CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations February-2024
Course Name: **ODE'S AND MULTIVARIABLE CALCULUS**
(Common for all Branches)

| Date: 15.02.2024 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. Find the integrating factor of $x\frac{dy}{dx}+y=logx$ 2 M

2. Solve $xp^2-yp+a=0$ 2 M

3. Solve the differential equation $(D^2 + 5D + 6)y = 0$ 2 M

4. Define Cauchy-Euler equation. 2 M

5. Find $\int\limits_{0}^{2}\int\limits_{0}^{x} e^{x+y}dydx$ 2 M

6. Evaluate $\int_0^1 \int_0^2 \int_0^3 xyz\, dxdydz$ 2 M

7. Find the gradient of scalar function $\phi(x,y,z) = 3x^2 y + y^3z^2$ at (1,-2,-1). 2 M

8. Prove that *curl grad $\phi = 0$*. 2 M

9. Evaluate $\int_C \overline{F}.d\overline{r}$ where $\overline{F} = x^2\overline{i}+y^2\overline{j}$ and C is the curve $y = x^2$ in the xy-plane 2 M

   from (0,0) to (1,1)

10. State Gauss Divergence theorem 2 M

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

11.A). i) Solve the differential equation $(x^2 + 2y^2)\, dx - xydy = 0$ 5M

   ii) Solve the differential equation $x\frac{dy}{dx} + y = x^3y^6$ 5M

OR

11. B). A body kept in air with temperature 25^0C cools from 140^0C to 80^0C in 20 minutes. Find 10M
   when the body cools down to 35^0C.

12. A). Solve $(D^2 +4)y = Tan2x$ by method of variation of parameter. 10M

OR

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

(P.T.O..)

13. A). Change of order of integration and hence evaluate the double integral $\int_0^1 \int_{x^2}^{2-x} xy\,dy\,dx$ 10M

<center>**OR**</center>

13. B). Find the volume of the tetrahedron bounded by the plane $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=1$ and the coordinate planes by triple integral.   10M

14. A). i) Find the directional derivative of $xyz^2 + xz$ at $(1,1,1)$ in the direction of normal to the surface $3xy^2 + y = z$ at $(0,1,1)$.   5M

    ii) Show that $(x^2 - yz)\bar{i} + (y^2 - zx)\bar{j} + (z^2 - xy)\bar{k}$ is irrotational and find its scalar potential.   5M

<center>**OR**</center>

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

15. A). Find the work done by $\bar{F} = (2x - y - z)\bar{i} + (x + y - z)\bar{j} + (3x - 2y - 5z)\bar{k}$ along a curve C in the xy-plane given by $x^2 + y^2 = 4, z = 0$.   10M

<center>**OR**</center>

15. B). Verify Green's theorem for $\bar{F} = (x^2 + y^2)\bar{i} - 2yx\bar{j}$ taken around the rectangle bounded by the lines $x = a, x = -a, y = 0, y = b$.   10M

<center>*****</center>

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

Date: 20.02.2024 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 bonding and anti-bonding molecular orbitals?   2 M

2. Differentiate between Sigma and Pi bonding?   2 M

3. A cell uses Zn electrode and a silver electrode. Represent the cell, write the electrode   2 M
    reaction, over all cell reaction and calculate the standard EMF of the cell. ($E^0_{(Zn2+/Zn)}$ =-o.76V
    and $E^0_{(Ag+/Ag)}$ =+0.80V)

4. What is galvanic corrosion? Illustrate with example?   2 M

5. What is meant by MRI?   2 M

6. What is chemical shift with examples?   2 M

7. What is meant by Hardness of water? How is it expressed?   2 M

8. Write a brief note on Calgon conditioning.   2 M

9. Define optical isomers with example.   2 M

10. Define isomerism? How they are broadly classified?   2 M

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

11.A). What is meant by bond order? Draw the molecular orbital diagram of O_2 molecule,   10M
        explain its magnetic nature and bond order?

OR

11. B). i) Enumerate the salient features of crystal field splitting theory.   5M
         ii) Describe the crystal field splitting of octahedral complex.   5M

12. A). i) Derive the Nernst equation for the following cell reaction- aA + bB → cC + Dd   5M
         ii) Discuss the construction and working of the hydrogen-oxygen fuel cell.   5M

OR

12. B). What is Electro chemical corrosion? Explain the mechanism of Evolution of H_2 and   10M
         Absorption of O_2 in it.

13. A). Explain the Fundamental vibrations of IR spectra and give its applications.   10M

OR

13. B). i) Explain the various types of electronic transitions possible in UV-Visible Spectroscopy.   6M
         ii) List the applications of UV-Visible Spectroscopy.   4M

(P.T.O..)

