Roll No. ..... Total Pages : 2

BT-5/D-21 **45115**

DESIGN AND ANALYSIS OF ALGORITHMS

Paper–CSE-305N

Time Allowed : 3 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. Discuss about the properties of Red-black trees. Suppose that a node x is inserted into a red-black tree with RB-insert and then is immediately deleted with RB-delete. Is the resulting red-black tree the same as the initial red-black tree ? Justify your answer. 15

2. What is Recurrence ? How is recursion-tree method solve the Recurrences ? 15

UNIT–II

3. How is Dynamic programming solve the problems by combining the solutions to subproblems ? Also state the matrix-chain multiplication problem to lower the cost. 15

4. How is a greedy approach applied to produce an optimal best solution to solve a problem of scheduling unit-time tasks with deadlines and penalties ? 15

UNIT–III

5. How is Bellman-Ford algorithm solve the single-source shortest-paths problem in which edge weights may be negative ? Explain. 15

6. How is Floyd-Warshall algorithm used as different dynamic programming formulation to solve the all-pairs shortest-paths problem on a directed graph ? Discuss with an example. 15

UNIT–IV

7. Describe the classical method of Ford and Fulkerson for finding maximum flow to compute the greatest rate to ship material from the source to the sink without violating any capacity constraints. 15

8. How are combinatorial problems solved with multiple-source and Multiple-sink maximum flow by maximum-bipartite-matching approach. Explain in detail. 15