**Exam. Code : 206702**
**Subject Code : 5236**

**M.Sc. Computer Science 2nd Semester**
**DESIGN & ANALYSIS OF ALGORITHMS**
**Paper—MCS-203**

Time Allowed—3 Hours] [Maximum Marks—100

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

1. Define algorithm. What are the parameters to judge the efficiency of an algorithm ? Explain various notations for representation of time complexity of an algorithm with suitable examples. 20
2. How is binary search different from linear search ? Write the binary search algorithm and compute its time complexity. 20
3. Explain the Quick sort algorithm for sorting the elements and show that the Quick-sort's best case running time is $\Omega(n \lg n)$. 20
4. What is meant by minimum spanning tree ? What are its applications ? Prove that Kruskal's algorithm generates a minimum-cost spanning tree for every connected undirected graph G. Analyze the time complexity of Kruskal's algorithm. 20
5. What is 0/1 Knapsack problem ? Describe, by giving an algorithm, how 0/1 Knapsack problem can be solved by using dynamic programming technique of designing an algorithm. 20




6. What do you mean by forward and backward approach of problem solving in Dynamic Programming ? What are the differences between Greedy and dynamic programming method of problem solving techniques ? Explain in detail how the technique of backtracking can be applied to solve the 8-queens problem. Present an algorithm for this and explain. 20
7. Define multistage graphs problem. Name the algorithms, which solve the problem. Write one of the algorithms and explain its working with an example. 20
8. Write short notes on :
   (a) Traversal techniques for graphs
   (b) Travelling salesman problem. 10,10