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

BT-5/D-20 **45115**

DESIGN AND ANALYSIS OF ALGORITHMS

Paper–CSE-305N

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. Differentiate between the following :

(a) Big-O and small-o asymptotic notations.

(b) Merge Sort and Quick sort.

2. (a) What is a recurrence relation? How is it helpful in finding the complexity of an algorithm? Explain.

(b) Write a short note on Red-black trees.

UNIT–II

3. What is dynamic programming ? How is it different from divide and conquer ? Explain it using longest common subsequence problem with X = {A, B, C, B, D, A, B} and Y = {B, D, C, A, B, A} as an example.

4. (a) How greedy algorithms work to find the solution of a problem ?

(b) Solve the 8-Queens problem using backtracking.

UNIT–III

5. (a) What do you mean by traversing a graph ? Explain topological sort along with its algorithm and analysis.

(b) Discuss the procedure to find the minimum spanning tree of a given graph using Kruskal's algorithm.

6. Explain the following :

(a) Single-source shortest path algorithm.

(b) All-pair shortest path algorithm.

UNIT–IV

7. (a) What is a complexity class? Explain NP class of computational complexity using suitable examples.

(b) What do you mean by bipartite graphs ? Explain.

8. Explain the following:

(a) Ford - Fulkerson method for maximum flow.

(b) Sorting and comparison networks.