1059

B.E. (Information Technology) Fourth Semester
ITE-401: Analysis and Design of Algorithms

Time allowed: 3 Hours   Max. Marks: 50

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I.   Attempt the following:-

   a) Solve $T(n) = 2T(n/2) + n$ when $n > 1$ and $T(1) = 1$ using substitution method.

   b) What are the best, average and worst case complexities of binary search problem? Also mention when they occur.

   c) What is the Greedy approach to solving knapsack problem?

   d) How backtracking algorithm reduces the number of alternatives to be examined?

   e) Define the sets P and NP and state the unsolved problem in Computer Science.

                                                (5x2)

UNIT – I

II.   Write the algorithm to find maximum and minimum in an array of n numbers. Analyze the algorithm for best, average and worst case performance.   (10)

III. Write the method to partition an array in quick sort. Apply the method and partition an array with 8 numbers.   (10)

IV.   Write the Greedy algorithm to obtain a minimum cost spanning tree. Explain with an example. Also analyze the algorithm.   (10)

UNIT – II

V.   Explain how dynamic programming is used in solving travelling salesperson problem?   (10)

VI.   Elaborate the solution to knapsack problem using backtracking approach.   (10)

VII. Define the following and mention their significance:-

   a) Satisfiability problem

   b) Deterministic and non-deterministic algorithms   (10)

x-x-x