MCA/DX · **5528**

DESIGN AND ANALYSIS OF ALGORITHMS

Paper : MCA-303

Time : Three Hours]   [Maximum Marks : 80

Note : Attempt *five* questions in all. Q. No. 1 is compulsory. Attempt remainging *four* questions by selecting only *one* question from each unit.

(Compulsory Question)

1. (a) What is the need of an Algorithm ?

   (b) Define Asymptotic Notation.

   (c) What do you mean by Traversal technique ?

   (d) How can you use a Structure for designing an Algorithm ?

   (e) Differentiate between Lower Bound and Upper Bound.

   (f) What are the Comparison Trees ?

   (g) When a problem becomes NP-Hard.

   (h) What should be the requirements for a problem to be NP-Complete ?   3×8=24

UNIT–I

2. (a) What do you mean by Structured Design Methodology ? Explain with example.   7

   (b) Compute the complexity terms in respect of Quick Sort technique.   7

3. (a) What is the criterion for analyzing an Algorithm ? How can you verify and test a program ? 10

(b) Describe Recurrence Relation with an example. 4

UNIT–II

4. (a) Give an account of the following algorithm design strategies :

(i) Greedy Method.

(ii) Divide and Conquer. 10

(b) What is the need of Dynamic Programming ? 4

5. (a) Write an algorithm for Binary Search. Illustrate with an example. 6

(b) Write algorithms for Breadth First and Depth First traversal techniques. 8

UNIT–III

6. (a) Find the number of comparisons required for a comparison based algorithm that arranges a set of N given unordered elements in descending order. 10

(b) What do you mean by the term Lower Bound on Parallel Computation ? Illustrate with example. 4

7. (a) Explain any *one* technique used for the solution of an algebraic problem. 7

(b) Explain the terms : Oracles and Adversary arguments. 7

UNIT–IV

8. (a) Explain Cook's Theorem with an example. 6

(b) Explain any *one* NP-Complete problem in detail by choosing an appropriate example. 8

9. (a) What do you mean by Chromatic Number ? 4

(b) Explain Approximation Algorithm in detail. 10

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