S.E.(INFORMATION TECHNOLOGY)(Sem III) (CBSGS) / DATA STRUCTURE & ALGORITHM ANALYSIS

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,   **10**
             45, 33, 8, 63, 74, 25, 18, 36

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**
             10, 1, 20,17,24, 18,12,15, 11,4,6

          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

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