

2C8123

Roll No. _____

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M.C.A. II-Sem. (Main/Back) Examination, June/July - 2025
MCA-203 Data Structures

Time : 3 Hours**Maximum Marks : 70****Instructions to Candidates:**

Attempt all Ten questions from Part A. All Five questions from Part B and Three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (As Mentioned in form No. 205).

PART - A
(Word limit 25)

All questions are compulsory.**(10×2=20)**

1. Differentiate between static and dynamic memory allocation.
2. Differentiate between dequeue and priority queue.
3. What is Recursion?
4. What is a header node in a linked list?
5. Write any two applications of stack in the field of computer science.
6. Write the time complexity of Insertion Sort, Bubble Sort, Quick Sort and Selection Sort.
7. What is a pivot in quick sort?
8. What is the best case complexity of binary search? Also write the important condition to apply binary search.
9. Differentiate between DFS and BFS.
10. What is AVL tree.

PART - B
(Word limit 100)

All questions are compulsory.**(5×4=20)**

1. Construct the binary tree, with respect to the following traversals of the tree.

INORDER: H K D B I L E A F C M J G
PRE ORDER: A B D H K E I L C F G J M

2. Write an algorithm to evaluate Postfix expression with the help of a stack.
3. What is the difference between a binary tree and a binary search tree? Give an example of tree that is binary tree but not a binary search tree.
4. Perform Bubble Sort on the given input sequence explaining step by step process. Also calculate the time complexity of the bubble sort.
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5. Differentiate between a stack and a queue. Write an algorithm to insert an item in a queue.

PART - C

Answer any Three of the following questions.

(3×10=30)

1. Write an algorithm to merge two sorted arrays into a third array. Do not sort the third array. Also calculate its complexity.
2. What is data structure? Write its classification and operations performed on data structure. Also write about the asymptotic notations used to represent the time complexity of an algorithm.
3. Describe singly linked list and write algorithms for insertion and deletion of a node.
4. What is a Binary Search Tree (BST)? Make a BST for the sequence of numbers.
55, 36, 70, 23, 89, 100, 58, 39, 41, 60, 65, 25
Write Preorder, Inorder and Postorder traversal of this tree. What is the height of the resultant tree? <https://www.pyqonline.com>
5. What is a minimum spanning tree of a graph? Apply Kruskal's algorithm to find the minimum spanning tree of the following graph:

