H.T No: | | | | | | | | | | | R25

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech I Semester Regular Examinations December-2025**
Course Name : **Matrices and Calculus**
Course Code : **A500001**
Branch : **CE/ ME/ ECE/ CSE**
Date & Session : **29-12-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions

Each question carries TWO marks. **5x2=10M**

1. Find the rank of the Matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 2 \\ 2 & 6 & 5 \end{bmatrix}$ 2 M
2. If 2,3 are the eigen values of matrix A, then find the characteristic equation of the matrix A. 2 M
3. Verify whether Rolle's theorem can be applied to the function $f(x) = \tan x$ in the interval $[0, \pi]$ 2 M
4. Suppose that $w = e^{xy}$, where $x = t^2$, $y = t^2$ then find $\frac{dw}{dt}$ 2 M
5. Evaluate $\int_0^1 \int_0^1 \int_0^1 e^{x+y+z}$ dx dy dz. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

6.A). i) Reduce matrix A into its Echelon form and hence find its rank. 5M

$$A = \begin{bmatrix} 5 & 3 & 14 & 4 \\ 0 & 1 & 2 & 1 \\ 1 & -1 & 2 & 0 \end{bmatrix}$$

ii) Using Gauss Jordan method, find the inverse of the matrix. 5M

$$A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$$

OR

6. B). Investigate the values of λ and μ so that the equations: 10M

$2x + 3y + 5z = 9$
$7x + 3y - 2z = 8$
$2x + 3y + \lambda z = \mu$ we have

a) No solution b) A unique solution c) An infinite number of solutions.

7. A). Verify Cayley-Hamilton theorem for 10M

$$A = \begin{bmatrix} 2 & -1 & 2 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$$ and hence find A^4 and A^{-1}

OR

7. B). Reduce the quadratic form $6x^2 + 3y^2 + 3z^2 - 4xy - 2yz + 4zx$ into canonical form by an orthogonal transformation and find its index, signature and nature. 10M

(P.T.O..)

8. A). i) Verify Rolles theorem for $f(x) = x^3 - 3x + 3$ in [0, 1] 5M

ii) Verify the Cauchy's mean value theorem for the functions $f(x) = \sqrt{x}$ and $g(x) = \frac{1}{\sqrt{x}}$ in [a, b] where $0 < a < b$ 5M

OR

8. B). i) Using Lagrange's mean value theorem, if $(0 < a < b < 1)$ Prove that 5M

$$\frac{b-a}{1+b^2} < (\tan^{-1} b - \tan^{-1} a) < \frac{b-a}{1+a^2}$$

Hence show that $\frac{\pi}{4} + \frac{3}{25} < \tan^{-1}(\frac{4}{3}) < \frac{\pi}{4} + \frac{1}{6}$

ii) Using Taylor series, expand log x in powers of (x-1). 5M

9. A). i) If $x = r\cos\theta$, $y = r\sin\theta$ then find the values of $\frac{\partial(r,\theta)}{\partial(x,y)}$ and $\frac{\partial(x,y)}{\partial(r,\theta)}$ Hence prove 5M

that $\frac{\partial(r,\theta)}{\partial(x,y)} \times \frac{\partial(x,y)}{\partial(r,\theta)} = 1$

ii) If $U = x + y + z$, $y + z = UV$, $z = UVW$ show that $\frac{\partial(x,y,z)}{\partial(U,V,W)} = U^2V$ 5M

OR

9. B). A rectangular box open at the top is to have a volume of 32 cubic ft. Find the dimensions of the box requiring least material for its construction. 10M

10. A). i) Change the order of Integration and hence evaluate $\int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}} xy\, dy\, dx$. 5M

ii) Find the area enclosed by the curves $y = x^2$ and $y^2 = x$ by using double integration. 5M

OR

10. B). Find the maximum volume of the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$ 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech I Semester Regular Examinations December-2025**
Course Name : **Ordinary Differential Equations and Vector Calculus**
Course Code : **A500002**
Branch : **EEE/ CSM/ CSD**
Date & Session : **29-12-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions

Each question carries TWO marks. **5x2=10M**

1. Define Exact differential equation. 2 M
2. Solve the differential equation $(D^3 + 1)y = 0$ 2 M
3. Find the Laplace transforms of $L(sint + cost)^2$ 2 M
4. Find curl of the vector field $xyz\,\bar{\imath} + 3x^2y\,\bar{\jmath} + (xz^2 - y^2z)\bar{k}$ 2 M
5. State Stokes theorem. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