14. A). i) Explain Reverse Osmosis Process for the desalination of brackish water? 5M

ii) What are scales and sludges? How they formed. Give the disadvantages of Scales and sludges? 5M

OR

14. B). What is Sterilization of Water? Explain the concept of breakpoint of chlorination and write its significance. 10M

15. A). i) Identify the optical isomerism and calculate the number of stereoisomers for Glyceraldehyde. 4M

ii) Define the following with examples (a) Enantiomers (b) Diasteriomers 6M

OR

15. B). i) Explain the addition of HX to olefinic compounds with suitable example using Markownikoff rule? 6M

ii) Write the structure, preparation and uses of paracetamol. 4M

*****

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations February-2024
Course Name: APPLIED PHYSICS
(Common for ECE, CSE, IT & CSD)

Date: 20.02.2024 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 Matter waves.	2 M
2.	Define Fermi-Dirac Distribution function.	2 M
3.	Define Fermi energy.	2 M
4.	Define Hall Effect.	2 M
5.	What is meant by forward and reverse bias?	2 M
6.	Write about Zener breakdown.	2 M
7.	Define the terms Absorption and Stimulated emission.	2 M
8.	Explain the parts of Optical fibers.	2 M
9.	Define the terms dipole moment and dielectric constant.	2 M
10.	What is meant by Meissner effect?	2 M

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

11.A). i) Explain the physical significance of wave function.   3M
ii) Derive the Schrodinger's time independent wave equation.   7M

OR

11. B). Write the differences between Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac   10M
distribution functions.

12. A). Calculate the carrier concentration of electrons in a n-type semiconductor.   10M

OR

12. B). i) Explain the Law of mass action.   4M
ii) Distinguish between Drift current and Diffusion current.   6M

13. A). Explain the construction, working and V-I characteristics of a PN junction diode.   10M

OR

13. B). i) Explain the radiative and non-radiative recombination.   2M
ii) Explain the construction and working of LED.   8M

14. A). Explain the construction and working of He- Ne laser and write its applications.   10M

OR

14. B). Define and derive an expression for Numerical aperture and Acceptance angle.   10M

15. A). Define and derive an expression for Internal field of a dielectric material.   10M

OR

15. B). Explain Domain theory of ferromagnetic materials and also explain it with Hysteresis   10M
loop.

*****

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations February-2024
Course Name: PROGRAMMING FOR PROBLEM SOLVING
(Common for CE & ME)

Date: 22.02.2024 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. Compare pseudocode with an algorithm.   2 M
2. What is the relational Operator in C?   2 M
3. What are the different ways of initializing array?   2 M
4. Show the general form of if – else – if statement.   2 M
5. What is the role of strrev( ) function?   2 M
6. Define function. Write the syntax of user defined functions.   2 M
7. Define Malloc () and write the syntax.   2 M
8. How are members of a union accessed?   2 M
9. Define sorting and explain why it is important.   2 M
10. Define Command Line Parameters.   2 M

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

11.A). Discuss the following operators in C language with example.   10M
    i).   Bitwise operators
    ii).   Increment and decrement operators.
    iii). Logical operators

OR

11. B). i) What is Flowchart? Draw flow chart to find Sum of N numbers.   5M
    ii) What is variable? Give the rules for variable declaration.   5M

12. A). What is an array? How are a single dimension and two dimension arrays declared and   10M
    initialized?

OR

12. B). Describe the Decision making statements and looping statements in C Programming.   10M

13. A). Explain string manipulation library functions with their syntaxes. Write a program to   10M
    check whether a string is palindrome or not.

OR

13. B). Explain the storage classes with suitable examples.   10M

(P.T.O..)

14. A). Write a program in C to find the sum and mean of all elements in an array using pointers.   10M

OR

14. B). Define Structure. Describe how to declare, initialize, and access members of Structure   10M
with a programming example.

15. A). Write a C program to read a data file containing integers. Find the largest and smallest   10M
integers and display them.

