CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations September-2023

Course Name: ODES & MULTIVARIABLE CALCULUS
(Common for all Branches)

Date: 04.09.2023 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. Find the integrating factor of $y^2 dx + (x^2 - xy - y^2)dy = 0$ 2 M

2. Define the order and degree of a Differential equation.   2 M

3. Find the Particular Integral of $(D^2 + 16)y = \cos 4x$ 2 M

4. Find the complimentary function of $(D^2 + 4D + 3)y = 0$ 2 M

5. Evaluate $\int\limits_0^1 \int\limits_0^1 \int\limits_0^1 e^{x+y+z} dx\,dy\,dz$ 2 M

6. Evaluate $\int\limits_0^1 \int\limits_0^1 xy\,dx\,dy$ 2 M

7. If $\phi = x^2 + y^2 + z^2$ then find grad ϕ at $(1, 1, 1)$ 2 M

8. If $\bar{r} = xi + yj + zk$ then find $\nabla \times \bar{r}$ 2 M

9. Give the physical significance of line integral $\int\limits_c \bar{F}.d\bar{r}$ 2 M

10. State Gauss divergence theorem.   2 M

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

11.A). Solve $(x^2 + y^2)dx - 2xy\,dy = 0$ 10M

OR

11. B). A bacterial culture growing exponentially increases from 200 to 500 grams in the period from 6 A.M to 9 A.M. How many grams will be present at noon?   10M

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

OR

12. B). Solve $(D^2 - 2D + 2)y = e^x \tan x$ by using method of variation of parameters.   10M

13. A). Evaluate the integral by changing the order of integration $\int\limits_0^\infty \int\limits_x^\infty \frac{e^{-y}}{y} dy\,dx$ 10M

OR

13. B). Find the area bounded by the curves $y^2 = 4x$ & $x^2 = 4y$ 10M

(P.T.O..)

14. A). Find the directional derivate of the function $f = x^2 - y^2 + 2z^2$ at the point P (1, 2, 3) in the direction of the line PQ where Q= (5, 0, 4). 10M

OR

14. B). Find the angle between the two surfaces $x^2 + y^2 + z^2 = 9$ & $z = x^2 + y^2 - 3$ at the point (2, -1, 2) 10M

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

OR

15. B). Evaluate by stoke theorem $\oint_C (x + y)dx + (2x - z)dy + (y + z)dz$ where C is the boundary of the triangle with vertices (0,0,0,) , (1,0,0) and (1,1,0) 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations September-2023
Course Name: ENGINEERING CHEMISTRY
(Common for CE, EEE, ME, CSC, CSM, AID & AIM)

Date: 06.09.2023 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 the molecular orbital diagram of butadiene.	2 M
2.	Define molecular orbital.	2 M
3.	What is the effect of dilution on specific conductance and equivalent conductance?	2 M
4.	State the Pilling Bedworth rule on stability of oxide layer.	2 M
5.	Give the applications of UV-visible spectroscopy.	2 M
6.	What are the applications of magnetic resonance imaging.	2 M
7.	Classify the types of hardness of water.	2 M
8.	What is priming and foaming?	2 M
9.	Define enantiomer with an example.	2 M
10.	Write reaction of addition of HBr to propene according to Markownicoff.	2 M

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

11.A). Discuss the molecular orbital energy level diagram of N_2 molecule.   10M

OR

11. B). Explain the crystal field splitting of d-orbitals in octahedral metal complexes.   10M

12. A). Describe the construction and working of Lead acid storage battery with discharging and charging reactions.   10M

OR

12. B). Explain the mechanism of electrochemical corrosion taking rusting of iron as example.   10M

13. A). Discuss the principle involved in vibrational spectroscopy (IR) and mention the types of fundamental vibrations.   10M

OR

13. B). Explain principle and application of NMR spectroscopy   10M

14. A). Describe the water softening method by Ion exchange process   10M

OR

14. B). 60 ml of standard hardness containing 1 mg of pure CaCO3 per ml consumed 22 ml of EDTA. 40 ml of water sample consumed 20 ml of EDTA solution using EBT indicator. 40 ml of water sample after boiling, filtering consumed 15 ml of EDTA. Calculate the temporary and permanent hardness of water sample.   10M

15. A). Discuss the confirmational analysis of n-butane.   10M

OR

15. B). Illustrate the mechanism of unimolecular nucleophilic substitution (sn_1)-reaction.   10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations September-2023
Course Name: APPLIED PHYSICS
(Common for ECE, CSE, IT & CSD)