6.A). i) Solve the differential equation 5M

$$\left(1 + e^{x/y}\right)dx + \left(1 - \frac{x}{y}\right)e^{x/y}dy = 0$$

ii) Solve the differential equation $\frac{dy}{dx} - y = y^2(\sin x + \cos x)$ 5M

OR

6. B). Show that the system of confocal conics $\frac{x^2}{a^2+\lambda} + \frac{y^2}{b^2+\lambda} = 1$, where λ is a parameter, is self-orthogonal. 10M

7. A). Solve the differential equation $(D^2 - 2D + 1)y = x^2 + e^{3x} + sin2x$ 10M

OR

7. B). Solve $(D^2 + a^2)y = Tanax$ by the method of variation of parameters. 10M

8. A). i) Evaluate L{t(sinat)} 5M

ii) Evaluate L{t e^{at} sin 3t} 5M

OR

8. B). Using Laplace Transform, solve $\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + 5y = e^{-t}sint$, given that 10M

$y(0) = 0, y'(0) = 1$

9. A). Show that $\nabla^2 r^n = n(n+1)r^{n-2}$ *where* $\bar{r} = x\bar{\imath} + y\bar{\jmath} + z\bar{k}$ *and* $|\bar{r}|^2 = r^2$ 10M

OR

9. B). i) Find the directional derivative of $2x^2 + z^2$ at (1,-1,3) in the direction of $\bar{\imath} + 2\bar{\jmath} + 3\bar{k}$ 5M

ii) Find curl $\bar{f}$ at the point (1, 2,3),given that $\bar{f}$ = grad($x^3y + y^3z + z^3x - x^2y^2z^2$). 5M

(P.T.O..)

10. A). Verify Green's theorem for $\oint((xy + y^2)dx + x^2dy)$, where c is bounded by y=x and $y=x^2$. 10M

OR

10. B). Verify Gauss Divergence theorem for $\bar{F} = (x^2 - yz)\bar{\imath} + (y^2 - zx)\,\bar{\jmath} + (z^2 - xy)\,\bar{k}$ taken over the rectangular parallelepiped bounded by $0 \leq x \leq a$, $0 \leq y \leq b$, $0 \leq z \leq c$. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech I Semester Regular Examinations December-2025**
Course Name : **Applied Chemistry**
Course Code : **A500010**
Branch : **CE/ ME**
Date & Session : **31-12-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions

Each question carries TWO marks. **5x2=10M**

1. Differentiate between temporary and permanent hardness of water. 2 M
2. What is a galvanic cell? Write its cell representation. 2 M
3. Distinguish between HCV and LCV. 2 M
4. What are Biodegradable polymers? Give two examples. 2 M
5. What do you mean by Triple point? Give an example. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

6.A). Describe the process of potable water treatment and disinfection by chlorination. 10M

OR

6. B). Explain the causes and prevention of boiler troubles such as scale and sludge formation. 10M

7. A). i) Discuss the construction and working of SCE. How pH is determined using this electrode? 6M
ii) Write Nernst's equation and its applications. 4M

OR

7. B). i) Discuss the mechanism of oxidation corrosion. 6M
ii) Explain cathodic protection of corrosion control method. 4M

8. A). Discuss about (i) Zn-air battery (ii) Hythane fuel and its applications. 10M

OR

8. B). Illustrate cracking of petroleum. Discuss moving bed catalytic cracking with neat diagram. 10M

9. A). Describe in detail the mechanism of conduction in trans-polyacetylene with a neat diagram and discuss its applications in modern technology. 10M

OR

9. B). i) Differentiate thermoplastics and thermosetting resins. 6M
ii) Classify of polymers based on origin and tacticity with examples. 4M

10. A). i) Write brief note on Setting and hardening of cement. 6M
ii) Explain about Fire point and flash point. 4M

OR

10. B). Discuss Ag-Pb system in detail with neat and labeled phase diagram. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	**B.Tech I Semester Regular Examinations December-2025**
Course Name	:	**Advanced Engineering Physics**
Course Code	:	**A500008**
Branch	:	**EEE/ ECE/ CSE**
Date & Session	:	**31-12-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions

Each question carries TWO marks. **5x2=10M**

1. What are Miller Indices. Calculate the Miller Indices of a plane whose intercepts along the X,Y,Z axes are 4a, 2b, 2c. 2 M
2. Derive the expression for de-Broglie wavelength of an electron in terms of accelerating potential. 2 M
3. Compare superposition and entanglement. 2 M
4. Define the terms: polarizability, polarization vector. 2 M
5. Explain why population inversion is not possible in two level system. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

