

**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations February-2024

Course Name: **LINEAR ALGEBRA AND CALCULUS**

(Common for all Branches)

Date: 06.02.2024 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. For what values of x, the matrix $\begin{bmatrix} 3-x & 2 & 2 \\ 2 & 4-x & 1 \\ -2 & -4 & -1-x \end{bmatrix}$ is singular. 2 M
2. Find the rank of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 2 \\ 2 & 6 & 5 \end{bmatrix}$ by using echelon form. 2 M
3. Find the sum and product of the eigenvalues of the matrix $\begin{bmatrix} 1 & 2 & 1 \\ 2 & 3 & 4 \\ 1 & 4 & -2 \end{bmatrix}$ 2 M
4. State Cayley-Hamilton theorem. 2 M
5. Test the convergence of the sequence $a_n = 1 + (-1)^n$. 2 M
6. Define Absolutely convergence and Conditionally convergence of a series. 2 M
7. Write the geometrical interpretation of Rolle's theorem. 2 M
8. Define Beta function. 2 M
9. Show that $\lim_{(x,y) \rightarrow (0,0)} \frac{x^3y}{x^6+y^2}$ does not exist. 2 M
10. If $U=x^2+y^2$, $V=2xy$ find $\frac{\partial(u,v)}{\partial(x,y)}$ 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) Using Gauss Jordan Method find the Inverse of the matrix $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$ 5M
- ii) Find the values of 'a' and 'b' for which the equations:
 $x + y + z = 3, x + 2y + 3z = 6, x + 9y + az = b$ have (a) Unique solution 5M
(b) No solution (c) Infinitely many solutions.

OR

11. B). Reduce the matrix $A = \begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$ into its normal form and hence find its rank. 10M
12. A). Diagonalize the matrix $A = \begin{bmatrix} -1 & 2 & -2 \\ 1 & 2 & 1 \\ -1 & -1 & 0 \end{bmatrix}$ 10M

OR

12. B). Reduce the quadratic form $2xy + 2yz + 2zx$ into canonical form by Orthogonal transformation. 10M

(P.T.O.)

13. A). i) Test the convergence of the series $\frac{1}{1.2.3} + \frac{3}{2.3.4} + \frac{5}{3.4.5} + \dots$ 5M

ii) Test the convergence of the series $\sum \left(1 + \frac{1}{\sqrt{n}}\right)^{-n^{3/2}}$ 5M

OR

13. B). i) Test the convergence of the series $\frac{x}{1.2} + \frac{x^2}{2.3} + \frac{x^3}{3.4} + \dots$ 5M

ii) Test whether the series $\sum_{n=1}^{\infty} \frac{\cos n\pi}{n^2+1}$ is absolutely convergent or not. 5M

14. A). i) Verify Cauchy's mean value theorem for $f(x)$ and $f'(x)$ in $(1, e)$ given $f(x) = \log x$ 5M

ii) Find the area of the surface generated by revolving the arc of the curve $y = c \cosh\left(\frac{x}{c}\right)$ from $x=0$ and $x=c$ about the x -axis. 5M

OR

14. B). i) By using Lagrange's mean value theorem if $0 < a < b$, prove that $\frac{b-a}{(1+b^2)} < \tan^{-1}b - \tan^{-1}a < \frac{b-a}{(1+a^2)}$ 5M

ii) Evaluate $\int_0^{\infty} e^{-x^2} dx$. 5M

15. A). i) If $U=f(x-y, y-z, z-x)$ prove that $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z} = 0$ 5M

ii) Find the Maximum and Minimum values of $x + y + z$ subject to $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 1$. 5M

OR

15. B). Discuss the maxima and minima of $f(x,y)=4x^2+2y^2+4xy-10x-2y-3$. 10M

H.T No:

--	--	--	--	--	--	--	--	--	--

R18

Course Code: A30001



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations February-2024

Course Name: ENGLISH

(Common for CSE, IT & CSD)

