

Time: 3 hours

Marks: 80

- N.B 1) Question no. 1 is compulsory
2) Attempt any three out of remaining question
- Q.1 a) What is ADT? Write ADT for Stack. **3**
 b) Explain Asymptotic notations **3**
 c) Draw all possible Binary Search Trees of 7,9,11 **3**
 d) Define Minimum spanning tree with example **3**
 e) Write an algorithm to count the number of nodes in singly linked list. **3**
 f) Explain with example **3**
 i. Degree of a tree
 ii. Height of a tree
 g) Define algorithm and state its properties **2**
- Q.2 a) Write a program for insertion in singly linked list. **10**
 b) Write an algorithm to implement stack as a array. **10**
- Q.3 a) Write a program for infix to postfix conversion **10**
 b) Write properties of Heap. Also build Max-Heap from given data: 56 , 12, 45, 33, 8, 63, 74, 25, 18, 36 **10**
- Q.4 a) Construct Binary Tree from given inorder and postorder traversal sequence **10**
 given below:
 Inorder: "INFORMATION"
 Postorder : "INOFMAINOTR"
 b) Write an BFS and DFS algorithms for graph traversal **10**
- Q.5 a) What is an AVL tree? Construct an AVL tree for following set of data: 14, 10, 1, 20,17,24, 18,12,15, 11,4,6 **10**
 b) Write an algorithm to implement insertion sort. Explain its time complexity. **10**
- Q.6 Write short note on (**any four**) **20**
 a) Red - black tree
 b) Selection sort
 c) Circular Queue
 d) Collision resolution techniques.
 e) linear and non linear data structures