6.A). i) Define packing fraction. Show that FCC structure has highest closed packed structure by calculating packing fraction of SC and BCC crystal structures. 7M
ii) Explain the concept of Surface to Volume ratio. 3M

OR

6. B). i) Describe the working principle and block diagram of Scanning Electron Microscopy. 8M
ii) Explain point defects and line defects in crystals with examples. 2M

7. A). i) Derive the expression for Schrodinger Time Independent wave equation. 8M
ii) Distinguish between direct and indirect band gap semiconductors. 2M

OR

7. B). i) Explain the construction and working of Solar cell. Draw and explain V-I characteristics of solar cell. 6M
ii) An electron confined to a 1D potential box of length $2A^0$. Calculate the energies corresponding to first, second and third quantum states. 4M

8. A). i) Discuss the Bloch sphere as an analytical tool for visualizing qubit states. 8M
ii) Discuss Dirac's bra and ket notation and its properties with examples. 2M

OR

8. B). i). Explain the difference between classical and quantum bits in terms of information representation. 6M
ii) Explain any four quantum gates with their truth tables. 4M

(P.T.O..)

9. A). i) What is hysteresis? Illustrate the hysteresis behavior of ferromagnetic materials on the basis of domain theory and draw the important conclusions from the curve. 8M

ii) Distinguish between hard and soft magnetic materials. 2M

OR

9. B). i) Write a short note on Piezo-electric, Pyro electric and Ferro electric materials with their applications. 8M

ii) If the atomic radii of Na, Mg are1.9, 1.45 Angstroms respectively. Determine their electronic polarizabilities. 2M

10. A). Describe in detail the construction and working of CO_2 laser with neat energy level diagram. 10M

OR

10. B). i) What do you mean by the term acceptance angle? Derive an expression for acceptance angle and numerical aperture of an optical fiber. 7M

ii) A semiconductor diode laser has peak emission wavelength at 1.55 μm. Find its band gap in eV. 3M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination	:	**B.Tech I Semester Regular Examinations December-2025**		
Course Name	:	**Engineering Chemistry**		
Course Code	:	**A500009**		
Branch	:	**CSM/ CSD**		
Date & Session	:	**31-12-2025 AN**	**Duration: 3 hours**	**Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions

Each question carries TWO marks. **5x2=10M**

1. Define Scales and Sludges in boiler feed water. 2 M
2. Calculate the EMF of the cell Ni | Ni^{+2} (1 M) || Pb^{+2} (1 M) | Pb at 25^0C. The standard electrode potentials of nickel and lead are -0.24 V and -0.13 V, respectively. 2 M
3. Classify batteries and give suitable examples. 2 M
4. Name two applications of Buna-S rubber. 2 M
5. What is shape-memory alloys? 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

6.A). Explain the principle and discuss the estimation of the hardness of water by the complexometric method. 10M

OR

6. B). Explain in detail the ion-exchange method, with a neat, labelled diagram. 10M

7. A). Discuss the construction and working of the calomel electrode with a neat, labelled diagram and how do you determine the pH of a given solution using calomel electrode. 10M

OR

7. B). i) Using the rusting of iron as an example, explain the mechanism of electrochemical corrosion. 5M

ii) Explain the factors affecting the rate of corrosion. 5M

8. A). Construct and explain the working of the Zn-air battery, along with its advantages and disadvantages. 10M

OR

8. B). i) Illustrate the synthesis of petrol by the Fischer–Tropsch method with a neat, labelled diagram. 5M

ii) Write short note on CNG and LPG give its applications. 5M

9. A). Outline the free radical addition polymerization mechanism with an example. 10M

OR

9. B). i) Describe the method of Nylon 6,6 preparation and give its applications. 5M

ii) State the importance of polylactic acid and mention its applications. 5M

10. A). Analyse the working of the amperometric glucose monitor sensor. 10M

OR

10. B). Explain how Raman spectroscopy is applied to detect tumours in medicine. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	**B.Tech I Semester Regular Examinations January-2026**
Course Name	:	**Engineering Mechanics**
Course Code	:	**A503202**
Branch	:	**CE/ ME**
Date & Session	:	**02-01-2026 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions

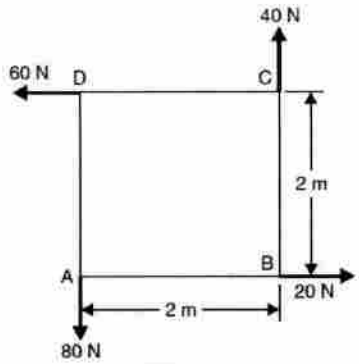
Each question carries TWO marks. **5x2=10M**

