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

MCA/D11 4528

Design and Analysis of Algorithm

Paper : MCA 303

Time : Three Hours] [Maximum Marks : 80

Note :– Attempt **FIVE** questions in all. Question No.**1** is compulsory. Attempt remaining **FOUR** questions by selecting only **ONE** question from each Unit.

(Compulsory Question)

1. (a) What do you mean by NP-Completeness ?

   (b) What do you mean by lower bounds on parallel computing ?

   (c) Differentiate between Recursive and Non-Recursive algorithm.

   (d) Define Dynamic Programming.

   (e) What do you mean by Greedy method ?

   (f) Define structured design methodology.

   (g) Define the term Back-Tracking.

   (h) Define Branch and Bond technique. 3×8=24

UNIT—I

2. (a) What do you mean by analysis of algorithm ? Discuss in detail an analysis of Insertion Sort Algorithm. Also give its complexity. 7

   (b) What is meant by asymptotic behaviour of algorithms ? Discuss various formal asymptotic notations. 7

3. Explain the following terms with examples :

(a) Recurrence relations

(b) Program verifications and testing

(c) Structured Design methodology. 14

UNIT—II

4. (a) What is Divide and Conquer strategy ? What are its elements ? Explain how quick sort algorithm sorts numbers using Divide and Conquer technique ? 9

(b) Give algorithm for Inorder traversal of binary tree. 5

5. (a) What do you mean by Greedy method ? Does it always provide an optimal solution ? Justify your answer. 8

(b) What do you mean by dynamic programming ? Where and how is it useful ? Explain. 6

UNIT—III

6. (a) What is lower bound ? How would you compute it for sorting algorithms ? Discuss with examples. 7

(b) What are algebraic problems ? Discuss some important techniques for algebraic problems. 7

7. (a) What do you understand by parallel computing ? Discuss some lower bounds on parallel computation. 7

(b) What do you understand by the term Oracles and Adversary arguments ? Explain with examples. 7

UNIT—IV

8. (a) Discuss some simplified NP-hard problems. 7

   (b) What are NP hard and NP complete problems ? Explain with examples. 7

9. Explain the following with examples :

   (a) Cook's Theorem

   (b) Approximation Algorithms. 14