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

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech II Semester Supplementary Examinations June/July-2025

Course Name: ODEs and Multivariable Calculus

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

Date: 30.06.2025 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. Find the solution of $ydx + x(1+y)dy = 0$. 2 M
2. Find the general solution of $y' + y = 0$ 2 M
3. Construct the complementary solution of $(D^2 - 1)y = 8e^{3x}$. 2 M
4. Build the particular integral of $(D^2 + 3D + 3)y = 7e^x$. 2 M
5. Evaluate $\int_3^4 \int_1^2 \frac{dydx}{(xy)^2}$ 2 M
6. Evaluate $\int_0^2 \int_1^z \int_0^{yz} xyz\, dx\, dy\, dz$. 2 M
7. Determine the angle between the surfaces $x \log z = y^2 - 1$ and $x^2 y = 2 - z$ at the point $(1,1,1)$. 2 M
8. Determine the curl of the vector field $\boldsymbol{V} = (x^2y^2 - z^3)i + 2xyz\, j + e^{xyz}k$. 2 M
9. Evaluate $\int_C x^2 y \boldsymbol{dr}$, where C is the curve defined by $x = 3\cos t, y = 3\sin t, 0 \le t \le \frac{\pi}{2}$. 2 M
10. State Stoke's theorem. 2 M

PART-B

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

11.A). i) Construct the solution of $y' + y = y^2$. 5M

ii) Solve $(1+y^2)\frac{dx}{dy} = tan^{-1}y - x$ 5M

OR

11. B). Water at temperature 10^oC takes 5 *min* to warm up to 20^oC in a room at temperature 40^oC. (i) Construct the temperature after 20 *min*. (ii) When will the temperature be 25^oC? 10M

12. A). i) Solve $(D^2 - 2D + 10)y = 16e^x \cos 3x$ 5M

ii) Solve $x^3y''' + 2x^2y'' = x + \sin(\log x)$. 5M

OR

12. B). i) Solve $(x-2)^2y'' - 3(x-2)y' + 4y = x$. 5M

ii) Solve $(D^2 + 1)y = cosec\, x \cdot \cot x$ by variation of parameters method. 5M

13. A). i) Determine the area bounded by the curves $x^2 = y$, $x = y$. 5M

ii) Determine the volume of the cylinder $x^2 + y^2 = 4, z = 0$ and $z = 4$. 5M

OR

13. B). i) Change the order of integration and the evaluate $\int_0^2 \int_1^{e^x} dy\, dx$. 5M

ii) Determine the volume of the cylinder $x^2 + y^2 + z^2 = 4$ 5M

(P.T.O..)

14. A). i) Find the directional derivative of $f(x,y) = x^2y^3 + xy$ at $(2,1)$, in the direction of vector $3\bar{\imath} - 2\bar{\jmath}$. 5M

ii) Show that $\nabla \times \nabla f = \bar{0}$ for any $f(x,y,z)$. 5M

OR

14. B). i) Show that $\bar{A} = (6xy + z^3)i + (3x^2 - z)j + (3xz^2 - y)k$ is irrotational. Find a scalar function $f(x,y,z)$ such that $\bar{A} = \nabla f$. 5M

ii) If $\boldsymbol{r} = xi + yj + zk$ and $r = |\boldsymbol{r}|$ then show that $div\left(\frac{r}{r^3}\right) = 0$ 5M

15. A). Prove or disprove that Green's theorem is valid for 10M
$f(x,y) = e^{-x}\sin y$, $g(x,y) = e^{-x}\cos y$ and C is the square with vertices at $(0,0), \left(\frac{\pi}{2},0\right), \left(\frac{\pi}{2},\frac{\pi}{2}\right), \left(0,\frac{\pi}{2}\right)$.

OR

15. B). Prove or disprove that divergence theorem is valid for $\iint_S (yz\,dy\,dz + zx\,dzdx + xydxdy)$, where S is the surface of the cube bounded by 10M
$0 \le x \le 1, 0 \le y \le 1, 0 \le z \le 1$.