1. State the Varignon's principle. 2 M
2. Define radius of gyration. 2 M
3. Derive an expression for the centre of gravity of a plane area using method of moments. 2 M
4. State the principle of work and energy. 2 M
5. Define power and its relation to work and velocity. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

6.A). Four forces of magnitudes 20 N, 40 N, 60 N and 80 N are acting respectively along the four sides of a square ABCD as shown in Fig. Determine the resultant moment about point A. Each side of square is 2 m. 10M



OR

6. B). Three concurrent forces act on a body: 10M

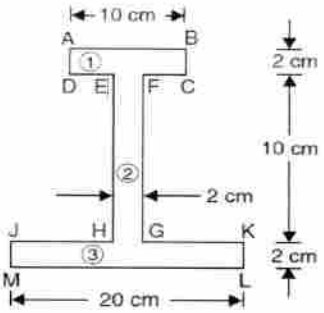
$F_1 = 100N$ at 30°, $F_2 = 150N$ at 120°, and $F_3 = 200N$ at 240° with positive X-axis

a) Determine the resultant of the system.

b) Find the magnitude and direction of a force required to keep the body in equilibrium.

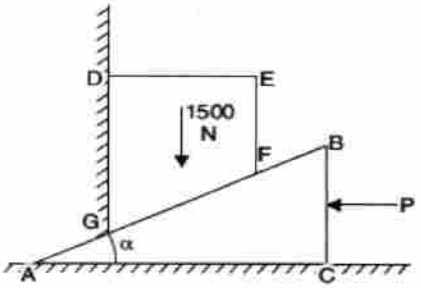
(P.T.O..)

7. A). Find the centre of gravity of the I-section shown in Fig. 10M



OR

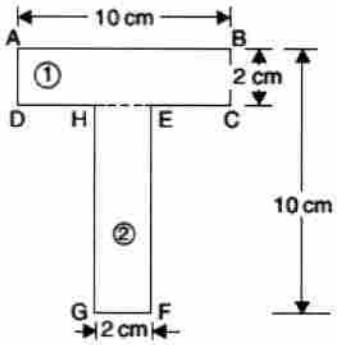
7. B). A block over lying a 10° wedge on a horizontal floor and leaning against a vertical wall and weighing 1500 N is to be raised by applying a horizontal force to the wedge. Assuming co-efficient of friction between all the surfaces in contact to be 0.3, determine the minimum horizontal force to be applied to raise the block. 10M



8. A). Derive Moment of Inertia of a Circular Section and hollow circular section. 10M

OR

8. B). A T-section of dimensions 10 × 10 × 2 cm. Determine the moment of inertia of the section about the horizontal and vertical axes, passing through the centre of gravity of the section. Also find the polar moment of inertia of the given T-section. 10M



9. A). i) A particle moves along a straight line with an acceleration $a = 2t + 3 m/s^2$. If its velocity is 5 m/s at $t = 0$, find the velocity and displacement at $t = 4s$. 5M

ii) Derive the expressions for velocity and acceleration of a particle in rectangular coordinates. 5M

OR

9. B). i) Derive the work–energy equation for a particle moving under a system of forces. 5M

ii) Two smooth spheres of masses 2 kg and 4 kg collide directly. The velocity of the lighter sphere before impact is 6 m/s, and the heavier one is at rest. If the coefficient of restitution $e = 0.5$, find their velocities after impact. 5M

(P.T.O..)

10. A). Derive the expression for work-energy principle for a rigid body in plane motion. 10M

OR

10. B). i) A uniform rod of length 1.5 m and weight 50 N is pivoted at one end and released from rest in the vertical position. Using work-energy principle, find the angular velocity when it passes through the horizontal position. 5M

ii) Two blocks of masses 8 kg and 5 kg are connected by a light string passing over a smooth pulley. Using D'Alembert's principle, find the acceleration of the system and the tension in the string. 5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech I Semester Regular Examinations January-2026**
Course Name : **English for Skill Enhancement**
Course Code : **A500101**
Branch : **EEE/ ECE/ CSM**
Date & Session : **02-01-2026 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions

Each question carries TWO marks. **5x2=10M**

1. Define prefixes and suffixes with one example each. 2 M
2. Distinguish between homophones and homographs with examples. 2 M
3. Mention any two ways to make an E-mail more formal and professional. 2 M
4. What is meant by redundancy in writing? Give one example. 2 M
5. Write two essential characteristics of a technical report. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

6.A). Discuss the causes and effects of the generation gap as explained by Benjamin M. Spock in "The Generation Gap." How does he suggest overcoming this issue between parents and children? 10M

OR

6. B). i) What are skimming and scanning? Illustrate how these techniques can enhance a reader's speed and comprehension. 5M

ii) Identify and correct the common errors in the following sentences: 5M

a) He is good in playing football.
b) The news are very shocking.
c) She is junior than me.
d) I prefer coffee than tea.
e) Each of the students have completed their work.

