



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations September-2023

Course Name: **LINEAR ALGEBRA AND CALCULUS**

(Common for all Branches)

Date: 05.09.2023 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. Show that $A = \begin{bmatrix} a+ic & -b+id \\ b+id & a-ic \end{bmatrix}$ is unitary if $a^2 + b^2 + c^2 + d^2 = 1$ 2 M
2. Find the rank of the matrix $\begin{bmatrix} 8 & 1 & 3 \\ 0 & 3 & 2 \\ -8 & -1 & -3 \end{bmatrix}$ 2 M
3. Prove that the Eigen Values of a Hermitian matrix are all real 2 M
4. Find the Eigen values of $A = \begin{bmatrix} 1 & 2 & -1 \\ 0 & 2 & 2 \\ 0 & 0 & -2 \end{bmatrix}$ 2 M
5. Test the convergence of $\sum_{n=0}^{\infty} \frac{1}{n^2+n+1}$ 2 M
6. Test the convergence of $\sum_{n=0}^{\infty} \frac{1}{3^n}$ 2 M
7. Evaluate $\int_0^{\infty} \sqrt{x} e^{-x} dx$ 2 M
8. Verify Rolle's theorem for $f(x) = x(x+3)e^{\frac{-x}{2}}$ in $[-3,0]$. 2 M
9. Show that the functions $u = x + y + z$, $v = x^2 + y^2 + z^2 - 2xy - 2yz - 2xz$ and $w = x^3 + y^3 + z^3 - 3xyz$ are functionally related. 2 M
10. Find the three positive numbers whose sum is 100 and Whose Product is maximum. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Find the inverse of the matrix A using Gauss-Jordan method 10M

$$A = \begin{bmatrix} -1 & -3 & 3 & -1 \\ 1 & 1 & -1 & 0 \\ 2 & -5 & 2 & -3 \\ -1 & 1 & 0 & 1 \end{bmatrix}$$

OR

11. B). Show that the only real number λ for which the system $x+2y+3z = \lambda x$, $3x+y+2z = \lambda y$, $2x+3y+z = \lambda z$, has non-zero solution is 6 and solve them when $\lambda=6$. 10M

(P.T.O..)

12. A). State the Cayley-Hamilton theorem, Verify the matrix 10M

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & -1 & 4 \\ 3 & 1 & -1 \end{bmatrix} \text{ \& using it also find the inverse of the matrix}$$

OR

12. B). Find the Eigen Values & Eigen Vectors of a matrix 10M

$$A = \begin{bmatrix} 3 & -1 & 1 \\ -1 & 5 & -1 \\ 1 & -1 & 3 \end{bmatrix} \text{ and also find the Eigen Values of } A^{-1}$$

13. A). Test the convergence of the series $1 + \frac{3}{7}x + \frac{3.6}{7.10}x^2 + \frac{3.6.9}{7.10.13}x^3 + \dots (x > 0)$ 10M

OR

13. B). Examine the following series for Absolute Convergence or Conditional convergence 10M

$$\frac{1}{5\sqrt{2}} - \frac{1}{5\sqrt{3}} + \frac{1}{5\sqrt{4}} - \dots$$

14. A). Define Beta and Gamma Functions, then show that $\beta(m, n) = \frac{\Gamma(m) \Gamma(n)}{\Gamma(m+n)}$ 10M

OR

14. B). i) Verify Taylor's theorem for $f(x) = (1-x)^{5/2}$ with Lagrange's form of remainder up to 2 terms in the interval $[0, 1]$. 7M

ii) Evaluate $\int_0^1 \frac{x^2}{\sqrt{1-x}} dx$ 3M

15. A). Find the Rectangular Parallelepiped of maximum volume that can be inscribed in a sphere. 10M

OR

15. B). Prove that the functions $u = x + y + z$, $v = xy + yz + zx$, $w = x^2 + y^2 + z^2$ are functionally dependent and find the relation between them. 10M

