

Code No: 09A40505

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD****B.Tech II Year II Semester Examinations, June-2014****DESIGN AND ANALYSIS OF ALGORITHMS**

(Common to CSE, IT)

**Time: 3 hours****Max. Marks: 75****Answer any five questions****All questions carry equal marks**

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- 1.a) Explain the asymptotic notations used in algorithm analysis.
- b) What is big "oh" notation? Show that if  $f(n) = a_m n^m + \dots + a_1 n + a_0$  then  $f(n) = O(n^m)$ .
- 2.a) What is weighting rule for Union(i, j)? How it improves the performance of union operation? Explain with example.
- b) What is biconnected graph? How to determine biconnected components of graph?
- 3.a) Apply divide and conquer strategy to the following input values for searching 112 and -14 by showing the values of low, mid, high for each search.  
-15, -6, 0, 7, 9, 23, 54, 82, 101, 112, 125, 131, 142, 151
- b) Why Strassen's matrix multiplication method is efficient? Explain with suitable example.
- 4.a) What is job sequencing with deadlines problem? Let  $n = 5$ ,  
 $(p_1, p_2, \dots, p_5) = (10, 3, 33, 11, 40)$  and  $(d_1, d_2, \dots, d_5) = (3, 1, 1, 2, 2)$ . Find the optimal solution using greedy algorithm.
- b) Write and explain the control abstraction for Divide and conquer.
- 5.a) How reliability design problem can be solved with dynamic programming? Give example.
- b) Discuss about all pairs shortest path problem with suitable example.
- 6.a) What is Hamiltonian cycle? Discuss a backtracking algorithm that finds all the Hamiltonian cycles in a graph.
- b) Write a recursive backtracking algorithm for sum of subsets problem.
- 7.a) Illustrate LCBB solution to solve the knapsack problem.
- b) What do you mean by bounding? Explain how these bound are useful in branch and bound methods?
- 8.a) Explain the classes of NP-Hard and NP-Complete.
- b) Discuss about deterministic and non-deterministic algorithms.

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