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BT–5 / D-19

DESIGN AND ANALYSIS OF ALGORITHMS

Paper–CSE-305N

Time allowed : 3 hours] *[Maximum marks : 75*

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

Unit–I

1. Explain the following:
   (a) Meaning and need of Data structures in problem solving
   (b) Operations and applications of priority queues
2. (a) Does recursion tree is more useful in solving recurrence relations than back-substitution? Explain.
   (b) What do you mean by binomial heaps?

Unit–II

3. What are the primary requirements to apply dynamic programming to a problem? Solve matrix-chain multiplication problem using it with suitable example.
4. (a) Solve the activity-selection problem using greedy approach if start= {5, 7, 15} and finish= {15, 20, 25} for 3 activities.
   (b) What is graph coloring? How is it different from Hamiltonian circuit?

Unit–III

5. (a) What do you mean by connected components in a graph? How to find strongly connected components?
   (b) Define breadth first traversal of a graph using suitable example.
6. What are negative edge weights in graphs? Show why dijkstra's algorithms fails with negative edge weights and bellman ford survive with it using suitable examples?

Unit–IV

7. Explain the following:
   (a) Polynomial and Non-polynomial complexity
   (b) Maximum bipartite matching
8. (a) "If a sorting network works correctly on binary inputs then it works correctly on any arbitrary inputs". Justify this statement using suitable examples.
   (b) Show the use of bitonic networks in merging networks. Can we use merge sort for merging networks? Justify your answer.