

**TILAK MAHARASHTRA VIDYAPEETH, PUNE**  
**MASTER OF) COMPUTER APPLICATIONS (M.C.A.)**  
**EXAMINATION: JUNE - 2025**  
**SEMESTER - I**

**Sub : Advanced C Programming and Data Structures (MCA-101-22/MCA24-101)**

**Date : 10/06/2025**

**Total Marks : 60**

**Time: 10.00 am To 12.30 pm**

**Instruction:**

1. All questions are compulsory unless and otherwise stated.
2. Bold figures to the right of every question are the maximum marks for that question.
3. Candidates are advised to attempt questions in order.
4. Answers written illegibly are likely to be marked zero.
5. Use of scientific calculators, Log tables, Mollier Charts is allowed.
6. Draw neat and labelled diagram wherever necessary.

- Q. 1. Answer the following in 2 - 3 lines. (Any 5) (10)**
1. Define data structures
  2. List down the applications of stack.
  3. What is matrix?
  4. What are leaf nodes?
  5. What is pointer? How pointers are declared.
  6. Define the term sorting.
  7. What is function prototype?
- Q. 2. Answer the following in short. (Any 4) (20)**
1. Write an algorithm to add node at the beginning of linked list
  2. Differentiate between static and dynamic memory allocation
  3. How you can create doubly linked list?
  4. What is tree? Write an algorithm for creating the binary tree.
  5. What is function? Write advantages & disadvantages of function.
  6. Explain the relation between stack and recursion.
- Q. 3. Answer the following in detail. (Any 3) (30)**
1. Illustrate with example binary search tree. Write an algorithm to create binary search tree.
  2. Explain the implementation of queue as a Data structures. State the rules to be followed by a queue.
  3. Convert following infix expression into postfix and prefix expression using Tabular form . (Expression  $(A + B) * (C - D) / E$ )
  4. Write a program to compare and concatenate using pointers.
  5. Write a program to sort an array using bubble sort technique.

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