Date: 08.02.2024 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. Fill in the blanks with suitable prepositions. 2 M
He had been _____ poor health _____ quite some time.
2. a) Arrange the following words in a meaningful order. 1 M
i) Family ii) Community iii) Member
b) He escaped from _____ (real/reality/really) by playing video games every afternoon. 1 M
(Pick the right word)
3. Find the suitable articles to fill in the blanks. 2 M
a) In olden days _____ father is considered as the bread winner of the family.
b) The Secretary and _____ president attend the board meeting.
4. i speak telugu and hindi better than English what about you (Punctuate) 2 M
5. Chose the right answer from the given brackets. 2 M
a) One should attend to duty. (His/her/one's)
b) Each of the winners _____ a scholarship and a trophy.(receives/receive)
6. Fill in the blanks in the given sentences by adding correct prefixes or suffixes to the given base word. 2 M
a) The doctors have advised her to be ___ (stress) only then she can overcome the ___ (weak).
b) College days are ___ (memory) days because here only we build ___ (relation) that are never forgettable.
7. Find out the misplaced modifiers and rewrite with meaningful sentences. 2 M
a) Anna suggested often that the children should play outside.
b) Without knowing about the content planned for the television show segments, it was impossible to give full consent to participate.
8. Write synonyms for the following words. 2 M
a) abandon b) Freedom
9. Find out the redundancies of the following sentences 2 M
(a) He ordered for a cup of tea.
(b) The companies merged together last year.
10. Write the full form of the following abbreviations. 2 M
a) M.L.C b) FM

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). What is the author's attitude towards how one should behave with other people? Do you agree with his reasoning? 10M

(P.T.O.)

OR

11. B). i) Fill in the blanks with suitable prepositions: 5M
What happened __ (in/at) the morning __ (of /on) 18th April __ (in/of) 2023? The police car chased the robbers __ (in/ through) the streets. They are good __ (by/at) running.
- ii) Identify the clauses of the following sentences. (Simple, Compound and Complex) 5M
- People who pay their debts are trusted.
 - We cannot go while it is snowing.
 - Raj thinks that I have made a mistake.
 - Tina bought some chocolates which she wanted to give her brother.
 - After I reached home, it started raining.

12. A). How did Alfred Tennyson draw parallelism between the journey of The Brook and the life of a man? 10M

OR

12. B). Write a summary on "How I Became a Public Speaker". 10M

13. A). What did Seneca say about Time Management? Explain with examples on "Time Management". 10M

OR

13. B). i) Rewrite the following sentences with agreement of the verb. 5M
Two and a half hours _not sufficient for us to complete the work. (is/are)
The great poet and singer _ dead. (was/were)
Nurses_ after patients in hospital. (look/ looks)
Neither of the leaders _compromised on his demands. (Have/has)
None of us __ready yet. (is/are)
- ii) How to become master in Writing explain with good principles. 5M

14. A). Write an Essay on "Addiction of Social Media". 10M

OR

14. B). Muhammad Yunus has done a lot to alleviate poverty. Discuss the idea of Microcredit as evident in this lesson. 10M

15. A). In "Politics and the English Language," Orwell describes a cycle in which the poor use of language leads to foolish thinking, which in turn leads to the poor use of language. Evaluate his claim about the cyclical connection between thought and speech and discuss its implications. 10M

OR

15. B). i) Give the full form of the following abbreviations 5M
a) VPP b) WTO c) BCC d) NASA e) ATM
- ii) What are the Techniques for writing precisely? 5M

H.T No:

--	--	--	--	--	--	--	--	--	--

R18

Course Code: A30008



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations February-2024

Course Name: **ENGINEERING PHYSICS**

(Common for CE & ME)

Date: 08.02.2024 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. Differentiate forced and damped vibrations. 2 M
2. Give some examples of simple harmonic oscillations. 2 M
3. State the principle of superposition. 2 M
4. The sodium yellow doublet has wavelengths 5890\AA and 5896\AA . What should be the resolving of a grating to resolve these lines? 2 M
5. Write the characteristics of LASER. 2 M
6. What is meant by attenuation in optical fibers. 2 M
7. Relate D, E and P. 2 M
8. Classify the magnetic materials based on hysteresis curve. 2 M
9. What is nano scale and mention the size limitation of nanoparticles? 2 M
10. List out any four applications of nanoparticles. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) Summarize the analogy between the electrical and mechanical oscillators with examples. 2M
ii) Derive the differential equation of damped harmonic oscillator and discuss the condition for critical damping. 8M