Date: 06.09.2023 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. Uncertainty in position of an electron is 100 Å. Calculate minimum uncertainty in velocity of the electron. Mass of electron: 9.1×10^{-31} Kg.; Planck's constant (h): 6.63×10^{-34} J-s.   2 M

2. Define bosons and fermions and give examples.   2 M

3. Write the effect of temperature on Fermi level in an intrinsic semiconductor.   2 M

4. Write the statement of Hall effect.   2 M

5. Define Zener breakdown voltage write any one application of Zener diode.   2 M

6. Write the working principle of LED and applications of LED.   2 M

7. Differentiate spontaneous emission and stimulated emission.   2 M

8. Calculate the numerical aperture of an optical fiber with core refractive index 1.50 and classing refractive index 1.45.   2 M

9. Define piezoelectricity and give examples for piezoelectric materials.   2 M

10. A magnetic material subjected to a magnetic field of strength of 220 A/m, shows magnetization of 3300 A/m. Calculate its relative permeability.   2 M

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

11.A). i) Explain de Broglie hypothesis.   2M
ii) Describe how Davisson and Germer experiment confirmed the existence of matter waves and verified de Broglie wavelength.   8M

OR

11. B). Derive Schrödinger time independent wave equation.   10M

12. A). i) What are intrinsic semiconductor.   2M
ii) Derive expression for concentration holes in valance band of an intrinsic semiconductor.   8M

OR

12. B). i) Draw energy band structure of N-type semiconductor.   2M
ii) Derive the expression for concentration of electrons in N-type semiconductor at low temperatures.   8M

13. A). i) Explain formation of PN junction diode.   2M
ii) Describe I-V characteristics of PN junction diode in forward and reverse biased conditions.   8M

OR

13. B). Describe construction, working and I-V characteristics of Solar cell.   10M

(P.T.O..)

14. A).   i) Explain construction and working of semiconductor laser.   8M
          ii) Write the applications of LASER.   2M

OR

14. B).   i) Explain the principle of light transmission in optical fiber.   4M
          ii) Describe step index and graded index optical fibers.   6M

15. A).   Derive expression for internal (Lorentz) field of a dielectric material, subjected to an   10M
external electric field.

OR

15. B).   i) Define superconductivity. Explain type I and type II superconductors.   6M
          ii) Discuss in brief the BSC theory of superconductivity.   4M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations September-2023
Course Name: PROGRAMMING FOR PROBLEM SOLVING
(Common for CE & ME)

Date: 08.09.2023 AN   Time: 3 hours   Max.Marks: 70

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

1. Define Pseudocode? Write Pseudocode for addition of two numbers.   2 M
2. Differentiate between getchar and gets.   2 M
3. Write a C program to find the given number is even or odd.   2 M
4. Define array? List out various Applications of an Array.   2 M
5. Define storage class and list out types of storage classes in C.   2 M
6. Explain strlen() and strcpy() with example.   2 M
7. Write differences between structures and unions.   2 M
8. Define pointer to an array, give an example.   2 M
9. Write the different modes to open a file.   2 M
10. What is searching? Write the different types of searching methods?   2 M

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

11.A). i) Explain about the basic data types in C language with example.   7M
        ii) Draw a flowchart to find area of circle.   3M

OR

11. B). Explain different types of operators in detail giving example for each.   10M

12. A). i) Differentiate between while and do-while.   5M
         ii) Write a program to display minimum and maximum numbers among 3 numbers using selection statements.   5M

OR

12. B). i) Explain about multi-dimensional arrays with example.   5M
         ii) Write a C program to find the multiplication of two matrices.   5M

13. A). Explain Parameter Passing Techniques in C with an example.   10M

OR

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

(P.T.O..)

