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,   **[10]**
44, 55, 60, 66, 77, 80, 88, 99 Illustrate the working of binary search technique
while searching an element (i) 40 (ii) 85.

b   What is a Binary search tree? Construct a Binary search tree for the following   **[10]**
elements. 50,33,44,22,77,35,60,40

5   a   Explain selection sort using an example. Write an algorithm for it and comment   **[10]**
on its complexity

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   **[10]**
to perform the following operations:

1. insert a node in the end

2. delete the fisrt node

3. display the nodes.

b   Write a program to implement a stack using array.   **[10]**

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