

**MCA-2<sup>ND</sup> Sem**

**Data Structure**

**Section-A**

**2\*7=14**

Attempt All Questions-

- What is a sparse matrix? Also give its important properties.
- Discuss the differences between Array and lists.
- Write two applications of Linked Lists.
- Explain a method to store a graph in computer.
- Explain Complete Binary Tree and Extended Binary Tree.
- Differentiate between directed and Undirected graph.
- Explain Garbage Collection with example.

**Section-B**

**7\*3=21**

Attempt Any Three-

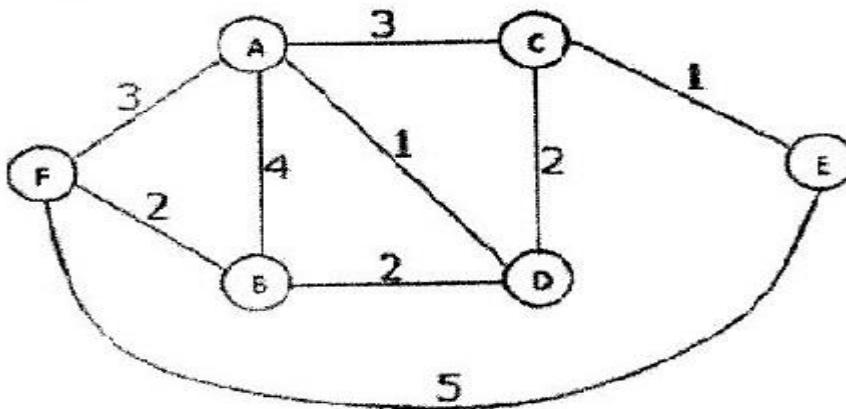
- Write a program for insertion sorting. Also Analyze Running time.
- Write Dijkstra Algorithm for finding the shortest path from a source vertex.
- What do you understand by recursion? Discuss and write function for Tower of Hanoi problem.
- Write a C-function or algorithm to implement BST for searching an element.
- What are the different ways the graph is represented in computer memory? Explain with example.

**Section-C**

**7\*5=35**

Attempt Any Five Questions-

- Illustrate the execution of Heap-Sort on the array.  
A=<6,14,3,25,2,10,20,30,7>
- Write an algorithm for the implementation of quick sort. Apply the algorithm to sort the given list---  
65,70,75,80,85,60,55,40,45
- What is spanning tree. Find the minimum cost of the following tree and draw its spanning tree--



- What is AVL tree? Explain the balancing methods of AVL trees with an example.
- Define Hashing. What are the properties of a good hash function? With necessary examples? Explain 4 different Hashing techniques.
- What is threaded binary tree? Explain the operation of threaded binary tree.
- How records are organized into blocks? Discuss any one method for the same with an example.