H.T No: | | | | | | | | | | | R18 | Course Code: A30005

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech II Semester Supplementary Examinations January-2025

Course Name: ODEs and Multivariable Calculus

(Common for All)

Date: 24.01.2025 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1. State Newton's Law of Cooling. 2 M
2. Solve p = sin(y-xp) 2 M
3. Find the Complimentary Function of $(D^2 + 5D + 4)y = x^2$ 2 M
4. Find the Particular Integral of $(D^2 + 1)y = e^x + sinx$ 2 M
5. Evaluate $\int_0^5 \int_0^{x^2} x\, dydx$ 2 M
6. Evaluate $\int_0^1 \int_1^2 \int_2^3 xyz\, dxdydz$ 2 M
7. Find $div\, \overline{A}$ at (1,-1,1) if $\overline{A} = x^2z\overline{i} + xy\overline{j} - yz^2\overline{k}$ 2 M
8. Find $curl\, \overline{f}$ where $\overline{f} = grad(x^3 + y^3 + z^3 - 3xyz)$ 2 M
9. Find the work done by a force $y\overline{i} + x\overline{j}$ which displays a particle from origin to a point $(\overline{i} + \overline{j})$ along the line $y = x$. 2 M
10. State Stoke's theorem 2 M

PART-B

Answer any FIVE questions. One question from each unit either A or B (Compulsory)

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

11. A. Bacteria in a culture, grows exponentially. So that the initial number has doubled in three hours. How many times the initial number will be present after 9 hours? 10M

OR

11. B. Solve $p^3 - 2xyp + 4y^2 = 0$ 10M

(P.T.O.)

12. A. Solve $(D^2 + a^2)y = \tan ax$ by the method of variation parameters — 10M

OR

12. B. Solve the differential equation $\left(x^2D^2 - xD + 4\right)y = \cos(\log x) + x\sin(\log x)$ — 10M

13. A. Evaluate $\iint_R y\,dxdy$ where R is the region bounded by the parabolas $y^2 = 4x$ and $x^2 = 4y$. — 10M

OR

13. B. Evaluate triple integral $\iiint xy^2z\,dxdydz$ taken through the positive octant of the sphere $x^2 + y^2 + z^2 = a^2$. — 10M

14. A. i) Find the angle between the normals to the surface $xy = z^2$ at the points (4,1,2) and (3,3,-3). — 5M

ii) Prove that $\nabla^2(r^n) = n(n+1)r^{n-2}$ — 5M

OR

14. B. Prove that $grad(\bar{a}\cdot\bar{b}) = (\bar{b}\cdot\nabla)\bar{a} + (\bar{a}\cdot\nabla)\bar{b} + \bar{b}\times curl\,\bar{a} + \bar{a}\times curl\,\bar{b}$. — 10M

15. A. Verify Green's theorem for $\oint_C e^{-x}\left(\sin y\,dx + \cos y\,dy\right)$ where C is the rectangle with the vertices $(0,0),(\pi,0),(\pi,\frac{\pi}{2}),(0,\frac{\pi}{2})$. — 10M

OR

15. B. Verify Gauss Divergence theorem for $\bar{F} = (x^3 - yz)\bar{i} - 2x^2y\bar{j} + z\bar{k}$ taken over the surface of the cube bounded by the planes $x = y = z = a$ and coordinate planes. — 10M

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H.T No: | | | | | | | | | | | R18 | Course Code: A30011

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech II Semester Supplementary Examinations January-2025

Course Name: Engineering Chemistry

Branch : CE/EEE/ME/CSC/CSM/AID/AIM

Date: 28.01.2025 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 bonding and anti bonding molecular orbital's in a molecule?	2 M
2.	Define crystal field stabilization energy.	2 M
3.	Define standard electrode potential.	2 M
4.	Iron corrodes faster than aluminium, even though iron is placed below aluminium in electrochemical series .Why?	2 M
5.	Tell the principle involved in NMR spectroscopy.	2 M
6.	List out any four applications of UV-visible spectroscopy.	2 M
7.	What happens when temporary hard water is boiled? (give equations)	2 M
8.	20ml of a sample water consumed 15ml of 0.02M EDTA before boiling and 5ml of the same EDTA after boiling. Calculate the permanent hardness and temporary hardness of water.	2 M
9.	Define enantiomers with one example.	2 M
10.	What is meant by markownikoff's rule? Explain with suitable example.	2 M