OR

15. B). Explain Bubble sort with an example   10M

✱✱✱✱✱

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations February-2024
Course Name: DATA STRUCTURES & ALGORITHMS
(Common for EEE, ECE, CSE, IT, CSC, CSM, CSD, AID & AIM)

Date: 22.02.2024 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. How does a linked list overcome the problems of arrays?   2 M
2. What do you mean by nonlinear data structure?   2 M
3. Outline the applications of stack.   2 M
4. How can a circular queue overcome the limitations of a linear queue?   2 M
5. What is a threaded binary tree?   2 M
6. How binary tree is represented using an array?   2 M
7. Define complete graph.   2 M
8. What do you mean by collision in hashing?   2 M
9. Define divide and conquer strategy.   2 M
10. Write the disadvantage of brute force pattern matching algorithm.   2 M

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

11.A). With neat sketch elaborate insertion at beginning and last operations on single linked list.   10M

OR

11. B). Perform insertion and deletion operations of a circular linked list with pseudocode.   10M

12. A). Elaborate basic operations associated with stack. Translate following arithmetic infix expression into postfix by using stack: 10M

$*(b + c) + (b/d) * a + z * u$

OR

12. B). Define queue data structure. Build the procedure to perform dequeue and enqueue operations on circular queue data structure with neat sketch.   10M

13. A). Illustrate AVL Tree. Create AVL Tree for the following sequence of numbers: 50, 20, 60, 10, 8, 15, 32, 46, 11, 48   10M

OR

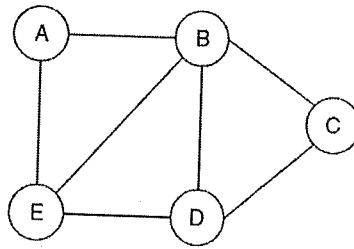13. B). Illustrate binary search tree. Explain tree traversal techniques with an example.   10M

(P.T.O..)

14. A). Build the hash table using various collision resolution techniques 50,700,76,85,92,73 and   10M
101 and hash table Size 7.

OR

14. B). Design the pseudo code for DFS and BFS. Apply DFS and BFS on following graph.   10M

15. A). Rearrange the following numbers in ascending order using Heap sort.   10M
10, 6, 3, 7, 17, 26, 56, 32, 72

OR

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

*****

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations February-2024
Course Name: ENGLISH
(Common for CE & ME)
Date: 24.02.2024 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. Fill in the blanks with suitable prepositions.   2 M
   They have been living _____ Mumbai _____ ten years.

2. Choose the appropriate word from the given brackets.   2 M
   a) Can I give some _____(advise/advice)?
   b) He's been having treatment for two months now without any ___(improvement/improved)

3. Find the suitable articles to fill in the blanks.   2 M
   a) The Secretary and------ (the/NA) president attends the board meeting.
   b) I met -------(a/an) European in Sunday Market last week.

4. Punctuate the following sentence correctly.   2 M
   whos the indian teams captain

5. Choose the right answer from the given brackets.   2 M
   a) The camel and the donkey .... luggage. (carry/carries)
   b) One should learn to master _____(one's self/ oneself)

6. Write two right words by using each of the following affixes.   2 M
   a) hyper-   b) trans-   c) --ment   d) --tion

7. Find out the misplaced modifiers and rewrite with meaningful sentence.   2 M
   a) We glued together the vase we broke quietly.
   b) We had a pizza after the movie that was delicious.

8. Write antonyms to the following words.   2 M
   a) intentional   b) Crooked

9. Define redundancies with examples.   2 M

10. Write the full form of the following abbreviations.   2 M
    a) esp   b) VAT

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

11.A). What does the author (William Hazlitt) say about despising people? what justification does he provide for his advice?   10M

OR

11. B). i) Fill in the blanks with suitable prepositions   5M
    I have seen you___(for/from) ages. I am tired __(of/on) waiting ___(for/about) you. You can stay ___(with/for) me tonight. My birthday is ----(on/in) 29th February.
    ii) Identify the clauses of the following sentences (Simple, Compound and Complex).   5M
       a) You may sit wherever you like.
       b) As she was not there, I spoke to her sister.
       c) Will you wait till I return?
       d) I fear that I shall fail.
       e) I do not know what he wants.

(P.T.O..)

12. A). What kind of landscape is described in the brook poem? What is the mood of the poem?   10M

OR

12. B). "How I Became A Public Speaker" describe the steps of George Bernard Shah's life.   10M

13. A). i) Fill in the blanks with suitable form.   5M
     a) The scissors__missing. (is/are)
     b) His wages _100 rupees a day. (is/are)
     c) Murali or Nithin must do _ own work. (His/their)
     d) Each of them ____ a successful politician. (Make/makes)
     e) The mango, as well as Apple, ___ sweet. (is/are)