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

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech II Semester Supplementary Examinations June/July-2025

Course Name: Engineering Chemistry

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

Date: 02.07.2025 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.	Distinguish between Atomic orbitals and Molecular orbitals.	2 M
2.	Omit any two Salient features of CFT.	2 M
3.	What are the differences between primary and secondary cells.	2 M
4.	Explain the galvanic corrosion.	2 M
5.	Omit any 4 applications of UV spectra.	2 M
6.	Write a short note on MRI.	2 M
7.	Define Temporary Hardness. What are the units of Hardness?	2 M
8.	What is Reverse Osmosis?	2 M
9.	What is Optical Activity?	2 M
10.	Define Enantiomers and Diastereomers.	2 M

PART-B

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

11.A).	Draw the Molecular orbital energy level diagrams of diatomic molecule N_2.	10M
	OR	
11. B).	Explain the Crystal field splitting of transition metal ion d- orbital in Tetrahedral complexes.	10M
12. A).	Explain the Construction, working and applications of Lithium ion batteries.	10M
	OR	
12. B).	Explain the mechanism involved in electrochemical corrosion.	10M
13. A).	Explain the principle and basic concepts of NMR spectroscopy.	10M
	OR	
13. B).	Describe the principle and different electronic transitions of electronic spectroscopy.	10M
14. A).	Explain Softening of water by ion- exchange process.	10M
	OR	
14. B).	Define Potable water and give any four specifications. Explain the Steps involved in the treatment of potable water.	10M
15. A).	Discuss the different Conformational isomers of n- butane.	10M
	OR	
15. B).	Explain the addition of HBr to propene by Markownikoff additions.	10M

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

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech II Semester Supplementary Examinations June/July-2025

Course Name: Applied Physics

(Common for ECE, CSE, IT & CSD)

Date: 02.07.2025 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 physical significance of wave function. 2 M
2. Write a short note on Fermi energy. 2 M
3. Define extrinsic semiconductor. 2 M
4. What is Drift and Diffusion? 2 M
5. What is the principle of light emission in LEDs? 2 M
6. State Impact ionization. 2 M
7. Discuss stimulated emission. 2 M
8. Classify the optical fiber. 2 M
9. Define piezoelectricity. 2 M
10. Write a short note on hysteresis. 2 M

PART-B

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

11.A). Derive Schrondingers time independent wave equation. 10M

OR

11. B). Derive energy eigen values of particle in one dimensional infinite potential well. 10M

12. A). Obtain an expression for carrier concentration in p-type extrinsic semiconductor. 10M

OR

12. B). State and explain Hall effect and derive an expression for hall coefficient 10M

13. A). Explain the formation, biasing, working and applications of PIN diode. 10M

OR

13. B). Discuss the construction,working, characteristics and applications of solar cell. 10M

14. A). With the help of suitable diagram explain construction and working of He-Ne Laser. 10M

OR

14. B). Derive an expression for numerical aperture and acceptance angle of optical fiber. 10M

15. A). Derive an expression for internal field inside a dielectric material. 10M

OR

15. B). Classify the magnetic materials on the basis of magnetic moment. 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 June/July-2025

Course Name: Programming for Problem Solving

(Common for CE & ME)

Date: 04.07.2025 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.	Write the Character Set in C Language.	2 M
2.	List the Single Character Input Functions in C Language.	2 M
3.	Write the syntax of while loop.	2 M
4.	What is the use of break statement?	2 M
5.	Define an argument.	2 M
6.	What is the scope and lifetime of an automatic variables?	2 M
7.	Define a pointer.	2 M
8.	What is Dynamic Memory Allocation?	2 M
9.	How do you close a file?	2 M
10.	What are Command Line Arguments?	2 M

PART-B

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

11.A).	Explain available Keywords in C Language.	10M
	OR	
11. B).	Write a C Program to find the biggest of three numbers using conditional operator.	10M
12. A).	Write the syntax and flowchart of if-else conditional statement and write a C Program to find the biggest of two numbers using if-else.	10M
	OR	
12. B).	How do you create multidimensional arrays in C? Explain with an example.	10M
13. A).	Explain with examples how arrays are passed as arguments in functions.	10M
	OR	
13. B).	Explain basic String Handling Functions in C with syntax and example.	10M
14. A).	Distinguish between Call-by-value and Call-by-reference. Demonstrate with an example.	10M
	OR	
14. B).	How the structure can be declared, initialized and accessed with suitable example program?	10M
15. A).	Write a C Program to find the key element in the given list using Linear Search.	10M
	OR	
15. B).	Write a C Program to sort the elements in the given list using Bubble Sort Technique.	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 June/July-2025

