

Duration: 3hrs

[Max Marks: 80]

- N.B. : (1) Question No 1 is Compulsory.  
 (2) Attempt any three questions out of the remaining five.  
 (3) Figures on right indicates marks  
 (4) Assume suitable data, if required and state it clearly.

- 1 Attempt any Three [15]
- a Define Data Structure. Give examples of Linear and Non-linear Data Structures
- b Explain Static Array vs Dynamic Array
- c Write any two applications of Stack
- d Differentiate between Circular Queue and Simple Queue.
- e Define Inorder, Preorder and Postorder traversal. Write the sequence for the tree:
- ```

  A
 / \
B   C

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- 2 a Write an algorithm for infix to postfix conversion [10]
- b Represent a Stack using an array and write the algorithms for Push and Pop operations [05]
- 3 a Write a C program to insert and delete a node in a Singly Linked List [10]
- b Explain Round Robin Scheduling using Queue with a suitable example. [05]
- 4 a Explain Binary Tree Traversals (Preorder, Inorder, Postorder) with a suitable example tree. [10]
- b Construct a Binary Search Tree (BST) for the following values [05]  
 50, 30, 70, 20, 40, 60, 80  
 Also show Inorder traversal of the final BST
- 5 a Explain DFS and BFS algorithms for graph traversal. [10]
- b Explain Topological Sorting with a suitable example. [05]
- 6 a Explain the following sorting techniques with one example each: [10]  
 i) Bubble Sort  
 ii) Insertion Sort  
 iii) Quick Sort (10)
- b What is Hashing? Explain Linear Probing and Quadratic Probing with examples. [05]

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