H.T No:

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R18

Course Code: A30008



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations September-2023

Course Name: **ENGINEERING PHYSICS**

(Common for CE & ME)

Date: 07.09.2023 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 damped oscillations? Give examples. 2 M
2. Distinguish between free and forced oscillations. 2 M
3. Explain the principle of superposition of waves. 2 M
4. Explain the differences between Fresnel and Fraunhofer diffraction. 2 M
5. Explain the characteristics of a laser beam. 2 M
6. What is meant by attenuation in optical fiber? 2 M
7. Define a) Electric dipole, b) Dielectric moment, c) Polarizability and d) dipole moment. 2 M
8. Compare the properties of soft and hard magnetic materials. 2 M
9. Discuss how the physical and chemical properties of nano-particles vary with their size? 2 M
10. What are the classifications of nanomaterials? 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). What is a transverse wave? Obtain the equation for the velocity of a transverse wave in stretched string. Write the laws of transverse vibrations of the strings. 10M
- OR**
11. B). What are forced oscillations? Obtain an expression for the amplitude of forced oscillator and give the condition for amplitude resonance? 10M
12. A). Apply the concept of Interference to explain the Newton's rings experiment and deduce the expression for radius of curvature of Plano convex lens. 10M
- OR**
12. B). Give the theory of Fraunhofer diffraction due to a single slit and hence obtain the condition for primary and secondary maxima. 10M
13. A). With neat diagrams describe the construction and working of a He-Ne laser. 10M
- OR**
13. B). i) Derive an expression for numerical aperture of an optical fiber. 7M
ii) An optical fibre has a core material of refractive index of 1.55 and cladding material of refractive index 1.50. The light is launched into it in air. Calculate its numerical aperture. 3M

(P.T.O.)

14. A). i) What is meant by polarization mechanism in dielectrics? 2M
ii) Discuss the different polarization mechanisms in dielectrics. 8M

OR

14. B). Explain domain theory of ferromagnetism based on hysteresis curve. 10M

15. A). i) Discuss the importance of surface to volume ratio of nanomaterials. 4M
ii) Explain the differences between top down and bottom-up synthesis methods. 6M

OR

15. B). Explain the characterization of nanomaterials by TEM. 10M

H.T No:

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R18

Course Code: A30009



CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations September-2023

Course Name: APPLIED PHYSICS

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

Date: 07.09.2023 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. Calculate de Broglie wavelength of an electron moving with velocity 10^6 m/s. 2 M
2. Define wavefunction and write its physical significance. 2 M
3. Define semiconductor. Write examples of elemental and compound semiconductors. 2 M
4. Sketch the bond model and band structures of a P-type semiconductor. 2 M
5. Define diffusion and drift currents in a PN junction diode. 2 M
6. Calculate the wavelength of light emitted by an LED, made by a semiconductor of energy band gap 3.1 eV. 2 M
7. Write the characteristics of LASER light. 2 M
8. Differentiate between step index and graded index optical fibers. 2 M
9. Define ferroelectricity. Give examples of ferro electric materials. 2 M
10. State Meissner effect in superconductors. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Apply the Schrödinger time independent wave equation to a particle confined in a rigid one-dimensional potential box of length, L, and derive expressions for its energy and wavefunction. 10M

OR

11. B). i) Define fermions and fermi energy level. 2M
ii) Explain Fermi-Dirac distribution function. 2M
iii) Describe the function at temperature conditions: (a) $T=0$ K and (b) $T \neq 0$ K, at energy levels below and above the fermi energy level. 6M

12. A). i) Derive expression for concentration electrons in conduction band of an intrinsic semiconductor. 8M
ii) Write the effect of temperature on the concentration of electrons in intrinsic semiconductor. 2M

OR

12. B). i) Explain Hall effect and derive expression for Hall coefficient of an extrinsic semiconductor. 8M
ii) Write any two applications of the Hall effect. 2M

(P.T.O..)

