(Note: Assume suitable data if necessary)
PART-A
Answer all TEN questions (Compulsory)
Each question carries TWO marks.   10x2=20M

1. Solve $y = a\sqrt{(1 + p^2)}$ 2 M
2. State law of natural growth or decay.   2 M
3. Solve $(D^2 + 4)y = sin2x$ 2 M
4. Find the wronskian of two functions $sinx$ and $cosx$ 2 M
5. Evaluate $\int_1^2 \int_0^x y^2 \, dxdy$.   2 M
6. Sketch the region of integration for $\int_0^a \int_0^{\sqrt{a^2-x^2}} f(x,y) \, dxdy$.   2 M
7. If $\bar{a}$ is constant vector then find the grad $(a \cdot \bar{r})$ 2 M
8. Find the greatest value of the directional derivative of the function $\emptyset = x^2yz^3$ at (2,1,-1)   2 M
9. State Gauss divergence theorem.   2 M
10. Evaluate $\int_c F \cdot dr$ where $\bar{F} = x^2y^2 i + yj$ and the curve $y^2 = x$ in the xy-plane from (0, 0) to   2 M
    (4, 4)

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). i) Solve $(x + 2y^3)\frac{dy}{dx} = y$.   5M
       ii) Solve $p^2 - p - 6 = 0$ where p=dy/dx   5M

OR

11.B). Uranium disintegrates at a rate proportional to the amount present at any instant. If   10M
       M_1 and M_2 are grams of uranium that are present at times T_1 and T_2 respectively, find
       the half-life of uranium.

12.A). Solve $\left(x^3 \frac{d^3y}{dx^3} + 3x^2 \frac{d^2y}{dx^2} + x\frac{dy}{dx} + 8y\right) = 65 \, cos(logx)$ 10M

OR

12.B). Solve $(D^2 + 1)y = sec$x by the method of variation of parameters   10M

13.A). By changing into polar coordinates, evaluate $\iint \frac{x^2y^2}{x^2+y^2} \, dxdy$ over the annular region   10M
       between the circles $x^2 + y^2 = a^2$ and $x^2 + y^2 = b^2$

OR

13.B). Change the order of integration in$\int_0^a \int_{\frac{x^2}{a}}^{2a-x} x \, y^2 \, dxdy$ and hence evaluate the same   10M

14.A). i) Find the value of a and b so that the surfaces $ax^2 - byz = (a + 2)x$ and   5M
       $4x^2y + z^3 = 4$ may intersect orthogonally at the point(1, −1,2).   5M
       ii) Find curlF at the point (1,2,3) given that $F =$ grad $(x^3y + y^3z + z^3x - x^2y^2z^2)$.

(P.T.O..)

OR

14. B). Find constants a, b, c so that the vectors $\bar{A} = (x + 2y + az)\bar{\imath} + (bx - 3y - z)\bar{\jmath} + (4x + cy + 2z)\bar{k}$ is irrotational. Also find ϕ such that $\bar{A} = \nabla\phi$.   10M

15. A). Verify green's theorem in the plane for $\oint (x^2 - xy^3)dx + (y^2 - 2xy)dy$ where" is the square with vertices $(0,0), (2,0), (2,2)$ and $(0,2)$.   10M

OR

15. B). If $\bar{F} = (2x^2 - 3z)i - 2xyj - 4xk$ then evaluate and $\int_v (\nabla X \bar{F})\, dv$ where 'v' is the closed region bounded by $x = 0, y = 0, z = 0, 2x + 2y + z = 4$.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations July/August-2024
Course Name: Engineering Chemistry
(Common for CE, EEE, ME, CSC, CSM, AID & AIM)

Date: 18.07.2024 FN   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. Predict the magnetic nature and bond order of O2 Molecule.   2 M
2. Define the term ligand in complex compound.   2 M
3. State the Nernst equation and their significances.   2 M
4. A pure metal rod half –immersed vertically in water starts corroding at the bottom. Give the reason.   2 M
5. Why does 1,3-Butadiene possess at higher wavelength maximum value than that of ethane?   2 M
6. List out any four applications of IR spectroscopy.   2 M
7. If 50 mL of a sample of hard water consumed 15mL of 0.01M EDTA. What is the hardness of water?   2 M
8. Enumerate the characteristics of priming and foaming in boilers.   2 M
9. Define diastereomers with one example.   2 M
10. Tell the products produced for the reduction of carbonyl compounds in the presence of $LiAlH_4$. Give one example.   2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Analyze the bonding nature of N_2 molecule and predict the magnetic nature of molecule.   10M

OR

11. B). Describe the crystal field splitting of d-orbital's in octa hedral complexes.   10M

12. A). Explain the construction and working of Li-ion battery as a storage battery in mobile phones.   10M

OR

12. B). Compare the galvanizing and tinning methods to control the corrosion on iron metal surface.   10M

13. A). Explain the possible electronic transitions of a molecule by the absorption of UV-visible radiation.   10M

OR

13. B). Define infrared spectroscopy. Describe the various molecular vibrations in the technique.   10M

14. A). What are the prime reasons for the boiler corrosion and caustic embrittlement? Explain in detail.   10M

(P.T.O..)

