

Roll No.

Total Pages : 4

OMCA/D-20

24207

DESIGN AND ANALYSIS OF ALGORITHMS

Paper–MCA-303

Time Allowed : 3 Hours]

[Maximum Marks : 80

Note : Attempt **five** questions in all, selecting **one** question from each Unit. Question No. 1 is compulsory. Rest questions carry equal marks.

Compulsory Question

1. Answer the following questions in brief : 8×3=24

- (i) What do you mean by “worst case efficiency” of an Algorithm? Explain.
- (ii) What is closest-pair problem? Explain.
- (iii) State the general principle of branch and bound algorithm.
- (iv) What is Kruskal’s algorithm?
- (v) Prove that any comparison sort algorithm requires $\Omega(n \log n)$ comparison in the worst case.

24207/K/1039

P. T. O.

- (vi) What are Hamiltonian cycles?
- (vii) What is breadth-first traversal algorithm?
- (viii) How can you determine whether a given problem is NP-Hard problem?

UNIT-I

- 2. Write the asymptotic notations used for best case, average case and worst case analysis of Algorithms. Write an algorithm for finding maximum element in an array. Give best, worst and average case complexities. 14
- 3. (a) What is Priorities queue? Explain its implementation. 7
- (b) What is Stack? Explain its implementation using linked representation. 7

UNIT-II

- 4. What do you mean by Dynamic programming design strategy? Explain its general method. How can you perform Matrix Chain Multiplication using dynamic programming? Explain with an example. 14

5. What is Greedy technique? How can you apply Greedy technique to find the minimum spanning tree using Prim's algorithm? Explain with an example. 14

UNIT-III

6. (a) What are Comparison trees? How can you find minimum in a list using comparison tree? Explain with an example. 7
- (b) Explain Oracle technique for establishing Lower bound in detail. 7
7. (a) How can you find the Lower bounds on Parallel computation? Explain with an example. 7
- (b) What is Fast Fourier Transform (FFT)? Explain an In-Place Version of FFT. 7

UNIT-IV

8. (a) What are NP-Hard problems? Discuss Cook's theorems. 7
- (b) Explain Chromatic Number Decision Problem with suitable example. 7

9. Write short notes on the following Approximation algorithms : 7+7=14

- (i) Maximum Programs Stored Problem
- (ii) Scheduling Independent Task.

