Unit 1

1. Write Dijkstra's algorithm and derive its time complexity with an example?
2. Write Heap sort algorithm and derive the best and worst case time complexities?
3. Write DFS algorithm and derive its time complexity?
4. Derive the best and worst case analysis of quick sort with an example?
5. Compare the best and worst case time complexities of any 4 sorting algorithms?
6. Explain the counting sort and derive its time complexity?
7. Briefly explain Proof of correctness of an algorithm with an example?
8. Explain topological sorting with the help of an example?

Unit 2

1. Explain with an example how matroids are useful in real time computations?
2. Discuss the use of Graph matching algorithm to find vertex cover of a graph?
3. Explain the components, advantages and disadvantages of greedy approach?
4. What is a minimum spanning tree and explain its properties and applications?
5. Discuss Edmond's Blossom algorithm with example?
6. Write an algorithm to compute maximal weight maximum independent set in graph?
7. Discuss in detail Prims algorithm with an example?
8. Discuss in detail Kruskal's algorithm with an example?

Unit 3

1. Illustrate the basic difference between Edmond Karp algorithm and Ford Fulkerson algorithm with an example?
2. Describe Max flow Min cut theorem and also its applications?
3. Define divide and conquer method and explain its advantages and disadvantages?
4. Explain the algorithm of Strassen's matrix multiplication technique?
1. Apply the Strassen's matrix multiplication technique for multiplying n x n matrices showing each step in detail?
2. Discuss Edmond-krap Maximum flow algorithm and its time complexity?
3. Develop an algorithm to find max-flow in graph using Ford-Fulkerson Method?

Unit 4

1. With an example derive the time complexity of matrix chain multiplication?
2. What is dynamic programming explain its characteristics and components?
3. Briefly discuss about Chinese remainder theorem with an example?
4. Show that the matrix chain multiplication algorithm provides the optimal solution to multiply a group of matrices?
1. Develop an algorithm for Floyd-Warshall method in dynamic programming
2. Write the algorithm for Chinese remainder theorem and specify its time complexity?
3. With an example perform all the arithmetic operations using modulo representation?

Unit 5

1. Explain the proof of NP complete?
2. Write the algorithm for Randomized problem?
3. Discuss in detail the components of linear programming and mention its applications?
4. What are NP-hardness and NP-completeness problems explain with examples?
1. Write the approximation algorithm and explain in detail?
2. How linear programming method can be used to improve maximization with an example?
3. Briefly discuss about randomized algorithm with an example?
4. Discuss interior point method in detail?
1. Explain how interior method can be used to achieve optimization?