OR

14. B). Where does the water come from your home? Give a natural water source. Discuss the   10M
treatment of that water for domestic supply.

15. A). Describe conformational isomers of n-butane.   10M

OR

15. B). Explain markownikoff's rule and anti markownikoff's rule with an example for each   10M
including mechanism.

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations July/August-2024

Course Name: Applied Physics

(Common for ECE, CSE, IT & CSD)

Date: 18.07.2024 FN	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 factors which lead de-Broglie to propose matter waves?	2 M
2.	Estimate Fermi energy.	2 M
3.	Define drift and diffusion current.	2 M
4.	Differentiate intrinsic and extrinsic semiconductors.	2 M
5.	Explain the difference LED and PIN Diode.	2 M
6.	How the junction forms in p-n diode?	2 M
7.	Mention the parts of an optical fibre.	2 M
8.	List any two applications of laser in engineering and technology.	2 M
9.	Define magnetic permeability and susceptibility.	2 M
10.	What are the different types of polarizations?	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A).	i) Write the physical significance of wave function.	2M
	ii) Derive the Schrodinger's time independent wave equation for the motion of a particle.	8M

OR

11. B).	i) Differentiate classical and quantum statistics.	4M
	ii) Compare Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics	6M

12. A).	With the help of energy level diagrams explain insulators, semiconductors and conductors.	10M

OR

12. B).	What is n-type semiconductor? Derive an expression for carrier concentration in n-type semiconductors.	10M

13. A).	Discuss the working principle and applications of solar cell.	10M

OR

13. B).	Explain breakdown mechanism and characteristics of Zener diode.	10M

14. A).	Describe the construction of Ruby laser with neat diagram. Explain its working with an ELD.	10M

OR

14. B).	i) What are the types of power losses in optical fibres? Explain.	6M
	ii) Describe the different types of optical fibres by giving the refractive index profiles.	4M

(P.T.O..)

15. A). i) Explain their behaviour of diamagnetic, paramagnetic and ferromagnetic materials.   4M

ii) Derive Claussius-Mossotti relation.   6M

OR

15. B). i) What are hard and soft magnetic materials? Give their properties and applications.   6M

ii) Write a short note on BCS theory of superconductors.   4M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations July/August-2024
Course Name: Programming for Problem Solving
(Common for CE & ME)

Date: 20.07.2024 FN | 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 Algorithm. What are the characteristics of an algorithm?	2 M
2.	Differentiate precedence and associativity.	2 M
3.	Define an array. Give the syntax for declaring one dimensional array with example	2 M
4.	How entry controlled loop is different from exit controlled loop	2 M
5.	What is the scope and lifetime of a variable?	2 M
6.	Mention the advantages of functions.	2 M
7.	Define self-referential structure.	2 M
8.	List and give syntax of dynamic memory allocation functions	2 M
9.	Differentiate text and binary files.	2 M
10.	What are command line arguments?	2 M

PART-B
Answer the following. Each question carries TEN Marks. | 5x10=50M

11.A).	i) Explain about basic data types in C.	5M
	ii) Explain about formatted input and output functions with suitable example.	5M

OR

11. B).	Explain about operators in C with examples.	10M

12. A).	i) Explain switch case with suitable example.	6M
	ii) Compare and contrast break and continue with example.	4M

OR

12. B).	i) Develop a C program to print reverse of a digit	5M
	ii) Explain about multidimensional array with example.	5M

13. A).	Explain about string handling functions with examples.	10M

OR

13. B).	i) What is recursion? What are the limitations of recursion?	5M
	ii) Explain about storage classes with examples.	5M

14. A).	i) Give a detailed noted on pointers	5M
	ii) Define a structure. Write a code to read the values in to the structure.	5M

OR

14. B).	i) Explain array of pointers.	5M
	ii) Write a short notes on enumerated data types.	5M

15. A).	i) Write a program to implement Bubble sort.	10M
	ii) Explain about opening, reading, writing and closing data to a file.	

OR

15. B).	Discuss in detail about random access files with examples.	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations July/August-2024
Course Name: Data Structures & Algorithms
(Common for EEE, ECE, CSE, IT, CSC, CSM, CSD, AID & AIM)

Date: 20.07.2024 FN	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 ADT? Mention the features of ADT.	2 M
2.	Differentiate Between doubly and circular linked lists.	2 M
3.	Write the underflow and overflow conditions of stack.	2 M
4.	List the applications of queue.	2 M
5.	Define Threaded Binary Tree with suitable Example.	2 M
6.	What is Balanced tree? Name the rotations used in AVL Trees.	2 M
7.	Differentiate Directed and Undirected graph with examples.	2 M
8.	Define Hashing and write the advantages of hashing.	2 M
9.	Give the time complexities for quick sort and Merge sort.	2 M
10.	What is pattern matching? Label any two algorithms for pattern matching.	2 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A).	Why do we need data structures? Write the operations performed on data structures. Differentiate Linear and Nonlinear Data structures.	10M

