Roll No. ..... Total Pages : 3

BT-6/M-20 **36017**

ANALYSIS AND DESIGN OF ALGORITHMS

Paper–IT-352

Time : Three Hours] [Maximum Marks : 100

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

UNIT–I

1. (a) What is an algorithm? Write the important steps for designing an algorithm. How run time analysis of an algorithm is performed?

(b) What is stable algorithm? Is quick sort stable? Express $6 * 2^n + n^2$ using asymptotic notations ? (10+10=20)

2. (a) Explain divide and conquer algorithm. Write the algorithm for binary search and find average case efficiency.

(b) Discuss Strassen's matrix multiplication with a specimen example and derive its time complexity. (10+10=20)

UNIT–II

3. (a) What is Greedy method/ algorithm? Does it always give an optimal solution? Give an example of exact optimization solution.

(b) Write a detailed note on single source shortest paths. (10+10=20)

4. (a) What is dynamic programming? How is this approach different from recursion? Give example in support to your answer.

(b) What do you understand by longest common sequence?

(10+10=20)

UNIT–III

5. (a) Describe the backtracking solution to solve 8-queens problems.

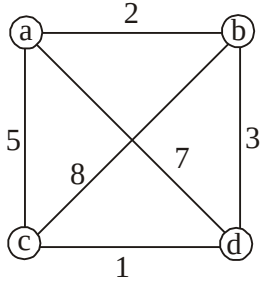
(b) Write a detailed note on Knapsack problem.

(10+10=20)

6. (a) Solve the following instance of 0/1 Knapsack problem; given the Knapsack capacity in W = 5 using dynamic programming and explain it.

Items	Weight	Value
1	4	10
2	3	20
3	2	15
4	5	25

(b) Apply Branch and Bound algorithm to solve the travelling salesman problem for



(10+10=20)

UNIT–IV

7. (a) Give a suitable example and explain depth first and breadth first search algorithms.

(b) What is the difference between binary search tree and B+ tree? Write the basic operations on B trees. How insertion is performed in binary search tree?

(7+13=20)

8. What are computational complexity measures? Explain the classes of NP-hard and NP-complete. 20