Course Name: Data Structures & Algorithms

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

Date: 04.07.2025 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.	Classify Data Structures in detail.	2 M
2.	List two differences between singly and double linked list.	2 M
3.	Outline the need of postfix evaluation.	2 M
4.	What are the common Operations in each type of Queue?	2 M
5.	Make use of a tree, label the parent node, child node, degree of the tree, height of the tree.	2 M
6.	Name the different rotations in AVL trees.	2 M
7.	How is Breadth First Search technique used in Real world application?	2 M
8.	List two Applications of Dictionaries.	2 M
9.	Compare the techniques of Quick sort and Merge Sort.	2 M
10.	Relate a small example and solve a Knuth-Morris Pratt Algorithm.	2 M

PART-B

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

11.A). Build a Step by step procedure to operate insertion on a Double Linked List? 10M

OR

11. B). Assume the Double Linked List has the values of 1,2,3,4,5,6,7,8,9,10 inserted , process the deletion operation on values 6 & 9 in the list? 10M

12. A). Experiment with the following infix expression to postfix notation step by step using the stack-based algorithm. Clearly explain the role of the stack and the precedence of operators at each step. 10M

Infix Expression:

A + B * (C - D) / E

OR

12. B). Apply your knowledge of priority queues to solve the following problem: 10M

Given the following tasks with their respective priorities, insert them into a priority queue (higher numbers indicate higher priority). Then, remove all the tasks one by one, ensuring the priority queue is maintained correctly.

Tasks and Priorities:

- Task A: Priority 3
- Task B: Priority 5
- Task C: Priority 1
- Task D: Priority 4
- Task E: Priority 2

(P.T.O.)

13. A). Construct an AVL tree with the given Values 1,5,2,4,7,10. 10M

OR

13. B). Apply deletion on AVL. Show the step by step procedure considering an example? 10M

14. A). Make use of a hash table with a size of 10 and the following hash function: 10M
h(key) = key % 10
Insert the following keys into the hash table:
25, 36, 47, 40, 55, 39

OR

14. B). Experiment a Breadth-First-Search (BFS) on the following graph starting from vertex A. Clearly show the traversal order and explain how the queue is used during the process. 10M
Graph Representation:
Vertices: A, B, C, D, E, F
Edges:

- A → B, A → C
- B → D, B → E
- C → F

15. A). Solve the array [40, 30, 50, 10, 20], perform a single partition step using the last element (20) as the pivot. Show the array after partitioning. 10M

OR

15. B). Make Use the brute-force algorithm to find all occurrences of the pattern AB in the text CABAABAB. 10M

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H.T No: | | | | | | | | | | | **R18** Course Code: A30001

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech II Semester Supplementary Examinations June/July-2025

Course Name: English

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

Date: 07.07.2025 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. To whom did William Hazlitt, author of the lesson "On the Conduct of Life," write a letter, and in what context? 2 M
2. Define preposition. Write any five prepositions of place. 2 M
3. Identify the speaker in the poem "The Brook"? What are literary techniques used in the poem by the poet? 2 M
4. Identify noun forms of the words "examine" and "prominent" 2 M
5. Recall the meanings of the root words 'poly' and 'biblio.' 2 M
6. Correct the following. 2 M
   i) Gold, as well as silver, **have** fallen in price.
   ii) The chairman and secretary is active in **their** duty.
7. What are the long-term effects of Yunus's microcredit in Bangladesh? 2 M
8. Provide any two useful tips for writing compelling essay. 2 M
9. Identify the author of the lesson "Politics and English Language"? What does the author wanted to convey to us in the usage of English language. 2 M
10. Define redundancy and provide two commonly used redundant phrases. 2 M

PART-B

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

11.A). i) What does the author, William Hazlitt, say about hating fellow human beings? What justification does he provide for his advice? 6M

ii) My father had been ____ poor health ____ quite some time. *(Insert appropriate preposition)* 2M

iii) Add prefixes to the following words. 2M

a) __dom b) __frequent c)__ logy d) __ interpretation

OR

11. B). i). How does Hazlitt's advice in *On the Conduct of Life* remain relevant in today's world? 6M

ii). Add suffixes to the following words. 2M

a) hyper__ b) neat__ c) trans___ d) history____

iii). Fill in the blanks with appropriate words given in the brackets. 2M

____(Since/So/Therefore) it is raining now, we will stay indoors. ___(If/Unless/Yet) you need to step outside, don't forget to carry an umbrella.