   ii) Write principles of good writing.   5M

OR

13. B). What did Seneca say about the importance of time? Write an essay on it.   10M

14. A). Write Essay on Advantages and Disadvantages of Online Classes.   10M

OR

14. B). Write the summary of Muhammad Yunus.   10M

15. A). Write Summary and Analysis of George Orwell's 'Politics and the English Language'.   10M

OR

15. B). Summarize the following passage with relevant title.   10M
One night a holy man, Abu Ben Adhem by name, suddenly woke up from a deep dream of peace and saw in his moonlit room an angel writing something in a book of gold. He did not feel at all frightened. The peaceful face of the angel made Abu bold and he said to the angel, "What are you writing?" The angel looked up and replied in a kind and sweet tone, "I am taking down the names of those who love God." "And is my name one among them?" Asked Abu. But the angel replied, " No, it is not." "I pray thee then," said Abu, "To write me down as one who loves his fellowmen."The Angel wrote and vanished. The next night the angel came again with a great light which awaked Abu Ben Adhem: and he showed Abu the names of those who had been blessed by the love of God. And behold! the name of Abu was at the top of the list.

*****

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech II Semester Supplementary Examinations February-2024
Course Name: ENGINEERING DRAWING
(Common for ECE, CSE, IT & CSD)

Date: 24.02.2024 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. Write systems used in placing of dimensions.   1 M
2. Show the procedure of how to divide a line into number of equal parts?   1 M
3. A Point A is 25 mm above the H.P.and 30 mm behind the V.P. Draw its projections.   1 M
4. Define a Plane in Projection of Planes.   1 M
5. What are right solids?   1 M
6. What is the difference between the prism and pyramid?   1 M
7. Write the relation between isometric length and true length.   1 M
8. Define isometric scale.   1 M
9. Draw the isometric view of a circular lamina of diameter 50 mm   1 M
10. Draw the isometric view of a square with 40mm side?   1 M

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

11.A). Draw a hyperbola with the distance of the focus from the directrix at 50mm and e=3/2   10M
(Eccentricity method).

OR

11. B). Draw a cycloid of a circle of diameter 40 mm for one revolution. Also, draw a tangent and   10M
a normal to the curve at a point 25 mm above the base line.

12. A). An 75 mm long line AB is inclined at 30° to the H.P. and 45° to the V.P. The end A is 15   10M
mm above the H.P. and lying in the V.P. Draw the projections of the line.

OR

12. B). A hexagonal plane of side 30 mm has a corner in the V.P. The surface of the plane is   10M
inclined at 45° to the V.P. and perpendicular to the H.P. Draw its projections. Assume that
the diagonal through the corner in the V.P. is parallel to the H.P.

13. A). A square pyramid of base side 40 mm and axis 60 mm is resting on its base on the H.P.   10M
Draw its projections when (a) a side of the base is parallel to the V.P., (b) a side of the
base is inclined at 30° to the V.P.

OR

13. B). A pentagonal prism of base edge 30 mm and axis 60 mm rests on an edge of its base in   10M
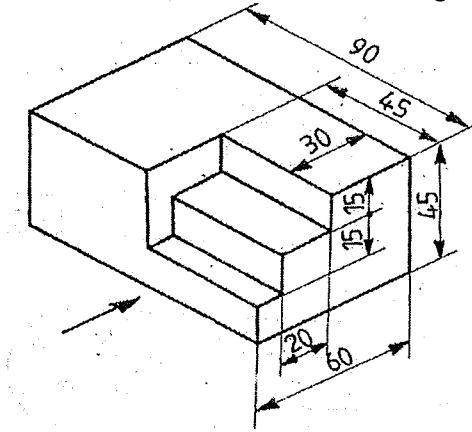the H.P. Its axis is parallel to V.P. and inclined at 45° to the H.P. Draw its projections.

(P.T.O..)

14. A). Draw the isometric projection of the frustum of a cone of base diameter 60 mm, top   10M
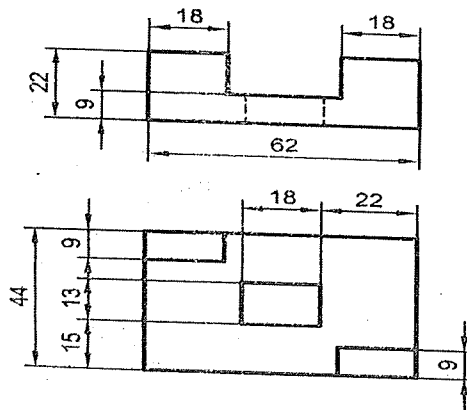diameter 30 mm and height 55 mm.

OR

14. B). Draw the isometric view of a cylinder of base diameter 50 mm and axis 60 mm. The axis   10M
of the cylinder is perpendicular to the (a) H.P., (b) V.P.

15. A). Draw the front view, top view and side view for the following fig.   10M

OR

15. B). The front and side views of an angle plate are shown in Fig. Draw its isometric view.   10M

*****