

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

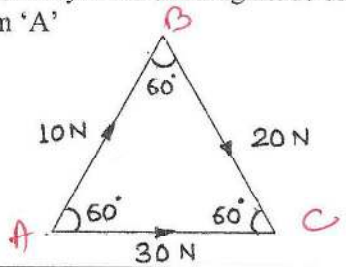
**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **COMMON**
COURSE CODE :- **CCG110**
COURSE NAME **APPLIED MECHANICS**
MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **13/ 12 / 2023**

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 | SQN | Question Text | R/U/A | Co CCG 110 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** 4 X 2 | | | **08** |
| | a) | State law and parallelogram of forces. | R | 1 | |
| | b) | State graphical condition and equilibrium for concurrent and non-concurrent force system. | U | 2 | |
| | c) | If angle of repose of a body with a plane is $45^0$ then what will be coefficient of friction. | A | 2 | |
| | d) | Resolve a 60N force passing through ordinates ( -2, +3) , (-3, +2). | A | 1 | |
| | e) | A block of 10KN is kept on the horizontal plane. The coefficient of friction between surfaces is 0.3 then what will be the normal reaction and force of the friction? | A | 2 | |
| | f) | Draw a neat sketch of overhang beam with point load 'W' at the free end. And u.d.l. of intensity 'w' N/m on the span of supported ends. | U | 2 | |
| Q.2 | | Attempt any **FOUR:** 4 X 4 | | | **16** |
| | a) | A triangle ABC of 1m side is subjected to forces 10N, 20N, 30N along AB, BC and AC respectively. Find the magnitude direction and locate then position of it from 'A'   | A | 1 | |
| | b) | i) State law of triangle in equilibrium.<br>ii) Find the component of the force 100 KN ( push) acting at $270^0$ with + ve axis | R<br>A | 2<br>1 | |
| | c) | Six parallel forces of magnitude 1000N, 1500N, 1800N, 2000N, 2400N and 2700N are acting 1m, 3m, 5m, 7m and 8m from the first 1000N force. Force $1^{st}$, $3^{rd}$ & $5^{th}$ are acting upwards while other acting downwards. Find resultant and its position using analytical method. | A | 1 | |



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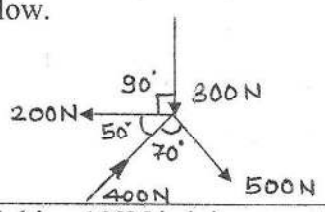
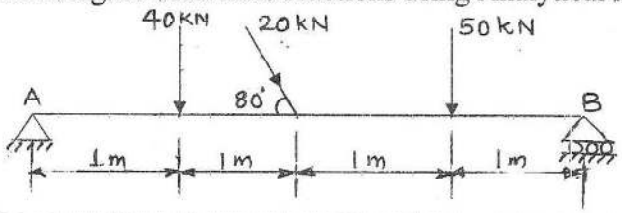
|---|---|---|---|---|---|
| | d) | Using graphical method find resultant and its position for the force system shown below.   | U | 3 | |
| | e) | A solid block weighing 100N is lying on a table for which coefficient of friction between block and table surface is 0.03. Determine the force acting at an angle of $40^0$ with the horizontal which would move the body. | A | 2 | |
| | f) | A sphere weighing 200N is supported by two planes inclined at $30^0$ & $60^0$ to the horizontal respectively. Calculate the reactions at the planes. | A | 2 | |
| Q.3 | | Attempt any **TWO:** | | | **16** |
| | a) | A body resting on a rough horizontal plane is on the point of moving by a pull of 22N acting $30^0$ inclined to the horizontal and if it is pushed by a force 28N acting $30^0$ inclined to the horizontal. Determine weight of the body and coefficient of friction. | | | |
| | b) | A simply supported beam of span 4m is acted by forces 40KN, 20KW, 50KN at the dist 1m, 2m and 3m from the left hand support respectively force 20KN is inclined at $80^0$ at the beam as shown in figure determine reactions using Analytical method.   | | | |
| | c) | i) Six forces 10N, 20N, 10N, 10N, 20N, 20N are concurrent and all are pull in sense making equal angle to each other. First force is on positive +Ve axis and order is mentained in clockwise manner then determines resultant and its position using analytical method.<br>ii) Using graphical method determine resultant and its position for problem given in Q. 3-C-i. | | | |
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define centre of gravity of a body. | R | 4 | |
| | b) | For a quarter circle of 150mm radius. Show its centroid with sketch. | U | 4 | |
| | c) | Define the following terms i) Kinetics ii) Kinematics | R | 5 | |
| | d) | State the Newton's 2nd Law of motion. | R | 5 | |
| | e) | State the relation between M A, U.R & efficiency of the machine. | R | 6 | |
| | f) | Define Ideal machine. | R | 6 | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Calculate the centroid of 'T' section from bottom as shown in Fig. No. 5. | A | 4 | |
| | b) | Locate the position of centroid for a channel as shown in Fig. No.6. | A | 4 | |
| | c) | Define the following terms i) Angular motion ii) Angular displacement iii) Angular velocity iv) Angular acceleration. | R | 5 | |

| | | | | | |
|---|---|---|---|---|---|
| | d) | A car starting from rest is accelerated at the rate of 0.4 m/sec$^2$. Find the distance covered by the car in 20 seconds. | A | 5 | |
| | e) | Define energy and state its various forms of energy. | R | 5 | |
| | f) | The law of machine with velocity ratio 20 is given by ( P=0.15W + 20) N. Determine i) Effort required for load 2000N. ii) Maximum efficiency of the machine. iii) Maximum Mechanical Advantages. iv) Load lost in friction at the load 2000N. | A | 5 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** 4 X 4 | | | **16** |
| | a) | A composite figure consists of a rectangle 400mm X 300mm and a semi circle of radius 200mm. Find centroid of the composite figure and show it on sketch. Refer Fig. No. 7 | A | 4 | |
| | b) | The velocity of a car reduces uniformly from 60km/h to 40km/h in travelling a distance of 100m on a straight road. Find i) Uniform acceleration ii) Time taken for given change. | A | 5 | |
| | c) | A wheel increases its speed from 45rpm to 90 rpm in 30 second find. i) Angular acceleration of the wheel ii) No of revolutions made by the wheel in these 30 seconds. | A | 5 | |
| | d) | A body of mass 10kg is kept on the terrace of second floor of building. If the height of each floor is 3.5m. Find the potential energy of the body from the ground. | A | 5 | |
| | e) | A machine litt's a load of 400N and 600N by Applying effort of 60N and 80N respectively. Determine law of machine and efficiency at a load of 800N if V.R. is 22. | A | 6 | |
| | f) | In a Litting machine a load of 20KN is raised by effort of 300N. If the efficiency is 75%. Calculate mechanical advantages and Velocity ratio. If the machine litt's a load by effort of 550N. Determine the law of machine. | A | 6 | |



**********

fig No-5

Q.No 5 (a)

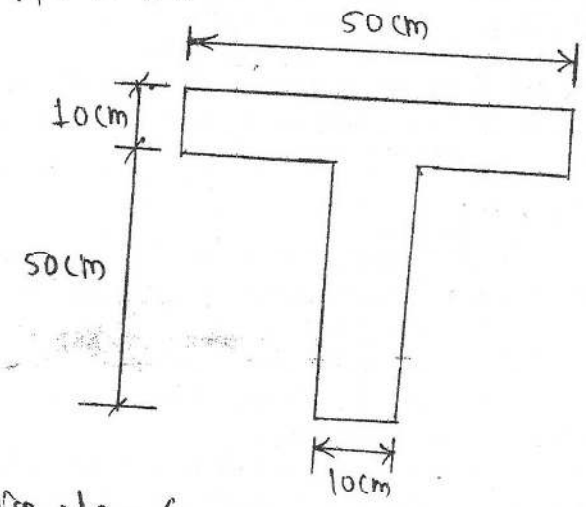



fig No-6

Q 5 (b)

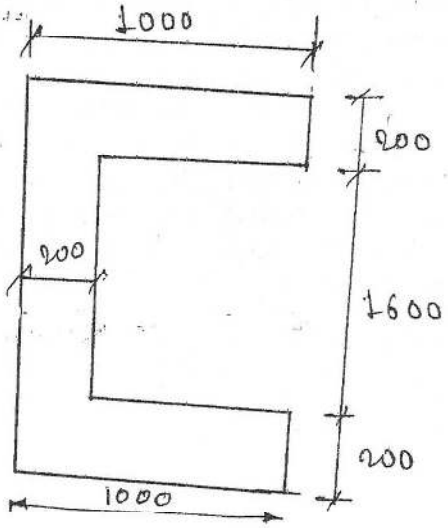
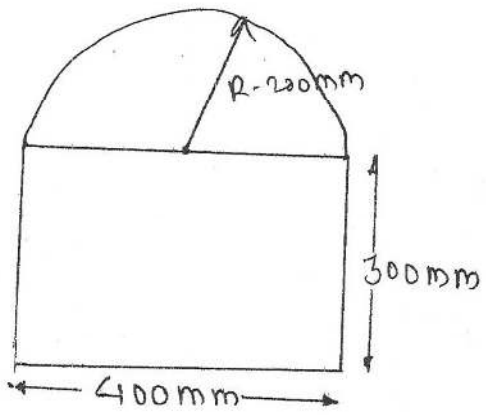



fig No-7

Q 6 (a)



# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **COMMON**

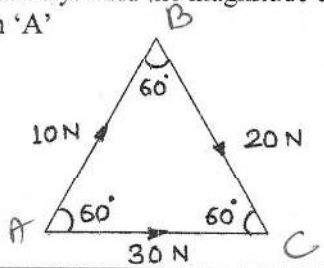
COURSE CODE :- **CCG110**

COURSE NAME **APPLIED MECHANICS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **13/ 12 / 2023**

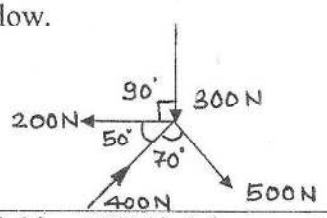
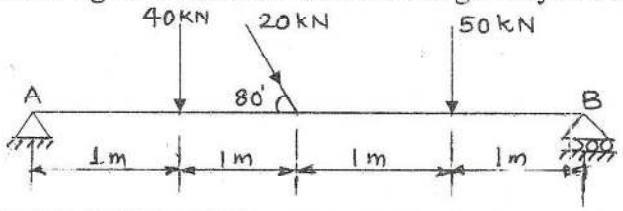
Instruction :-

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 | SQN | Question Text | R/U/A | Co CCG 110 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | State law and parallelogram of forces. | R | 1 | |
| | b) | State graphical condition and equilibrium for concurrent and non-concurrent force system. | U | 2 | |
| | c) | If angle of repose of a body with a plane is $45^0$ then what will be coefficient of friction. | A | 2 | |
| | d) | Resolve a 60N force passing through ordinates ( -2, +3) , (-3, +2). | A | 1 | |
| | e) | A block of 10KN is kept on the horizontal plane. The coefficient of friction between surfaces is 0.3 then what will be the normal reaction and force of the friction? | A | 2 | |
| | f) | Draw a neat sketch of overhang beam with point load 'W' at the free end. And u.d.l. of intensity 'w' N/m on the span of supported ends. | U | 2 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | A triangle ABC of 1m side is subjected to forces 10N, 20N, 30N along AB, BC and AC respectively. Find the magnitude direction and locate then position of it from 'A'   | A | 1 | |
| | b) | i) State law of triangle in equilibrium.<br>ii) Find the component of the force 100 KN ( push) acting at $270^0$ with + ve axis | R<br>A | 2<br>1 | |
| | c) | Six parallel forces of magnitude 1000N, 1500N, 1800N, 2000N, 2400N and 2700N are acting 1m, 3m, 5m, 7m and 8m from the first 1000N force. Force $1^{st}$, $3^{rd}$ & $5^{th}$ are acting upwards while other acting downwards. Find resultant and its position using analytical method. | A | 1 | |



P.T.O

| | | | | | |
|---|---|---|---|---|---|
| | d) | Using graphical method find resultant and its position for the force system shown below.   | U | 3 | |
| | e) | A solid block weighing 100N is lying on a table for which coefficient of friction between block and table surface is 0.03. Determine the force acting at an angle of $40^0$ with the horizontal which would move the body. | A | 2 | |
| | f) | A sphere weighing 200N is supported by two planes inclined at $30^0$ & $60^0$ to the horizontal respectively. Calculate the reactions at the planes. | A | 2 | |
| | | | | | |
| Q.3 | | Attempt any **TWO:** | | | **16** |
| | a) | A body resting on a rough horizontal plane is on the point of moving by a pull of 22N acting $30^0$ inclined to the horizontal and if it is pushed by a force 28N acting $30^0$ inclined to the horizontal. Determine weight of the body and coefficient of friction. | | | |
| | b) | A simply supported beam of span 4m is acted by forces 40KN, 20KW, 50KN at the dist 1m, 2m and 3m from the left hand support respectively force 20KN is inclined at $80^0$ at the beam as shown in figure determine reactions using Analytical method.   | | | |
| | c) | i) Six forces 10N, 20N, 10N, 10N, 20N, 20N are concurrent and all are pull in sense making equal angle to each other. First force is on positive +Ve axis and order is mentained in clockwise manner then determines resultant and its position using analytical method.<br>ii) Using graphical method determine resultant and its position for problem given in Q. 3-C-i. | | | |
| | | | | | |
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define centre of gravity of a body. | R | 4 | |
| | b) | For a quarter circle of 150mm radius. Show its centroid with sketch. | U | 4 | |
| | c) | Define the following terms i) Kinetics ii) Kinematics | R | 5 | |
| | d) | State the Newton's 2nd Law of motion. | R | 5 | |
| | e) | State the relation between M A, U.R & efficiency of the machine. | R | 6 | |
| | f) | Define Ideal machine. | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Calculate the centroid of 'T' section from bottom as shown in Fig. No. 5. | A | 4 | |
| | b) | Locate the position of centroid for a channel as shown in Fig. No.6. | A | 4 | |
| | c) | Define the following terms i) Angular motion ii) Angular displacement iii) Angular velocity iv) Angular acceleration. | R | 5 | |

| | | | | | |
|---|---|---|---|---|---|
| | d) | A car starting from rest is accelerated at the rate of 0.4 m/sec$^2$. Find the distance covered by the car in 20 seconds. | A | 5 | |
| | e) | Define energy and state its various forms of energy. | R | 5 | |
| | f) | The law of machine with velocity ratio 20 is given by ( P=0.15W + 20) N. Determine i) Effort required for load 2000N. ii) Maximum efficiency of the machine. iii) Maximum Mechanical Advantages. iv) Load lost in friction at the load 2000N. | A | 5 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | A composite figure consists of a rectangle 400mm X 300mm and a semi circle of radius 200mm. Find centroid of the composite figure and show it on sketch. Refer Fig. No. 7 | A | 4 | |
| | b) | The velocity of a car reduces uniformly from 60km/h to 40km/h in travelling a distance of 100m on a straight road. Find i) Uniform acceleration ii) Time taken for given change. | A | 5 | |
| | c) | A wheel increases its speed from 45rpm to 90 rpm in 30 second find. i) Angular acceleration of the wheel ii) No of revolutions made by the wheel in these 30 seconds. | A | 5 | |
| | d) | A body of mass 10kg is kept on the terrace of second floor of building. If the height of each floor is 3.5m. Find the potential energy of the body from the ground. | A | 5 | |
| | e) | A machine litt's a load of 400N and 600N by Applying effort of 60N and 80N respectively. Determine law of machine and efficiency at a load of 800N if V.R. is 22. | A | 6 | |
| | f) | In a Lifting machine a load of 20KN is raised by effort of 300N. If the efficiency is 75%. Calculate mechanical advantages and Velocity ratio. If the machine litt's a load by effort of 550N. Determine the law of machine. | A | 6 | |



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fig No-5

Q.No 5 (a)

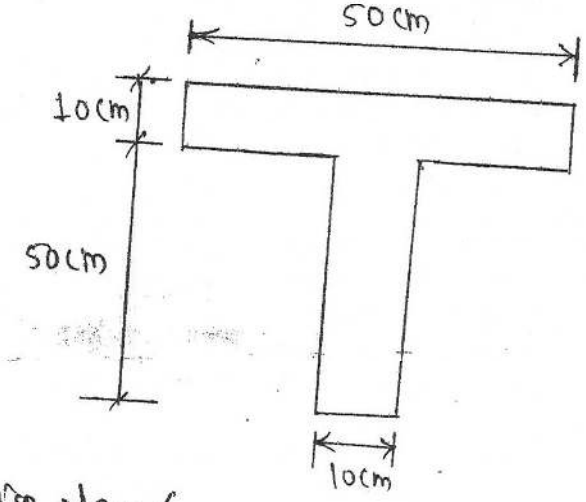



Fig No-6

Q 5 (b)

