Name: **Enrolment No:**	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, Dec 2022

Programme Name: B Tech (Mechatronics) **Semester : V**
Course Name : Design and Analysis of Algorithms **Time : 03hrs**
Course Code : MECH3036P **Max. Marks: 100**
Nos. of page(s) : 2
Instructions:

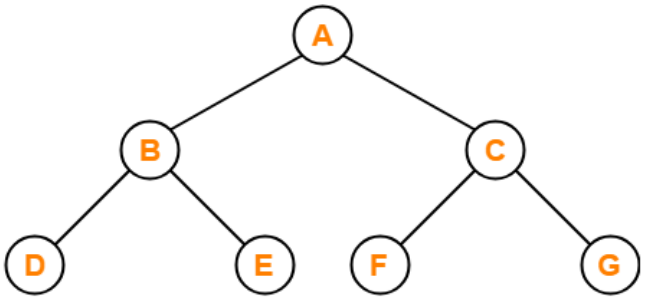
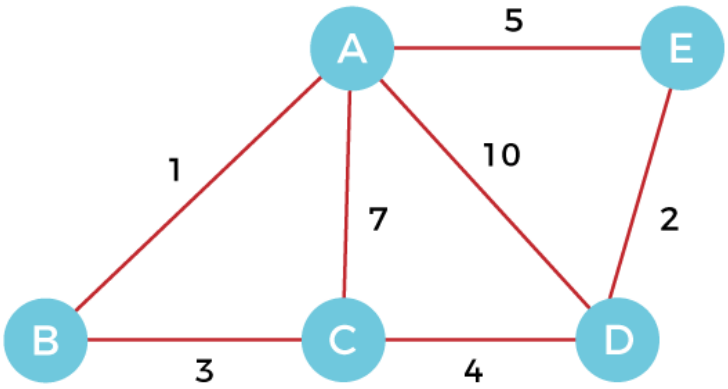
SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Explain Dynamic Programming with example.	**4**	**CO3**
Q 2	Explain Binary search Tree with example.	**4**	**CO4**
Q 3	Write a short note on space complexity and time complexity with example.	**4**	**CO1**
Q 4	Explain the Binary Search Algorithm and write the difference of it with linear search.	**4**	**CO2**
Q5	Explain the graph coloring problem.	**4**	**CO5**

SECTION B
(4Qx10M= 40 Marks)

Instruction: Write brief notes. (100-150 words)

Q 6	Write a short note on different Asymptotic Notations? Explain with diagrams.	**10**	**CO1**
Q 7	Suppose these are the elements in an array 39, 27,43,3,9,82,12 Explaining with different steps sort the elements by Quick sort Algorithm. Mention the time complexity in Best case and Worst Case.	**10**	**CO2**
Q 8	Find the in-order, pre-order and post-order traversal of the given tree.	**10**	**CO4**

			
Q 9	Given a set of non-negative integers, and a value sum, determine if there is a subset of the given set with sum equal to given sum. W{1:6}= {3, 34, 4, 12, 5, 2} and m=9	**10**	**CO5**
SECTION-C **(2Qx20M=40 Marks)** **Instruction: Write long answer. (Up to 350 words while explaining)** **Attempt any part of question no. 10 as there is an option "a" OR "b". Attempt any part of question no. 11 as there is an option "a" OR "b".**			
Q 10	Briefly explain about spanning tree. Draw a minimum cost spanning tree for the following diagram using Prim's Algorithm  OR Construct a binary tree Post-order traversal: 15, 10, 23, 25, 20, 35, 42, 39, 30 Post-order traversal: 10, 15, 20, 23, 25, 30, 35, 39, 42	**20**	**CO3**

Q11	Consider the matrices P, Q, R and T which are 6 x 5, 5 x 7, 7 x 3 and 3 x 9, respectively. What is the minimum number of multiplications required to multiply the four matrices? Compute the optimal sequence and optimal parenthesization for matrix multiplication. Also design the algorithms for the optimal sequence and optimal parenthesization through analyzing the space and time complexity. OR Suppose, these are the elements in an array 18, -12, 8, 19, 21, 23, -15, 31, 67, 62 Explaining with different steps sort the elements by Merge Sort Algorithm. Write the time complexity and space complexity of it.	**20**	**CO2**