$A = \begin{bmatrix} 6 & 8 \\ 9 & 7 \end{bmatrix}$ $B = \begin{bmatrix} 2 & 5 \\ 3 & 6 \end{bmatrix}$

14 a) State Matrix Chain Multiplication Problem. Write Dynamic Programming Algorithm for Matrix Chain Multiplication Problem. (4)

b) Using Dynamic Programming, find the fully parenthesized matrix product for multiplying the chain of matrices< A1 A2 A3 A4 A5 A6 > whose dimensions are <30X35>, <35X15>, <15X5>, <5X10>, <10X20> and <20X25> respectively. (5)

PART E

Answer any four full questions, each carries10 marks.

15 a) Explain Greedy Approach. Write the general greedy algorithm. (3)

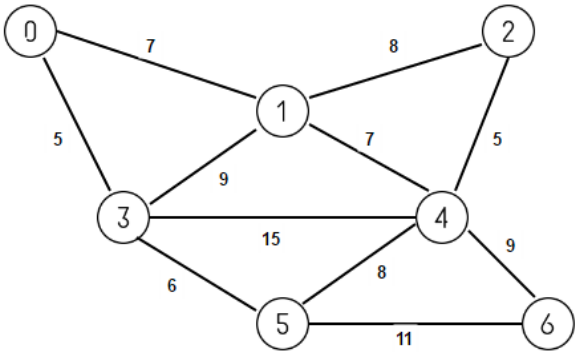
b) Formulate Fractional Knapsack Problem. Write Greedy Algorithm for fractional Knapsack Problem. (4)

c) Find the optimal solution for the following fractional Knapsack problem. (3)

n=4, m = 60, W={40, 10, 20, 24} and P={280, 100, 120, 120}

16 a) Write the Kruskal's algorithm for Minimum Spanning Tree. Analyse its complexity. (6)

b) Compute the Minimum Spanning Tree and its cost for the following graph using Kruskal's Algorithm. Indicate each step clearly. (4)



17 a) An undirected graph G=(V, E) contains n (n > 2) nodes named v_1 , v_2 ,….v_n. Two vertices v_i , vj are connected if and only if 0 < |i – j| <= 2. Each edge (vi, vj) is assigned a weight i + j. What will be the cost of the minimum spanning tree (as a function of n) of such a graph with n nodes? (4)

b) Consider a complete undirected graph with vertex set {0, 1, 2, 3, 4}. Entry wij in the matrix W below is the weight of the edge {i, j}. What is the Cost of the Minimum Spanning Tree T using Prim's Algorithm in this graph such that vertex 0 is a leaf node in the tree T? (6)

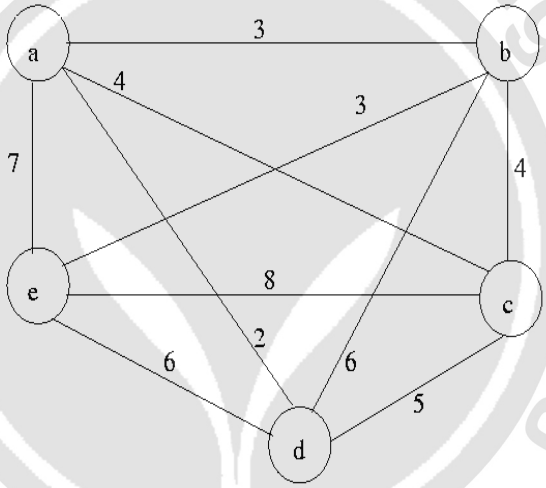
$$W = \begin{pmatrix} 0 & 1 & 8 & 1 & 4 \\ 1 & 0 & 12 & 4 & 9 \\ 8 & 12 & 0 & 7 & 3 \\ 1 & 4 & 7 & 0 & 2 \\ 4 & 9 & 3 & 2 & 0 \end{pmatrix}$$

18 a) State and Explain N Queens Problem. Write the backtracking algorithm for solving N Queens problem. (5)

b) Show the state space tree for 4 Queens problem. Show the steps in solving 4 Queens problem using backtracking method to print all the solutions. (5)

19 a) Explain Branch and Bound method for solving Travelling Salesman Problem. (5)

b) Solve Travelling Salesman problem for the following graph using Branch and Bound Technique. (5)



20 a) Define NP- Hard and NP – Complete Problems. (2)

b) What are the steps used to show a given problem is NP-Complete? (4)

c) Write notes on polynomial time reducibility. Give Examples. (4)

****