Explain the grammar principles behind your corrections.

7. A). Explain the key ideas presented in "Emerging Technologies." How does technology impact modern communication and daily life? 10M

OR

7. B). Describe the various types of paragraphs and explain how coherence and unity are maintained in paragraph writing. 10M

8. A). Compare and contrast the themes of "Leisure" and "Be Thankful." How do both poems promote mindfulness and appreciation of life? 10M

OR

8. B). Write a formal letter to a company applying for the position of Customer Support Executive. Include subject, format, and tone appropriately. 10M

(P.T.O..)

9. A). "Customer validation is crucial for business success." Discuss this statement with reference to Pranav Jain's "Why a Start-Up Needs to Find its Customers First." 10M

OR

9. B). i) Convert the following sentences from active voice to passive voice: 5M
   a) People speak English all over the world.
   b) The company will launch a new product soon.
   c) Someone has stolen my bag.
   d) She is painting a beautiful picture.
   e) They are repairing the bridge.

   ii) What are one-word substitutes? Give two examples. 5M

10. A). Explain how the lesson "Professional Ethics" guides young professionals to face moral dilemmas at work. Provide examples of ethical decision-making. 10M

OR

10. B). Write a technical report on "The Impact of Social Media on Students' Communication. Skills." Include introduction, analysis, findings, and suggestions. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech I Semester Regular Examinations January-2026**
Course Name : **Basic Electrical Engineering**
Course Code : **A502202**
Branch : **CSE/ CSD**
Date & Session : **02-01-2026 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions

Each question carries TWO marks. **5x2=10M**

1. State Norton's theorem. 2 M
2. Define power factor and write the power factor at resonance condition. 2 M
3. Why the copper losses are more in a transformer? 2 M
4. Write the merits and demerits of slip-ring induction motor. 2 M
5. What do you mean by switch fuse unit? 2 M

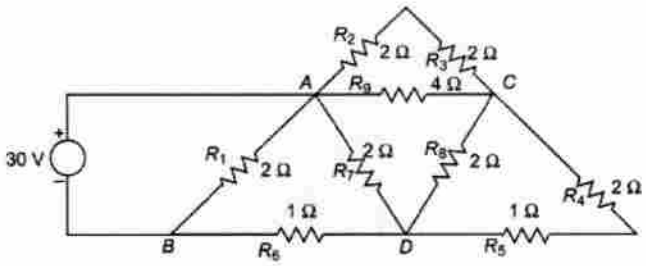
PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

6.A). Explain Thevenin's Theorem. Illustrate the theorem with a suitable example. 10M

OR

6. B). Determine the current delivered by the source in the circuit shown in Fig. 10M



7. A). Derive the relation between line and phase quantities of voltage and current for a delta system. 10M

OR

7. B). A 230 V, 50 Hz A.C. supply is applied to a coil of 0.06 H inductance and 2.5Ω resistance connected in series with a 6·8 μF capacitor. Calculate (i) impedance (ii) current (iii) phase angle between current and voltage (iv) power factor and (v) power consumed. 10M

8. A). Explain the construction and principle of operation of single-phase transformer 10M

OR

8. B). i) Describe the principle of operation of auto transformer, what is the saving of copper in this transformer when compared with two winding transformer? 5M
ii) Discuss the various three phase transformer groups and their significance. 5M

(P.T.O..)

9. A).	Explain the construction and principle of operation of DC Generator.	10M
	OR	
9. B).	Describe the construction and working principle of 3-Phase induction Motor.	10M
10. A).	i) Describe the operation of ELCB with its schematic diagram.	5M
	ii) What are the drawbacks of low power factor, describe how it is improved?	5M
	OR	
10. B).	i) Give applications of the primary and secondary batteries.	5M
	ii) What are the advantages of earthing?	5M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
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Examination : **B.Tech I Semester Regular Examinations January-2026**
Course Name : **C Programming and Data Structures**
Course Code : **A505203**
Branch : **CE / ME**
Date & Session : **05-01-2026 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions

Each question carries TWO marks. **5x2=10M**

1. Define an algorithm and list its key characteristics. 2 M
2. Differentiate between while and do-while loops with syntax. 2 M
3. What is a pointer? Give an Example. 2 M
4. Write any two string handling functions in C. 2 M
5. Define stack and list any two stack operations. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

