**SWARNANDHRA COLLEGE OF ENGINEERING & TECHNOLOGY**

DEPARTMENT OF MASTER OF COMPUTR APPLICATIONS

**III SEMESTER**

SUBJECT: Design and Analysis of Algorithms Subject Code: 16MC3T03

Regulation: R16

**UNIT-I**

1. a) Explain the properties of an algorithm and advantages of pseudo code over algorithm

b)write the algorithm for matrix addition and find the time complexity of the algorithm using step table method

 2. a) Write a short note on spanning trees.

 b)Develop the algorithms for the following

i). UNION

ii) FIND

 iii) WEIGHTED UNION

3 .a)Explain Asymptotic Notations of time and space complexity

b)write an algorithm for sum of N numbers and find time complexity using step table method

**UNIT-II**

1. a) write a control abstraction for the Greedy method

b) Calculate the Matrix Multiplication using Strassen’s Formulas



1. a) Analysebest,average,worst time complexitys for Quick Sort

b)Apply Merge Sort to sort the list a[1:10]=(31,28,17,65,35,42.,86,25,45,52). Draw the

tree of recursive calls of merge sort, merge functions.

1. a) State the Greedy Knapsack? Find an optimal solution to the Knapsack instancen=3, m=20, (P1, P2, P3) = (25, 24, 15) and (W1, W2, W3) = (18, 15, 10)

b) Discuss Divide and concquer General method with algorithm

**UNIT-III**

1. a)write an algorithm to compute lengths of shortest paths

b)Define the principle of optimality and discuss the applications of dynamic programming

 2.Compute the all-pairs shortest paths from the following graph and define code

 8

1

2

 3

 7 2 7 5

 2

3

 1

4

 3.Solve the following instance of 0/1 Knapsack problem using Dynamicprogramming

 n = 3,m=6; (W1, W2, W3) = (2, 3, 4); (P1, P2, P3) = (1, 2, 5);

**UNIT-IV**

1. Explain the 4-queen problem and Draw the portion of the state space tree using backtracking algorithm.

 2. a)Discuss sum of Subsets problem

b) Solve the sum of subsets problem with m=35,w= {5,7,10,12,15,18,20}

 and Draw the portion of the state space tree.

 3.Write an algorithm to determine the Hamiltonian cycle in a given graph using backtracking.

22

11

3

4

55

**UNIT-V**

1. a)Discuss FIFO Branch and Bound method

b) Solve the the 0/1 knapsack instance: n=4,(p1,p2,p3,p4) =(10,10,12,18),

(w1,w2,w3,w4) = (2,4,6,9), and m=15 using FIFO Branch and Bound method

1. Explain Travelling sales person problem LCBB procedure with the following instance matrix and draw the portion of the state space tree and find an optimal tour

 ∞ 20 30 10 11

 15 ∞ 16 4 2

 3 5 ∞ 2 4

 19 6 18 ∞ 3

 16 4 7 16 ∞

1. a)Explain the LCBB for the 0/1 knapsack instance: n=5,(p1,p2,p3,p4,p5)=(10,15,6,8,4),

(w1,w2,w3,w4,w5)=(4,6,3,4,2), andm=12.

b)Write the control abstraction for LC-search

 4. Discuss cook’s Theroem

 5. Define the following

 i)Non-deterministic algorithms with example

 ii)NP-Complete

 iii)NP-Hard

 6. Discuss about NP-hard and NP-complete