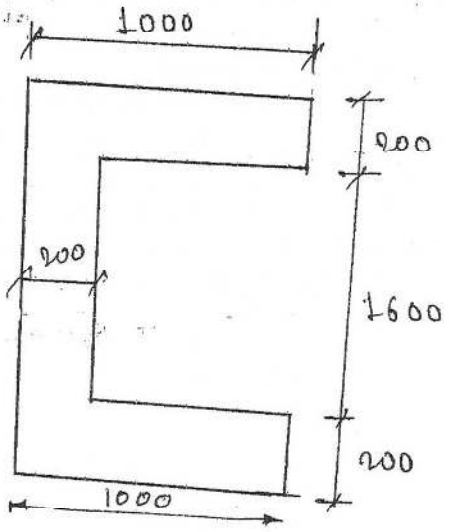
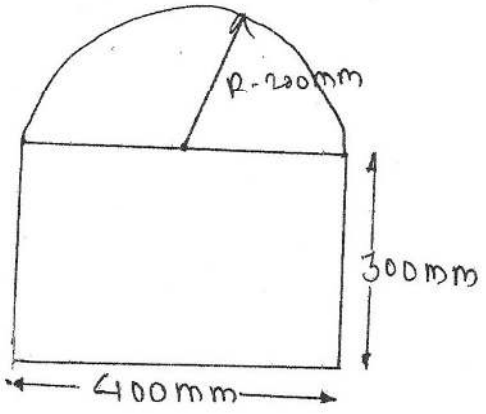



Fig No-7

Q 6 (a)



**GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.**

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **SECOND** PROGRAM : **COMMON**

COURSE CODE :- **CCG203**

COURSE NAME **COMMUNICATION SKILL**

MAX. MARKS : **40** TIME : **02Hrs.** DATE :- **14/ 12 / 2023**

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 | SQN | Question Text | R/U/A | Co CCG 203 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** ( Answer the each of following given question in three-five sentences) | | | **08** |
| | a) | State correct meaning of the term- 'Sender' as used in communication theory and give its one relevant example. | R | 1 | |
| | b) | Explain the term-'Feedback' and state its significance in two-way human communication. | U | 1 | |
| | c) | List out two basic characteristics associated with oral communication. | R | 2 | |
| | d) | Define the phrase- 'visual graphic communication' as used in the theory of communication. | R | 3 | |
| | e) | State what the 'Media Aided presentation' means in communication context. Also give one suitable example of it. | U | 5 | |
| | f) | Define the term- Mock Interview. | R | 6 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** ( Answer the given questions in ten-twelve sentences each) | | | **16** |
| | a) | Draw Wel-labeled diagram of communication cycle and define each element involved in the process of communication. | A | 1 | |
| | b) | State the importance of oral communication for the student life while persuing a diploma engineering. | U | 2 | |
| | c) | Explain the meaning of 'Formal Business Correspondence' and give at least four features associated with this type of communication. | U | 3 | |
| | d) | Explain the word-Proximics with one correct relevant example. | A | 1 | |
| | e) | "Considering your audience is a crucial step in preparation of Business presentation". Explain the meaning of this statement in the light of successful and effective communication. | U | 5 | |
| | f) | Describe how a good posture is important for a professional person with one relevant example. | U | 4 | |
| | | | | | |

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| Q.3 | | Attempt any **TWO:** | | | **16** |
|---|---|---|---|---|---|
| | a) | Compose a well planned letter of application with your resume for the post of junior Engineer at Cognizant Solution Pvt. Ltd. Pune-16. Send your letter to The Manager ( H.R.) Department of this organization. | A | 3 | |
| | b) | The government has received funds from the World Bank. This fund is for Well fair of people. The government plans to use the fund in following different schemes- it plans to use 40% amount for road construction; 25% amount for education; 20% amount for primary Health care and 15% amount for rural development. Draw a suitable table and pie chart showing this distribution of amount for different purposes. | A | 4 | |
| | c) | Show with one relevant example how dress and appearance has positive effect in interview event . | A | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **SECOND** PROGRAM : **COMMON**

COURSE CODE :- **CCG203**

COURSE NAME **COMMUNICATION SKILL**

MAX. MARKS : **40** TIME : **02Hrs.** DATE :- **14/ 12 / 2023**

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 | SQN | Question Text | R/U/A | Co CCG 203 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** ( Answer the each of following given question in three-five sentences) | | | **08** |
| | a) | State correct meaning of the term- 'Sender' as used in communication theory and give its one relevant example. | R | 1 | |
| | b) | Explain the term-'Feedback' and state its significance in two-way human communication. | U | 1 | |
| | c) | List out two basic characteristics associated with oral communication. | R | 2 | |
| | d) | Define the phrase- 'visual graphic communication' as used in the theory of communication. | R | 3 | |
| | e) | State what the 'Media Aided presentation' means in communication context. Also give one suitable example of it. | U | 5 | |
| | f) | Define the term- Mock Interview. | R | 6 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** ( Answer the given questions in ten-twelve sentences each) | | | **16** |
| | a) | Draw Wel-labeled diagram of communication cycle and define each element involved in the process of communication. | A | 1 | |
| | b) | State the importance of oral communication for the student life while persuing a diploma engineering. | U | 2 | |
| | c) | Explain the meaning of 'Formal Business Correspondence' and give at least four features associated with this type of communication. | U | 3 | |
| | d) | Explain the word-Proximics with one correct relevant example. | A | 1 | |
| | e) | "Considering your audience is a crucial step in preparation of Business presentation". Explain the meaning of this statement in the light of successful and effective communication. | U | 5 | |
| | f) | Describe how a good posture is important for a professional person with one relevant example. | U | 4 | |
| | | | | | |

**P.T.O**

| Q.3 | | Attempt any **TWO:** | | | **16** |
|---|---|---|---|---|---|
| | a) | Compose a well planned letter of application with your resume for the post of junior Engineer at Cognizant Solution Pvt. Ltd. Pune-16. Send your letter to The Manager ( H.R.) Department of this organization. | A | 3 | |
| | b) | The government has received funds from the World Bank. This fund is for Well fair of people. The government plans to use the fund in following different schemes- it plans to use 40% amount for road construction; 25% amount for education; 20% amount for primary Health care and 15% amount for rural development. Draw a suitable table and pie chart showing this distribution of amount for different purposes. | A | 4 | |
| | c) | Show with one relevant example how dress and appearance has positive effect in interview event . | A | 6 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER /~~SUMMER~~** 2023

**EXAM SEAT NO.** | | | | | | |

LEVEL : - First PROGRAM : COMMON to all

COURSE CODE :- CCH105

COURSE NAME :- Basic Mathematics

MAX. MARKS : 70 TIME : **03 Hrs** DATE :- 14-12-2023

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 CCH 105 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **THREE: (2 X 3)** | | | **06** |
| | a) | Solve: $\log_2(7x+2)=3$ | R | 1 | |
| | b) | Evaluate $\begin{bmatrix}-1 & 6 & 3\\ 2 & 5 & 11\\ -3 & 5 & 0\end{bmatrix}+\begin{bmatrix}2 & 2 & 1\\ 7 & 2 & 6\\ -6 & 9 & 5\end{bmatrix}$ | A | 1 | |
| | c) | Find slope and both the intercepts made by the following line on both the axes. $2(2x-5)=3(4x+15)$ | A | 3 | |
| | d) | Find Mean Deviation from Mean of : 1,2,3,4,5 | A | 2 | |
| | e) | Find range of the following data<br>Marks: 3, 8, 13, 18, 23, 28, 33<br>No. of students: 1, 4, 5, 7, 2, 3, 10 | A | 2 | |
| Q.2 | | Attempt any **FOUR: (4 X 4)** | | | **16** |
| | a) | Find x if $\log_2 x + \log_x 16 = 15$ | U | 1 | |
| | b) | Resolve into partial fractions : $\frac{x}{x^2+1}$ | A | 1 | |
| | c) | If $A=\begin{bmatrix}2 & 3\\ -1 & 5\end{bmatrix}$ and $B=\begin{bmatrix}3 & -1 & 2\\ 1 & 0 & -2\end{bmatrix}$ then verify that $(AB)^T = B^T . A^T$ | A | 1 | |
| | d) | Find mean deviation from Mean of the following frequency distribution<br>$x_i$: 8, 16, 24, 32, 40, 48, 56, 64<br>$f_i$: 5, 13, 12, 8, 6, 10, 9, 3 | A | 2 | |
| | e) | Find S.D. of the following<br>$x_i$: 5, 10, 15, 20, 25<br>$f_i$: 12, 17, 22, 19, 16 | A | 2 | |
| | f) | Find equation of straight line which makes equal intercepts on axes and passes through (6 , -1) | U | 3 | |
| Q.3 | | Attempt any **TWO: (6 X 2)** | | | **12** |
| | a) | The score of two batsmen A and B in 10 innings during ICC tournaments are as follows. Find which batsman is more consistent and also find who shows more variability in their scores.<br>A: 32, 28, 47, 63, 71, 39, 10, 60, 96, 14<br>B: 19, 31, 48, 53, 67, 90, 10, 62, 40, 80 | A | 2 | |
| | b) | Solve the following equations by matrix inversion method<br>$x + y + z = 3$<br>$3x - 2y + 3z = 4$<br>$5x + 5y + z = 11$ | R | 1 | |
| | c) | i) Find length of perpendicular of the line $\sqrt{3}x - y - 14 = 0$ from the origin.<br>ii) Find the angle between the lines $3x + y = 2$ and $x - 6y = 3$. Hence state whether the lines are parallel or not. | U | 3 | |

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| | | | | | |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR: (2 X 4)** | | | **08** |
| | a) | Without using calculator find the value of $\tan(15°)$ | R | 4 | |
| | b) | If $f(x) = x^2 + 6x + 10$ , find $f(0) + f(2)$ | U | 5 | |
| | c) | State whether the function $f(x) = \frac{x^3}{1+x^2}$ is even or odd | U | 5 | |
| | d) | Find $\frac{dy}{dx}$ if $y = \frac{x+1}{x-1}$ | U | 5 | |
| | e) | Find $\frac{dy}{dx}$ if $y = x \tan x$ | R | 5 | |
| | f) | Find the slope of the tangent of the curve $y = x^3$ at $x = 4$ | A | 5 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR: (4 X 4)** | | | **16** |
| | a) | Prove that $\frac{\sin 4A+\sin 5A+\sin 6A}{\cos 4A+\cos 5A+\cos 6A} = \tan 5A$ | U | 4 | |
| | b) | Without using calculator find the value of $\frac{\tan 32°+\tan 88°}{1-\tan 32° \tan 88°}$ | A | 4 | |
| | c) | Show that $\sin^{-1}(\frac{3}{5}) + \sin^{-1}(\frac{8}{17}) = \cos^{-1}(\frac{36}{85})$ | A | 4 | |
| | d) | Find $\frac{dy}{dx}$ if $y = (\tan x)^{\sin x}$ | U | 5 | |
| | e) | If $x = a(\theta - \sin\theta)$ and $y = a(1 - \cos\theta)$ find $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$ | U | 5 | |
| | f) | Find $\frac{dy}{dx}$ if $x^2 + 3xy + y^2 = 5$ | U | 5 | |
| | | | | | |
| Q.6 | | Attempt any **TWO: (6 X 2)** | | | **12** |
| | a) | i) If $\tan x = \frac{5}{6}, \tan y = \frac{1}{11}$ prove that $x + y = \frac{\pi}{4}$<br>ii) If $\sin A = 0.4$ find $\sin 3A$ using multiple angle formula | U | 4 | |
| | b) | i) Find $\frac{dy}{dx}$ if $y = e^{3\sec x+4\tan x}$<br>ii) Find $\frac{dy}{dx}$ if $y = \tan^{-1}(\frac{x}{\sqrt{1-x^2}})$ | A | 5 | |
| | c) | i) Find radius of curvature of the curve $y = x^3$ at (2,1)<br>ii) Find the equation of normal to the curve $4x^2 + 9y^2 = 40$ at (1,2) | A | 5 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER /~~SUMMER~~- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - First PROGRAM : COMMON to all

COURSE CODE :- CCH105

COURSE NAME :- Basic Mathematics

MAX. MARKS : 70 TIME : **03 Hrs** DATE :- 14-12-2023

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 CCH 105 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **THREE: (2 X 3)** | | | **06** |
| | a) | Solve: $\log_2(7x+2)=3$ | R | 1 | |
| | b) | Evaluate $\begin{bmatrix}-1 & 6 & 3\\ 2 & 5 & 11\\ -3 & 5 & 0\end{bmatrix}+\begin{bmatrix}2 & 2 & 1\\ 7 & 2 & 6\\ -6 & 9 & 5\end{bmatrix}$ | A | 1 | |
| | c) | Find slope and both the intercepts made by the following line on both the axes. $2(2x-5)=3(4x+15)$ | A | 3 | |
| | d) | Find Mean Deviation from Mean of : 1,2,3,4,5 | A | 2 | |
| | e) | Find range of the following data<br>Marks: 3, 8, 13, 18, 23, 28, 33<br>No. of students: 1, 4, 5, 7, 2, 3, 10 | A | 2 | |
| Q.2 | | Attempt any **FOUR: (4 X 4)** | | | **16** |
| | a) | Find x if $\log_2 x + \log_x 16 = 15$ | U | 1 | |
| | b) | Resolve into partial fractions : $\frac{x}{x^3+1}$ | A | 1 | |
| | c) | If $A=\begin{bmatrix}2 & 3\\ -1 & 5\end{bmatrix}$ and $B=\begin{bmatrix}3 & -1 & 2\\ 1 & 0 & -2\end{bmatrix}$ then verify that $(AB)^T = B^T . A^T$ | A | 1 | |
| | d) | Find mean deviation from Mean of the following frequency distribution<br>$x_i$: 8, 16, 24, 32, 40, 48, 56, 64<br>$f_i$: 5, 13, 12, 8, 6, 10, 9, 3 | A | 2 | |
| | e) | Find S.D. of the following<br>$x_i$: 5, 10, 15, 20, 25<br>$f_i$: 12, 17, 22, 19, 16 | A | 2 | |
| | f) | Find equation of straight line which makes equal intercepts on axes and passes through (6 , -1) | U | 3 | |
| Q.3 | | Attempt any **TWO: (6 X 2)** | | | **12** |
| | a) | The score of two batsmen A and B in 10 innings during ICC tournaments are as follows. Find which batsman is more consistent and also find who shows more variability in their scores.<br>A: 32, 28, 47, 63, 71, 39, 10, 60, 96, 14<br>B: 19, 31, 48, 53, 67, 90, 10, 62, 40, 80 | A | 2 | |
| | b) | Solve the following equations by matrix inversion method<br>$x + y + z = 3$<br>$3x - 2y + 3z = 4$<br>$5x + 5y + z = 11$ | R | 1 | |
| | c) | i) Find length of perpendicular of the line $\sqrt{3}x - y - 14 = 0$ from the origin.<br>ii) Find the angle between the lines $3x + y = 2$ and $x - 6y = 3$. Hence state whether the lines are parallel or not. | U | 3 | |

PTO

| | | | | | |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR: (2 X 4)** | | | **08** |
| | a) | Without using calculator find the value of $\tan(15°)$ | R | 4 | |
| | b) | If $f(x) = x^2 + 6x + 10$ , find $f(0) + f(2)$ | U | 5 | |
| | c) | State whether the function $f(x) = \frac{x^3}{1+x^2}$ is even or odd | U | 5 | |
| | d) | Find $\frac{dy}{dx}$ if $y = \frac{x+1}{x-1}$ | U | 5 | |
| | e) | Find $\frac{dy}{dx}$ if $y = x \tan x$ | R | 5 | |
| | f) | Find the slope of the tangent of the curve $y = x^3$ at $x = 4$ | A | 5 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR: (4 X 4)** | | | **16** |
| | a) | Prove that $\frac{\sin 4A+\sin 5A+\sin 6A}{\cos 4A+\cos 5A+\cos 6A} = \tan 5A$ | U | 4 | |
| | b) | Without using calculator find the value of $\frac{\tan 32°+\tan 88°}{1-\tan 32° \tan 88°}$ | A | 4 | |
| | c) | Show that $\sin^{-1}(\frac{3}{5}) + \sin^{-1}(\frac{8}{17}) = \cos^{-1}(\frac{36}{85})$ | A | 4 | |
| | d) | Find $\frac{dy}{dx}$ if $y = (\tan x)^{\sin x}$ | U | 5 | |
| | e) | If $x = a(\theta - \sin\theta)$ and $y = a(1 - \cos\theta)$ find $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$ | U | 5 | |
| | f) | Find $\frac{dy}{dx}$ if $x^2 + 3xy + y^2 = 5$ | U | 5 | |
| | | | | | |
| Q.6 | | Attempt any **TWO: (6 X 2)** | | | **12** |
| | a) | i) If $\tan x = \frac{5}{6}, \tan y = \frac{1}{11}$ prove that $x + y = \frac{\pi}{4}$<br>ii) If $\sin A = 0.4$ find $\sin 3A$ using multiple angle formula | U | 4 | |
| | b) | i) Find $\frac{dy}{dx}$ if $y = e^{3\sec x+4\tan x}$<br>ii) Find $\frac{dy}{dx}$ if $y = \tan^{-1}(\frac{x}{\sqrt{1-x^2}})$ | A | 5 | |
| | c) | i) Find radius of curvature of the curve $y = x^3$ at (2,1)<br>ii) Find the equation of normal to the curve $4x^2 + 9y^2 = 40$ at (1,2) | A | 5 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/~~SUMMER~~- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - First PROGRAM : COMMON

