Subject: **Design & analysis of Algorithms**
Subject Code: **20CST-311**

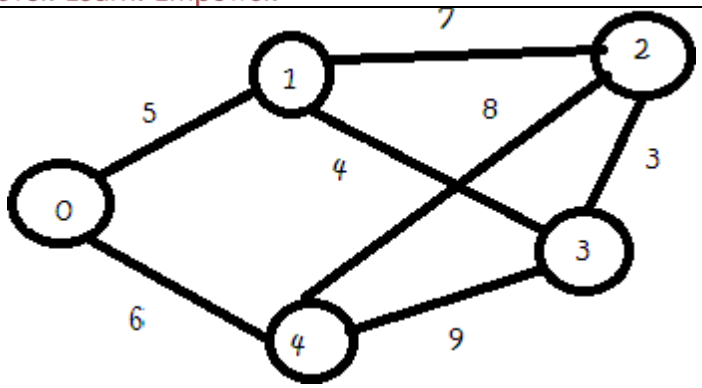
Assignment- 2

Last date of Submission: 20 Oct., 2022 **Total Marks:** 10 (2.5 marks each)

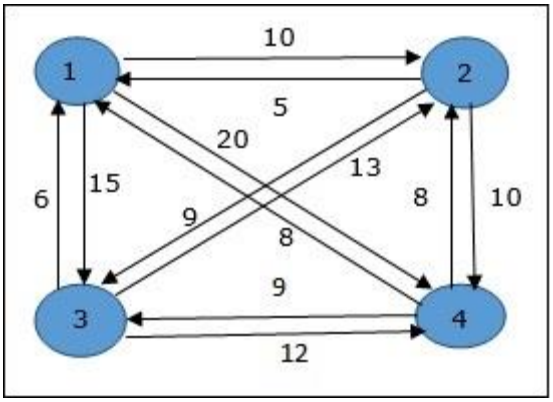
***Note: 1) Assignment should be handwritten.**
2) Every student needs to submit assignment as per the allotted set mentioned in attached PDF.

Set-1

1	Solve using fractional knapsack: M=20, n=4 P= (3, 10, 15, 5) W= (5, 13, 12, 8).
2	A networking company uses a compression technique to encode the message before transmitting over the network. Suppose the message contains the following characters with their frequency: character Frequency a 5 b 9 c 12 d 13 e 16 f 45 If the compression technique used is Huffman Coding, how many bits will be saved in the message?
3	Find minimum spanning tree using prim and kruskal's algorithm:

	
4	Write algorithm for matrix chain multiplication and solve the given sequence matrices: P=<30, 35, 15, 5, 10, 20, 3>

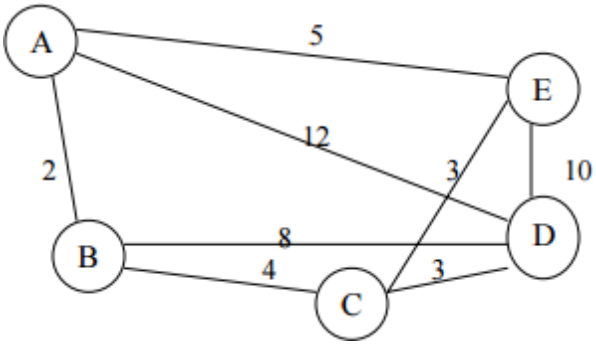
Set-2

1	Let A1, A2, A3, and A4 be four matrices of dimensions 10 x 5, 5 x 20, 20 x 10, and 10 x 5, respectively. The minimum number of scalar multiplications required to find the product A1 A2 A3 A4 using the basic matrix multiplication method is?
2	Find longest common subsequence for: A=<1001010> B=<10011>
3	What is the difference between greedy and dynamic programming approach?
4	Solve the following travelling salesperson problem. 

Set-3

1	What do you understand by 0-1 Knapsack problem and fractional knapsack problem?
2	What is spanning tree give an example. Write down the Prim's and Kruskal's minimum-cost spanning tree algorithms.
3	Write the difference between the Greedy method and Dynamic programming.
4	Solve the following instance of 0/1 Knapsack problem using Dynamic programming n = 3; (W1, W2, W3) = (3, 5, 7); (P1, P2, P3) = (3, 7, 12); M(capacity of knapsack) = 4.

Set-4

1	Discuss about n-queen problem.
2	State the concept of branch and bound method and also list its applications.
3	A set of cities are given as graph. Solve the given Travelling Salesman Problem using Branch and Bound: 
4	Consider two strings A = "qpqrr" and B = "pqprqrp". Let x be the length of the longest common subsequence (not necessarily contiguous) between A and B and let y be the number of such longest common subsequences between A and B. Then x + 10y = _.