13. A). i) Define Zener diode. Draw I-V characteristic curves of Zener diode in forward and reverse bias conditions and explain the phenomenon of Zener breakdown voltage. 8M
ii) Write applications of Zener diode. 2M
- OR**
13. B). i) Describe construction, working and I-V characteristics of LED. 7M
ii) Write advantages and applications of LED. 3M
14. A). i) Define metastable state and population inversion. 2M
ii) Explain construction and working of He-Ne laser, using energy level diagram. 8M
- OR**
14. B). i) Describe construction of optical fiber. 4M
ii) Derive expressions for numerical aperture and acceptance angle of optical fiber. 6M
15. A). i) Explain different types of polarization mechanisms in a dielectric material 8M
ii) Give an application of dielectric materials. 2M
- OR**
15. B). Explain phenomenon of magnetic hysteresis, that occurs in ferro magnetic material using domain theory of ferromagnetism. 10M

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R18

Course Code: A30001



CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations September-2023

Course Name: ENGLISH

(Common for ECE, CSE, IT & CSD)

Date: 07.09.2023 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 is the young boy's attitude towards his new school? 2 M
2. What is Clause? Give two examples. 2 M
3. Where does the brook come from? 2 M
4. Fill in the blanks with appropriate articles. 2 M
 - a) She has ___ apple in her hand.
 - b) She is ___ excellent pianist.
5. Give four words using the prefix 'mis-'. 2 M
6. Correct the following sentences 2 M
 - a) The dog wagged it's tail.
 - b) Neither of the kids brought their lunch.
7. Write a paragraph on 'Computer' following the principles of writing. 2 M
8. Write at least two synonyms each for the following words. 2 M
 - a) Brave
 - b) Dangerous
9. List out two clichés with examples. 2 M
10. Expand the following: 2 M
 - a) RAM
 - b) ATM
 - c) COD
 - d) CNG

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). According to "On the Conduct of Life," what are the differences between home and school? 10M
- OR**
11. B). "Do not affect the society of your inferiors in rank, nor court that of the great"- Analyze the reason for Hazlitt's advice to his son. 10M
12. A). Discuss in brief the beauty of nature as described by the poet in the poem- "The Brook". 10M
- OR**
12. B). How did Bernard Shaw become a public speaker? 10M
13. A). Elucidate the life lessons discussed by Seneca on managing time. 10M
- OR**
13. B). What is the purpose and principles of Good Writing? 10M

(P.T.O.)

14. A). Explain how Yunus applied microcredit to help the poor people. 10M

OR

14. B). Write an essay on 'The role of Physical Education in the school system'. 10M

15. A). Can you find any examples in the essay of Orwell violating his own principles? 10M

OR

15. B). What is Redundancies? Give five examples. 10M

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R18

Course Code: A30312



CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations September-2023

Course Name: ENGINEERING GRAPHICS

(Common for CE & ME)

Date: 09.09.2023 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE marks.

10x1=10M

1. List out the various methods of construction of ellipse. 1 M
2. Define cycloid. 1 M
3. Draw the representation of first angle projection. 1 M
4. Point A is on the H.P. and 50 mm in front of the V.P. Draw its projections. 1 M
5. Classify the solids. 1 M
6. State the need of sections of solids. 1 M
7. Give the applications of intersections of solids. 1 M
8. Name the different methods of development of surfaces. 1 M
9. Define isometric projection. 1 M
10. Draw isometric projection of cube with 30 mm side. 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Draw a hypo-cycloid of a circle of 30 mm diameter which rolls inside another circle of 160 mm diameter for one revolution. Draw a tangent and normal at 60 mm from the centre of directing circle. 10M

OR

11. B). Construct a scale of R.F.=1/2.5 to show decimeters and centimeters and to read millimeters, to measure upto 4 decimeters. Show on the scale the distance of 0.64 decimeters. Name the scale. 10M