COURSE CODE:-CCG107

COURSE NAME :-ENGINEERING DRAWING-I

MAX. MARKS : **80** TIME : **04 Hrs** DATE :-15/12/23

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 **FOUR:** | | | **08** |
| | a) | List the different types of drawing instruments. | R | 1 | 2 |
| | b) | Draw the convention of Hidden lines and Section lines | U | 1 | 2 |
| | c) | Draw the projection of point P which is in VP and 30mm above HP | U | 3 | 2 |
| | d) | Draw the projection of point R which is 15 mm infront of VP and 20mm above HP | U | 3 | 2 |
| | e) | Write the applications of elliptical curve in practice (Any two). | A | 2 | 2 |
| | f) | Define "Representative Fraction". | R | 1 | 2 |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **20** |
| | a) | Draw the involute of circle of base diameter 50 mm | U | 2 | **5** |
| | b) | Draw the cycloid of a circle of base diameter 40 mm | U | 2 | 5 |
| | c) | Draw the parabola by rectangle method having base 50mm and axis 70mm | U | 2 | 5 |
| | d) | Draw an Archimedean spiral of one convolution ,the maximum and minimum radii being 80mm and 20mm respectively | U | 2 | 5 |
| | e) | The foci of an ellipse are 90mm apart. The major axis is 110mm long. Determine the length of minor axis and draw an ellipse by concentric circle method. | U | 2 | 5 |
| | f) | Construct a plain scale with R.F 1:40 to read upto 6 meters in meters and decimeters. Show on it a distance of 4.9 meters. | U | 1 | 5 |
| | | | | | |
| Q.3 | | Attempt any TWO: | | | **12** |
| | a) | The front view of a line PQ,100mm long ,measures 85mm.The end P is 20mm above H.P and 40mm infront of V.P. Draw its three views, if it is parallel to H.P.Find its inclination with V.P | U | 3 | 6 |
| | b) | The distance between the projectors through the ends of a line MN,75mm long is 60mm.Its end M is 15mm above the H.P and 20mm infront of V.P. Draw its three views ,when it is parallel to V.P. Determine its inclination with H.P. | U | 3 | 6 |
| | c) | The end A of a line AB, 100mm long, is in V.P. and 25mm above the H.P. and inclined at 450 with V.P. Draw its three views. Find the distance of end B from V.P. The line is parallel to HP. | U | 3 | 6 |

| QN | SQN | Question Text | R/U/A | Co CCG 107 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **TWO** | | | **12** |
| | a) | A pentagonal plate of 30mm side is resting on one side on V.P. such that plate is inclined at $40^0$ with V.P. and perpendicular to H.P. The centre of plate is 50mm above H.P. Draw three views. | R & U | 4 | |
| | b) | A rectangular lamina ABCD of smaller side AB=35mm and longer side BC=60 mm resting on the V.P. on its smaller side AB. Lamina is inclined to V.P. in such a way that its front view appears to be square side AB is perpendicular to H.P. Draw three views of the lamina. | R & U | 4 | |
| | c) | A hexagonal plate of negligible thickness is resting on one side on the H.P. The plate is inclined at $45^0$ to V.P. and perpendicular to H.P. The side of plate is 30mm. Draw three views. | R & U | 4 | |
| | | | | | |
| Q.5 | | Attempt any **ONE:** | | | **14** |
| | a) | Figure No. 1 shows pictorial view of an object. Draw following views looking in direction A.<br>i) Front view.<br>ii) Top view.<br>iii) Proper dimensioning. | U & A | 5 | <br>06<br>06<br>02 |
| | b) | Figure No.2 shows pictorial view of an object. Draw following views looking in direction X.<br>i) Front view.<br>ii) Top view.<br>iii) Side view.<br>iv) Dimensioning. | U & A | 5 | <br>04<br>04<br>04<br>02 |
| | | | | | |
| Q.6 | | Attempt any **ONE:** | | | **14** |
| | a) | Figure No. 3 shows pictorial view of an object. Draw the following views looking in direction X.<br>i) Sectional F.V. along section PQ.<br>ii) Top view.<br>iii) Dimensioning. | U & A | 6 | <br>06<br>06<br>02 |
| | b) | Figure No. 4 shows pictorial view of an object. Draw the following views of an object looking in direction X.<br>i) Front view.<br>ii) Sectional R.H.S.V.<br>iii) Dimensioning. | U & A | 6 | <br>06<br>06<br>02 |



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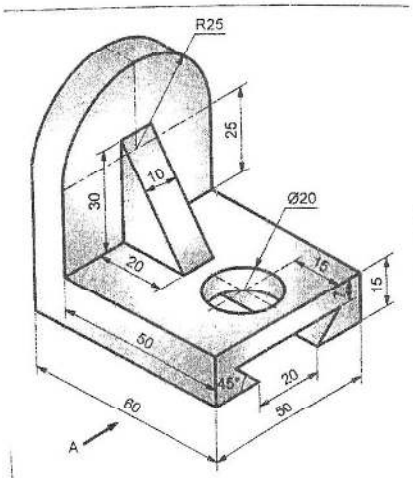


Figure 1

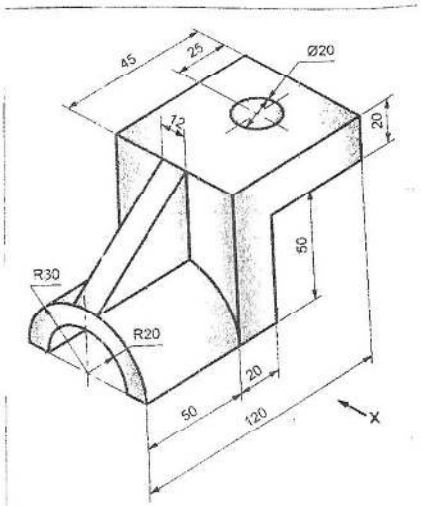


Figure 2

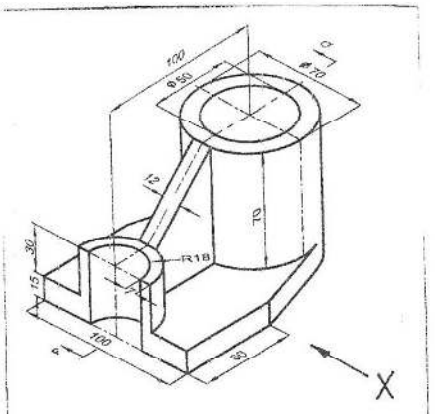


Figure 3

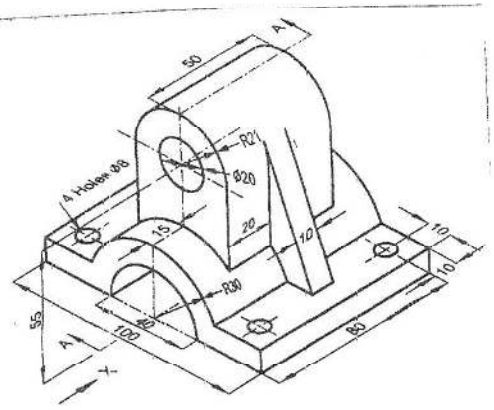


Figure 4

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER/~~SUMMER~~- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - First PROGRAM : COMMON

COURSE CODE:-CCG107

COURSE NAME :-ENGINEERING DRAWING-I

MAX. MARKS : **80** TIME : **04 Hrs** DATE :-15/12/23

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 **FOUR:** | | | **08** |
| | a) | List the different types of drawing instruments. | R | 1 | 2 |
| | b) | Draw the convention of Hidden lines and Section lines | U | 1 | 2 |
| | c) | Draw the projection of point P which is in VP and 30mm above HP | U | 3 | 2 |
| | d) | Draw the projection of point R which is 15 mm infront of VP and 20mm above HP | U | 3 | 2 |
| | e) | Write the applications of elliptical curve in practice (Any two). | A | 2 | 2 |
| | f) | Define "Representative Fraction". | R | 1 | 2 |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **20** |
| | a) | Draw the involute of circle of base diameter 50 mm | U | 2 | 5 |
| | b) | Draw the cycloid of a circle of base diameter 40 mm | U | 2 | 5 |
| | c) | Draw the parabola by rectangle method having base 50mm and axis 70mm | U | 2 | 5 |
| | d) | Draw an Archimedean spiral of one convolution ,the maximum and minimum radii being 80mm and 20mm respectively | U | 2 | 5 |
| | e) | The foci of an ellipse are 90mm apart. The major axis is 110mm long. Determine the length of minor axis and draw an ellipse by concentric circle method. | U | 2 | 5 |
| | f) | Construct a plain scale with R.F 1:40 to read upto 6 meters in meters and decimeters. Show on it a distance of 4.9 meters. | U | 1 | 5 |
| | | | | | |
| Q.3 | | Attempt any TWO: | | | **12** |
| | a) | The front view of a line PQ,100mm long ,measures 85mm.The end P is 20mm above H.P and 40mm infront of V.P. Draw its three views, if it is parallel to H.P.Find its inclination with V.P | U | 3 | 6 |
| | b) | The distance between the projectors through the ends of a line MN,75mm long is 60mm.Its end M is 15mm above the H.P and 20mm infront of V.P. Draw its three views ,when it is parallel to V.P. Determine its inclination with H.P. | U | 3 | 6 |
| | c) | The end A of a line AB, 100mm long, is in V.P. and 25mm above the H.P. and inclined at 450 with V.P. Draw its three views. Find the distance of end B from V.P. The line is parallel to HP. | U | 3 | 6 |

| QN | SQN | Question Text | R/U/A | Co CCG 107 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **TWO** | | | **12** |
| | a) | A pentagonal plate of 30mm side is resting on one side on V.P. such that plate is inclined at $40^0$ with V.P. and perpendicular to H.P. The centre of plate is 50mm above H.P. Draw three views. | R & U | 4 | |
| | b) | A rectangular lamina ABCD of smaller side AB=35mm and longer side BC=60 mm resting on the V.P. on its smaller side AB. Lamina is inclined to V.P. in such a way that its front view appears to be square side AB is perpendicular to H.P. Draw three views of the lamina. | R & U | 4 | |
| | c) | A hexagonal plate of negligible thickness is resting on one side on the H.P. The plate is inclined at $45^0$ to V.P. and perpendicular to H.P. The side of plate is 30mm. Draw three views. | R & U | 4 | |
| | | | | | |
| Q.5 | | Attempt any **ONE:** | | | **14** |
| | a) | Figure No. 1 shows pictorial view of an object. Draw following views looking in direction A.<br>i) Front view.<br>ii) Top view.<br>iii) Proper dimensioning. | U & A | 5 | <br>06<br>06<br>02 |
| | b) | Figure No.2 shows pictorial view of an object. Draw following views looking in direction X.<br>i) Front view.<br>ii) Top view.<br>iii) Side view.<br>iv) Dimensioning. | U & A | 5 | <br>04<br>04<br>04<br>02 |
| | | | | | |
| Q.6 | | Attempt any **ONE:** | | | **14** |
| | a) | Figure No. 3 shows pictorial view of an object. Draw the following views looking in direction X.<br>i) Sectional F.V. along section PQ.<br>ii) Top view.<br>iii) Dimensioning. | U & A | 6 | <br>06<br>06<br>02 |
| | b) | Figure No. 4 shows pictorial view of an object. Draw the following views of an object looking in direction X.<br>i) Front view.<br>ii) Sectional R.H.S.V.<br>iii) Dimensioning. | U & A | 6 | <br>06<br>06<br>02 |



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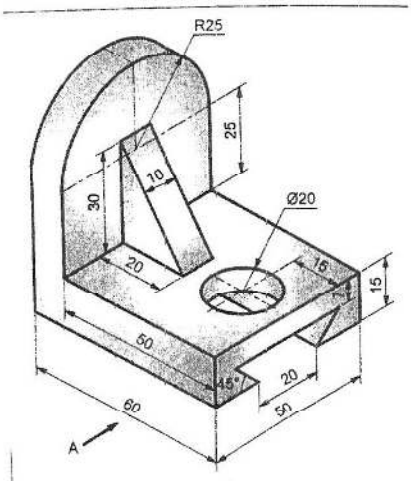


Figure 1

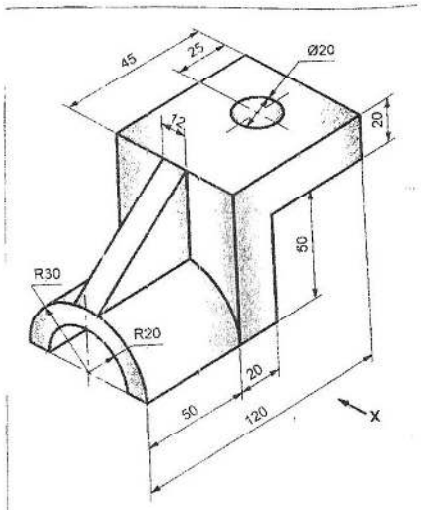


Figure 2

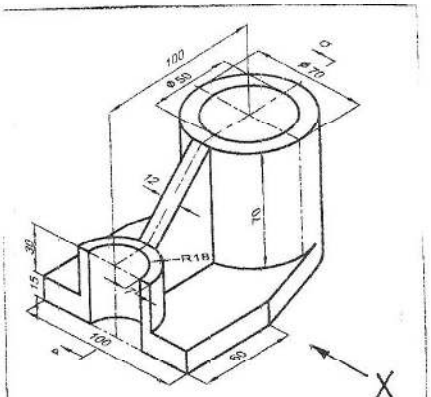


Figure 3

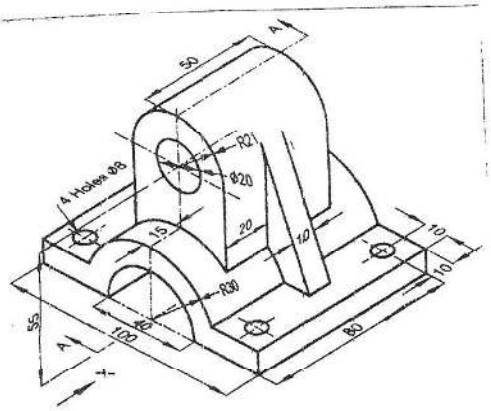


Figure 4

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - First PROGRAM : CE/ME/MT

COURSE CODE :- CCG 106/CCF106/X110

COURSE NAME :- Engineering Mathematics

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 16/ **12** / **2023**

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 CEG301 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Express $\frac{1}{2+3i}$ in the form of x+iy | R | 1 | |
| | b) | Find the equation of straight line having slope $\frac{3}{4}$ and passing through point(1,2) | U | 2 | |
| | c) | Find the slope and x-intercept of straight line 5x- 10y -20 = 0 | R | 2 | |
| | d) | If two coins are tossed simultaneously, then find the probability that both are heads | R | 3 | |
| | e) | A card is drawn at random from a well shuffled pack. Find the probability that it is a black card. | U | 3 | |
| | f) | If a random variable has Poisson's distribution such that P(1) = P(2), find P(4). (Given $e^{-2} = 0.1353$) | A | 4 | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Find $\frac{z_1}{z_2}$; if $z_1 = -3 + 4i$ and $z_2 = 5-3i$ | U | 1 | |
| | b) | There are 20 tickets bearing numbers from 1 to 20. One ticket is drawn at random .Find the probability that the number it is multiple of 5 or 6. | A | 3 | |
| | c) | Sacks of sugar packed by an automatic loader have an average weight of 100kg with standard deviation 0.250kg .Assuming normal distribution ,find the chance of sack weighing less than 99.5 kg. (given Area between z = 0 to z = 2 is 0.4772 ) | A | 4 | |
| | d) | Simplify : $\frac{(\cos 2\theta + i\sin 2\theta)^{\frac{3}{2}}(\cos\theta - i\sin\theta)^3}{(\cos 3\theta - i\sin 3\theta)(\cos 5\theta - i\sin 5\theta)^{\frac{2}{5}}}$ | A | 1 | |
| | e) | Find the angle between the lines 3x- y = 4 and 2x + y =3 | A | 2 | |
| | f) | If 2% of electric bulbs are manufactured by a company are defective, find the probability that in a sample of 100 bulbs, 3 bulbs are defective. | A | 4 | |

