

END SEMESTER EXAMINATIONS- APRIL/MAY 2013

B. E. / B.Tech (Full Time) Regulations-2004

IT 531 Algorithm Design Techniques

Max. Marks 100

Part A (10 X 2 = 20 marks)

1. Find the order of $n^3 + 300 + 500$
2. Define Θ notation.
3. List the basic steps involved while solving any problem using the Divide-and-Conquer strategy.
4. State a problem that is solved using a Greedy algorithm.
5. What are Greedy algorithms?
6. Give an application of the Longest Common Sequence problem.
7. How is the solution for 8-Queens problem represented?
8. What is meant by best-first branch-and-bound algorithm?
9. Define NP problems using language theoretic framework.
10. State a classical NPC problem.

Part B (5 X 16 = 80 marks)

11. Write the complete **Merge-sort** algorithm including any algorithm it uses and do a worst case analysis of it. Show how the algorithm works on the list {10, 15, 25, 35, 50, 90, 40, 80} (8+4+4)
12. (a) Write the complete **Quick-sort** algorithm including any algorithm it uses. Generate a recurrence relation for its worst case analysis. Solve this recurrence relation and arrive at its worst-case behavior. (8+2+6)
(OR)
(b) Write the algorithm FASTEST-WAY that finds the fastest way through the factory which has two assembly lines. (16)
13. (a) Write down the **MATRIX-CHAIN_ORDER** algorithm. Find an optimal parenthesization of a matrix-chain product whose sequence of dimensions is (5, 10, 3, 2, 5). How many scalar multiplications are done in that case? Show the **m** table and **s** table generated. (16)