12. A). A line AB is 75 mm long. A is 50 mm in front of V.P. and 15 mm above H.P. B is 15 mm in front of V.P. and is 40 mm above H.P. The top view of the line is 50 mm long. Draw the front view and measure its length. Determine its inclinations with H.P. and V.P. 10M

OR

12. B). A regular Hexagon of 35 mm side has one corner on H.P. Its surface is inclined at 45° to H.P. and the top view of the longest diagonal through the corner on which it rests, makes as angle of 60° with V.P. Draw its projections. 10M

13. A). A tetrahedron of base 40 mm side rests with one of its edges on H.P. and inclined at 45° to V.P. The triangular face containing that edge is inclined at 30° to H.P. Draw its projections. 10M

OR

13. B). A cone of base 50mm diameter and axis 60 mm long rests with its base on HP. It is cut by a section plane perpendicular to HP and inclined at 60° to VP and at a distance of 10 mm from its axis. Draw the sectional front view and the true shape of the section. 10M

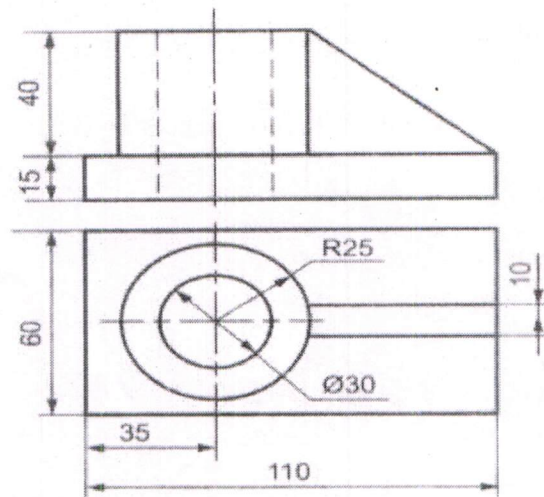
(P.T.O.)

14. A). A vertical hexagonal prism of 75 mm side of base and axis 60 mm long has one of its rectangular faces parallel to VP. A circular hole of 40 mm diameter is drilled through the prism such that the axis of the hole bisects the axis of the prism at right angle and is perpendicular to VP. Draw the development of the lateral surface of the prism. 10M

OR

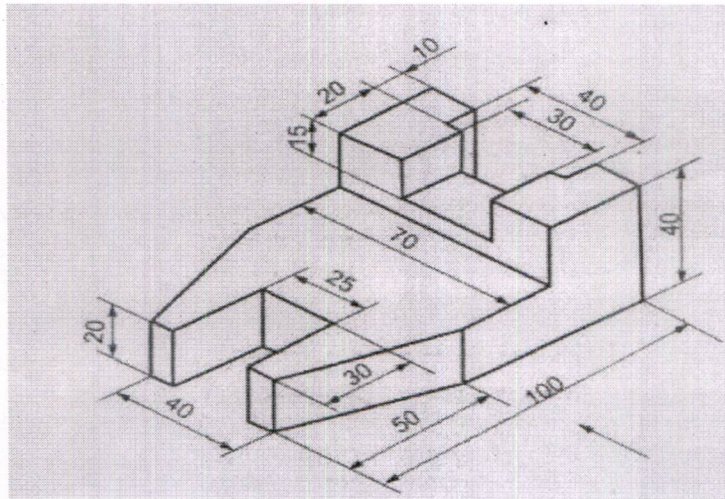
14. B). A vertical cylinder of 80 mm diameter is completely penetrated by another cylinder of 60 mm diameter, their axes bisecting each other at the right angles. Draw their projections showing curves of penetration. 10M

15. A). Draw the isometric view of the object shown in figure below. 10M



OR

15. B). Draw the front view in the direction of arrow, top view and left side view of the figure shown below. 10M



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R18

Course Code: A30501



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations September-2023

Course Name: **PROGRAMMING FOR PROBLEM SOLVING**
(Common for all Branches)

