

**MCA/D-18**

**DESIGN AND ANALYSIS OF ALGORITHMS**

**MCA-14-33**

1. Attempt all the questions :

- (a) Write the properties of asymptotic notations.
- (b) Drive the complexity of Binary Search Algorithm.
- (c) List out the memory function used under dynamic Programming.
- (d) Define flow 'cut'.
- (e) Define time Complexity.
- (f) How NP-Hard problems are different from NP-complete?
- (g) Define Hamiltonian Circuit Problem.
- (h) Distinguish between Algorithm and Pseudo Code.

**Unit I**

2. Write an algorithm based on divide and conquer strategy to search an element in a given list. Assume that the elements of list are in sorted order.
3. Explain the method of determine the complexity of procedure by the step count approach. Illustrate with an example.

## **Unit II**

4. Explain, how Matrix-chain multiplication problem can be solved using dynamic programming with suitable example.
5. Explain Recursive Binary Search Algorithm with suitable example.

## **Unit III**

6. State the Greedy Knapsack. Find an optimal solution to the Knapsack instance  $n=3, m=20$ .  $(P_1, P_2, P_3)=(25, 24, 15)$  and  $(W_1, W_2, W_3)=(18, 15, 10)$ .
7. Discuss the single source shortest paths algorithm with suitable example.

## **Unit IV**

8. Implement an algorithm for Knapsack problem using NP-Hard Approach.
9. Explain the concepts of P, NP and NP-complete Problems.