12. A). i). What message does the poem 'The Brook', convey to mankind? 6M

ii). Fill in the blanks with suitable articles. 2M

a. You can catch Pinakini express, if you start early.

b. Anusha is ____ Sania Mirza of our college

iii). Write the meanings of the following roots. 2M

a) bio b) astro

(P.T.O..)

OR

12. B). i). What are the key elements of effective public speaking? How do you overcome stage fear while you are making a public speech? 6M

ii). What are the noun forms of the words "significant" and "collaborate." 2M

iii). Punctuate the following. 2M

the father said to his daughters why didn't you finish your assignment i don't tolerate your negligence anymore

13. A). i). Discuss five fundamental principles of good writing. 6M

ii). Fill in the blanks following the rules of Subject- Verb Agreement 4M

a) The CM, together with his ministers, ___ (is/are) going to the Assembly.

b) Neither his parents nor he ____ (was/were) present there in the reception.

c) The quality of sweets_____(was/were) not good.

d) One of my relatives ___ (is/are) present at the ceremony.

OR

13. B). i). Discuss any five strategies for effective time management. 6M

ii). Fill in the blanks following the rules of Pronoun Agreement. 4M

a) Neither of the boys returned to _____ (its/their) home.

b) One should respect _____ (his/one's) parents.

c) Each of the girls presented_____ (her/their) own way on the issue.

d) Every student must bring _____ (his or her/their) ID cards to the exam center.

14. A). i). Discuss the role of Muhammad Yunus in empowering women of Bangladesh through the microcredit system. 6M

ii). Write synonyms for the following. 2M

a) abandon b) vital

iii). Rewrite the sentences by placing modifiers in the right place. 2M

a) My brother consulted a doctor with indigestion.

b) Rosy only eats burgers.

OR

14. B). i). Write an essay on " The Benefits and Risks of Self-Driving Cars" 6M

ii). Write antonyms for the following. 2M

a) tolerant b) affluent

iii). Rewrite the sentences by placing modifiers in the right place. 2M

a) My brother bought a dog for my sister called Dolly.

b) They don't sell milk to anyone in plastic bottles.

15. A). i). Do the author's language improvement rules make communication simpler and clearer? If so, how? 6M

ii). Write the full form of the following abbreviations: 2M

a) URL b) MNC

iii). Remove redundancies in the following sentences. 2M

a) The student **repeated again** his question in yesterday class.

b) My sister gave her **final conclusion**.

(P.T.O..)

OR

15. B). i) Summarize the following passage: 6M

As the world faces the challenges of climate change and environmental degradation, renewable energy has emerged as a crucial solution. Solar, wind, hydro, and geothermal power are increasingly replacing traditional fossil fuels, offering cleaner and more sustainable alternatives. Countries around the globe are investing in renewable energy infrastructure to reduce carbon emissions and promote a greener future. Despite challenges such as high initial costs and technological limitations, innovations continue to drive progress, making renewable energy sources more accessible and efficient

ii). Write the full form of the following abbreviations: 2M

a) SIM b) CEO

iii). Remove redundancies in the following sentences.

a) The D-Mart in our town offers a **free gift** to new customers. 2M

b) The **end result** of the operation was a failure.