Date: 09.09.2023 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 Flowchart. Draw the flow chart for addition of two numbers. 2 M
2. List different types of Operators. 2 M
3. Write a C program to display the sum of the elements of 1-D array. 2 M
4. Differentiate between break and continue. 2 M
5. Define Function, giving its Syntax. 2 M
6. Write the features of register storage class. 2 M
7. Write the syntax to declare and initialize a pointer. 2 M
8. Define enumerated datatype and how to use it, give an example. 2 M
9. Describe fgetc() and fputc() with syntax. 2 M
10. Compare between searching and sorting? 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) Explain Structure of a C Program. 5M
ii) Write the characteristics of Computer. 5M

OR

11. B). i) Explain different types of programming languages. 5M
ii) Evaluate the following expression $x=3*((4*5)/2)$. Write the importance of Precedence and Associativity. 5M

12. A). Explain Selection statements in C with syntax, flowchart and example. 10M

OR

12. B). i) Define an array. Explain how to process an array. 6M
ii) Write a C program to find the addition of two matrices. 4M

13. A). Write a program to display Fibonacci series using functions: 10M
i) With recursive function ii) Without recursion

OR

13. B). What are the string handling functions? Explain different string handling functions with example? 10M

(P.T.O..)

14. A). Define pointer to structure. how to access structure members using structure pointer, give an example? 10M

OR

14. B). Explain pointer to 1-D array and 2-D array and how to access array elements using pointers. 10M

15. A). Define File. Explain in detail about the various file operations. 10M

OR

15. B). i) Differentiate between Linear and binary search. 5M
ii) Write a C Program for selection sort. 5M

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R18

Course Code: A30311

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

B.Tech I Semester Supplementary Examinations September-2023

Course Name: ENGINEERING MECHANICS

(Common for CE & ME)

Date: 12.09.2023 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. Two forces of 80 N and 70 N acts simultaneously at a point. Find the resultant force, if the angle between them is 150° . 2 M
2. State the Lami's Theorem. 2 M
3. Explain the term angle of friction. 2 M
4. What is centre of gravity? 2 M
5. State the theorem of parallel axis applied to moment of inertia. 2 M
6. Derive an expression for mass moment of inertia of a uniform thin rod about the centroidal axis perpendicular to the length. 2 M
7. A body is dropped from the top of a tall building. If it takes 2.8 seconds in falling on the ground, find the height of the building. 2 M
8. a) What do you understand by the term 'energy'? 2 M
b) What are the various forms of mechanical energy?
9. Explain the term 'instantaneous centre'. 2 M
10. State D' Alembert's principle. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). A string ABCD, attached to fixed points A and D has two equal weights of 1000 N attached to it at B and C. The weights rest with the portions AB and CD inclined at angles as shown in Fig. 1. Find the tensions in the portions AB, BC and CD of the string, if the inclination of the portion BC with the vertical is 120° . 10M

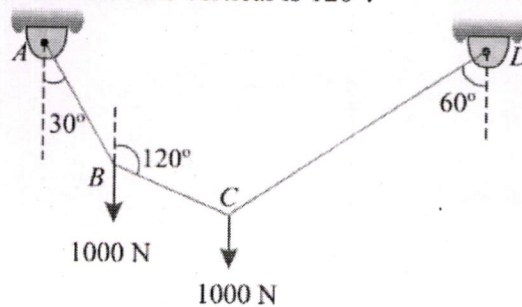


Fig. 1

(P.T.O..)

