APRIL 2026 **52507/225C4A**

Time : Three hours Maximum : 75 marks

PART A — (10 × 2 = 20 marks)

Answer any TEN questions.

1. Define a data structure.

2. What is a sparse matrix?

3. Write any two applications of stacks.

4. Define a circular queue.

5. What is a binary tree?

6. Define: AVL tree.

7. What is an algorithm?

8. Define: Asymptotic notation.

9. What is BFS traversal?

10. Write the time complexity of binary search.

11. What is backtracking?

12. Mention any two applications of divide and conquer technique.

PART B — (5 × 5 = 25 marks)

Answer any FIVE questions.

13. Explain the representation of arrays and their applications.

14. Write a C function for inserting a node in a singly linked list.

15. Describe infix to postfix conversion using stack.

16. Write operations of circular queue using array representation.

17. Explain binary tree traversals with example.

18. Describe Kruskal's algorithm to find MST.

19. Explain the quick sort algorithm with an example.

PART C — (3 × 10 = 30 marks)

Answer any THREE questions.

20. Write and explain the operations on doubly linked list with example.

21. Explain the array and linked list representation of stacks and queues.

22. Explain the construction and insertion operations in AVL tree.

23. Describe Prim's algorithm with an example.

24. Explain the 8-Queens problem using backtracking.

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