OR

11. B).	Explain How to create Circular linked list and insert nodes at end?	10M
12. A).	Define Stack ADT ? Explain and implement stack operations with examples.	10M

OR

12. B).	Discuss ADT of a queue with an example. Implement queue using arrays.	10M
13. A).	List the types of Binary Search Tree. Explain insertion and deletion operation on binary search tree with Example.	10M

OR

13. B).	Create AVL Tree by inserting the values from 1-10.	10M
14. A).	Demonstrate Matrix and Linked list representation of a graph. Also give the Applications of Graphs.	10M

OR

14. B).	Demonstrate the two basic techniques for collision resolution in hashing.	10M
15. A).	Sort the following list of elements by using Quick sort. 15,28,46,10,35,54,5,17	10M

OR

15. B).	Describe the main idea behind the KMP algorithm. How does it improve upon the brute force string matching algorithm	10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations July/August-2024

Course Name: Engineering Drawing

(Common for ECE, CSE, IT & CSD)

Date: 23.07.2024 FN   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. What is the significance of Engineering Drawing in manufacture?   1 M
2. Define conic section.   1 M
3. What are advantages of orthographic projection?   1 M
4. What is the principle of Third angle projection?   1 M
5. Define a solid.   1 M
6. What are the types of Solids?   1 M
7. What is an isometric view?   1 M
8. What is an isometric projection?   1 M
9. Draw the isometric view of a square in top view.   1 M
10. How many views are drawn in Orthographic projection to represent the three dimensions of an object?   1 M

PART-B
Answer the following. Each question carries TEN Marks.   5x10=50M

11.A). Construct an ellipse with distance of focus from the directrix being 75 mm and eccentricity 2/3. Draw the tangent and normal to the curve at a distance of 45mm from directrix.   10M

OR

11. B). Construct a hyperbola with the distance of the focus from directrix being 50mm and e=3/2. Draw the tangent and normal to the curve at any point.   10M

12. A). A line AB of 70mm length has its end 'A' at 10mm above H.P and 20mm in front of V.P. Its front view and top view measure 50mm and 60mm respectively. Draw the projections of the line and determine its inclinations with H.P and V.P.   10M

OR

12. B). A regular pentagonal plane of 40mm side has a corner at 20mm from V.P and 50mm from H.P. Its surface makes an angle of 45° to V.P and perpendicular to H.P. Draw the projections of the plane.   10M

13. A). Draw the projections of a pentagonal prism of base 25mm side and axis 60mm long, when its resting on one of its corners of the base on H.P. The axis of the solid is inclined at 45° to H.P.   10M

OR

13. B). Draw the projections of pentagonal pyramid with side of base 25mm and axis 60mm long which is resting with a slant face on H.P such that, the axis is parallel to V.P.   10M
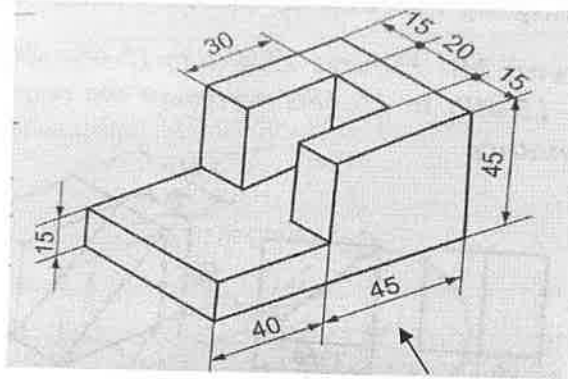
(P.T.O..)

14. A). Draw the isometric view of a hexagonal prism with side of base 20mm and length of axis   10M
60mm when its axis is (i) vertical and   (ii) horizontal.
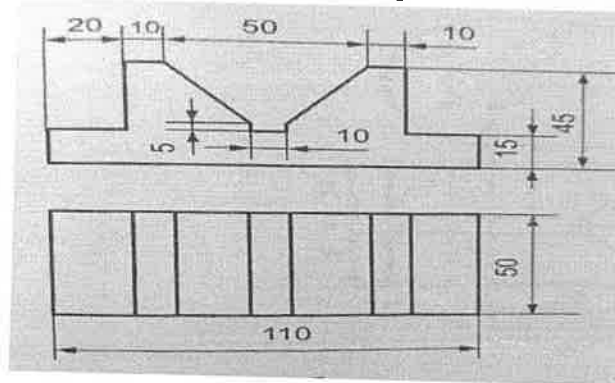
OR

14. B). Draw the isometric view of a cylinder of base diameter 30mm and axis 50mm long.   10M

15. A). Draw the i) front view ii) top view and iii) side view of the below figure.   10M

OR

15. B). Draw the isometric view of the two views of a component shown below.   10M

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