

BT-3/DX

8302

DATA STRUCTURES

Paper – CSE-203E

Time : Three Hours]

[Maximum Marks : 100

**Note :** Attempt five questions in all, picking at least one question from each unit.

**UNIT-I**

1. (a) Write function to convert an infix expression to a postfix one using stacks.  
(b) Write function to count and return all occurrences of a given integer from an array of integers. 14,6
2. (a) Give an efficient method to represent polynomials using arrays. Now write a function called polyadd( ) to add two given polynomials. Pass the starting addresses of polynomials as parameters to this function.  
(b) Implement an algorithm to test if a string is a palindrome using stack. 12,8

**UNIT-II**

3. (a) Write algorithm to delete a node pointed by 'p' in a singly linked list 'L'. This node could be anywhere in the linked list.  
(b) Write algorithm to reverse a singly linked list without using additional nodes. You may use pointers. 8,12

4. (a) Write a C function to combine two singly connected linked lists such that if one list is  $L = (l_0, l_1, \dots, l_m)$  and other list is  $M = (m_0, m_1, \dots, m_n)$ , after combining them the combined list should be  $(l_0, m_0, l_1, m_1, \dots)$ . No additional nodes may be used.  
(b) Write functions that implement stacks and queues using linked lists. 12,8

**UNIT-III**

5. (a) What are AVL trees ? Write algorithms for AVL tree left balance and rotate right and left.  
(b) Write function to count number of leaf nodes of a binary tree. 12,8
6. (a) What is a  $m$ -way tree ? Draw a four-way tree. What is a B-tree ? Draw a B-tree of order 5.  
(b) Write algorithms to add and delete a node from binary search tree. 8,12

**UNIT-IV**

7. (a) Write an algorithm that finds the sum of the degrees for a node of a graph represented using the adjacency list representation.  
(b) What is Bucket hashing method ? Write its algorithm. 10,10
8. (a) Write algorithms for heap sort and quick sort.  
(b) Write down any minimum-cost spanning tree algorithm. Obtain its running time complexity. 10,10