2031
M. E. (Information Technology)
First Semester
MEIT-111: Advanced Algorithm Analysis

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: Apriori analysis, Order of growth?

   b) What are instance characteristics?

   c) Discuss the limitation of Floyd-Warshall algorithm.

   d) What is a multistage graph?

   e) Explain how recurrence relation can be used to represent time complexity of algorithms?

   f) Explain the DAC approach for matrix multiplication.

   g) Explain the principle of optimality with an example?

   h) Why are slack variables?

   i) What are non-deterministic algorithms?

   j) Explain the best case, average case and worst case of quick sort algorithm? (10)

UNIT - I

II. a) Write an algorithm to find the second maximum number from an array of integers. find its time and space complexity.

   b) Draw the recursion tree for $T(n) = T(n/3) + T(2n/3) + cn$, where c is a constant and provide a tight asymptotic bound on its solution.   (5,5)

III. a) Give two applications of spanning tree. Illustrate the working of Kruskal's algorithm to find minimum spanning tree. Discuss the time complexity for execution.

b) Explain the Travelling salesman problem. Find the minimum cost of the tour by using travelling salesman problem if starting from city A.

	A	B	C	D
A	-	13	15	30
B	15	-	7	11
C	10	8	-	21
D	9	12	9	-

(5,5)

IV. a) Discuss the characteristics of Greedy algorithm design strategy. Find an optimal solution of the following knapsack instance and discuss the complexity of the algorithm. (Given M = 60)

I={11,I2,I314,I5} ; W= {5,10,20,30,40} ;   P= (30,20,100,90,160}

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) What is a state space tree? Discuss the advantages of backtracking approach and Illustrate how it can be used to solve 8-queens problem.

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 Brute force and Knuth-Morries-Pratt algorithm for string matching. Compare the complexity of both methods.

b) Explain the flow of network problem with example? Discuss its two applications.
(5,5)

VII. a) Discuss the problem formulation using linear Programming and illustrate its application in real world. Explain various steps involved to solve a linear programming problem.

b) Write short notes on Bipartite matching, NP hard and NP complete classes. (5,5)

x-x-x