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BT-5/D-22 **45274**

DESIGN AND ANALYSIS OF ALGORITHMS

Paper–PC–CS–AIML-303A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all selecting at least *one* question from each unit. All questions carry equal marks.

UNIT-I

1. (a) Explain the substitution method for recurrence relation.

(b) Analyze the best, average and worst case complexity of quick sort.

2. (a) What do you understand by Asymptotic notation and Asymptotic analysis? Discuss.

(b) Discuss the Strassen Matrix multiplication algorithm along with its time complexity.

UNIT-II

3. (a) Explain how Matrix - chain Multiplication problem can be solved using dynamic programming with suitable example.

(b) What is a Red Black tree? What are its properties? Discuss the algorithm to insert an element in it.

4. (a) Explain the general principle of Greedy method and explain the greedy technique for solving the Job Sequencing problem.

(b) Describe the Travelling sales person problem and discuss how to solve it using dynamic programming.

UNIT-III

5. (a) What is a Spanning tree? Explain Prim's Minimum cost spanning tree algorithm with suitable example.

(b) Compare BFS and DFS algorithm with an example graph and denote its time complexities.

6. (a) Compare the time complexities of solving the All Pairs Shortest Path problem using Floyds algorithm and using the Dijkstra's algorithm by varying the source node. Justify your answer.

(b) Differentiate between P, NP, NP complete and NP hard problems.

UNIT-IV

7. What do you understand by a Bitonic Sequence? Explain the bitonic sort algorithm.

8. (a) What is a bipartite graph? Discuss Maximum Bipartite Matching algorithm.

(b) Discuss Ford-Fulkerson Algorithm for Maximum Flow Problem.
