Total No. of Questions : 10] [Total No. of Printed Pages : 4

Roll No. .....

CS/IT–305(N)

B. E. (Third Semester) EXAMINATION, Feb., 2010

(New Scheme)

(Common for CS & IT Engg. Branch)

DATA STRUCTURE/DATA STRUCTURE AND ALGORITHM

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt any *one* question from each Unit. All questions carry equal marks.

Unit – I

1. (a) What are the various ways to analyse programs ? Also discuss complexity of algorithms. 10

   (b) What is the importance of sparse matrix ? Write an algorithm to transpose a given matrix in sparse form. 10

Or

2. (a) Write in brief about the following : 5 each

   (i) Garbage collection

   (ii) Backtracking

   (b) What do you understand by tail recursion ? Explain with the help of suitable example. 10

P. T. O.

Unit – II

3. (a) What is stack data structure ? Write algorithms for linked implementation of stack. 10

   (b) What is a D-queue ? List various classes of D-queue. Explain its insertion and deletion operations with the help of examples. 10

Or

4. (a) Write an algorithm to convert an infix expression to its prefix form. 10

   (b) Discuss the advantages and disadvantages of doubly linked list. Give an example to demonstrate insertion and deletion operations in DLL stored in array form. 10

Unit – III

5. (a) Define Tree. Prove that a binary tree with n nodes has exactly $(n - 1)$ edges or branches. 10

   (b) What is an AVL Tree ? Discuss various types of rotations required to balance an unbalanced AVL Tree. Construct an AVL tree of the following data : 10

   March, May, November, August, April, January, December, July, February, June, October, September

Or

6. (a) What is a threaded binary tree ? Explain with proper example. 10

   (b) Write an algorithm to check whether two given binary trees are equal or not. 10

Unit – IV

7. (a) Write insertion sort algorithm. Also discuss its time complexity. 10

(b) What is quick sort technique ? Using quick sort arrange the following elements in ascending order : 10

26, 5, 37, 1, 61, 11, 59, 15, 48, 19

Or

8. (a) What is the use of hashing function ? Explain any *four* hashing functions with examples. 10

(b) Write notes on the following : 5 each

(i) Overflow handling in hashing

(ii) Static tree tables

Unit – V

9. (a) What is a graph ? How a graph can be represented in memory ? Write an algorithm to delete an edge from a graph. 10

(b) Find the minimum cost spanning tree of the given graph using Kruskal's algorithm. 10

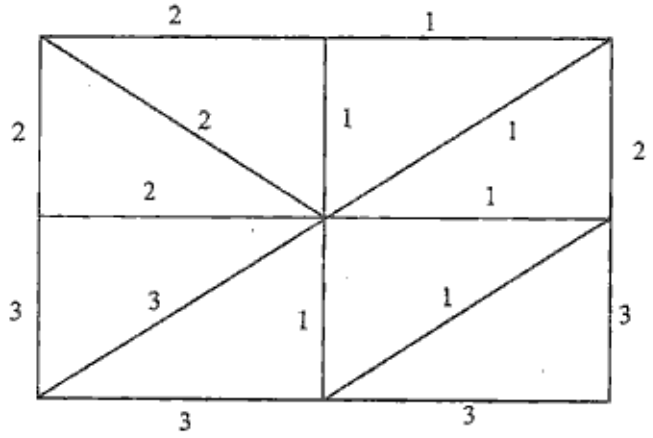

Fig. 1

Or

10. (a) Write Breadth first search technique and its use. 10

(b) Write Prim's algorithm for minimum spanning tree. Determine minimum spanning tree for the following undirected graph : 10

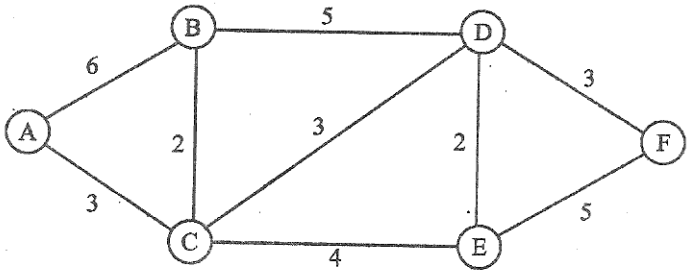

Fig. 2