OR

11. B). i) Differentiate between transverse waves and longitudinal waves on a string. 7M
ii) Mention any three applications of acoustic waves. 3M

12. A). i) Explain young's double slit experiment. 2M
ii) With neat diagram discuss the interference in thin films by reflected light. 8M

OR

12. B). Explain the Fraunhofer diffraction due to single slit for principal maxima and secondary maxima. 10M

13. A). Explain lasing action. Describe the construction and working of He-Ne laser. With neat diagrams. 10M

OR

13. B). What is acceptance angle and deduce the expression for it. 10M

(P.T.O.)

14. A). Discuss in detail various types of polarization in dielectric materials. 10M

OR

14. B). Define magnetic moment. Obtain the expression for magnetic moment due orbital motion of electron. 10M

15. A). With neat diagram explain synthesis of nanoparticles using Sol-Gel process. 10M

OR

15. B). Why nanoparticles exhibit the different properties. Explain the reasons. 10M

H.T No:

R18

Course Code: A30009



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations February-2024

Course Name: APPLIED PHYSICS

(Common for EEE, CSC, CSM, AID & AIM)

Date: 08.02.2024 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. Define Heisenberg's uncertainty Principle. 2 M
2. Define the term Wave function. 2 M
3. Explain types of Semiconductors. 2 M
4. Define drift and diffusion current. 2 M
5. Draw the V-I characteristics of PN Junction diode. 2 M
6. Write applications of LED. 2 M
7. What are the characteristics of Laser? 2 M
8. Explain the Principle of Optical fibers. 2 M
9. Define Ferro electricity and Piezoelectricity. 2 M
10. Define the terms magnetic field Induction and magnetic Susceptibility. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Explain how Davisson-Germer's experiment verified the existence of matter waves. 10M
- OR**
11. B). Show that the energies of a particle in a potential box are quantized. 10M
12. A). Obtain an expression for carrier concentration of electrons in an intrinsic semiconductor. 10M
- OR**
12. B). Define Hall effect and derive an expression for Hall voltage and Hall co-efficient. 10M
13. A). i) Sketch the energy level diagram of an open circuit PN junction diode. 5M
ii) Explain the breakdown mechanism in Zener diode and its characteristics. 5M
- OR**
13. B). Explain the construction, working principle and characteristics of Solar Cell. 10M
14. A). Derive the relation between Einstein's Co-efficient. 10M
- OR**
14. B). Describe different types of fibers by giving the refractive index profiles, materials and propagation details. 10M
15. A). Classify different types of magnetic materials. 10M
- OR**
15. B). Explain the concept of superconductivity? Write a note on Type-I and Type-II superconductors. 10M

H.T No:

--	--	--	--	--	--	--	--	--	--

R18

Course Code: A30501



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations February-2024

Course Name: **PROGRAMMING FOR PROBLEM SOLVING**

(Common for EEE, ECE, CSE, IT, CSC, CSM, CSD, AID & AIM)

Date: 13.02.2024 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. Define keyword, constant and variable. 2 M
2. Differentiate Logical and Syntax Errors. 2 M
3. Distinguish between one dimensional and two dimensional arrays. 2 M
4. Show the differences between while and do-while statements. 2 M
5. Show a C function to compare two strings. 2 M
6. Write any two applications of recursive function. 2 M
7. What is dynamic memory allocation? 2 M
8. Differentiate between structure and a union. 2 M
9. Define Command Line Parameters. 2 M
10. What are advantages and disadvantages of Bubble Sort? 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). What is an operator? List and explain any five types of operators with an suitable example. 10M

OR

11. B). Discuss about the Constants, Expressions and Statements in 'C'. 10M
12. A). Explain about the various decision making and branching statements. 10M

OR

12. B). What is an array? List out the different types of arrays with an suitable example. 10M
13. A). What are the methods through which the parameters are passed to a function in C Language? How do they make a difference. 10M

OR

13. B). Discuss any five string handling functions in detail. 10M
14. A). Define Pointer. What are the features of pointers? Write a C program to print address of a variable. 10M