6.A). Explain the use of flowchart symbols and draw flowchart for finding the largest of three numbers. 10M

OR

6. B). Write a C Program using arithmetic expressions and precedence rules to compute the area and perimeter of a rectangle. 10M

7. A). Describe the working of for loop with suitable flowchart and C code examples. 10M

OR

7. B). Write a C program to check whether a given number is a palindrome using functions and control statements. 10M

8. A). Elucidate the concept of two-dimensional arrays and write a C program to perform matrix addition. 10M

OR

8. B). Discuss pointer arithmetic and demonstrate pointer-to-pointer usage with a C example. 10M

9. A). Define structures and explain how to pass a structure to a function with an example. 10M

OR

9. B). Write a C program to read and display student information using arrays of structures. 10M

10. A). Illustrate linked list representation and write algorithms for insertion and deletion in a singly linked list. 10M

OR

10. B). Write and explain the C program to perform Bubble Sort with an example. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech I Semester Regular Examinations January-2026**
Course Name : **Programming for Problem Solving**
Course Code : **A505201**
Branch : **EEE/ ECE/ CSE/ CSM/ CSD**
Date & Session : **05-01-2026 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions

Each question carries TWO marks. **5x2=10M**

1. List the properties of good Algorithms. 2 M
2. Define exit and return statements. 2 M
3. What do you mean by pointer to pointer? 2 M
4. Compare Structure and Union. 2 M
5. Write the syntax of Command Line Arguments. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

6.A). i) Define Identifier. Outline the rules to construct identifier. Provide five examples each of valid and invalid identifiers. 5M
ii) Build a program to determine if a given year is a leap year. 5M

OR

6. B). i) What is flowchart? Illustrate various symbols used for flowchart with neat sketch. 5M
ii) Explain formatted input and output statements with examples. 5M

7. A). i) Compare and contrast Entry-controlled loop and an Exit-controlled loop. 5M
ii) Design a program to print prime numbers Between 1 to 25. 5M

OR

7. B). i) Illustrate the concept of recursion with an example program to calculate the factorial of a number. 5M
ii) Show how break and continue statements are used in a C program with example. 5M

8. A). i) Identify and explain the dynamic memory allocation functions available in the C language. 5M
ii) How to use pointers as arguments in a function explain with a program. 5M

OR

8. B). i) Discuss the declaration and initialization of one dimensional and two-dimensional array with an example. 5M
ii) Explain in detail how to access a one-dimensional array using pointers with an example program. 5M

(P.T.O..)

9. A). i) Define a Self-referential structure. Explain how it is used to build a singly linked list. 5M

ii) Develop a program to check whether a string is palindrome or not. 5M

OR

9. B). i) With the help of syntax and example program explain any five string handling functions. 5M

ii) Define a structure type **book**, which would contain book name, author, pages and price. Construct a program to read this data using member operator and display the same. 5M

10. A). i) List and explain the various differences between text and binary file. 5M

ii) Trace the successful search for 23 and the unsuccessful search for 18 in the array using binary search for the following numbers: 4, 8, 15, 16, 23, 42, 50. 5M

OR

10. B). Explain the Bubble sort technique and write the algorithm to implement the bubble sort. 10M

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H.T No: | | | | | | | | | | | R25

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	**B.Tech I Semester Regular Examinations January-2026**		
Course Name	:	**Engineering Graphics**		
Course Code	:	**A503201**		
Branch	:	**CE/ ME**		
Date & Session	:	**07-01-2026 AN**	**Duration: 3 hours**	**Max. Marks: 60**

(Note: Assume suitable data if necessary)

Answer the following questions
Each question carries TWELVE marks. **5x12=60M**

1.A). Draw an ellipse when the distance of the focus from the directrix = 60 mm and the eccentricity = 2/3. Locate the vertices, length of the major and minor axes. Also draw the tangent and the normal. 12M

OR

1.B). Draw an epicycloid generated by a rolling circle of radius 25 mm on the outside of a fixed circle of radius 75 mm. Draw the tangent and normal to the curve at any point on it. 12M

2.A). A line PQ, 60 mm long, has its end P in HP and 20 mm in front of VP. The line is inclined at 30° to HP and 45° to VP. Draw its projections and determine its true length. 12M

OR

2.B). A circular lamina of 60 mm diameter rests on HP with one point on its circumference. The surface is inclined at 45° to HP and its top view makes 30° with VP. Draw its projections. 12M

3.A). Draw the projections of hexagonal pyramid of base 25 mm and height 60 mm when one of its triangular faces lies on HP, and its base edge is at right angle to the VP and the axis of the pyramid is parallel to VP. 12M