14. A). Explain in detail about the various dynamic memory allocation functions with suitable examples.　10M

OR

14. B). i) Write a C program to implement unions.　4M
ii) Explain typedef and enumerated data type with example.　6M

15. A). i) What are command line arguments and how to use it?　5M
ii) Explain how fseek() function works with example.　5M

OR

15. B). Write a 'C' program to implement Bubble sort with an example.　10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations September-2023
Course Name: DATA STRUCTURES & ALGORITHMS
(Common for EEE, ECE, CSE, IT, CSC, CSM, CSD, AID & AIM)

Date: 08.09.2023 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. List out some examples for linear and non-linear data structures.   2 M
2. What is Linked List? Explain its representation.   2 M
3. Define stack.   2 M
4. List different types of queue.   2 M
5. What is Binary tree? List the properties of Binary tree.   2 M
6. Define AVL tree.   2 M
7. Define Graph.   2 M
8. What are the collision resolution methods?   2 M
9. Define sorting. List any two sorting techniques.   2 M
10. What is Pattern matching? Give an example.   2 M

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

11.A). Explain different cases of insertion operation on single linked lists? Write the pseudo code for the same.   10M

OR

11. B). What is Double linked list? Describe creation and operations of Double linked list?   10M

12. A). Demonstrate the conversion of postfix expression from the given infix expression: $((A-(B+C))*D)\uparrow(E+F)$.   10M

OR

12. B). What is a queue? Explain its operations with example?   10M

13. A). Explain in detail about binary tree traversals.   10M

OR

13. B). Draw a Binary search tree for the following input list
        60,25,75,15,50,66,33,44.
    Trace the algorithm to delete the nodes 25 and then 75 from the tree.   10M

14. A). Explain DFS graph traversal algorithm with an example.   10M

OR

14. B). Describe Collision Resolution Techniques with an example.   10M

(P.T.O..)

15. A). i) Write an algorithm to implement quick sort.   5M
    ii) Sort the following numbers using quick sort representing each pass: 5M
    10, 6, 3, 7, 17, 26, 56, 32, 72

OR

15. B). Sort the following list of elements by using merge sort representing each pass: 10M
    39, 16, 45, 11, 55, 18, 43, 88

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations September-2023

Course Name: ENGLISH

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

Date: 11.09.2023 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. Identify the errors in the usage of prepositions in the following sentences and correct them.   2 M
   a) She's proud with her achievements.
   b) He's allergic from peanuts.

2. Convert the following sentences as directed.   2 M
   a) I missed the bus. I had to walk to work. (Convert Into Compound sentence)
   b) She baked cookies, and her friends enjoyed them. (Convert Into Simple sentence)

3. Fill in the blanks with appropriate articles.   2 M
   a). _____ book I borrowed from library is really interesting.
   b). She's _____ friend I was talking about last night.

4. Identify and give the meaning of the root words.   2 M
   A) Biology   B) Telephone   C) Democracy   D) Geology

5. Correct the errors in the following sentences.   2 M
   a) She don't like pizza.
   b) Their going to the beach tomorrow.

6. Find the meanings of the following underlined prefixes/suffixes.   2 M
   A) Reconstruct   B) Disagreeable   C) Friendliness   D) Unhappiness

7. Mark the misplaced modifiers and rewrite the sentences after placing the modifiers in the right place.   2 M
   a) On her way home, Janaki found a gold man's watch.
   b) The child ate a cold dish of cereal for breakfast this morning.

8. Fill in the blanks with antonyms of the words in brackets.   2 M
   a) Constructing another storey in this building is_____. (legal)
   b) Hemant is a/an _____boy, he never completes his work on time. (responsible)

9. Correct the redundant words/phrases from these sentences.   2 M
   a) She added an extra bonus to the already completed project.
   b) The tall skyscraper towered high above the city skyline.

10. Interpret out what these abbreviations stand for.   2 M
    A) NASA   B) RSVP   C) CPU   D) NATO

(P.T.O..)

PART-B

11.A). The author stresses the importance of not judging people or places the first time you encounter them. Why does he say this?   10M

OR

11. B). The author feels that in being school /hostel will teach his son about how to get along with others and prepare him for the ups and downs of life. Do you agree with this belief?   10M

12. A). What kind of landscape is described in the first three stanzas of the poem, 'The Brook'?   10M

OR

12. B). Explain what you think is meant by the lines, "For men may come and men may go/ But I go on forever". What does it say about nature?   10M

13. A). What is Time Management? Elucidate the tips discussed by the author in the essay, 'On Saving Time'.   10M

OR

13. B). "What are some essential principles of good writing, and how do they contribute to effective communication in various forms of written content?"   10M

14. A). How did Grameen Bank help the impoverished Women of Bangladesh? Why did the bank focus on the women of Bangladesh?   10M

