

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
- Overflow handling in hashing
 - 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

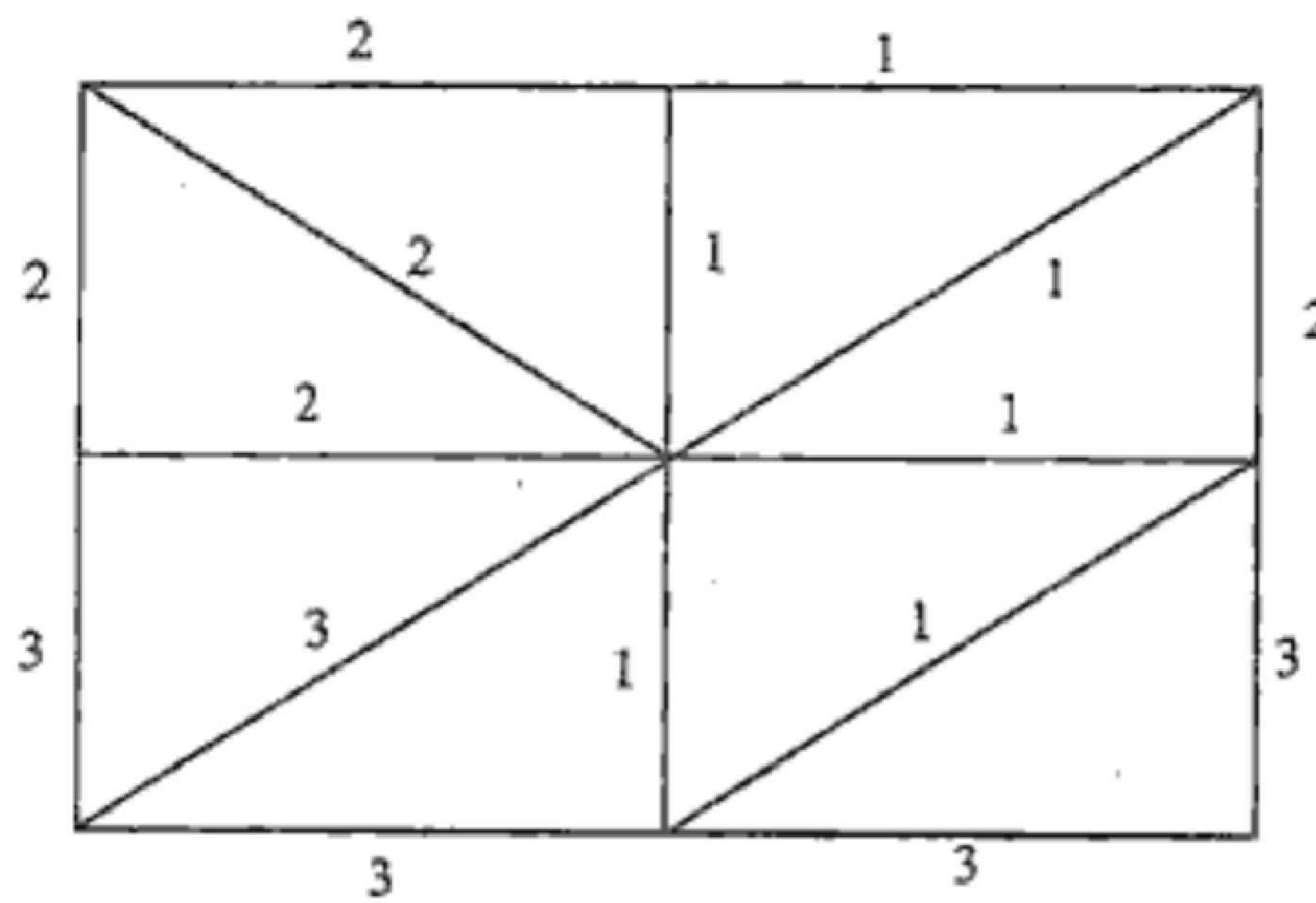


Fig. 1

Or

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

P. T. O.

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

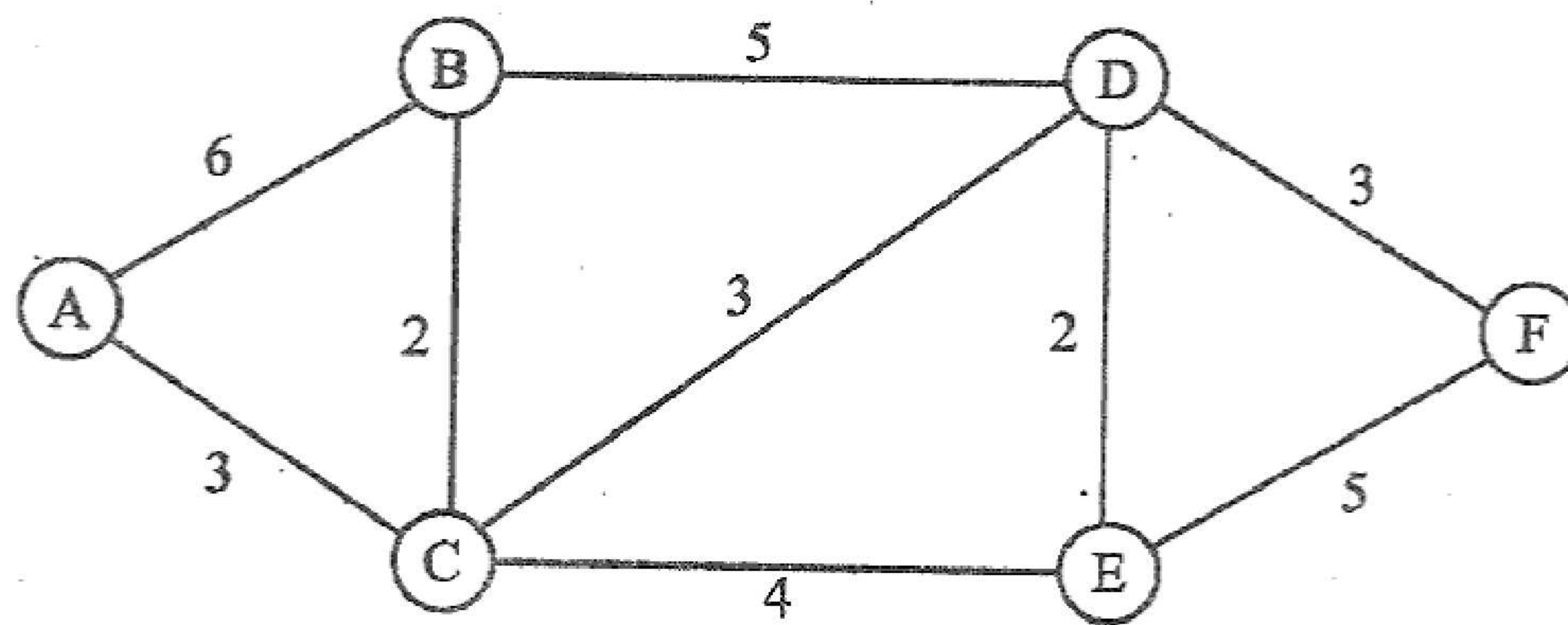


Fig. 2