OR

14. B). Write a C program to maintain a record of "n" student details using an array of structures with four fields (Roll number, Name, Marks, and Grade). Each field is of an appropriate data type. Print the marks of the student given student name as input. 10M

15. A). Explain about operations on Data files with an example 10M

OR

15. B). i) Write a C Program to search an element in an array using linear search. 5M
ii) Write a C program for Implementation of Bubble sort. 5M

H.T No:

--	--	--	--	--	--	--	--	--	--

R18

Course Code: A30312



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations February-2024

Course Name: ENGINEERING GRAPHICS

(Common for CE & ME)

Date: 13.02.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

- | | |
|----------------------------------------------------------------------------------------|-----|
| 1. Define the term Epicycloid & Hypo cycloid. | 1 M |
| 2. Draw the different lines used in engineering practice. | 1 M |
| 3. Define the term orthographic projection. | 1 M |
| 4. Draw the symbolic representation for 1st angle projection and 3rd angle projection. | 1 M |
| 5. Define the term frustum of a solid and explain with neat sketches. | 1 M |
| 6. When can we obtain a true shape of a section? | 1 M |
| 7. State a few practical applications of the development of surfaces. | 1 M |
| 8. Explain interpenetration of solids. | 1 M |
| 9. Define the term Isometric axis. | 1 M |
| 10. Define the term isometric lines and non-isometric lines. | 1 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 11.A). Construct a Diagonal scale of R.F = 1/4000 to show meters and long enough to measure up to 500 meters. Represent 359m on it. | 10M |
| OR | |
| 11. B). The distance of the focus from the directrix is 50mm and eccentricity $e = 2/3$. Construct an ellipse, draw a normal and tangent at a point 60mm from the directrix. | 10M |
| 12. A). The top view of a 75mm long line AB measures 65mm, while the length of its front view is 50mm. It's one end A is in the HP and 12mm in front of the VP. Draw the projections of AB and determine its inclinations with the HP and VP. | 10M |
| OR | |
| 12. B). A regular hexagon of 40mm side has a corner in the HP. Its surface is inclined at 45° to the HP and the top view makes an angle of 60° with the VP. Draw its projections. | 10M |
| 13. A). A pentagonal prism of base side 30mm and axis 60mm has an edge of its base in the V.P and inclined at 45° to the H.P. Its axis is inclined at 30° to the V.P. Draw its projections. | 10M |
| OR | |
| 13. B). The cone base diameter 50mm axis height 60mm long is resting on its base on the ground. It is cut by section plane perpendicular to VP and bisect the axis of cone at an angle 45° to the HP. Draw sectional top view, true shape of the section. | 10M |

(P.T.O.)

14. A). A pentagonal prism of base side 30mm and axis 70mm is resting on its base on the H.P with a rectangular face parallel to the V.P. It is cut by an auxiliary inclined plane (A.I.P) whose V.T is inclined at 45° to the reference line and passes through the midpoint of the axis. Draw the development of the lateral surface of the truncated prism. 10M

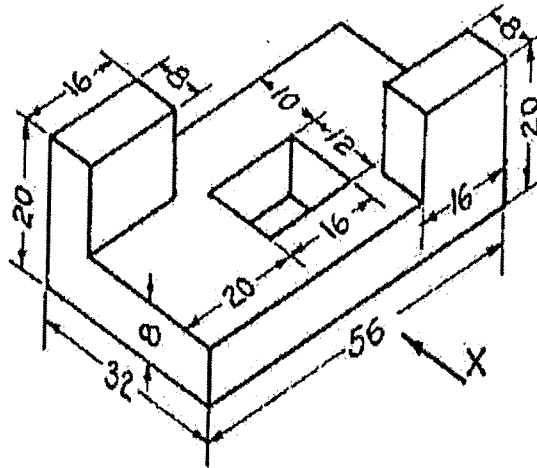
OR

14. B). A square prism of base side 60mm is resting on its base on the H.P. It is completely penetrated by a horizontal cylinder of base diameter 40mm such that axes of the prism and the cylinder intersect each other at right angles. Draw the projections of the combination and show the curves of intersection. 10M

