

Duration: 3hrs

[Max Marks:80]

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

- 1 Attempt the following. **[20]**
 - a Explain linear and nonlinear data structures.
 - b Explain infix, postfix and prefix expression with an example.
 - c Differentiate between stack and queue.
 - d Write an algorithm to traverse a singly linked list
- 2 a Write a C program to implement queue using Arrays. **[10]**
 b Write an algorithm to convert infix expression to postfix using stack. **[10]**
- 3 a Explain BFS and DFS algorithm. **[10]**
 b Write an algorithm for linear search and binary search algorithms **[10]**
- 4 a Consider the following sorted array DATA with 13 elements: 11, 22, 30, 33, 40, 44, 55, 60, 66, 77, 80, 88, 99 Illustrate the working of binary search technique while searching an element (i) 40 (ii) 85. **[10]**
 b What is a Binary search tree? Construct a Binary search tree for the following elements. 50,33,44,22,77,35,60,40 **[10]**
- 5 a Explain selection sort using an example. Write an algorithm for it and comment on its complexity **[10]**
 b Explain different graph representation techniques with an example. **[10]**
- 6 a Write a C program to implement a singly linked list. The program should be able to perform the following operations: **[10]**
 1. insert a node in the end
 2. delete the first node
 3. display the nodes.
- b Write a program to implement a stack using array. **[10]**