| Q.3 | | Attempt any **FOUR:** | | | 16 |
|---|---|---|---|---|---|
| | a) | Express $z = 1+i\sqrt{3}$ in the polar form | R | 1 | |
| | b) | Find the equation of line passing through the point (4,5) and perpendicular to the line $7x - 5y = 420$ | U | 2 | |
| | c) | Take 100 sets of 10 tosses of an unbiased coin. In how many cases do you except to get (i) 7 heads & 3 tails (ii) at least 7 heads | A | 4 | |
| | d) | Find the length of perpendicular on the line $8x-3y+4=0$ from(1,2) | R | 2 | |
| | e) | 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 | |
| | f) | Out of 1000 families having 3 children each, how many would you except to have (i) 2 boys & 1 girl (ii) 2 girls & 1 boy | A | 4 | |

| Q.4 | | Attempt any **FOUR:** | | | 08 |
|---|---|---|---|---|---|
| | a) | Define even function and odd function | R | 4 | |
| | b) | Evaluate $\lim_{x \to 2}\left[\frac{x-2}{x^2+x-6}\right]$ | R | 4 | |
| | c) | Find $\frac{dy}{dx}$, if $y = \log x + \log_5 x + \log_5 5$. | R | 5 | |
| | d) | Find $\frac{dy}{dx}$, if $y = \cos(xe^x)$ | R | 5 | |
| | e) | Evaluate $\lim_{x \to 1}\left[\frac{1}{1-x^2} + \frac{1}{x-1}\right]$ | U | 4 | |
| | f) | At what point on the curve $y = e^x$, the slope is 1? | A | 5 | |

| Q.5 | | Attempt any **FOUR:** | | | 16 |
|---|---|---|---|---|---|
| | a) | Find the maximum and minimum values of $y = x^3 - 9x^2 + 24x$. | A | 5 | |
| | b) | If $f(x) = 3x^4 + x^2 + 5 - 3\cos x + 2\sin^2 x$, show that $f(x) + f(-x) = 2f(x)$. | A | 4 | |
| | c) | Evaluate $\lim_{x \to \infty}\left[\sqrt{x^2+5x} - x\right]$ | A | 4 | |
| | d) | If $x^p y^q = (x+y)^{p+q}$, then show that $\frac{dy}{dx} = \frac{y}{x}$. | U | 5 | |
| | e) | If $y = x^x$, *find* $\frac{dy}{dx}$. | A | 5 | |
| | f) | If $y = \sec^{-1}\left(\frac{1}{4x^3 - 3x}\right)$, then find $\frac{dy}{dx}$. | A | 5 | |

| Q.6 | | Attempt any **FOUR:** | | | 16 |
|---|---|---|---|---|---|
| | a) | Find $\frac{dy}{dx}$, *if* $\log(x\,y) = x^2 + y^2$. | U | 5 | |
| | b) | If $x = 3\sin\theta - 2\sin^3\theta$, $y = \cos\theta - 2\cos^3\theta$, then find $\frac{dy}{dx}$ *at* $\theta = \frac{\pi}{4}$. | A | 5 | |
| | c) | If $f(x) = 16^x + \log_2 x$, *find* $f\left(\frac{1}{4}\right)$ *and* $f\left(\frac{1}{2}\right)$. | A | 4 | |
| | d) | Evaluate $\lim_{x \to 2}\left[\frac{x^2-4}{\sqrt{x+2} - \sqrt{3x-2}}\right]$ | A | 4 | |
| | e) | Show that the equation of the tangent to the curve $\left(\frac{x}{a}\right)^m + \left(\frac{y}{b}\right)^m = 2$ at the point (a, b) is $\frac{x}{a} + \frac{y}{b} = 2$. | A | 5 | |
| | f) | If $y = e^{m\sin^{-1}x}$, then prove that $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} - m^2y = 0$ | A | 5 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - First PROGRAM : CE/ME/MT

COURSE CODE :- CCG 106/CCF106/X110

COURSE NAME :- Engineering Mathematics

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 16/ **12** / **2023**

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.
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7) QN- Question No., SQN-Sub Question No. R- Remembering, U- Understanding, A- Application.

| QN | SQN | SECTION -I | R/U/A | CO CEG301 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | Express $\frac{1}{2+3i}$ in the form of x+iy | R | 1 | |
| | b) | Find the equation of straight line having slope $\frac{3}{4}$ and passing through point(1,2) | U | 2 | |
| | c) | Find the slope and x-intercept of straight line 5x- 10y -20 = 0 | R | 2 | |
| | d) | If two coins are tossed simultaneously, then find the probability that both are heads | R | 3 | |
| | e) | A card is drawn at random from a well shuffled pack. Find the probability that it is a black card. | U | 3 | |
| | f) | If a random variable has Poisson's distribution such that P(1) = P(2), find P(4). (Given $e^{-2} = 0.1353$) | A | 4 | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Find $\frac{Z_1}{Z_2}$; if $Z_1 = -3 + 4i$ and $Z_2 = 5-3i$ | U | 1 | |
| | b) | There are 20 tickets bearing numbers from 1 to 20. One ticket is drawn at random .Find the probability that the number it is multiple of 5 or 6. | A | 3 | |
| | c) | Sacks of sugar packed by an automatic loader have an average weight of 100kg with standard deviation 0.250kg .Assuming normal distribution ,find the chance of sack weighing less than 99.5 kg. (given Area between z = 0 to z = 2 is 0.4772 ) | A | 4 | |
| | d) | Simplify : $\frac{(\cos 2\theta + i\sin 2\theta)^{\frac{3}{2}}(\cos\theta - i\sin\theta)^3}{(\cos 3\theta - i\sin 3\theta)(\cos 5\theta - i\sin 5\theta)^{\frac{2}{5}}}$ | A | 1 | |
| | e) | Find the angle between the lines 3x- y = 4 and 2x + y =3 | A | 2 | |
| | f) | If 2% of electric bulbs are manufactured by a company are defective, find the probability that in a sample of 100 bulbs, 3 bulbs are defective. | A | 4 | |

| Q.3 | | Attempt any **FOUR:** | | | 16 |
|---|---|---|---|---|---|
| | a) | Express $z = 1+i\sqrt{3}$ in the polar form | R | 1 | |
| | b) | Find the equation of line passing through the point (4,5) and perpendicular to the line $7x - 5y = 420$ | U | 2 | |
| | c) | Take 100 sets of 10 tosses of an unbiased coin. In how many cases do you except to get (i) 7 heads & 3 tails (ii) at least 7 heads | A | 4 | |
| | d) | Find the length of perpendicular on the line $8x-3y+4=0$ from(1,2) | R | 2 | |
| | e) | 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 | |
| | f) | Out of 1000 families having 3 children each, how many would you except to have (i) 2 boys & 1 girl (ii) 2 girls & 1 boy | A | 4 | |

| Q.4 | | Attempt any **FOUR:** | | | 08 |
|---|---|---|---|---|---|
| | a) | Define even function and odd function | R | 4 | |
| | b) | Evaluate $\lim_{x \to 2}\left[\frac{x-2}{x^2+x-6}\right]$ | R | 4 | |
| | c) | Find $\frac{dy}{dx}$, if $y = \log x + \log_5 x + \log_5 5$. | R | 5 | |
| | d) | Find $\frac{dy}{dx}$, if $y = \cos\left(xe^x\right)$ | R | 5 | |
| | e) | Evaluate $\lim_{x \to 1}\left[\frac{1}{1-x^2} + \frac{1}{x-1}\right]$ | U | 4 | |
| | f) | At what point on the curve $y = e^x$, the slope is 1? | A | 5 | |

| Q.5 | | Attempt any **FOUR:** | | | 16 |
|---|---|---|---|---|---|
| | a) | Find the maximum and minimum values of $y = x^3 - 9x^2 + 24x$. | A | 5 | |
| | b) | If $f(x) = 3x^4 + x^2 + 5 - 3\cos x + 2\sin^2 x$, show that $f(x) + f(-x) = 2f(x)$. | A | 4 | |
| | c) | Evaluate $\lim_{x \to \infty}\left[\sqrt{x^2+5x} - x\right]$ | A | 4 | |
| | d) | If $x^p y^q = (x+y)^{p+q}$, then show that $\frac{dy}{dx} = \frac{y}{x}$. | U | 5 | |
| | e) | If $y = x^x$, *find* $\frac{dy}{dx}$. | A | 5 | |
| | f) | If $y = \sec^{-1}\left(\frac{1}{4x^3 - 3x}\right)$, then find $\frac{dy}{dx}$. | A | 5 | |

| Q.6 | | Attempt any **FOUR:** | | | 16 |
|---|---|---|---|---|---|
| | a) | Find $\frac{dy}{dx}$, *if* $\log(xy) = x^2 + y^2$. | U | 5 | |
| | b) | If $x = 3\sin\theta - 2\sin^3\theta$, $y = \cos\theta - 2\cos^3\theta$, then find $\frac{dy}{dx}$ *at* $\theta = \frac{\pi}{4}$. | A | 5 | |
| | c) | If $f(x) = 16^x + \log_2 x$, *find* $f\left(\frac{1}{4}\right)$ *and* $f\left(\frac{1}{2}\right)$. | A | 4 | |
| | d) | Evaluate $\lim_{x \to 2}\left[\frac{x^2-4}{\sqrt{x+2} - \sqrt{3x-2}}\right]$ | A | 4 | |
| | e) | Show that the equation of the tangent to the curve $\left(\frac{x}{a}\right)^m + \left(\frac{y}{b}\right)^m = 2$ at the point (a, b) is $\frac{x}{a} + \frac{y}{b} = 2$. | A | 5 | |
| | f) | If $y = e^{m\sin^{-1}x}$, then prove that $\left(1-x^2\right)\frac{d^2y}{dx^2} - x\frac{dy}{dx} - m^2y = 0$ | A | 5 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **EE/IT/E& TC**

COURSE CODE :- **CCG118**

COURSE NAME **ENGINEERING MATHEMATICS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **16/ 12 / 2023**

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 | SQN | Question Text | R/U/A | Co CCG 118 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | If $2(3-4i)+4(2-5i)=x+iy$ , find $x$ & $y$. | R | 1 | |
| | b) | If $z=2+3i$, *find* $(z+3)^2$ | R | 1 | |
| | c) | Find the acute angle between the lines $3x-y=4$ & $2x+y=3$ | U | 2 | |
| | d) | Find equation of straight line passing through (4,-5) & having slope $-2/3$. | U | 2 | |
| | e) | Solve : $5x-2y+z=4$, $x+4y+z=12$, $x+2y+5z=20$, (carry out one iteration only) by Jacobi's method. | A | 3 | |
| | f) | Find an approximate root of the equation $x^3+x-1=0$ by using method of Regular-Falsi. ( carry out one iteration only) | A | 3 | |
| | | | | | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Using De'Moivre's theorem, simplify $\frac{(\cos 5\theta - i\sin 5\theta)^2 \ (\cos 7\theta + i\sin 7\theta)^{-3}}{(\cos 4\theta - i\sin 4\theta)^9 \ (\cos\theta + i\sin\theta)^5}$ | A | 1 | |
| | b) | Prove that : $(1+i)^8 + (1-i)^8 = 32$ . | A | 1 | |
| | c) | Find the distance between the lines $3x+2y=5$ & $6x+4y=6$ | U | 2 | |
| | d) | Using Bisection method, find $\sqrt[3]{10}$ . | A | 3 | |
| | e) | Find the approximate root of the equation $x.\log x = 1.2$ between 2 & 3 upto three iterations by Regula-Falsi method. | A | 3 | |
| | f) | Solve $10x+y+2z=13$, $3x+10y+z=14$, $2x+3y+10z=15$ by Jacobi's method ( carry out 3 iterations only) | A | 3 | |
| | | | | | |
| Q.3 | | Attempt any **FOUR:** | | | 16 |
| | a) | Convert into Polar form, $z=1+i\sqrt{3}$ . | A | 1 | |
| | b) | Find the length of the perpendicular from the point (3,-2) on the line 7(x-2) = 5 (y+3). | R | 2 | |
| | c) | Find the equation of a line passing through the point of intersection of the lines $2x+3y=13$ & $5x-y=7$ & perpendicular to the line $3x-y+7=0$. | A | 2 | |
| | d) | Using Bisection method find approximate root of $x^3-x+1=0$ (carry out three iterations) | A | 3 | |

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|---|---|---|---|---|---|
| | e) | Solve $10x+y+z=12,\ x+10y+z=12,\ x+y+10z=12$ by Gauss-Seidel method. ( carry out three iterations only) | A | 3 | |
| | f) | Solve $25x=22-6y+8z,\ 15y=75-6x-5z,\ 40z=66-x-y$ by Jacobi's method ( carry out three iterations only) | A | 3 | |
| | | | | | |
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define even function and odd function | R | 4 | |
| | b) | Evaluate $\lim_{x\to 2}\left[\frac{x-2}{x^2+x\ \ 6}\right]$ | R | 4 | |
| | c) | Find $\frac{dy}{dx}$, if $y=\log x+\log_5 x+\log_5 5$. | R | 5 | |
| | d) | Find $\frac{dy}{dx}$, if $y=\cos(xe^x)$ | R | 5 | |
| | e) | Evaluate $\lim_{x\to 1}\left[\frac{1}{1-x^2}+\frac{1}{x-1}\right]$ | U | 4 | |
| | f) | At what point on the curve $y=e^x$, the slope is 1? | A | 5 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Find the maximum and minimum values of $y=x^3-9x^2+24x$. | A | 5 | |
| | b) | If $f(x)=3x^4+x^2+5-3\cos x+2\sin^2 x$, show that $f(x)+f(-x)=2f(x)$. | A | 4 | |
| | c) | Evaluate $\lim_{x\to\infty}\left[\sqrt{x^2+5x}-x\right]$ | A | 4 | |
| | d) | If $x^p y^q=(x+y)^{p+q}$, then show that $\frac{dy}{dx}=\frac{y}{x}$. | U | 5 | |
| | e) | If $y=x^x$, *find* $\frac{dy}{dx}$. | A | 5 | |
| | f) | If $y=\sec^{-1}\left(\frac{1}{4x^3-3x}\right)$, then find $\frac{dy}{dx}$. | A | 5 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Find $\frac{dy}{dx}$, *if* $\log(x\ y)=x^2+y^2$. | U | 5 | |
| | b) | If $x=3\sin\theta-2\sin^3\theta,\ y=\cos\theta-2\cos^3\theta$, then find $\frac{dy}{dx}$ *at* $\theta=\frac{\pi}{4}$. | A | 5 | |
| | c) | If $f(x)=16^x+\log_2 x$, *find* $f\left(\frac{1}{4}\right)$ *and* $f\left(\frac{1}{2}\right)$. | A | 4 | |
| | d) | Evaluate $\lim_{x\to 2}\left[\frac{x^2-4}{\sqrt{x+2}-\sqrt{3x-2}}\right]$ | A | 4 | |
| | e) | Show that the equation of the tangent to the curve $\left(\frac{x}{a}\right)^m+\left(\frac{y}{b}\right)^m=2$ at the point (a, b) is $\frac{x}{a}+\frac{y}{b}=2$. | A | 5 | |
| | f) | If $y=e^{m\sin^{-1}x}$, then prove that $(1-x^2)\frac{d^2y}{dx^2}-x\frac{dy}{dx}-m^2y=0$ | A | 5 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **EE/IT/E& TC**

COURSE CODE :- **CCG118**

COURSE NAME **ENGINEERING MATHEMATICS**

MAX. MARKS : **80** TIME : **03Hrs.** DATE :- **16/ 12 / 2023**

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 | SQN | Question Text | R/U/A | Co CCG 118 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | If $2(3-4i)+4(2-5i)=x+iy$ , find $x$ & $y$. | R | 1 | |
| | b) | If $z=2+3i$, *find* $(z+3)^2$ | R | 1 | |
| | c) | Find the acute angle between the lines $3x-y=4$ & $2x+y=3$ | U | 2 | |
| | d) | Find equation of straight line passing through (4,-5) & having slope $-2/3$. | U | 2 | |
| | e) | Solve : $5x-2y+z=4$, $x+4y+z=12$, $x+2y+5z=20$, (carry out one iteration only) by Jacobi's method. | A | 3 | |
| | f) | Find an approximate root of the equation $x^3+x-1=0$ by using method of Regular-Falsi. ( carry out one iteration only) | A | 3 | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Using De'Moivre's theorem, simplify $\frac{(\cos 5\theta - i\sin 5\theta)^2 \ (\cos 7\theta + i\sin 7\theta)^{-3}}{(\cos 4\theta - i\sin 4\theta)^9 \ (\cos\theta + i\sin\theta)^5}$ | A | 1 | |
| | b) | Prove that : $(1+i)^8 + (1-i)^8 = 32$ . | A | 1 | |
| | c) | Find the distance between the lines $3x+2y=5$ & $6x+4y=6$ | U | 2 | |
| | d) | Using Bisection method, find $\sqrt[3]{10}$ . | A | 3 | |
| | e) | Find the approximate root of the equation $x.\log x = 1.2$ between 2 & 3 upto three iterations by Regula-Falsi method. | A | 3 | |
| | f) | Solve $10x+y+2z=13$, $3x+10y+z=14$, $2x+3y+10z=15$ by Jacobi's method ( carry out 3 iterations only) | A | 3 | |
| Q.3 | | Attempt any **FOUR:** | | | 16 |
| | a) | Convert into Polar form, $z=1+i\sqrt{3}$ . | A | 1 | |
| | b) | Find the length of the perpendicular from the point (3,-2) on the line 7(x-2) = 5 (y+3). | R | 2 | |
| | c) | Find the equation of a line passing through the point of intersection of the lines $2x+3y=13$ & $5x-y=7$ & perpendicular to the line $3x-y+7=0$. | A | 2 | |
| | d) | Using Bisection method find approximate root of $x^3-x+1=0$ (carry out three iterations) | A | 3 | |

