Exam. Code: 206702
Subject Code: 4621

M.Sc. (Computer Science) 2nd Semester
DESIGN AND ANALYSIS OF ALGORITHMS
Paper—MCS-203

Time Allowed—Three Hours] [Maximum Marks—100

Note :— Attempt any **FIVE** questions. All questions carry equal marks.

1. What is an Algorithm ? Explain various properties of an algorithm. Explain Worst Case, Best Case and Average Case Complexity of an algorithm by taking suitable examples. 20

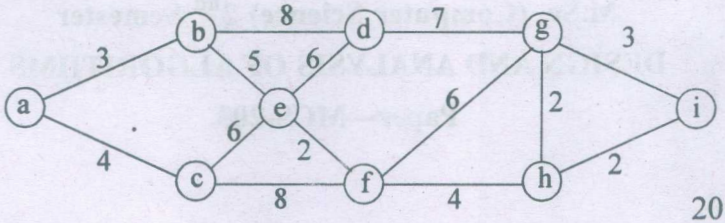
2. When is the binary search technique used for searching in a list ? Write a recursive algorithm for binary search. Compare the performance of binary search with linear search. 20

3. Write QUICK-SORT Algorithm and sort the following array showing the steps of Algorithm :

   15, 10, 13, 9, 12, 7

   Also find the complexity of this algorithm. 20

4. What is minimum cost spanning tree ? Explain Kruskal's algorithm to obtain minimum spanning tree and apply it on the following graph :



20

5. Explain how using dynamic programming reduces the complexity of a simple algorithm. Explain the procedure to solve Travelling Sales Persons problem using dynamic programming approach. Comment on the nature of solution to the problem. 20

6. Define Backtracking as a technique to solve problems with a large search space. Solve 8-queen's problem using backtracking. 20

7. What are the different ways in which the graph is represented in computer memory ? Compare the efficiencies of BFS and DFS as searching algorithms used for graphs and trees. 20

8. Write short notes on :—

   (a) Binary Search Tree.

   (b) 0/1 Knapsack. 10,10