PART-B

Answer any FIVE questions. One question from each unit either A or B (Compulsory)

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

11. A.	Draw the π-molecular orbital diagram of benzene and discuss the presence of nodes.	10M
	OR	
11. B.	Illustrate the sailent features of crystal field theory. Based on that draw the splitting of d-orbitals in tetrahedral complexes.	10M
12. A.	Derive Nernst equation for single electrode. Calculate the single electrode potential of a half cell for zinc electrode dipping in a 0.01M zinc solution.(E^o=0.763V)	10M
	OR	
12. B.	Compare the process of chemical and electrochemical corrosion on metal surface.	10M

(P.T.O.)

13. A. Explain the following in respect of NMR spectroscopy:
(i) chemical shift (ii) spin-spin interaction 10M

OR

13. B. Discuss the applications of UV-visible and IR spectroscopy. 10M

14. A. Describe the estimation of hardness of water by EDTA method. 10M

OR

14. B. What are ion-exchange resins? Discuss their application in water softening. How are exhausted resins regenerated? 10M

15. A. Discuss the stereo chemistry of lactic acid and tartaric acid. 10M

OR

15. B. With the help of suitable examples write on account of SN^1 and SN^2 reactions including the mechanism. 10M

H.T No: | | | | | | | | | | | R18 | Course Code: A30009

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech II Semester Supplementary Examinations January-2025

Course Name: Applied Physics
Branch : ECE/CSE/IT/CSD
Date: 28.01.2025 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 the matter waves.**	2 M
2.	**What is the Fermi-Dirac function?**	2 M
3.	**Mention the list of semiconductors.**	2 M
4.	**Define the Hall effect.**	2 M
5.	**Draw the energy diagram of the PN diode.**	2 M
6.	**What is the radiative recombination?**	2 M
7.	**Define spontaneous emission.**	2 M
8.	**How refractive index of core changes in graded-index fiber?**	2 M
9.	**List the piezoelectric materials.**	2 M
10.	**What is the main difference between ferri and anti ferromagnetism?**	2 M

PART-B

Answer any FIVE questions. One question from each unit either A or B (Compulsory)
Each question carries TEN Marks. **5x10=50M**

11. A.	**Deduce the Schrodinger wave equations.**	10M
	OR	
11. B.	**Calculate the density of states in solids.**	10M
12. A.	**Calculate the number of holes in the valance band of the intrinsic semi conductors.**	10M
	OR	
12. B.	**Find the concentration of electrons in N-type semiconductor at temperature T.**	10M
13. A.	**How PN junction formed and explain its V-I characteristics?**	10M
	OR	
13. B.	**Discuss the construction and working of solar cell.**	10M
14. A.	**Derive the Einstein coefficients and find the relation between them.**	10M
	OR	
14. B.	**Explain the application of optical fibres in communication system.**	10M

(P.T.O)

15. A. **Discuss the internal fields in solids.** 10M

OR

15. B. **Explain the hysteresis curve of ferromagnetism.** 10M

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H.T No: | | | | | | | | | | | R18 | Course Code: A30501

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech II Semester Supplementary Examinations January-2025

Course Name: Programming for Problem Solving

(Common for CE & ME)

Date: 30.01.2025 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1.	Explain the importance of C language.	2 M
2.	What is the difference between Variable and Data Type?	2 M
3.	Define an Array.	2 M
4.	What is the syntax for nested if?	2 M
5.	What is a function? Write the types of functions.	2 M
6.	Explain the difference between register and auto storage classes.	2 M
7.	Define pointer. How can you declare it?	2 M
8.	Compare Structure and Union.	2 M
9.	What is Data File?	2 M
10.	Contrast between Searching and Sorting.	2 M