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| | | | | | |
|---|---|---|---|---|---|
| | e) | Solve $10x+y+z=12,\ x+10y+z=12,\ x+y+10z=12$ by Gauss-Seidel method. ( carry out three iterations only) | A | 3 | |
| | f) | Solve $25x=22-6y+8z,\ 15y=75-6x-5z,\ 40z=66-x-y$ by Jacobi's method ( carry out three iterations only) | A | 3 | |
| | | | | | |
| Q.4 | | Attempt any **FOUR:** | | | **08** |
| | a) | Define even function and odd function | R | 4 | |
| | b) | Evaluate $\lim_{x\to 2}\left[\frac{x-2}{x^2+x-6}\right]$ | R | 4 | |
| | c) | Find $\frac{dy}{dx}$, if $y=\log x+\log_5 x+\log_5 5$. | R | 5 | |
| | d) | Find $\frac{dy}{dx}$, if $y=\cos\left(xe^x\right)$ | R | 5 | |
| | e) | Evaluate $\lim_{x\to 1}\left[\frac{1}{1-x^2}+\frac{1}{x-1}\right]$ | U | 4 | |
| | f) | At what point on the curve $y=e^x$, the slope is 1? | A | 5 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR:** | | | **16** |
| | a) | Find the maximum and minimum values of $y=x^3-9x^2+24x$. | A | 5 | |
| | b) | If $f(x)=3x^4+x^2+5-3\cos x+2\sin^2 x$, show that $f(x)+f(-x)=2f(x)$. | A | 4 | |
| | c) | Evaluate $\lim_{x\to\infty}\left[\sqrt{x^2+5x}-x\right]$ | A | 4 | |
| | d) | If $x^p y^q=(x+y)^{p+q}$, then show that $\frac{dy}{dx}=\frac{y}{x}$. | U | 5 | |
| | e) | If $y=x^x$, *find* $\frac{dy}{dx}$. | A | 5 | |
| | f) | If $y=\sec^{-1}\left(\frac{1}{4x^3-3x}\right)$, then find $\frac{dy}{dx}$. | A | 5 | |
| | | | | | |
| Q.6 | | Attempt any **FOUR:** | | | **16** |
| | a) | Find $\frac{dy}{dx}$, *if* $\log(xy)=x^2+y^2$. | U | 5 | |
| | b) | If $x=3\sin\theta-2\sin^3\theta,\ y=\cos\theta-2\cos^3\theta$, then find $\frac{dy}{dx}$ *at* $\theta=\frac{\pi}{4}$. | A | 5 | |
| | c) | If $f(x)=16^x+\log_2 x$, *find* $f\left(\frac{1}{4}\right)$ *and* $f\left(\frac{1}{2}\right)$. | A | 4 | |
| | d) | Evaluate $\lim_{x\to 2}\left[\frac{x^2-4}{\sqrt{x+2}-\sqrt{3x-2}}\right]$ | A | 4 | |
| | e) | Show that the equation of the tangent to the curve $\left(\frac{x}{a}\right)^m+\left(\frac{y}{b}\right)^m=2$ at the point (a, b) is $\frac{x}{a}+\frac{y}{b}=2$. | A | 5 | |
| | f) | If $y=e^{m\sin^{-1}x}$, then prove that $\left(1-x^2\right)\frac{d^2y}{dx^2}-x\frac{dy}{dx}-m^2y=0$ | A | 5 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL: - First PROGRAM: CE/MT

COURSE CODE:-CCH107

COURSE NAME: - ENGINEERING GRAPHICS

MAX. MARKS : 70 TIME : **04 Hrs** DATE :-16/12/23

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 the following** | | | **06** |
| | a) | List different types of drawing instruments | R | 107-1 | 02 |
| | b) | Construct a plain scale to show kilometers and hectometers when RF =1:35000 and long enough to measure 5km. Measure 3.7 km on the scale. **Or** | U | 107-1 | 04 |
| | b) | Construct a diagonal scale of RF = 1:2 to show millimeter and centimeter to measure up to 35 centimeters. Show on scale a distance of 23.6 centimeter. | U | 107-1 | 04 |
| **Q.2** | | **Attempt any THREE: (6M X 3)** | | | **18** |
| | a) | The major and minor axis of an ellipse are 110 mm and 70 mm respectively. Find the focus and draw the ellipse by arc of circle method. | U | 107-2 | 6 |
| | b) | Draw an epicycloid when generating circle diameter is 40mm and directing circle is 120mm.Take starting points as the points of contacts between two circles. | U | 107-2 | 6 |
| | c) | Draw an involute of hexagon of side 20 mm. | U | 107-2 | 6 |
| | d) | Draw a helix on a cylinder of 50 mm diameter of two turns, given the pitch as 40 mm. | U | 107-2 | 6 |
| **Q.3** | | **Attempt any TWO: (5M X 2)** | | | **10** |
| | a) | Draw the projections of the following points<br>1) Point A is 50mm above HP and 45 mm infront of VP<br>2) Point B is in H.P and 20mm infront of VP<br>3) Point C is in both H.P and V.P<br>4) Point D is in V.P and 50mm above H.P<br>5) Point E is 30mm above H.P and 52 mm Infront of V.P | U | 107-3 | 5 |
| | b) | The distance between the projections through the ends of a line AB, 75mm long is 60mm. Its end A is 15mm above the H. P and 20mm infront of V.P. Draw its views, when it is parallel to V.P. Determine its inclination with H.P. | U | 107-3 | 5 |
| | c) | The front View of a line PQ,100mm long, measures 85mm.The end P is 20mm above the H. P and 40mm infront of V.P. Draw its views, if it is parallel to H.P. Find its inclination with V.P. | U | 107-3 | 5 |

| QN | SQN | Question Text. | R/U/A | Co CCH 107 | 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 corners with the side opposite to the corner on H.P. 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. | U | 4 | |
| | b) | A rectangular lamina ABCD of smaller side AB = 30 mm and longer side BC= 50 mm is resting on the V.P. on its smaller side AB. Lamina is inclined to V.P. in such a way that its elevation appears to be a square. Side AB is perpendicular to H.P. Draw three views of the lamina and find its inclination with V.P. | U | 4 | |
| | c) | A circular plate of diameter 60 mm is resting on the H.P. on a point of its circumference. The plate is inclined to H.P. in such a way that the plan appears to be an ellipse of minor axis 35 mm. The plate is perpendicular to V.P. Draw three views of the plate and find its inclination with H.P. | U | 4 | |
| **Q.5** | | **Attempt any One: (1 X 14M)** | | | **14** |
| | a) | **Figure No 1** given below shows an isometric view of an object. Draw<br>i) Front View looking in direction X ( 5 M)<br>ii) Top View ( 4 M)<br>ii) Left Hand Side View ( 5 M) | A | 5 | |

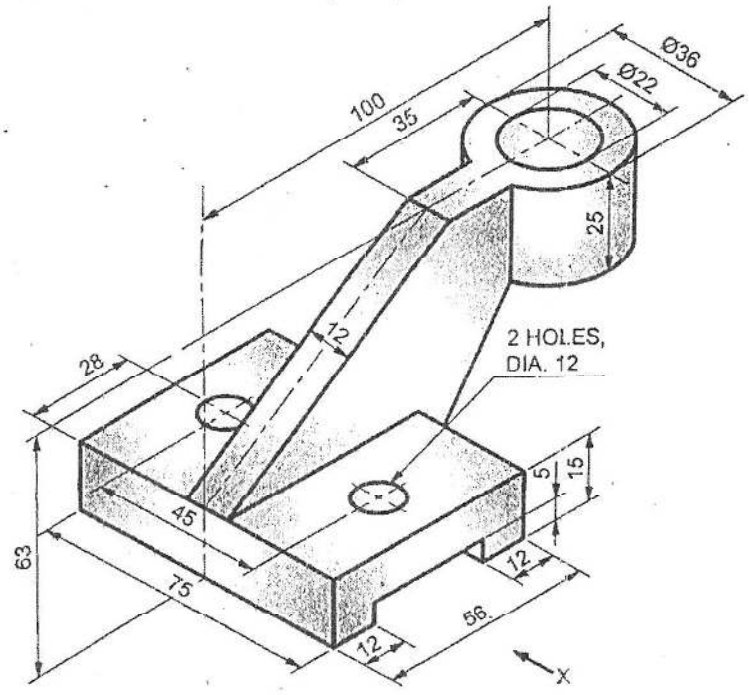


**Figure No. 1**

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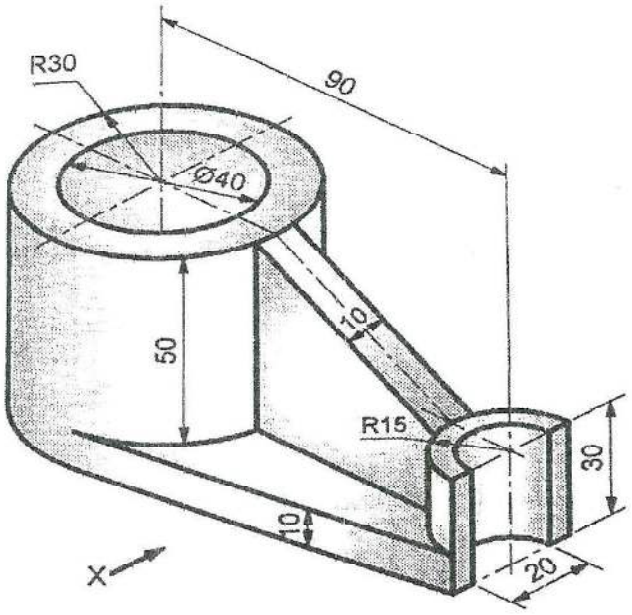
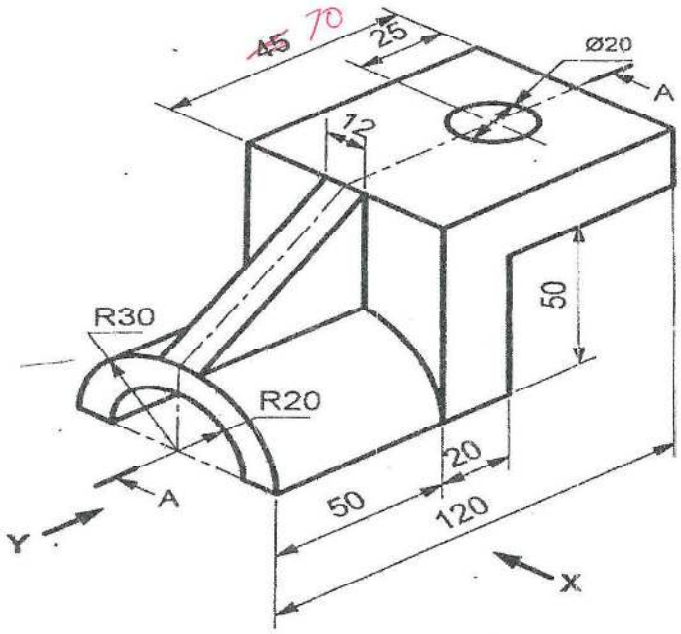
| | | | | | |
|---|---|---|---|---|---|
| | b) | **Figure No 2** given below shows an isometric view of an object. Draw<br>i) Front View looking in direction X ( 5 M)<br>ii) Top View ( 4 M)<br>iii) Left Hand Side View ( 5 M)<br>Right<br>  <br><br>**Figure No. 2** | A | 5 | |
| **Q.6** | | **Attempt any One: (1 X 12M)** | | | **12** |
| | a) | **Figure No 3** given below shows an isometric view of an object. Draw<br>i) Front View looking in direction Y ( 4 M)<br>ii) Top View ( 4 M)<br>iv) Sectional Right Hand Side View along A-A ( 4 M)<br>  <br><br>**Figure No 3** | A | 6 | |

| | | | | | |
|---|---|---|---|---|---|
| | b) | **Figure No 4** given below shows an isometric view of an object. Draw<br>i) Sectional Front View looking in direction X along A-A (6M)<br>ii) Left Hand Side View (6 M) | A | 6 | |

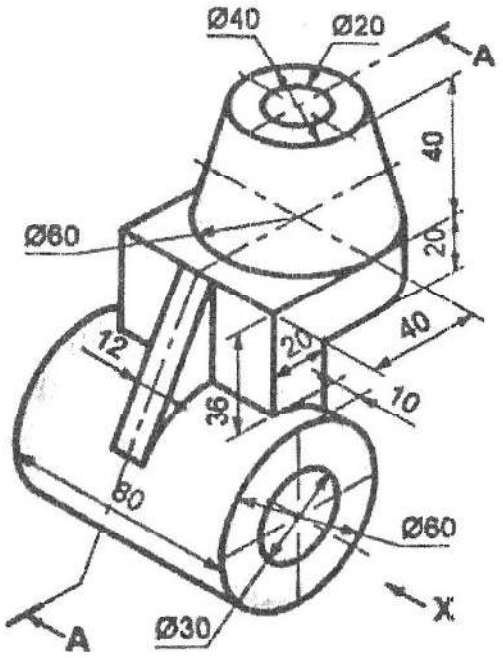



**Figure No 4**

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL: - First PROGRAM: CE/MT

COURSE CODE:-CCH107

COURSE NAME: - ENGINEERING GRAPHICS

MAX. MARKS : 70 TIME : **04 Hrs** DATE :-16/12/23

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 the following** | | | **06** |
| | a) | List different types of drawing instruments | R | 107-1 | **02** |
| | b) | Construct a plain scale to show kilometers and hectometers when RF =1:35000 and long enough to measure 5km. Measure 3.7 km on the scale. **Or** | U | 107-1 | **04** |
| | b) | Construct a diagonal scale of RF = 1:2 to show millimeter and centimeter to measure up to 35 centimeters. Show on scale a distance of 23.6 centimeter. | U | 107-1 | **04** |
| **Q.2** | | **Attempt any THREE: (6M X 3)** | | | **18** |
| | a) | The major and minor axis of an ellipse are 110 mm and 70 mm respectively. Find the focus and draw the ellipse by arc of circle method. | U | 107-2 | **6** |
| | b) | Draw an epicycloid when generating circle diameter is 40mm and directing circle is 120mm.Take starting points as the points of contacts between two circles. | U | 107-2 | **6** |
| | c) | Draw an involute of hexagon of side 20 mm. | U | 107-2 | **6** |
| | d) | Draw a helix on a cylinder of 50 mm diameter of two turns, given the pitch as 40 mm. | U | 107-2 | **6** |
| **Q.3** | | **Attempt any TWO: (5M X 2)** | | | **10** |
| | a) | Draw the projections of the following points<br>1) Point A is 50mm above HP and 45 mm infront of VP<br>2) Point B is in H.P and 20mm infront of VP<br>3) Point C is in both H.P and V.P<br>4) Point D is in V.P and 50mm above H.P<br>5) Point E is 30mm above H.P and 52 mm Infront of V.P | U | 107-3 | 5 |
| | b) | The distance between the projections through the ends of a line AB, 75mm long is 60mm. Its end A is 15mm above the H. P and 20mm infront of V.P. Draw its views, when it is parallel to V.P. Determine its inclination with H.P. | U | 107-3 | 5 |
| | c) | The front View of a line PQ,100mm long, measures 85mm.The end P is 20mm above the H. P and 40mm infront of V.P. Draw its views, if it is parallel to H.P. Find its inclination with V.P. | U | 107-3 | 5 |

| QN | SQN | Question Text. | R/U/A | Co CCH 107 | 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 corners with the side opposite to the corner on H.P. 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. | U | 4 | |
| | b) | A rectangular lamina ABCD of smaller side AB = 30 mm and longer side BC= 50 mm is resting on the V.P. on its smaller side AB. Lamina is inclined to V.P. in such a way that its elevation appears to be a square. Side AB is perpendicular to H.P. Draw three views of the lamina and find its inclination with V.P. | U | 4 | |
| | c) | A circular plate of diameter 60 mm is resting on the H.P. on a point of its circumference. The plate is inclined to H.P. in such a way that the plan appears to be an ellipse of minor axis 35 mm. The plate is perpendicular to V.P. Draw three views of the plate and find its inclination with H.P. | U | 4 | |
| **Q.5** | | **Attempt any One: (1 X 14M)** | | | **14** |
| | a) | **Figure No 1** given below shows an isometric view of an object. Draw<br>i) Front View looking in direction X ( 5 M)<br>ii) Top View ( 4 M)<br>ii) Left Hand Side View ( 5 M) | A | 5 | |