OR

11. B). Two cylinders P and Q rest in a channel as shown in Fig.2. The cylinder P has diameter of 100 mm and weighs 200 N, whereas the cylinder Q has diameter of 180 mm and weighs 500 N. If the bottom width of the box is 180 mm, with one side vertical and the other inclined at 60° , determine the pressures at all the four points of contact. 10M

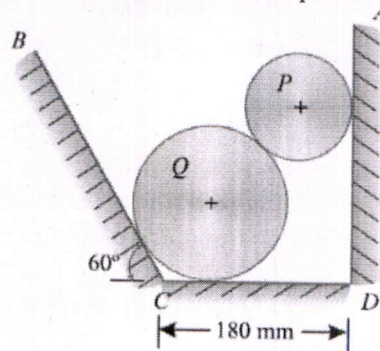
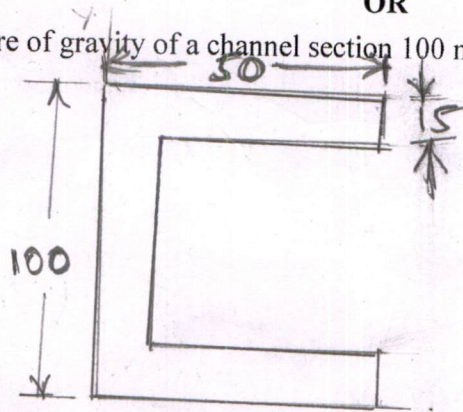


Fig.2

12. A). i) State and explain the laws of dynamic friction. 5M
ii) A body, resting on a rough horizontal plane, required a pull of 180 N inclined at 30° to the plane just to move it. It was found that a push of 220 N inclined at 30° to the plane just moved the body. Determine the weight of the body and the coefficient of friction. 5M

OR

12. B). Find the centre of gravity of a channel section $100 \text{ mm} \times 50 \text{ mm} \times 15 \text{ mm}$. 10M



13. A). i) State and prove the theorem of perpendicular axis applied to moment of inertia. 6M
ii) Derive an equation for moment of inertia of the rectangular section about centroidal axis. 4M

OR

13. B). Find the moment of inertia of a T-section with flange as $150 \text{ mm} \times 50 \text{ mm}$ and web as $150 \text{ mm} \times 50 \text{ mm}$ about X-X and Y-Y axes through the centre of gravity of the section. 10M
14. A). i) A burglar's car had a start with an acceleration of 2 m/s^2 . A police vigilant party came after 5 seconds and continued to chase the burglar's car with a uniform velocity of 20 m/s. Find the time taken, in which the police van will overtake the burglar's car. 5M
ii) A stone, dropped into a well, is heard to strike the water after 4 seconds. Find the depth of well, if velocity of the sound is 350 m/s. 5M

OR

14. B). Two electric trains A and B leave the same station on parallel lines. The train A starts from rest with a uniform acceleration of 0.2 m/s^2 and attains a speed of 45 km.p.h., which is maintained constant afterwards. The train B leaves 1 minute after with a uniform acceleration of 0.4 m/s^2 to attain a maximum speed of 72 km.p.h., which is maintained constant afterwards. When will the train B overtake the train A? 10M

(P.T.O.)

15. A). Two blocks shown in Fig.3, have masses $A = 20 \text{ kg}$ and $B = 10 \text{ kg}$ and the coefficient of friction between the block A and the horizontal plane, $\mu = 0.25$. If the system is released, from rest, and the block B falls through a vertical distance of 1 m , what is the velocity acquired by it? Neglect the friction in the pulley and the extension of the string. 10M

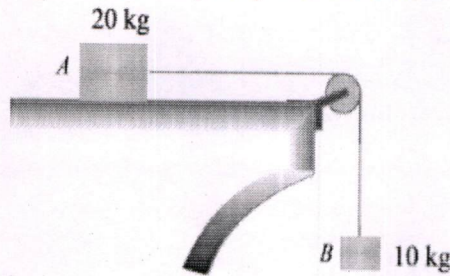


Fig.3

OR

15. B). A body of mass 150 kg , rests on a rough plane inclined at 10° to the horizontal. It is pulled up the plane, from rest, by means of a light flexible rope running parallel to the plane. The portion of the rope, beyond the pulley hangs vertically down and carries a man of 80 kg at the end. If the coefficient of friction for the plane and the body is 0.2 , find (i) the tension in the rope, (ii) the acceleration in m/s^2 , with which the body moves up the plane, and (iii) the distance in metres moved by the body in 4 seconds starting from rest. 10M

H.T No:

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R18

Course Code: A30313



CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations September-2023

Course Name: ENGINEERING DRAWING

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

Date: 12.09.2023 AN

Time: 3 hours

Max.Marks: 60

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE marks.