PART-B

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

11.A).	What is Computer? Explain the different parts of computer with neat diagram.	10M
	OR	
11. B).	Explain the types of Operators in C and How the Expressions evaluated in C.	10M
12. A).	Discuss the use of break, continue and goto Statement in loops? Give suitable example.	10M
	OR	
12. B).	With suitable example explain how to declare and initialize multi-dimensional arrays.	10M
13. A).	Compare call-by-value and call-by-reference parameter passing technique?	10M
	OR	
13. B).	Explain the following string handling functions: i) strcpy() ii) strcmp() iii) strcat() iv) strlen() v) strncat()	10M
14. A).	List the features of pointers? Write a C program to read and print an array of elements using pointers.	10M
	OR	
14. B).	Explain the declaration, initialization and accessing the members of a structure with an example.	10M
15. A).	Explain about the various file modes? Write a C program to copy the contents from one file to another file.	10M
	OR	
15. B).	Explain the bubble sort algorithm with example.	10M

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H.T No: | | | | | | | | | | | **R18** | **Course Code: A30503**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech II Semester Supplementary Examinations January-2025

Course Name: Data Structures & Algorithms

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

Date: 30.01.2025 AN **Time: 3 hours** **Max.Marks: 70**

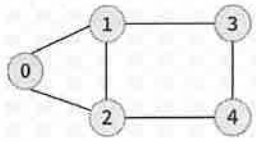
(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1. What do you mean by ADT? 2 M
2. Write C segment for structure definition of single linked list. 2 M
3. Show that the recursive application of the stack for the factorial of a number. 2 M
4. Outline the applications of queue. 2 M
5. Find maximum number of nodes in a binary tree of height 3. 2 M
6. Define complete binary tree. 2 M
7. Construct an adjacency Matrix for the given graph. 2 M



8. What is open addressing? 2 M
9. When does the worst case of Quicksort occur? 2 M
10. Construct Bad match table for the given pattern "HELLO". 2 M

PART-B

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

11.A). Design an algorithm for reversal of a linked list and illustrate with neat diagrams. 10M

OR

11. B). Outline the steps involved in insertion at anywhere and deletion at last of a doubly linked list with neat sketch. 10M

12. A). Interpret procedure to convert infix to post fix expression? Convert following infix expression to equivalent postfix expression and also evaluate post fix expression: *16/2^3*4+5* 10M

OR

12. B). Demonstrate the basic operations of the queue and construct the queue. 10M

13. A). Build a Binary search tree is generated by inserting in order of the following integers: 50, 15, 62, 5, 20, 58, 91, 3, 8, 37, 60, 24. Find the in-order, preorder, and post order traversals. 10M

OR

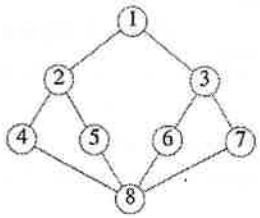
13. B). Outline the properties of AVL tree. Make an AVL tree for the following sequence of numbers. 45, 36, 76, 23, 89, 115, 98, 39, 41, 56, 69, 48. 10M

(P.T.O..)

14. A). Summarize the various hash functions. Explain in detail Hash collision resolution techniques with the following keys. 36, 48, 66, 27, 23, 87, 10, 12 and table Size 10. 10M

OR

14. B). Illustrate various representations of graph data structure. Apply DFS and BFS on following graph 10M



15. A). Design the quick sort algorithm and arrange the following elements in ascending order using quick sort: 12, 25, 5, 9, 1, 84, 63, 7, 15, 4, 3. 10M

OR

15. B). Search the pattern " a b a b a c a" in following text using Knuth-Morris-Pratt Algorithm "b a c b a b a b a a b c b a b". 10M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30313**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech II Semester Supplementary Examinations January-2025

Course Name: Engineering Drawing

(Common for CSE/ IT/ CSD/ ECE)

Date: 01.02.2025 AN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries ONE marks. **10x1=10M**