15. A). A cylinder of base diameter 70 mm, axis height 60 mm long, a frustum of a square pyramid base edge 50 mm, axis height 60 mm long and top edge 30 mm, a sphere having radius 20mm located centrally one and the above. Draw isometric view (or) isometric projection for the given solids. 10M

OR

15. B). Draw the Front view, Top view and side view for the figure shown below. 10M



H.T No:

--	--	--	--	--	--	--	--	--	--

R18

Course Code: A30011



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations February-2024

Course Name: ENGINEERING CHEMISTRY

(Common for ECE, CSE, IT & CSD)

Date: 15.02.2024 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

1. What are the differences between Atomic Orbitals and Molecular Orbitals? 2 M
2. List out the reason for crystal field splitting of d-orbitals. 2 M
3. What are the advantages of fuel cells over batteries? 2 M
4. Why galvanized iron sheets are not used in making food storage utensils? 2 M
5. Explain any two selection rules of Rotational Spectroscopy. 2 M
6. What is Nuclear magnetic resonance? 2 M
7. List out the reason why do we express hardness of water in terms of CaCO₃ equivalent. 2 M
8. A sample of water contains the following salts in milligrams per litre, Mg(HCO₃)₂= 73mg/L, Ca(HCO₃)₂= 162mg/L, MgCl₂= 95mg/L, CaSO₄=136mg/L. Estimate the total hardness of water sample. 2 M
9. Define Enantiomers and give one example. 2 M
10. Explain Grignard addition of carbonyl compounds. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) Give an account of LCMO. 5M
ii) Draw molecular orbital diagram of O₂ and explain the magnetic behavior of it. 5M
- OR**
11. B). i) Assess the salient feature of the Crystal field Theory. 5M
ii) Explain the crystal field splitting of transition metal ion d-orbitals square planar geometry. 5M
12. A). What is Cathodic Protection? Explain Sacrificial Anodic Protection? 10M
- OR**
12. B). i) Explain the chemical reactions involved in Electrochemical Corrosion. 5M
ii) What is a battery? Explain the construction of Li- ion battery? 5M
13. A). i) What are various electronic transitions? Justify it with suitable examples. 5M
ii) Explain the chemical shift in NMR spectroscopy? 5M
- OR**
13. B). i) Illustrate the principles of UV spectroscopy. 5M
ii) List out various fundamental vibrations. 5M

(P.T.O.)

14. A). i) Explain Ion – Exchange Method for softening of hard water with the importance of regeneration? 5M
ii) Explain how brackish water can be desalinated by Reverse Osmosis method with neat diagram 5M

OR

14. B). i) Categorize various steps involved in the treatment of domestic water. 5M
ii) What are the disadvantages of Boiler Corrosion? Explain how such corrosion is prevented. 5M
15. A). i) Explain Nucleophilic substitution reaction Mechanism. 6M
ii) Identify the possible optical isomers of Tartaric Acid. 4M

OR

15. B). i) What are conformational Isomers? Assess it with the n-Butane and give energy potential diagram for the conformers. 6M
ii) Identify the synthetic method for Paracetamol and write its pharmaceutical applications. 4M

H.T No:

--	--	--	--	--	--	--	--	--	--

R18

Course Code: A30313



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations February-2024

Course Name: **ENGINEERING DRAWING**

(Common for EEE, CSC, CSM, AID & AIM)

Date: 15.02.2024 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark.