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

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech II Semester Supplementary Examinations June/July-2025

Course Name: Engineering Drawing

(Common for CSE, IT, CSD & ECE)

Date: 07.07.2025 AN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

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

1. List of two practical applications of hyperbola. 1 M
2. Name the curve formed, when a cone is cut by a section plane A-A making an angle 90° with the axis. 1 M
3. Define orthographic projection. 1 M
4. How many views are required to represent an object very clearly? 1 M
5. Differentiate the diagrams of pentagonal pyramid and pentagonal prism. 1 M
6. The true shape of circular plane is seen in the front view. What will be the shape of its top view? 1 M
7. What is the isometric view of a sphere? 1 M
8. State whether the hidden lines are represented in the isometric views. 1 M
9. Distinguish between isometric view and orthographic view. 1 M
10. What is the relation between true length and isometric length? 1 M

PART-B

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

11.A). Sketch and name the curve when the distance of its focus from its directrix is equal to 50 mm and eccentricity is 2/3. Also draw a tangent and a normal to the curve at a point 70 mm away from the directrix on the bottom portion of the curve. 10M

OR

11. B). A circle of diameter 50 mm rolls on a flat surface without slipping. Trace the path of a point lying on the circumference for one complete revolution of the circle. Also show a normal and tangent to the curve at a point 40 mm above the directing line. Name the curve. 10M

12. A). Represent the projection of points on a common principal plane and the distance between them is 25 mm. 10M

(i) Point P is 30 mm. above H.P and 40 mm. in front of V.P
(ii) Point Q is 25 mm. above H.P and 35 mm. behind V.P
(iii) Point R is 32 mm. below H.P and 45 mm behind V.P
(iv) Point S is 35 mm. below H.P and 42 mm in front of V.P
(v.) Point T is in H.P and 30 mm behind V.P
(vi) Point U is in V.P and 40 mm. below H.P
(vii) Point V is in V.P and 35 mm. above H.P.
(viii) Point W is in both H.P and in V.P.

(P.T.O.)

OR

12. B). A straight-line PQ of 70mm long is inclined at 30° to HP and 45° to VP. Its end P is 10mm above HP and 20mm in front of VP. Draw its projections. 10M

13. A). Draw the projections of a pentagonal prism, base 25 mm side and axis 50 mm long, resting on one of its rectangular faces on the H.P., with the axis inclined at 45^0 to the V.P. 10M

OR

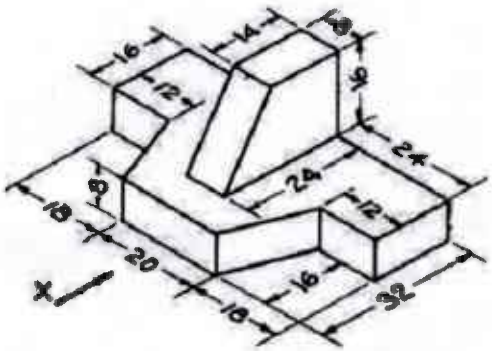
13. B). A cone having a 50 mm diameter and a 70 mm long axis, has a point of its base circle in the H.P., such that the axis is inclined at 45^0 to the H.P. and parallel to the V.P. Draw its projections. 10M

14. A). Draw an isometric view of frustum of hexagonal pyramid having 35 mm base side 20 mm top side and 80 mm long axis, resting on its base on the HP with an edge of base parallel to the VP. 10M

OR

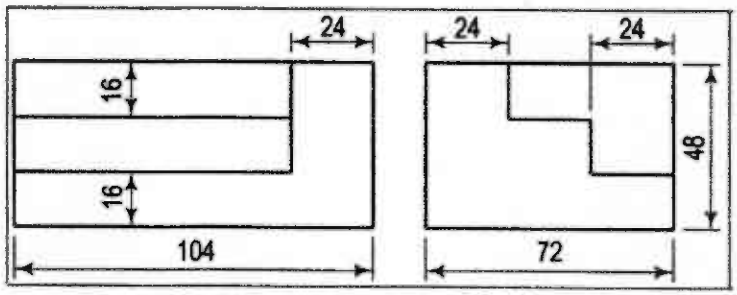
14. B). Draw an isometric view of frustum of cone with a 60 mm base diameter 40 mm top diameter and 60 mm long axis, resting on its base on the HP. 10M

15. A). Convert the isometric view of the picture shown in the figure in to orthogonal projections. Draw the front view and top view. 10M



OR

15. B). Prepare the isometric view of the given orthographic projection of the object. All dimensions are in mm. 10M



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