OR

14. B). Construct an argumentative essay on "Shifting the Focus: Rejuvenating India's Manufacturing Sector"?   10M

15. A). The author says political language is designed to twist meaning. Do you agree with this statement? Substantiate your answer with examples.   10M

OR

15. B). Summarize the given text and provide a suitable title.

"In recent years, climate change has become a pressing global concern. Rising temperatures, extreme weather events, and melting ice caps are all indicators of the profound impact that human activities are having on the planet. Scientists warn that unless we take urgent action to reduce greenhouse gas emissions, the consequences could be catastrophic.   10M

One of the primary drivers of climate change is the burning of fossil fuels, such as coal, oil, and natural gas. These fuels release carbon dioxide and other greenhouse gases into the atmosphere, trapping heat and causing the planet's temperature to rise. This phenomenon, known as the greenhouse effect, is at the heart of the climate crisis. To combat climate change, countries around the world have committed to reducing their carbon emissions through various agreements and initiatives. Transitioning to renewable energy sources, improving energy efficiency, and reforestation are some of the strategies being employed to mitigate the effects of climate change.

In addition to environmental concerns, climate change also poses significant risks to human health, agriculture, and biodiversity. It is a complex and multifaceted problem that requires a coordinated global effort to address. The choices we make today will determine the future of our planet and the well-being of generations to come."

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations September-2023

Course Name: ENGINEERING DRAWING

(Common for ECE, CSE, IT & CSD)

Date: 11.09.2023 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. Relate epicycloid and hypocycloid.   1 M
2. Show a Straight line of 80 mm into 9 equal parts.   1 M
3. A point A is 20 mm above H.P and 30 mm Infront of V.P. Find the projections of the point.   1 M
4. Show the projections of the line CD of 60 mm when it is resting on both H.P and V.P.   1 M
5. List the types of projection of regular solids.   1 M
6. Define Prism and Pyramid.   1 M
7. What is an isometric length corresponding to a true length 40 mm.   1 M
8. Show the isometric projections of a circle of diameter 30 mm.   1 M
9. Relate between orthographic views and isometric views.   1 M
10. Show the 3-Orthographic views of a cube of side length 25 mm.   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 directrix as 50 mm and   10M
eccentricity as 3/2.

OR

11. B). Show a curve generated by a fixed point on the circumference of a circle of diameter 30   10M
mm, when it rolls without slipping along a straight line for one complete revolution.

12. A). A line AB 75 mm long is inclined at 45° to the HP and 30° to the VP. Its end B is in the   10M
HP and 40 mm in front of the VP. Show its projections.

OR

12. B). Construct the projections of a regular hexagon of 25 mm side, having one of its sides in   10M
the HP and inclined at 60° to the VP and its surface making an angle of 45° with the HP.

13. A). A pentagonal prism with side of base 30 mm and axis 60 mm long is resting with an edge   10M
of its base on HP, such that the rectangular face containing that edge is inclined at 60° to
HP. Build the projections of the prism when its axis is parallel to V.P.

OR

13. B). A cone 40 mm diameter and 50 mm axis is resting on one generator on H.P, which makes   10M
30° inclination with V.P. Develop its projections.

(P.T.O..)

14. A). Construct the isometric view, the frustum of hexagonal pyramid with base side 50mm, top   10M
side 30mm and axis height 80mm is resting on HP with one of its base edges.

OR

14. B). Develop the isometric view of a pentagonal prism of base side 30 mm and axis 60 mm.   10M
The prism rests on its base on the H.P. with a vertical face perpendicular V.P.

15. A). Construct (i) Front View (ii) Top View (iii) Side View of the object shown below. (All   10M
dimensions are in mm)
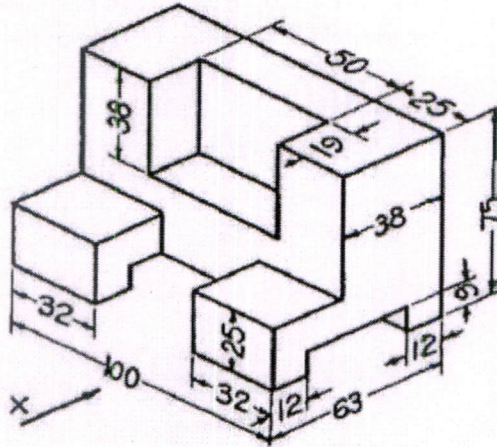
OR

15. B). Draw the isometric projection as per given figure below.   10M

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