10x1=10M

1. If the distance from the focus is 3 units and the distance from the directrix is 3 units, then how much is the eccentricity? 1 M
2. What is the fixed point which is responsible for generating the conics? 1 M
3. In orthographic projection, which planes are inclined to both horizontal and vertical planes? 1 M
4. When a point is below HP and in front of VP, the point is resting in which quadrant? 1 M
5. Which axis of the solid is parallel to both HP and VP, The view which reveals the true shape of the base? 1 M
6. To obtain true shape of the solid how to set the auxiliary plane? 1 M
7. While drawing isometric view of the sphere what its diameter taken? 1 M
8. A cylinder standing on the HP is cut by a vertical plane parallel to the axis and away from it what is the shape of the section? 1 M
9. In an isometric projection, what is the angle of three inclined principal axes? 1 M
10. Top view of a square is given and has to draw its isometric view which angle the base has to make with horizontal? 1 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Draw epicycloids of a circle of 50mm diameter, which rolls outside on the another circle of 160 mm diameter for one revolution clockwise. Draw a tangent and normal to its at a point of 90 mm from the center of the directing circle. 10M

OR

11. B). The focus of a conic is 50 mm from directrix. Draw the locus of a point P moving in such a way that eccentricity is $\frac{2}{3}$. Also draw a tangent and normal at any point on the curve. 10M

12. A). The top view of a line AB is 70 mm long and inclined to XY line at 45 degree, one end A is 20 mm above HP and 10 mm in front of VP. The other end is 60 mm above the HP and is in front of VP. What is the true length of line and its inclination with HP and VP? Also locate its horizontal and vertical traces. 10M

OR

12. B). A hexagonal prism base 30mm side and axis 50 mm long is placed with one of its base edges on HP such that the axis is inclined at 30 degree to HP and 45 degree to VP. Draw its projections. 10M

(P.T.O.)

13. A). Draw the projections of a cylinder 75mm diameter and 100 mm long, lying on the ground with its axis inclined at 30 degree to the V.P and parallel to the ground. 10M

OR

13. B). Draw the projections of a regular pentagon of 40 mm side, having its surface inclined at 30 degree to the ground and a side parallel to the H.P and inclined at an angle 60 degree to the V.P. 10M

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

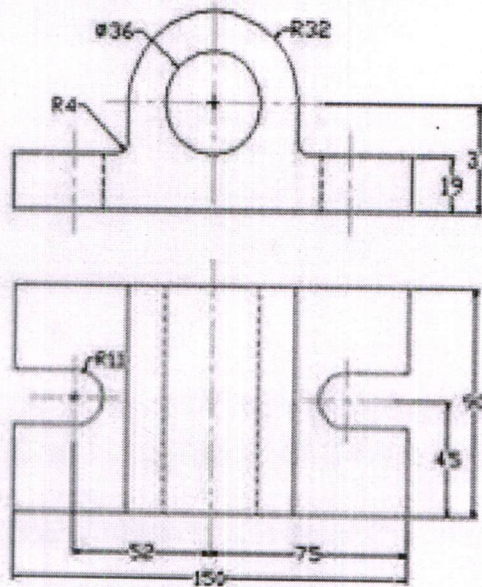


Fig-1

OR

14. B). Draw an isometric view of Frustum of Cone with a 60 mm base diameter, 40 mm Top diameter and 70mm long axis, resting on its base on the HP? 10M