10x1=10M

- | | | |
|-----|---------------------------------------------------------------------------------------------------------------------------------|-----|
| 1. | Which of the conic has an eccentricity of unity? | 1 M |
| 2. | Define eccentricity. | 1 M |
| 3. | If a line is inclined to VP, what is its elevation? | 1 M |
| 4. | In orthographic projection, each projection view represents how many dimensions of an object.? | 1 M |
| 5. | Which solid have minimum number of faces? | 1 M |
| 6. | How many number of stages necessary to get the orthographic views of a solid having its axis inclined to both reference planes? | 1 M |
| 7. | Differentiate between Prism and Pyramid. | 1 M |
| 8. | Which solid formed by four equilateral triangles? | 1 M |
| 9. | Difference between Isometric view and Isometric projection. | 1 M |
| 10. | What is the isometric view of circle? | 1 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- | | | |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 11.A). | Draw an ellipse whose focus distance from directrix is 70 mm and e is 1/2. Draw the tangent and normal 40 mm above the axis. | 10M |
| OR | | |
| 11. B). | Draw hypocycloid of a circle of 40 mm diameter, which rolls inside of another circle of 160 mm diameter for one revolution counter clockwise. Draw a tangent and normal to it at a point 65 mm from the center of the directing circle. | 10M |
| 12. A). | A line AB of 80mm length is inclined 45° HP and 30° VP. Draw projections of a line is situated 30mm above HP and 20mm in front of VP. | 10M |
| OR | | |
| 12. B). | A circular plate of diameter 60 mm is kept on H.P. on a point of its circumference. The surface of the circular plate makes an angle of 40° to H.P. Draw the projections of the circle when diameter passing through the point on H.P. makes an angle of 30° to V.P. | 10M |
| 13. A). | A cube of edge 40 mm is resting on the ground on one of its corners with a solid diagonal perpendicular to the VP. Draw the projections. | 10M |

(P.T.O..)

OR

13. B). A hexagonal pyramid base 30mm side and axis 60 mm long, has one of its slant edges on HP, such that two of its triangular faces containing the slant edge on which it rests are equally inclined to HP. The top view of the axis appears to be inclined at 45 degree to VP. Draw its projections, when its base is nearer to the observe than its apex. 10M
14. A). Draw an isometric view of a cylinder, with a 50mm base diameter and a 70mm long axis when (a) The base is on the HP (b) when one of the generators is on the HP? 10M

OR

14. B). Draw the isometric view of the given orthographic projection of the object? 10M

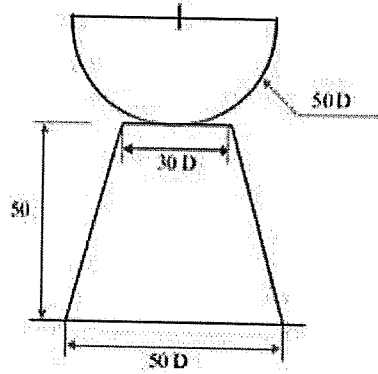


Fig-1

15. A). Draw front view, top view and left side view. 10M

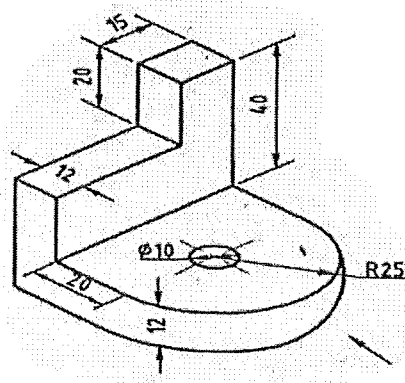


Fig-2

OR

15. B). Draw an Isometric view for the following figure. 10M

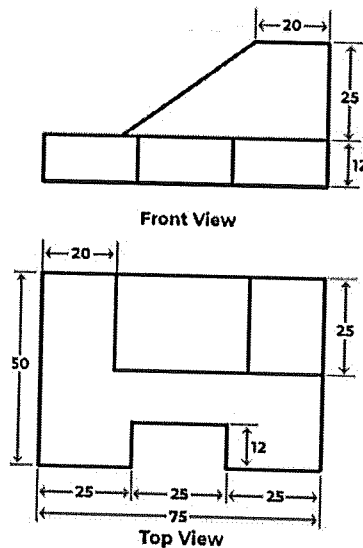


Fig-3



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations February-2024

Course Name: **ENGINEERING MECHANICS**

(Common for CE & ME)

Date: 15.02.2024 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks.

