Roll No. ..... Total Pages : 2

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 $L = (l_0, l_1, ..., l_m)$ and other list is $M = (m_0, m_1, ..., m_n)$, after combining them the combined list should be $(l_0, m_0, l_1, m_1, ...)$. 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