OR

3.B). A cube of 50 mm long edges is so placed on HP on one corner that a body diagonal is Parallel to HP and perpendicular to VP. Draw it's projections. 12M

4.A). A square prism, base side 40 mm, axis 80 mm long has its base on the H.P. and its faces equally inclined to the V.P. It is cut by a plane, perpendicular to the V.P., inclined at 60^0 to the H.P. and passing through a point on the axis, 55 mm above the H.P. Draw its front view, sectional top view and auxiliary top view. 12M

OR

4.B). A cylinder of base diameter 50 mm and axis length 60 mm is resting on HP on its base, cut by a plane inclined at 55^0 to HP and perpendicular to VP. The cutting plane is passing through a point on the axis at a distance 30mm from the top end. Draw the development of the lateral surface of the remaining portion of the cylinder. 12M

(P.T.O..)

5.A). A sphere of radius 20 mm is kept on the top face of a square prism of side of base 40 mm and height 20 mm. The latter is placed on the top face of a cylinder of 65 mm diameter and 25 mm height. All the three solids have the common axis. Draw the isometric projection of combination of solids. 12M

OR

5.B). Draw the i) Front view, ii) Side view from the left and iii) Top view as shown in figure 1. All dimensions are in mm. 12M

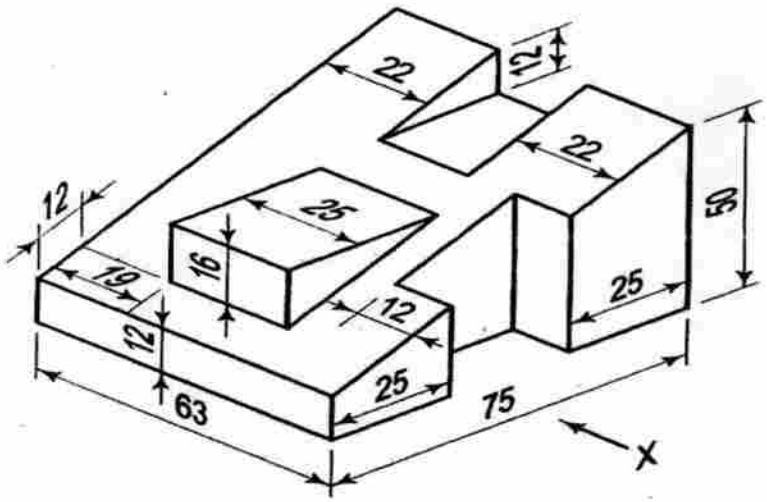

Fig.1

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H.T No: | | | | | | | | | | | R25

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination	:	**B.Tech I Semester Regular Examinations January-2026**
Course Name	:	**Electrical Circuits-I**
Course Code	:	**A502201**
Branch	:	**EEE**
Date & Session	:	**07-01-2026 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions

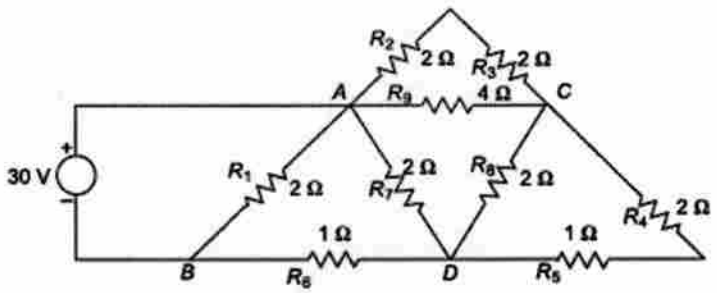
Each question carries TWO marks. **5x2=10M**

1. What are active and passive elements? Give examples. 2 M
2. Find the RMS value of a sinusoidal waveform of current at peak value 10 A. 2 M
3. Write the advantages of three phase over single phase system. 2 M
4. Write the statement of compensation Theorem. 2 M
5. Define self-inductance and mutual inductance. 2 M

PART-B

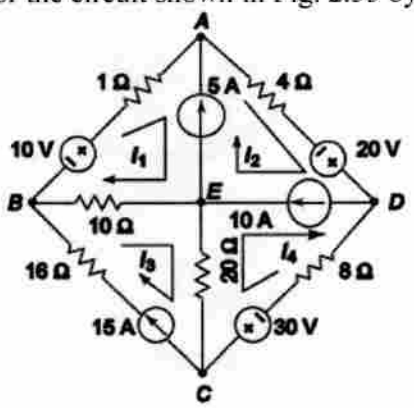
Answer the following. Each question carries TEN Marks. **5x10=50M**

6.A). Find the Current flowing through each resistor for the circuit as shown in Fig. 10M



OR

6. B). Determine the loop currents for the circuit shown in Fig. 2.55 by using mesh analysis. 10M

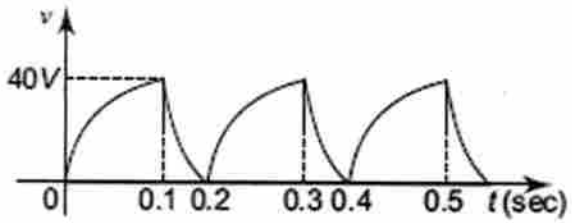


(P.T.O..)