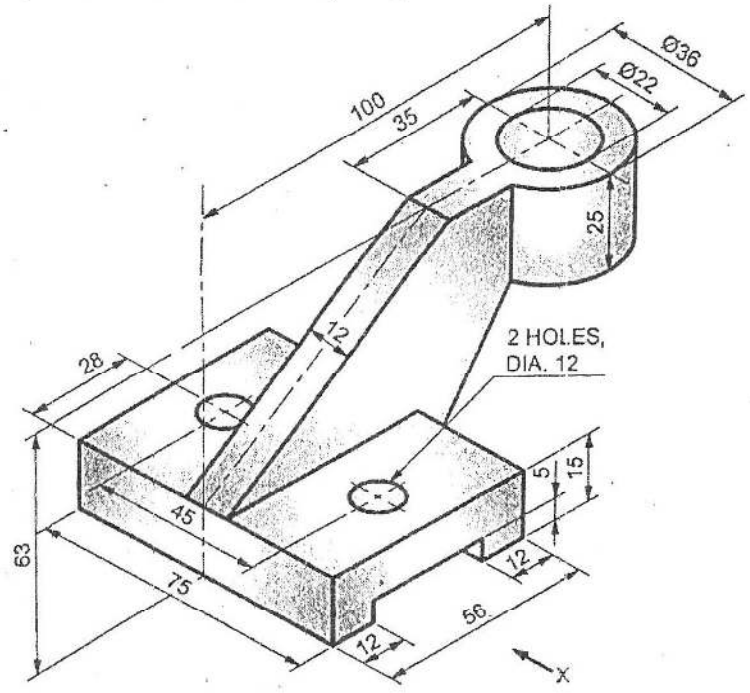
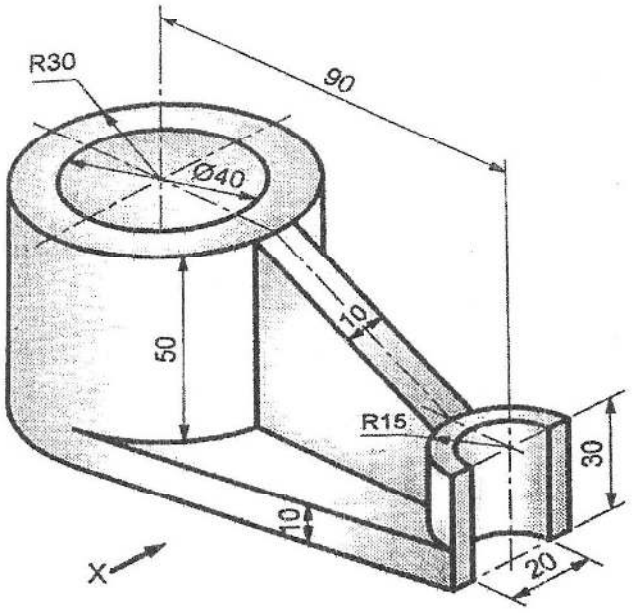
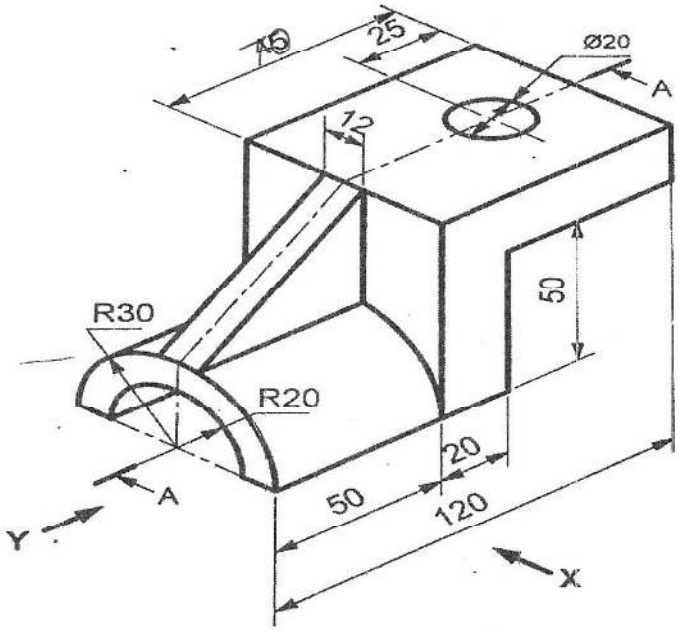



**Figure No. 1**

P.T.O

| | | | | | |
|---|---|---|---|---|---|
| | b) | **Figure No 2** given below shows an isometric view of an object. Draw<br>i) Front View looking in direction X ( 5 M)<br>ii) Top View ( 4 M)<br>iii) Left Hand Side View ( 5 M)<br>Right<br>  <br><br>**Figure No. 2** | A | 5 | |
| **Q.6** | | **Attempt any One: (1 X 12M)** | | | **12** |
| | a) | **Figure No 3** given below shows an isometric view of an object. Draw<br>i) Front View looking in direction Y ( 4 M)<br>ii) Top View ( 4 M)<br>iv) Sectional Right Hand Side View along A-A ( 4 M)<br>  <br><br>**Figure No 3** | A | 6 | |

P-314

| | | | | | |
|---|---|---|---|---|---|
| | b) | **Figure No 4** given below shows an isometric view of an object. Draw<br>i) Sectional Front View looking in direction X along A-A (6M)<br>ii) Left Hand Side View (6 M) | A | 6 | |

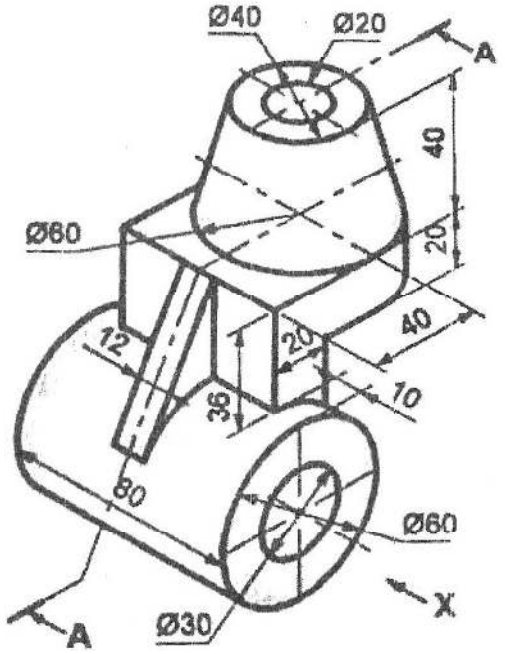



**Figure No 4**

P-414

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - First PROGRAM : Common

COURSE CODE :- CCG 105/X104

COURSE NAME :- Basic Mathematics

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 15/ **12** / **2023**

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 CEG301 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | If $\log_5 125=3$ express it in equivalent exponential form. | U | 1 | |
| | b) | Expand the determinant $\begin{vmatrix} 3 & -5 & -1 \\ 1 & 3 & 5 \\ -5 & 1 & 3 \end{vmatrix}$ | R | 2 | |
| | c) | Resolve into partial fractions $\frac{x+4}{x(x+1)}$ | U | 3 | |
| | d) | If $\begin{bmatrix} 3 & -6 \\ 4 & 2 \end{bmatrix}+\begin{bmatrix} 2 & 3 \\ -2 & 1 \end{bmatrix}=\begin{bmatrix} a & b \\ c & 6d \end{bmatrix}$ find a, b, c, d | R | 4 | |
| | e) | Find AB if $A=\begin{bmatrix} 1 & 2 & 3 \\ 4 & 6 & 6 \end{bmatrix}$, $B=\begin{bmatrix} 1 \\ 8 \\ 9 \end{bmatrix}$ | R | 4 | |
| | f) | If $A=\begin{bmatrix} 2 & -1 \\ 4 & 3 \end{bmatrix}$ $B=\begin{bmatrix} 3 & -2 \\ -1 & 4 \end{bmatrix}$ find the Matrix 'X' such that $2A + X = 3B$ | A | 4 | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Solve $\log_3 (x-2)+\log_3 x=1$ | A | 1 | |
| | b) | Using Crammer's rule solve $x+z=4$; $y+z=2$ ; $x+y=0$ | A | 2 | |
| | c) | Find x & y ,if $\left\{4\begin{bmatrix} 2 & -1 & 3 \\ 1 & 0 & 2 \end{bmatrix}-\begin{bmatrix} 3 & -3 & 4 \\ 2 & 1 & 1 \end{bmatrix}\right\}\begin{bmatrix} 2 \\ -1 \\ 1 \end{bmatrix}=\begin{bmatrix} x \\ y \end{bmatrix}$ | A | 4 | |
| | d) | Resolve into partial fraction $\frac{2x^2-11x+5}{(x-3)(x^2+2x-5)}$ | A | 3 | |
| | e) | Resolve into partial fractions $\frac{3x+2}{(x+1)^2(x-2)}$ | A | 3 | |
| | f) | If $A=\begin{bmatrix} 1 & 2 & 1 \\ 0 & 2 & 3 \\ 0 & 0 & 1 \end{bmatrix}$ $B=\begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 5 \\ 2 & 4 & 7 \end{bmatrix}$ verify $(AB)' = B'A'$ | A | 4 | |

P.T.O.

| Q.3 | | Attempt any **FOUR:** | | | **16** |
|---|---|---|---|---|---|
| | a) | Prove that $\frac{1}{\log_{ab} abc} + \frac{1}{\log_{bc} abc} + \frac{1}{\log_{ca} abc} = 2$ | A | 1 | |
| | b) | In a given electrical network ,the equation for the current $i_1, i_2, i_3$ are $2i_1 - i_2 + i_3 = 0$; $4i_1 - i_3 = 2$ ; $2i_2 + i_3 = 2$ find $i_1, i_2, i_3$ . | A | 2 | |
| | c) | Resolve into partial fractions $\frac{2x+3}{x^2-2x-3}$ | R | 3 | |
| | d) | Resolve into partial fractions $\frac{(x^2+1)}{(x^2+2)(x^2+3)}$ | U | 3 | |
| | e) | If $A = \begin{bmatrix} 4 & 3 & 2 \\ -1 & 2 & 0 \end{bmatrix}$ , $B = \begin{bmatrix} 1 & 2 \\ -1 & 0 \\ 1 & -2 \end{bmatrix}$ then show that matrix AB is non singular. | A | 4 | |
| | f) | Find the inverse of the following matrix by adjoint method $\begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$ | A | 4 | |

| Q.4 | | Attempt any **FOUR:** | | | **08** |
|---|---|---|---|---|---|
| | a) | Express $\left(\frac{3\pi}{4}\right)^C$ in degree measure. | R | 5 | |
| | b) | If $\tan x = \frac{3}{4}$ *and* $\tan y = \frac{1}{7}$ find tan (x + y). | R | 5 | |
| | c) | Evaluate $\cos 22^0 . \cos 38^0 - \sin 22^0 . \sin 38^0$ . | A | 5 | |
| | d) | If $\sin A = 0.4$ find $\sin 2A$. | U | 5 | |
| | e) | Find A & B if $2\cos 75^0 . \cos 15^0 = \cos A + \cos B$. | R | 5 | |
| | f) | Express as a sum or difference : $2\cos 3\theta \sin \theta$ | R | 5 | |

| Q.5 | | Attempt any **FOUR:** | | | **16** |
|---|---|---|---|---|---|
| | a) | Prove that $\frac{\sin \theta}{1+\cos \theta} + \frac{1+\cos \theta}{\sin \theta} = 2\cos ec\theta$. | A | 5 | |
| | b) | Verify that $\cos 225^0 . \cos 675^0 + \sin 585^0 . \sin 315^0 = 0$. | A | 5 | |
| | c) | If $\sin 30^0 = \frac{1}{2}$ *find* $\sin 15^0$ & $\cos 15^0$ . | A | 5 | |
| | d) | Prove that $\frac{\sin 8x - \sin 5x}{\cos 7x + \cos 6x} = \sin x + \cos x . \tan \frac{x}{2}$. | A | 5 | |
| | e) | Prove that $\tan^{-1}\left(\frac{1}{4}\right) + \tan^{-1}\left(\frac{2}{9}\right) = \cot^{-1} 2$. | A | 5 | |
| | f) | Show that $\cos^{-1} x = 2\sin^{-1}\sqrt{\frac{1-x}{2}}$ . | U | 5 | |

| Q.6 | | Attempt any **FOUR:** | | | **16** |
|---|---|---|---|---|---|
| | a) | Prove that $\sin(A+B).\sin(A-B) = \sin^2 A - \sin^2 B$. | U | 5 | |
| | b) | If $A = 30^0$, verify $\cos 3A = 4\cos^3 A - 3\cos A$. | A | 5 | |
| | c) | Prove that $\sin^{-1}\left(\frac{3}{5}\right) + \cos^{-1}\left(\frac{12}{13}\right) = \cos^{-1}\left(\frac{33}{65}\right)$ . | A | 5 | |
| | d) | If $\tan \frac{\theta}{2} = \frac{2}{3}$, find the value of $2\sin \theta + 3\cos \theta$ . | A | 5 | |
| | e) | Show that $\sin 50^0 - \sin 70^0 + \sin 10^0 = 0$. | A | 5 | |
| | f) | Prove that $\tan^{-1} x - \tan^{-1} y = \tan^{-1}\left(\frac{x-y}{1+xy}\right)$ *if* $x > 0, y > 0$. | A | 5 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - First PROGRAM : Common

COURSE CODE :- CCG 105/X104

COURSE NAME :- Basic Mathematics

MAX. MARKS : **80** TIME : **03 Hrs** DATE :- 15/ **12** / **2023**

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 CEG301 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **08** |
| | a) | If $\log_5 125=3$ express it in equivalent exponential form. | U | 1 | |
| | b) | Expand the determinant $\begin{vmatrix} 3 & -5 & -1 \\ 1 & 3 & 5 \\ -5 & 1 & 3 \end{vmatrix}$ | R | 2 | |
| | c) | Resolve into partial fractions $\frac{x+4}{x(x+1)}$ | U | 3 | |
| | d) | If $\begin{bmatrix} 3 & -6 \\ 4 & 2 \end{bmatrix}+\begin{bmatrix} 2 & 3 \\ -2 & 1 \end{bmatrix}=\begin{bmatrix} a & b \\ c & 6d \end{bmatrix}$ find a, b, c, d | R | 4 | |
| | e) | Find AB if A= $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 6 & 6 \end{bmatrix}$, B = $\begin{bmatrix} 1 \\ 8 \\ 9 \end{bmatrix}$ | R | 4 | |
| | f) | If A= $\begin{bmatrix} 2 & -1 \\ 4 & 3 \end{bmatrix}$ B= $\begin{bmatrix} 3 & -2 \\ -1 & 4 \end{bmatrix}$ find the Matrix 'X' such that $2A + X = 3B$ | A | 4 | |
| Q.2 | | Attempt any **FOUR:** | | | **16** |
| | a) | Solve $\log_3 (x-2)+\log_3 x=1$ | A | 1 | |
| | b) | Using Crammer's rule solve $x+z=4$; $y+z=2$ ; $x+y=0$ | A | 2 | |
| | c) | Find x & y ,if $\left\{4\begin{bmatrix} 2 & -1 & 3 \\ 1 & 0 & 2 \end{bmatrix}-\begin{bmatrix} 3 & -3 & 4 \\ 2 & 1 & 1 \end{bmatrix}\right\}\begin{bmatrix} 2 \\ -1 \\ 1 \end{bmatrix}=\begin{bmatrix} x \\ y \end{bmatrix}$ | A | 4 | |
| | d) | Resolve into partial fraction $\frac{2x^2-11x+5}{(x-3)(x^2+2x-5)}$ | A | 3 | |
| | e) | Resolve into partial fractions $\frac{3x+2}{(x+1)^2(x-2)}$ | A | 3 | |
| | f) | If A= $\begin{bmatrix} 1 & 2 & 1 \\ 0 & 2 & 3 \\ 0 & 0 & 1 \end{bmatrix}$ B = $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 5 \\ 2 & 4 & 7 \end{bmatrix}$ verify $(AB)' = B'A'$ | A | 4 | |

P.T.O.

