



End Term (Odd) Semester Examination Nov-Dec 2025

Roll no.....

Name of the Program and semester: **MCA/MCA (AI&DS)**

Name of the Course: **Programming and Problem Solving**

Course Code: **TMC-103/TMD-103**

Time: 3 hour

Maximum Marks: 100

Note:

- (i) All the questions are compulsory.
- (ii) Answer any two sub questions from a, b and c in each main question.
- (iii) Total marks for each question is 20 (twenty).
- (iv) Each sub-question carries 10 marks.

Q1. (2X10=20 Marks) **CO-1, CO-2**

- a. (i) Why is computational thinking important? What are the pillars of computational thinking?
(ii) Explain the various problem-solving approaches in programming.
- b. Explain the frequency count and complexity of an algorithm by taking a suitable example.
- c. What do you mean by programming paradigms? Explain in detail by giving suitable examples.

Q2. (2X10=20 Marks) **CO-2, CO-3**

- a. Write short notes on the following:
(i) Else if ladder (ii) Jumping Statements (iii) Bitwise Operators
- b. Draw a neat and clean flow chart to find the product of factorial of first and last digit of an input number.
Example: input number: 3825 Output is 720 (3! X 5!)
- c. Write a C program to find all prime factors of an input number.

Q3. (2X10=20 Marks) **CO-3, CO-4**

- a. Elaborate the difference between iteration & recursion. Also write a recursive function (return with parameters type) to find HCF (Highest Common Factor) of two numbers by using successive division method.
- b. Write a program in C to count and display the frequency of each character in a string. Remove the duplicate characters and store them in another string.
- c. “A 2-D array is collection of single dimensional array” elaborate this statement. How do we implement matrix using 2D array? Write a C program to print the transpose of a matrix of order mxn.

Q4. (2X10=20 Marks) **CO-3, CO-4**

- a. Write short notes on the following:



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- (i) Conditional compilation (ii) Macros (iii) Command Line Arguments
- b. Write a program to find and display the occurrence of a substring within another string. Both the strings should be input by the user.
- c. Write a program to input N names than sort and display these input names. Sort using any sorting technique.

Q5. (2X10=20 Marks) CO-4, CO-5

- a. (i) What is a self-referential structure? Explain with an example.
- b. (i). Explain the following file handling functions:-
fseek(), ftell(), feof(), fread(), fwrite().
- (ii) What is the size of a pointer variable? What are the various arithmetic operations that can be perform on pointers?
- c. Write a program in C copy the contents of a text file in reverse order in another file.