1. List the applications of hyperbola. 1 M
2. Define epicycloid. 1 M
3. Point P is 25 mm above H.P and 35 mm. behind VP. Draw the projections of the point. 1 M
4. A 50 mm long line PQ is parallel to both H.P and V.P. The line is 25mm in front of V.P and 60mm above H.P, Draw the projections of the line. 1 M
5. Define pyramid. 1 M
6. What do you mean by cylinder and cone in solids? 1 M
7. What is isometric projection and isometric view? 1 M
8. Draw the isometric view of a horizontal square with 30 mm side. 1 M
9. Differentiate between isometric line and non-isometric line. 1 M
10. Is isometric projection representing 2-Dimensional view or 3-Dimensional view. 1 M

PART-B

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

11.A). Construct a hyperbola, with the distance between the focus and the directrix as 50 mm and eccentricity as 3/2. Also, draw normal and tangent to the curve at a point 30 mm from the directrix. 10M

OR

11. B). Draw a hypocycloid for a rolling circle of diameter 75 mm and a base circle of 250 mm diameter. Draw a tangent and a normal at any point on the curve. 10M

12. A). Line AB is 85 mm long. Its FV and TV measure 55 mm and 65 mm long respectively. The end is 10 mm above HP and 25 mm in front of VP. Draw projections of line AB if end B is in first quadrant. Find angle with HP and VP. 10M

OR

12. B). A semicircular plate of 80 mm diameter has its straight edge in the VP and inclined at 45° to the HP. The surface of the plate makes an angle of 30° with the VP. Draw its projections. 10M

13. A). A square prism, side of base 30 mm and axis 50mm long has its axis inclined at 60° to HP. It has an edge of its base in the HP and inclined at 45° to VP. Draw its projections 10M

OR

13. B). A cone of diameter of base 60 mm and axis length equal to 120 mm rests on a point of its periphery of the base on H.P such that its axis is inclined at an angle of 35^0 with the H.P. and 60^0 with the V.P. and the apex is near to the observer. Draw its projection. 10M

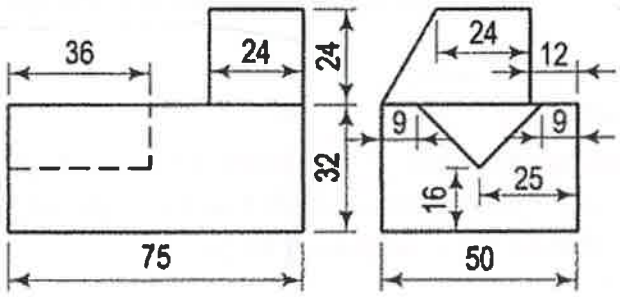
(P.T.O.)

14. A). A cylinder of base diameter 30 mm axis 60 mm is resting centrally on a slab of 60 mm square and thickness 20 mm. Draw the isometric projection of the combination of the solids. 10M

OR

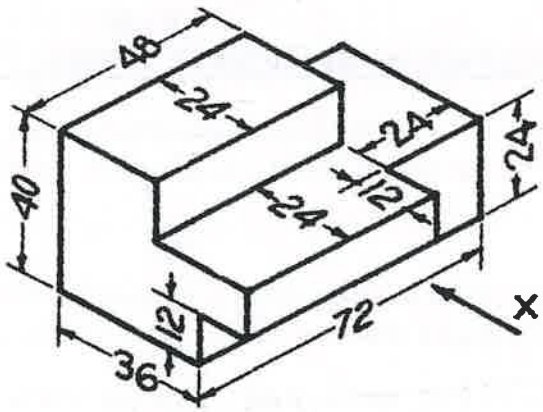
14. B). Draw a frustum of a cone with base diameter 60mm, top diameter 40mm and height of a cone is 80mm long. Draw its isometric projections. 10M

15. A). Draw the Isometric view of the machine parts shown below All dimensions are in mm 10M



OR

15. B). Draw the front view, top view and side view for the object shown in figure. All dimensions are in mm. 10M



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