7. A). Derive the Expressions for Bandwidth and Quality factor for Series Resonance 10M

OR

7. B). Find the Average, RMS, form factor and peak factor of the waveform shown below. 10M

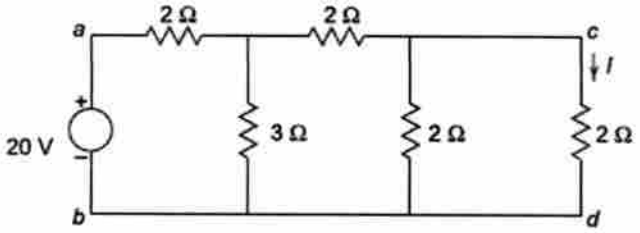


8. A). A 3 phase 400 V, 4 wire system has a star connected load with zA =(10 + j0) Ω, zB = (15 + j10) Ω, zC = (0 + 5j) Ω. Find the line currents and current through neutral conductor. Draw the phasor diagram. 10M

OR

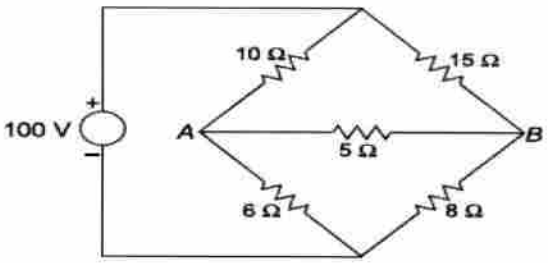
8. B). Derive the relationship between line and phase voltages in a balanced three phase delta connected load. 10M

9. A). Verify the Reciprocity Theorem for the Circuit as shown in fig. 10M.



OR

9. B). Use Thevenin's theorem to find the current in 5 Ω resistor as shown in fig. 10M



10. A). Explain the Importance of Dot Convention and derive expression for Coefficient of Coupling. 10M

OR

10. B). Two inductively coupled coils have self-inductances L_1 = 50 mH and L_2 = 200 mH. If the coefficient of coupling is 0.7 (i), find the value of mutual inductance between the coils, and (ii) what is the maximum possible mutual inductance? 10M

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H.T No: | | | | | | | | | | | R25

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **B.Tech I Semester Regular Examinations January-2026**
Course Name : **Electronic Devices and Circuits**
Course Code : **A504201**
Branch : **CSM/ CSD**
Date & Session : **07-01-2026 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all FIVE questions

Each question carries TWO marks. **5x2=10M**

1. Explain how the reverse saturation current of a PN diode varies with temperature. 2 M
2. Why is a bipolar junction transistor (BJT) called a current-controlled device? 2 M
3. Analyze the phenomenon of thermal runaway in a transistor and explain how it can be prevented. 2 M
4. Compare input impedance and voltage gain of CE and CC amplifiers. 2 M
5. Define pinch-off voltage of a JFET and write its mathematical expression. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

6.A). Explain the construction, operation and characteristics of PN junction diode. Also list its Advantages, disadvantages and its applications. 10M

OR

6. B). Draw and explain the circuit diagram of half wave rectifier with capacitor filter and derive the ripple factor expression. 10M

7. A). Explain the input and output characteristics of NPN transistor in Common Base configuration. 10M

OR

7. B). i) Compare the performance of transistor in different configurations. 5M
ii) Define α, β, γ of a transistor and derive the relationship between them. 5M

8. A). Explain the selection of Q point for a transistor bias circuit and discuss the limitations on the output voltage swing. 10M

OR

8. B). Draw a self bias circuit using BJT and derive an expression for the stability factor. 10M

9. A). Describe the analysis of transistor amplifier circuit using h-parameters. 10M

OR

9. B). Explain the hybrid small signal model for common collector configuration. 10M

10. A). Explain the construction and operation of N-channel JFET with neat sketches and characteristics curve. 10M

OR

10. B). Explain the constructional features of a depletion mode and Enhancement mode P-channel MOSFET and explain its basic operation with the help of characteristics curves. 10M

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