| Q.3 | | Attempt any **FOUR:** | | | **16** |
|---|---|---|---|---|---|
| | a) | Prove that $\frac{1}{\log_{ab} abc} + \frac{1}{\log_{bc} abc} + \frac{1}{\log_{ca} abc} = 2$ | A | 1 | |
| | b) | In a given electrical network ,the equation for the current $i_1, i_2, i_3$ are $2i_1 - i_2 + i_3 = 0$; $4i_1 - i_3 = 2$ ; $2i_2 + i_3 = 2$ find $i_1, i_2, i_3$ . | A | 2 | |
| | c) | Resolve into partial fractions $\frac{2x+3}{x^2-2x-3}$ | R | 3 | |
| | d) | Resolve into partial fractions $\frac{(x^2+1)}{(x^2+2)(x^2+3)}$ | U | 3 | |
| | e) | If $A = \begin{bmatrix} 4 & 3 & 2 \\ -1 & 2 & 0 \end{bmatrix}$ , $B = \begin{bmatrix} 1 & 2 \\ -1 & 0 \\ 1 & -2 \end{bmatrix}$ then show that matrix AB is non singular. | A | 4 | |
| | f) | Find the inverse of the following matrix by adjoint method $\begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$ | A | 4 | |

| Q.4 | | Attempt any **FOUR:** | | | **08** |
|---|---|---|---|---|---|
| | a) | Express $\left(\frac{3\pi}{4}\right)^C$ in degree measure. | R | 5 | |
| | b) | If $\tan x = \frac{3}{4}$ *and* $\tan y = \frac{1}{7}$ find tan (x + y). | R | 5 | |
| | c) | Evaluate $\cos 22^0 . \cos 38^0 - \sin 22^0 . \sin 38^0$. | A | 5 | |
| | d) | If $\sin A = 0.4$ find $\sin 2A$. | U | 5 | |
| | e) | Find A & B if $2\cos 75^0 . \cos 15^0 = \cos A + \cos B$. | R | 5 | |
| | f) | Express as a sum or difference : $2\cos 3\theta \sin \theta$ | R | 5 | |

| Q.5 | | Attempt any **FOUR:** | | | **16** |
|---|---|---|---|---|---|
| | a) | Prove that $\frac{\sin\theta}{1+\cos\theta} + \frac{1+\cos\theta}{\sin\theta} = 2\cos ec\theta$. | A | 5 | |
| | b) | Verify that $\cos 225^0 . \cos 675^0 + \sin 585^0 . \sin 315^0 = 0$. | A | 5 | |
| | c) | If $\sin 30^0 = \frac{1}{2}$ *find* $\sin 15^0$ & $\cos 15^0$. | A | 5 | |
| | d) | Prove that $\frac{\sin 8x - \sin 5x}{\cos 7x + \cos 6x} = \sin x + \cos x . \tan\frac{x}{2}$. | A | 5 | |
| | e) | Prove that $\tan^{-1}\left(\frac{1}{4}\right) + \tan^{-1}\left(\frac{2}{9}\right) = \cot^{-1} 2$. | A | 5 | |
| | f) | Show that $\cos^{-1} x = 2\sin^{-1}\sqrt{\frac{1-x}{2}}$ . | U | 5 | |

| Q.6 | | Attempt any **FOUR:** | | | **16** |
|---|---|---|---|---|---|
| | a) | Prove that $\sin(A+B).\sin(A-B) = \sin^2 A - \sin^2 B$. | U | 5 | |
| | b) | If $A = 30^0$, verify $\cos 3A = 4\cos^3 A - 3\cos A$. | A | 5 | |
| | c) | Prove that $\sin^{-1}\left(\frac{3}{5}\right) + \cos^{-1}\left(\frac{12}{13}\right) = \cos^{-1}\left(\frac{33}{65}\right)$ . | A | 5 | |
| | d) | If $\tan\frac{\theta}{2} = \frac{2}{3}$ ,find the value of $2\sin\theta + 3\cos\theta$ . | A | 5 | |
| | e) | Show that $\sin 50^0 - \sin 70^0 - \sin 10^0 = 0$. | A | 5 | |
| | f) | Prove that $\tan^{-1} x - \tan^{-1} y = \tan^{-1}\left(\frac{x-y}{1+xy}\right)$ *if* $x > 0, y > 0$. | A | 5 | |

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# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **COMMON**

COURSE CODE :- **CCG108**

COURSE NAME **ENGINEERING DRAWING - II**

MAX. MARKS : **80** TIME : **04Hrs.** DATE :- **19/ 12 / 2023**

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 | SQN | Question Text | R/U/A | Co CCG 108 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **16** |
| | a) | A right circular cone, base 50mm dia. and axis 60mm long is resting on its apex on H.P. Draw the projection of a cone, when the axis is parallel to V.P. and inclined at $45^0$ to H.P. Use first angle method of projections. | R & U | 1 | |
| | b) | A tetrahedron 60mm long edges has one edge in the H.P. with that edge perpendicular to V.P. and the triangular face containing that edge is vertical. Draw its three views. | R & U | 1 | |
| | c) | A square pyramid side of base 35mm and axis length 50mm is lying on the H.P. on one of triangular faces. Draw the projection of the pyramid when its axis is parallel to V.P. | R & U | 1 | |
| | d) | A cylinder of base dia. 50mm and axis length 60mm is lying on a point on its circumference H.P. and its axis in inclined to V.P. at $30^0$ and parallel to H.P. Draw the projection of a cylinder. | R & U | 1 | |
| | e) | A cube of 50mm long edges is held on one of its corner on H.P. such that one of its solid diagonals is opposite to that corner is parallel to HP and VP. Draw the projection of cube. | R & U | 1 | |
| | f) | A pentagonal prism, base 25mm side and axis 50mm long is resting on one of its rectangular faces on HP. Draw the projections. | R & U | 1 | |
| | | | | | |
| Q.2 | | Attempt any **TWO:** | | | **16** |
| | a) | A cone, base 60mm diameter and height 70mm is resting on base in HP. It is cut by vertical section plane, inclined at $60^0$ to HP and bisecting the axis. Draw F.V., sectional T.V. and true shape of section. | R & U | 2 | |
| | b) | A right circular cone 50mm dia. base and 70mm height is resting on its base on H.P. It is cut by a section plane perpendicular to V.P. and inclined at $45^0$ to H.P. The cutting plane cuts the axis at a point 30mm from the apex. Draw i) F.V. ii) Sectional T.V. iii) True shape of section. | R & U | 2 | |
| | c) | A cylinder of 50mm dia. and 70mm height has its axis vertical, it is cut by a section plane perpendicular to VP and inclined at $45^0$ to HP and intersecting the axis 40mm above the base. Draw i) F.V. ii) Sectional T.V. iii) True shape of section | R & U | 2 | |

P.T.O

| | | | | | |
|---|---|---|---|---|---|
| Q.3 | | Attempt any **FOUR:** (Dec 23) | | | **08** |
| | a) | Hexagonal headed bolt. | U & A | 3 | |
| | b) | Flanged nut. | | | |
| | c) | Chamfered Washer. | | | |
| | d) | Split-pin. | | | |
| | e) | British standard with worth threads. | | | |
| | f) | Single Riveted, Single Strap Butt Joint. | | | |
| | | | | | |
| Q.4 | | Attempt any **ONE:** | | | **08** |
| | a) | Fig. I shows front view and top view of an object. Draw the following.<br>i) Reproduce the front view.<br>ii) Reproduce the TOP view.<br>iii) Draw Left hand side view. | U | 4 | <br>02<br>02<br>04 |
| | b) | Fig. II shows front view and left hand side view of an object. Draw the following.<br>i) Reproduce the front view.<br>ii) Reproduce the left hand side view. (L.H.S.V.)<br>iii) Draw Top view. | U | 4 | <br>02<br>02<br>04 |
| | | | | | |
| Q.5 | | Attempt any **ONE:** | | | **16** |
| | a) | Fig. III shows F.V. and S.V. Draw isometric view. | U | 5 | |
| | b) | Fig. IV shows F.V. and R.H.S.V. ( Right Hand Side View) Draw isometric projection. | U | 5 | |
| | | | | | |
| Q.6 | | Attempt any **TWO:** | | | **16** |
| | a) | Fig. V shows a projection of a pentagonal prism with a partial hole as indicated. Draw the development of prism with hole in it. | U | 6 | |
| | b) | A right circular cone having diameter of base 40mm, axis length 60mm resting on its base on H.P. is cut by an AIP inclined at $45^0$ to H.P. and bisecting the axis. Draw the development of lateral surface of the cone retaining the portion containing base. | U | 6 | |
| | c) | A square pyramid with side base 50mm and height of axis 75mm stands on its base in HP, with one of its edges parallel to VP. It is cut by a section plane inclined at $45^0$ to HP and passing through midpoint of axis. The upper part of pyramid is removed. Draw the development of lateral surface of the pyramid. | U | 6 | |

P.T.O

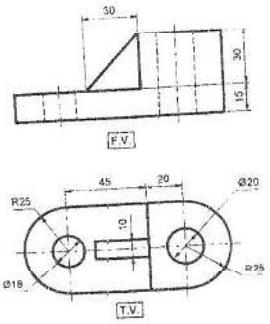
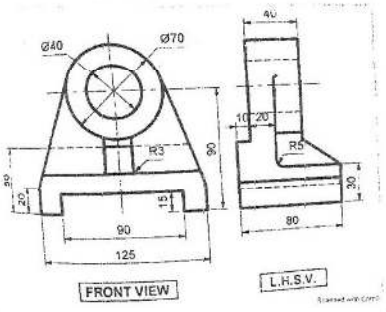
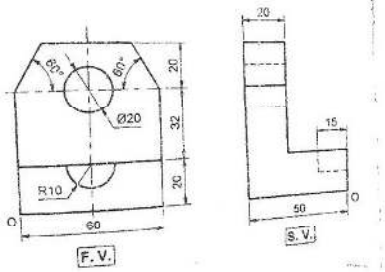



Fig I

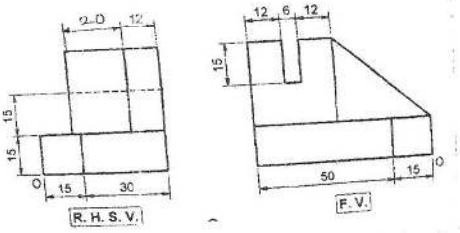
Q.4(a)




Q.4(b) Fig II




Q.5(a) Fig III




Q.5(b) Fig IV

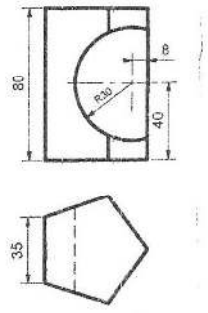



Fig. V

Q.6(a)

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**ODD TERM END EXAM WINTER -2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - **FIRST** PROGRAM : **COMMON**

COURSE CODE :- **CCG108**

COURSE NAME **ENGINEERING DRAWING - II**

MAX. MARKS : **80** TIME : **04Hrs.** DATE :- **19/ 12 / 2023**

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 | SQN | Question Text | R/U/A | Co CCG 108 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **FOUR:** | | | **16** |
| | a) | A right circular cone, base 50mm dia. and axis 60mm long is resting on its apex on H.P. Draw the projection of a cone, when the axis is parallel to V.P. and inclined at $45^0$ to H.P. Use first angle method of projections. | R & U | 1 | |
| | b) | A tetrahedron 60mm long edges has one edge in the H.P. with that edge perpendicular to V.P. and the triangular face containing that edge is vertical. Draw its three views. | R & U | 1 | |
| | c) | A square pyramid side of base 35mm and axis length 50mm is lying on the H.P. on one of triangular faces. Draw the projection of the pyramid when its axis is parallel to V.P. | R & U | 1 | |
| | d) | A cylinder of base dia. 50mm and axis length 60mm is lying on a point on its circumference H.P. and its axis in inclined to V.P. at $30^0$ and parallel to H.P. Draw the projection of a cylinder. | R & U | 1 | |
| | e) | A cube of 50mm long edges is held on one of its corner on H.P. such that one of its solid diagonals is opposite to that corner is parallel to HP and VP. Draw the projection of cube. | R & U | 1 | |
| | f) | A pentagonal prism, base 25mm side and axis 50mm long is resting on one of its rectangular faces on HP. Draw the projections. | R & U | 1 | |
| | | | | | |
| Q.2 | | Attempt any **TWO:** | | | **16** |
| | a) | A cone, base 60mm diameter and height 70mm is resting on base in HP. It is cut by vertical section plane, inclined at $60^0$ to HP and bisecting the axis. Draw F.V., sectional T.V. and true shape of section. | R & U | 2 | |
| | b) | A right circular cone 50mm dia. base and 70mm height is resting on its base on H.P. It is cut by a section plane perpendicular to V.P. and inclined at $45^0$ to H.P. The cutting plane cuts the axis at a point 30mm from the apex. Draw i) F.V. ii) Sectional T.V. iii) True shape of section. | R & U | 2 | |
| | c) | A cylinder of 50mm dia. and 70mm height has its axis vertical, it is cut by a section plane perpendicular to VP and inclined at $45^0$ to HP and intersecting the axis 40mm above the base. Draw i) F.V. ii) Sectional T.V. iii) True shape of section | R & U | 2 | |
| | | | | | |

P.T.O

| | | | | | |
|---|---|---|---|---|---|
| Q.3 | | Attempt any **FOUR:** (अेकूण) | | | **08** |
| | a) | Hexagonal headed bolt. | U & A | 3 | |
| | b) | Flanged nut. | | | |
| | c) | Chamfered Washer. | | | |
| | d) | Split-pin. | | | |
| | e) | British standard with worth threads. | | | |
| | f) | Single Riveted, Single Strap Butt Joint. | | | |
| | | | | | |
| Q.4 | | Attempt any **ONE:** | | | **08** |
| | a) | Fig. I shows front view and top view of an object. Draw the following.<br>i) Reproduce the front view.<br>ii) Reproduce the TOP view.<br>iii) Draw Left hand side view. | U | 4 | <br>02<br>02<br>04 |
| | b) | Fig. II shows front view and left hand side view of an object. Draw the following.<br>i) Reproduce the front view.<br>ii) Reproduce the left hand side view. (L.H.S.V.)<br>iii) Draw Top view. | U | 4 | <br>02<br>02<br>04 |
| | | | | | |
| Q.5 | | Attempt any **ONE:** | | | **16** |
| | a) | Fig. III shows F.V. and S.V. Draw isometric view. | U | 5 | |
| | b) | Fig. IV shows F.V. and R.H.S.V. ( Right Hand Side View) Draw isometric projection. | U | 5 | |
| | | | | | |
| Q.6 | | Attempt any **TWO:** | | | **16** |
| | a) | Fig. V shows a projection of a pentagonal prism with a partial hole as indicated. Draw the development of prism with hole in it. | U | 6 | |
| | b) | A right circular cone having diameter of base 40mm, axis length 60mm resting on its base on H.P. is cut by an AIP inclined at $45^0$ to H.P. and bisecting the axis. Draw the development of lateral surface of the cone retaining the portion containing base. | U | 6 | |
| | c) | A square pyramid with side base 50mm and height of axis 75mm stands on its base in HP, with one of its edges parallel to VP. It is cut by a section plane inclined at $45^0$ to HP and passing through midpoint of axis. The upper part of pyramid is removed. Draw the development of lateral surface of the pyramid. | U | 6 | |

P.T.O

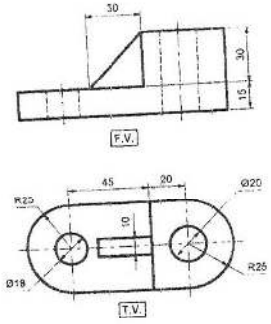
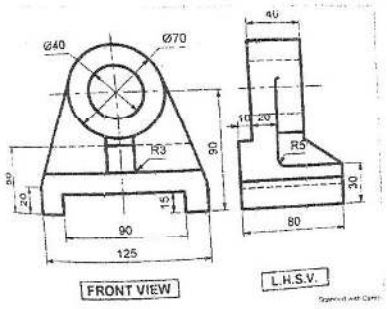
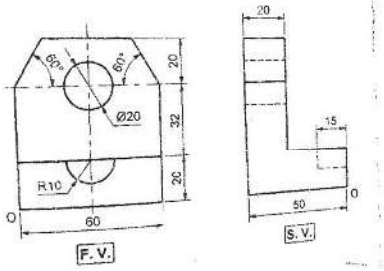



Fig I

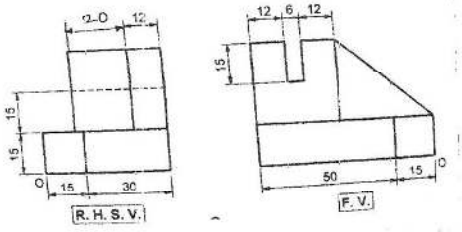
Q.4(a)




