Roll No. ..... Total Pages : 3

BT-3/D-12 **8302**

DATA STRUCTURES

Paper—CSE-203E

Option–II

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks. Always write suitable explanation of logic or comment in the program code, wherever needed. In all questions, wherever algorithm or pseudo-code is to be written, you can write equivalent function in C-language syntax also. It will not lead to any deduction of marks. Rather it will be preferable.

UNIT–I

1. (a) Write a modular program in C which finds and stores transpose of an m * n matrix into same matrix. No other matrix should be used in the program at all. Max 7 marks will be given if transpose is not stored in same matrix.

   (b) What do you understand by ADT ? Explain. 14,6

2. (a) Write algorithm to convert given infix expression to postfix expression.

   (b) Write a program to convert a given Sparse matrix to the equivalent non-sparse matrix. 10,10

UNIT–II

3. (a) Write algorithm to reverse a singly linked list and explain its working.

   (b) What is a priority queue and what are its applications? 12,8

4. (a) Write a algorithm to delete a node from a given doubly linked list. The position of the node will be supplied as an argument to the module. The position can be 1 (meaning first node) to n. Declarethe necessary structures needed for this module.

   (b) Write linked list implementation of queue operations. 10,10

UNIT–III

5. (a) Using examples, show the prefix and postfix expressions representation using trees.

   (b) How lists are represented using trees ? Explain.

   (c) Write algorithm to find height of a binary tree. Explain its working. 6,6,8

6. (a) Write short notes on the following :

   (i) Balanced multi-way search trees

   (ii) B-trees.

   (b) Write a non-recursive implementation of pre-order traversal of binary tree. 10,10

UNIT–IV

7. (a) Describe the working of linear probing and chaining. Where are these useful ?

(b) Step by step, show, how following numbers get sorted using heap sort :

20, 18, 35, 16, 10, 18, 2, 14. 10,10

8. (a) Define minimum spanning tree. How can we find a minimum spanning tree from a given graph ? Explain with help of a suitable example.

(b) Draw a directed graph of at least 5 nodes and having at least 8 edges. Show its representation using adjacency list.

(c) Write algorithm for bubble sort. 8,5,7