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Roll No. ..... Total Pages : 4

11075/NJ

D–19/2111

ALGORITHM ANALYSIS AND DESIGN

Paper–305

Semester–V

Time Allowed : 3 Hours] [Maximum Marks : 50

Note : The candidates are required to attempt **three** questions each from Sections A and B carrying 5 marks each and the entire Section C consisting of 10 short answer type questions carrying 2 marks each.

SECTION—A

1. Explain the concept of Hashing and Hashing function in detail. Explain the concept of Linear and Quadratic Probing also. 5

2. What do you mean by Divide and Conquer? Cite an example to elaborate the concept using single source shortest path with six nodes. 5

3. Explain the concept of Principle of Optimality. How is it used in Optimal Search tree with four nodes {15, 14, 17, 20} with their corresponding cost of searching to be (2, 3, 5, 1). 5

4. Explain, how Quick sort is an external sort in detail. 5

5. What is Knapsack problem? How is it used to solve with knapsack capacity (M = 8) for items (1, 2, 3, 4) with their corresponding weights (1, 5, 3, 4) and profit value (15, 10, 5, 9). 5

SECTION—B

6. What do you mean by the Graph Coloring? What is the chromatic number of the graph ? Explain with the help of an example. 5

7. List differences between :

   (a) Greedy Algorithm and Dynamic Programming.

   (b) Deterministic and the Non-deterministic polynomial time algorithm. 5

8. Explain the Lower bound theory in detail using sorting and searching algorithms in detail. 5

9. What is Backtracking? How is it used in 8-queens problem ? Explain in detail. 5

10. What do you mean by Branch and Bound method? How is it used in solving knapsack problem? 5

SECTION—C

11. Explain briefly : 10×2=20

   (i) Big Oh Notation.

   (ii) Performance Metrics.

   (iii) Fractional knapsack.

   (iv) Travelling Salesman Problem.

   (v) Lower bound theory.

   (vi) Problem Classes.

   (vii) Graphs.

   (viii) Multistage graphs.

   (xi) Max-Min heaps.

   (x) Trees.