B. Tech Degree VI Semester Examination, April 2010

CS/IT 604 ANALYSIS AND DESIGN OF ALGORITHMS
(2006 Scheme)

Time : 3 Hours   Maximum Marks : 100

PART A
(Answer *ALL* Questions)

(8 x 5 = 40)

I. a. Explain the divide and conquer technique with quick sort as an example.

b. Solve the recurrence equation $T(n) = 2T\left(\sqrt{n}\right) + 1$.

c. Derive an expression to find the worst case complexity of insertion operation in Red Black Trees.

d. Explain the union operation in Binomial heap.

e. Explain graph traversal techniques.

f. Explain transitive closure of a binary relation with an example.

g. Distinguish between NP hard and NP complete problems.

h. Explain any one graph coloring algorithm.

PART B

(4 x 15 = 60)

II. a. Explain the different asymptotic notations used for specifying the growth rate of functions.   (10)

b. Explain with an example Dynamic Programming.   (5)
OR
III. Explain the various criteria used for analyzing algorithms with suitable examples.   (15)

IV. Explain any one searching algorithm with an example. Also derive the worst case and average case time complexity.   (15)
OR
V. Explain Heap Sort Algorithm. Derive the worst case and average case time complexity. (15)

VI. a. Explain with an example strongly connected component of a directed graph.   (5)

b. Explain any one algorithm for finding the all pair shortest path in graphs.   (10)
OR
VII. What is a binary search tree? Explain an algorithm for constructing an optimal binary search tree. Analyse its complexity.   (15)

VIII. What is Bin Packing Problem? Explain how first fit decreasing strategy can be used for solving it.   (15)
OR
IX. Define Travelling Salesman Problem – TSP. Explain three possible strategies for TSP.   (15)

***