Exam.Code:1005
Sub. Code: 7799

1129

M.E. (Information Technology)

First Semester

MEIT-101/111: Algorithm Analysis and Design

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) Explain: Asymptotic analysis. Profiling?

b) How is space complexity computed?

c) What is complete Bipartite matching?

d) What is Strassen's multiplication approach?

e) Discuss advantages and limitation of using recursion.

f) Find the complexity of Brute force string matching algorithm.

g) Explain the optimal substructure property with example?

h) Why are slack variables used in linear programming?

i) What are deterministic algorithms?

j) Explain the best case, average case and worst case of binary search algorithm? (10x1)

UNIT – I

II. a) Write an algorithm to calculate exponent x^n , of a given number x , where n>= 0. Also find its time and space complexity.

b) What is a recurrence relation? Solve the following recurrence relation using recursion - tree method: T(n) = 2T(n/2) + nlgn. (2x5)

III. a) Discuss a strategy and an algorithm to find the minimum cost spanning tree. Comment on the time complexity of the algorithm.

b) Given two sorting methods: Merge sort and Quick sort, which is having better performance? Justify your answer in terms of best and worst case scenario. (2x5)

P.T.O.

IV. a) Justify the reason for applying a particular kind of algorithm design strategy for solving the two variants of the knapsack problem. Use greedy strategy to solve the following instances of the fractional Knapsack problem: n=3, m=20, (pl,p2,p3)=(25,24,15) and (wl,w2,w3)=(18,15,10) for finding the optimal solution. Discuss its complexity.

b) Explain the - All pairs shortest path problem? Discuss how the principle of optimality is applied to find solution to the problem. (5,5)

UNIT – II

V. a) Discuss the technique for solving the n-queens problem. Illustrate the implementation logic and complexity of the algorithm.

b) Discuss the strategy and find possible solutions of the following sum of subset problem: n=4. (wl,w2,w3,w4) = (11,13,24,7), m=31 (5,5)

VI. a) Explain the Knuth-Morries-Pratt algorithm and discuss its complexity.

b) What is flow of network problem? Discuss its two applications. (5,5)

VII. a) Discuss the applications of Linear Programming. Explain the problem formulation and the steps to solve a linear programming problem.

b) Write short note on: NP-hard and NP-complete classes. (5,5)

x-x-x