10x2=20M

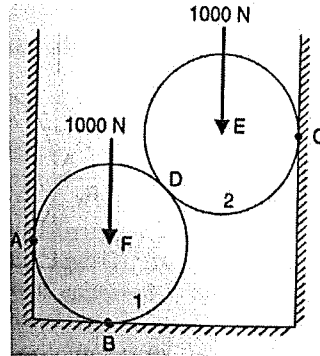
- | | | |
|-----|-----------------------------------------------------------------|-----|
| 1. | What Varignon's theorem. | 2 M |
| 2. | State the parallelogram law of forces. | 2 M |
| 3. | Discuss about the types of friction. | 2 M |
| 4. | Differentiate between Centroid & Center of gravity. | 2 M |
| 5. | Illustrate Importance of radius of gyration. | 2 M |
| 6. | What is polar moment of inertia? | 2 M |
| 7. | How a uniform motion differs from a uniform accelerated motion? | 2 M |
| 8. | Discuss about rectilinear & curvilinear motion. | 2 M |
| 9. | Define Momentum & Impulse & its units. | 2 M |
| 10. | Summarize the concept of D'Alemberts Principle. | 2 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Find the reaction at A, B and C. Radius of sphere each is 150mm and distance between two vertical walls is 300mm. 10M



OR

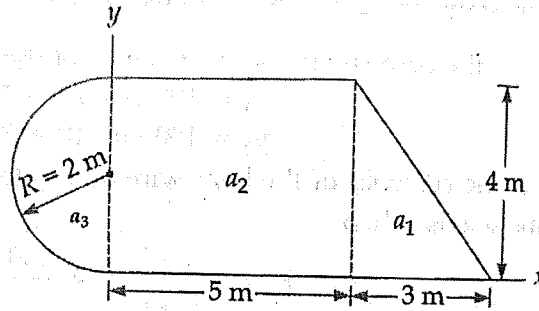
11. B). A smooth sphere of radius 15 cm and weight 2 N is supported in contact with a smooth vertical wall by a string whose length equals the radius of sphere. The string joins a point on the wall and a point on the surface of sphere. Workout inclination and the tension in the string and reaction of the wall. 10M
12. A). A body resting on a rough horizontal plane required a pull of 24 N inclined at 30° to the plane just to move it. It was also found that a push of 30N at 30° to the plane was just enough to cause motion to impend. Determine weight of the body & the coefficient of friction? 10M

(P.T.O.)

OR

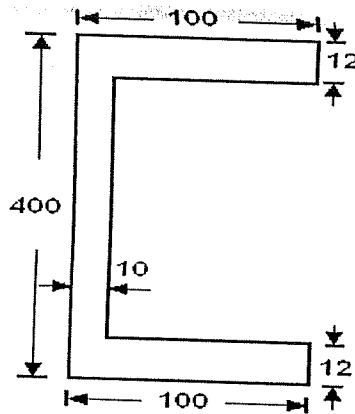
12. B). Determine the centroid of below problem.

10M



13. A). Determine the area moment of inertia of the given figure about centroidal axes.

10M



OR

13. B). Derive the Mass moment of inertia of circular lamina with radius R .

10M

14. A). The acceleration of a particle is expressed as $a = 10 - x$. The particle starts with no initial velocity at the position $x = 0$. Determine (i) the velocity of the particle when $x = 8\text{ m}$, (ii) the position of the particle where the velocity is again zero, and (iii) the velocity of the particle when acceleration becomes zero.

10M

OR

14. B). A motorist is driving at 80 km/hr on the curved position of a highway of 400 m radius. He suddenly applies the brakes and that causes the speed to decrease to 45 km/hr at a constant rate in 8 seconds. Determine the tangential and normal components of acceleration immediately after the application of brakes and 4 seconds later.

10M

15. A). A man weighing 750 N stands on the floor of a lift. Determine the pressure exerted on the floor when (i) the lift moves upward with an acceleration of 2.5 m/s^2 (ii) the lift moves downward with an acceleration of 2.5 m/s^2 .

10M

If 900 N pressure is to be exerted on the floor, then with what acceleration the lift should move upward? Work-out your solution by using D' Alembert's principle.

OR

15. B). A wooden block of weight 40 N rests on a rough horizontal plane having friction coefficient $\mu = 0.35$. The block is struck by a bullet travelling horizontally with a velocity of 750 m/s and weighing 0.25 N . Workout the distance by which the block is displaced from its initial position. It may be presumed that the bullet after striking the block gets embedded in it.

10M