Q.4(b) Fig II




Q.5(a) Fig III




Q.5(b) Fig IV

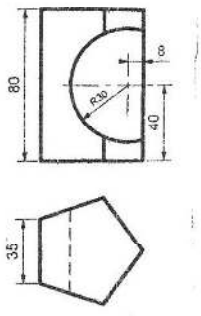



Fig. V

Q.6(a)

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER / ~~SUMMER~~- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - First PROGRAM : CE/ME/MT

COURSE CODE :- CCH 111

COURSE NAME :- APPLIED MECHANICS

MAX. MARKS : 70 TIME : **03 Hrs** DATE :-19/12/ 2023

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 CCH 111 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **THREE: (2 X 3)** | | | **06** |
| | a) | Resolve a force of 12 kN in two directions at $30^0$ and $40^0$ on either side of it. | A | CCH -1 | |
| | b) | State the characteristics of a force. | R | CCH -1 | |
| | c) | State relation between resultant and equilibriant with sketch. | U | CCH -2 | |
| | d) | Calculate centroid of a semi-circle of radius 2m and show it in a neat sketch. | A | CCH -2 | |
| | e) | A ladder of uniform weight leans against a smooth vertical wall and rough horizontal floor. Draw FBD considering equilibrium. | U | CCH-3 | |
| Q.2 | | Attempt any **FOUR: (4 X 4)** | | | **16** |
| | a) | Calculate the magnitude and direction of resultant of following force system shown in figure No.1 | A | CCH -2 | |
| | b) | Calculate the resultant of two concurrent forces of magnitude 25 kN and 50 kN with included angle of $55^0$. | A | CCH -1 | |
| | c) | A tee section has a flange 200 x 20 mm and a web of 15 x 240 mm. Calculate the position of centroid. | A | CCH -2 | |
| | d) | A body weighing 250 N is resting on a rough horizontal plane and is just moved by a horizontal force of 100 N. Calculate coefficient of friction. Also calculate magnitude and direction of resultant reaction. | A | CCH -3 | |
| | e) | Calculate the moment about point B for the force system shown in fig. No. 2 | A | CCH -1 | |
| | f) | Calculate beam reactions of the beam shown in fig. No. 3 using graphical method | A | CCH -2 | |
| Q.3 | | Attempt any **TWO: (6 X 2)** | | | **12** |
| | a) | A simply supported beam of span 10m carries two point loads of 60 kN and 40 kN at 2m and 5m respectively from left support. In addition to this beam also carries a u.d.l. of 16kN/m over 5m from right support. Calculate support reactions by analytical method. | A | CCH -2 | |
| | b) | A body of weight 400 N is placed on a plane inclined at an angle of $18^0$ with the horizontal. If coefficient of friction is 0.27, calculate the value of the force to be applied parallel to the plane just to move the body up the plane. | A | CCH-3 | |
| | c) | Calculate orthogonal components of following forces.<br>1) 100 N acting $30^0$ West of South.<br>2) 400 N acting due North<br>3) 250 N acting North-East | | | |

P.T.O.

| QN | SQN | Question Text | R/U/A | Co CCH 111 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR: (2 X 4)** | | | 08 |
| | a) | Define the ideal machine and ideal effort. | R | 4 | |
| | b) | State law of machine and explain its significance. | R | 4 | |
| | c) | Define Kinetics and kinematics. | R | 5 | |
| | d) | Define momentum and explain Newton's second law of motion. | U | 5 | |
| | e) | Name the two forms of mechanical energy with its S.I units. | U | 6 | |
| | f) | State the law of conservation of energy. | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR: (4 X 4)** | | | 16 |
| | a) | In a machine load of 500 N was lifted by an effort 50 N, Another load of 750 N was lifted by an effort of 60 N. Obtain law of machine. | A | 4 | |
| | b) | What do you understand by the term 'Reversibility' of a machine? Explain the difference between a reversible and a self-locking machine. | U | 4 | |
| | c) | In a double threaded worm and worm wheel, the number of teeth on the worm wheel is 120. The diameter of effort wheel is 100 mm and that of loading drum is 150 mm. This worm and worm wheel lifts a load of 2.5 kN by applying 100 N effort. Calculate efficiency and effort lost in friction. | A | 4 | |
| | d) | Explain with field example "Potential energy and Kinetic energy." | U | 5 | |
| | e) | A particle starts with a velocity of 3m/s and moves in a straight line with constant acceleration. If its velocity after 5 seconds is 5.5 m/s, find acceleration and distance travelled in 5 seconds. | A | 5 | |
| | f) | A trolley weighing 2000N moves over a level track for a distance of 2km. The resistance of the track is 5N per 1000N. Find the work done. | A | 6 | |
| | | | | | |
| Q.6 | | Attempt any **TWO: (6 X 2)** | | | 12 |
| | a) | i) State V.R. of differential axle and wheel with meaning of each term. | R | 4 | |
| | | ii) The velocity ratio of a certain machine is 50. Determine the effort required to lift a load of 1500 N if the efficiency of the machine is 40%. | A | 4 | |
| | b) | A motor driven grinding wheel starts from rest and receives a constant acceleration of 3 rad/s$^2$ for 12 sec. Find:<br>i) Speed of the wheel in rpm at the end of this interval.<br>ii) Total angel through which the wheel is turned during this time. | A | 5 | |
| | c) | A water tank of capacity 15000 liters is to be filled in 20 minutes by a pump. For this, water is to be lifted through a height of 12m. If efficiency of pump is 60% find the horse power of the pump. | A | 6 | |

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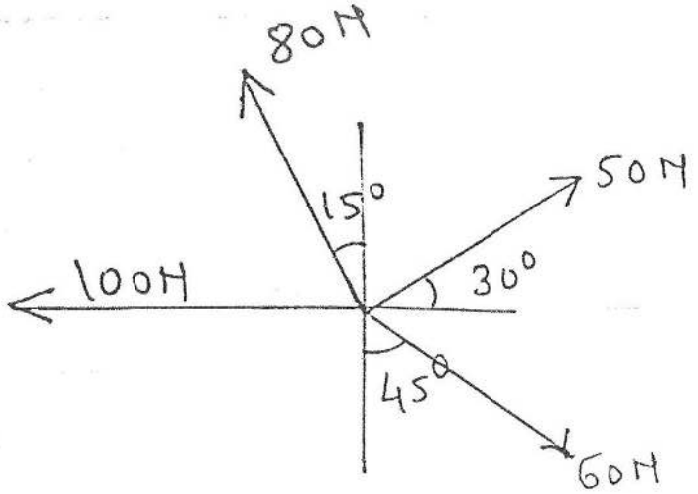


Fig No. 1

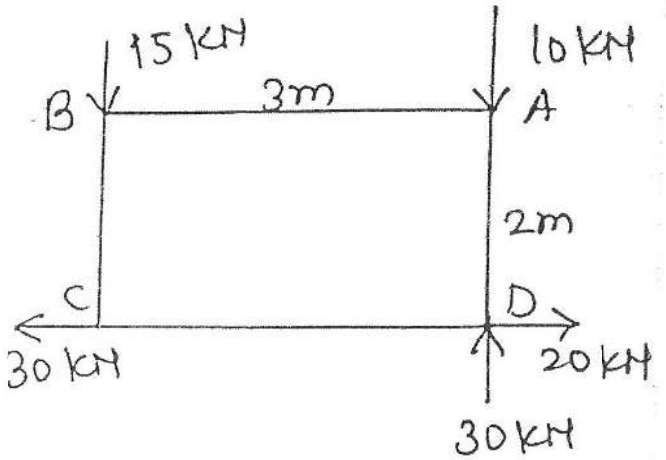


Fig No. 2

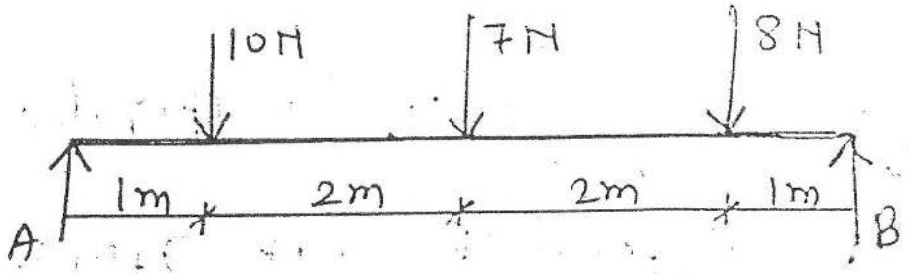


Fig No. 3

# GOVERNMENT POLYTECHNIC, KOLHAPUR – 416004.

(An Autonomous Institute of Govt. Of Maharashtra)

**WINTER / ~~SUMMER~~- 2023**

**EXAM SEAT NO.** | | | | | | |

LEVEL : - First PROGRAM : CE/ME/MT

COURSE CODE :- CCH 111

COURSE NAME :- APPLIED MECHANICS

MAX. MARKS : 70 TIME : **03 Hrs** DATE :-19/12/ 2023

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 CCH 111 | Marks |
|---|---|---|---|---|---|
| Q.1 | | Attempt any **THREE: (2 X 3)** | | | 06 |
| | a) | Resolve a force of 12 kN in two directions at $30^0$ and $40^0$ on either side of it. | A | CCH -1 | |
| | b) | State the characteristics of a force. | R | CCH -1 | |
| | c) | State relation between resultant and equilibriant with sketch. | U | CCH -2 | |
| | d) | Calculate centroid of a semi-circle of radius 2m and show it in a neat sketch. | A | CCH -2 | |
| | e) | A ladder of uniform weight leans against a smooth vertical wall and rough horizontal floor. Draw FBD considering equilibrium. | U | CCH-3 | |
| Q.2 | | Attempt any **FOUR: (4 X 4)** | | | 16 |
| | a) | Calculate the magnitude and direction of resultant of following force system shown in figure No.1 | A | CCH -2 | |
| | b) | Calculate the resultant of two concurrent forces of magnitude 25 kN and 50 kN with included angle of $55^0$. | A | CCH -1 | |
| | c) | A tee section has a flange 200 x 20 mm and a web of 15 x 240 mm. Calculate the position of centroid. | A | CCH -2 | |
| | d) | A body weighing 250 N is resting on a rough horizontal plane and is just moved by a horizontal force of 100 N. Calculate coefficient of friction. Also calculate magnitude and direction of resultant reaction. | A | CCH -3 | |
| | e) | Calculate the moment about point B for the force system shown in fig. No. 2 | A | CCH -1 | |
| | f) | Calculate beam reactions of the beam shown in fig. No. 3 using graphical method | A | CCH -2 | |
| Q.3 | | Attempt any **TWO: (6 X 2)** | | | 12 |
| | a) | A simply supported beam of span 10m carries two point loads of 60 kN and 40 kN at 2m and 5m respectively from left support. In addition to this beam also carries a u.d.l. of 16kN/m over 5m from right support. Calculate support reactions by analytical method. | A | CCH -2 | 34 |
| | b) | A body of weight 400 N is placed on a plane inclined at an angle of $18^0$ with the horizontal. If coefficient of friction is 0.27, calculate the value of the force to be applied parallel to the plane just to move the body up the plane. | A | CCH-3 | |
| | c) | Calculate orthogonal components of following forces.<br>1) 100 N acting $30^0$ West of South.<br>2) 400 N acting due North<br>3) 250 N acting North-East | | | |

P.T.O.

| QN | SQN | Question Text | R/U/A | Co CO1 | Marks |
|---|---|---|---|---|---|
| Q.4 | | Attempt any **FOUR: (2 X 4)** | | | 08 |
| | a) | Define the ideal machine and ideal effort. | R | 4 | |
| | b) | State law of machine and explain its significance. | R | 4 | |
| | c) | Define Kinetics and kinematics. | R | 5 | |
| | d) | Define momentum and explain Newton's second law of motion. | U | 5 | |
| | e) | Name the two forms of mechanical energy with its S.I units. | U | 6 | |
| | f) | State the law of conservation of energy. | R | 6 | |
| | | | | | |
| Q.5 | | Attempt any **FOUR: (4 X 4)** | | | 16 |
| | a) | In a machine load of 500 N was lifted by an effort 50 N, Another load of 750 N was lifted by an effort of 60 N. Obtain law of machine. | A | 4 | |
| | b) | What do you understand by the term 'Reversibility' of a machine? Explain the difference between a reversible and a self-locking machine. | U | 4 | |
| | c) | In a double threaded worm and worm wheel, the number of teeth on the worm wheel is 120. The diameter of effort wheel is 100 mm and that of loading drum is 150 mm. This worm and worm wheel lifts a load of 2.5 kN by applying 100 N effort. Calculate efficiency and effort lost in friction. | A | 4 | |
| | d) | Explain with field example "Potential energy and Kinetic energy." | U | 5 | |
| | e) | A particle starts with a velocity of 3m/s and moves in a straight line with constant acceleration. If its velocity after 5 seconds is 5.5 m/s, find acceleration and distance travelled in 5 seconds. | A | 5 | |
| | f) | A trolley weighing 2000N moves over a level track for a distance of 2km. The resistance of the track is 5N per 1000N. Find the work done. | A | 6 | |
| | | | | | |
| Q.6 | | Attempt any **TWO: (6 X 2)** | | | 12 |
| | a) | i) State V.R. of differential axle and wheel with meaning of each term. | R | 4 | |
| | | ii) The velocity ratio of a certain machine is 50. Determine the effort required to lift a load of 1500 N if the efficiency of the machine is 40%. | A | 4 | |
| | b) | A motor driven grinding wheel starts from rest and receives a constant acceleration of 3 rad/s$^2$ for 12 sec. Find:<br>i) Speed of the wheel in rpm at the end of this interval.<br>ii) Total angel through which the wheel is turned during this time. | A | 5 | |
| | c) | A water tank of capacity 15000 liters is to be filled in 20 minutes by a pump. For this, water is to be lifted through a height of 12m. If efficiency of pump is 60% find the horse power of the pump. | A | 6 | |

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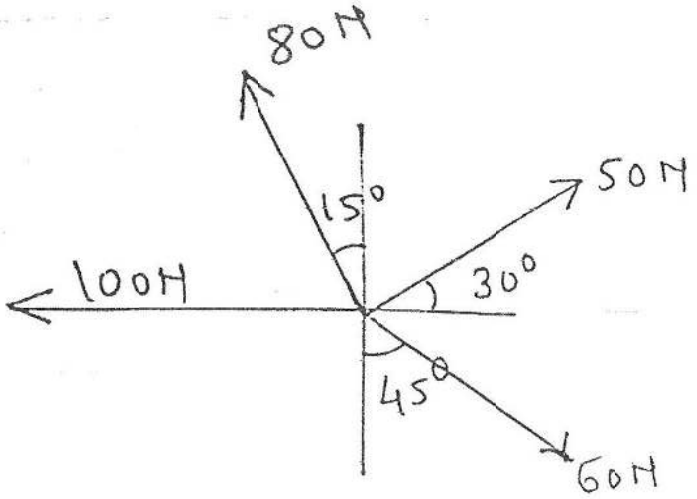


Fig No. 1

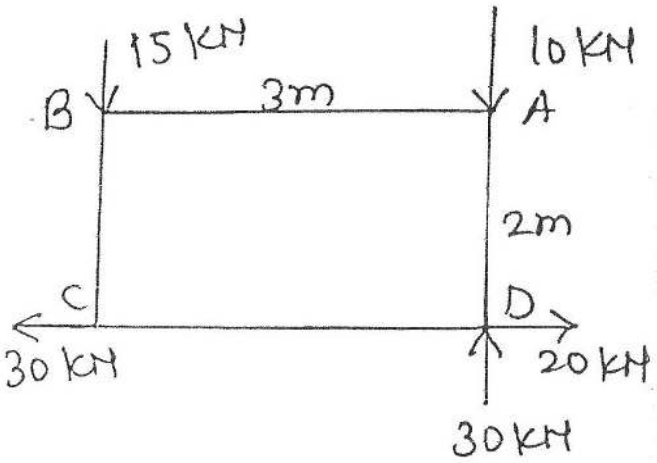


Fig No. 2

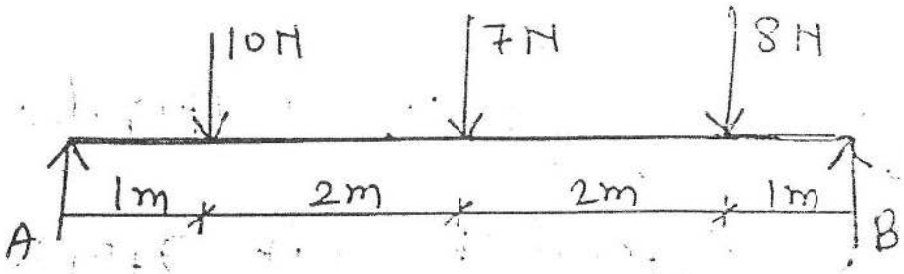


Fig No. 3