15. A). Draw to scale 1:1 the front view, top view and side view of the given machine block. 10M

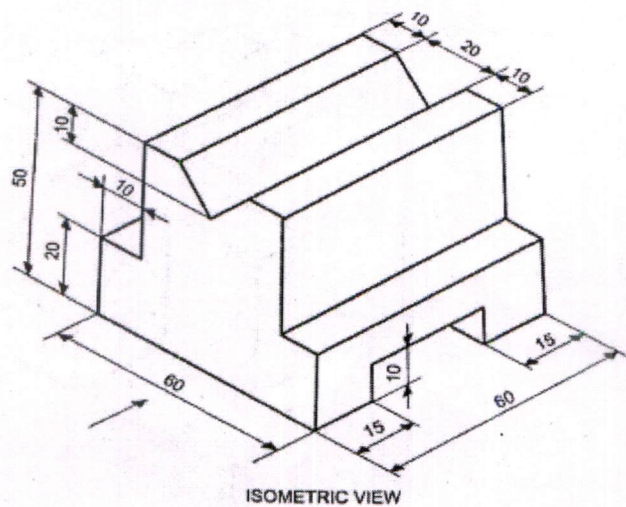


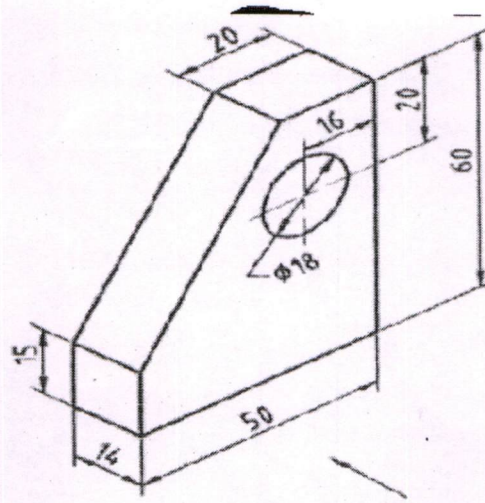
Fig-2

(P.T.O..)

OR

15. B). Draw front view, top view and left side view of Fig-3

10M



ISOMETRIC VIEW

Fig-3

H.T No:

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R18

Course Code: A30011



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech I Semester Supplementary Examinations September-2023

Course Name: **ENGINEERING CHEMISTRY**

(Common for ECE, CSE, IT & CSD)

Date: 12.09.2023 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 is atomic orbital? | 2 M |
| 2. Draw the π – molecular orbital of 1,3 butadiene. | 2 M |
| 3. Write the electrode reactions of calomel when acting as anode as well as cathode? | 2 M |
| 4. What is hot dipping? | 2 M |
| 5. Define bathochromic shift and hypsochromic shift. | 2 M |
| 6. What are fundamental bonding vibrations in IR spectra? | 2 M |
| 7. Write specifications of potable water. | 2 M |
| 8. Differentiate between scale and sludge. | 2 M |
| 9. Define structural isomer? Give an example. | 2 M |
| 10. Show the any two reduction reactions of carbonyl. | 2 M |

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- | | |
|---|-----|
| 11.A). Discuss the molecular orbital energy level diagram of O ₂ molecule. | 10M |
| OR | |
| 11. B). Explain the crystal field splitting of d-orbitals in square planar metal complexes. | 10M |
| 12. A). Discuss any five applications of electrochemical series. | 10M |
| OR | |
| 12. B). Describe the methods of corrosion control by cathodic protection. | 10M |
| 13. A). Explain the electronic transitions takes place in UV-visible spectroscopy. | 10M |
| OR | |
| 13. B). Discuss briefly principle involved in NMR spectroscopy. | 10M |
| 14. A). Explain the steps involved in municipal water treatment. | 10M |
| OR | |
| 14. B). Discuss any two internal conditioning methods of water treatment. | 10M |
| 15. A). Explain the Grignard addition reactions of formaldehyde, acetaldehyde, and acetone. | 10M |
| OR | |
| 15. B). Outline the mechanism of SN ¹ and SN ² with one example each. | 10M |
