Name: Enrolment No:	UPES UNIVERSITY OF TOMORROW

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Supplementary Examination, May 2022

Course: Advanced Data Structures | **Semester: II**
Program: BAO/DevOps | **Time: 3 hrs.**
Course Code: CSEG1004 | **Max. Marks: 100**

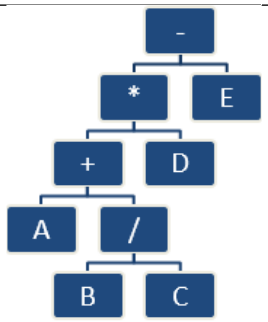
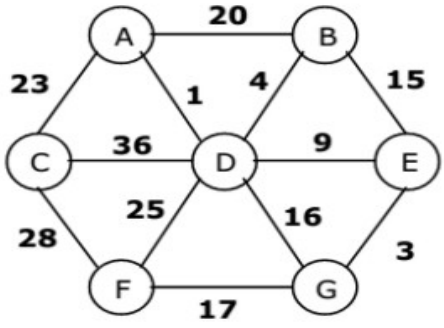
SECTION A (20 marks)

1. **Each Question will carry 4 marks.**
2. **Instruction: Use C-language while providing code snippets or programs.**

S.No.	Question	CO
Q1	Contrast structures in procedural and OO programming with suitable code snippets.	CO1
Q2	When is the copy constructor called? Give an example.	CO1
Q3	Exemplify Inheritance and its types in C++.	CO2
Q4	Mention the properties of a good hash function. Provide the best implementation technique and substantially defend why it is considered so.	CO3
Q5	With suitable examples illustrate the different types of edges used with a graph data structure?	CO5

SECTION B (40 marks)

1. **Each Question will carry 10 marks.**
2. **Instruction: Write short/brief notes.**

Q6	Demonstrate the use of pointers to access data members and member functions of a Class with suitable code.	CO1
Q7	With adequate code explain the purpose of parametric polymorphism.	CO2
Q8	Use the depth-first traversal techniques and find the possible traversals on the given Expression tree. 	CO3
Q9	Find the depth-first and breadth-first traversals of the following digraph starting at node A. 	CO5

SECTION-C (40 marks) 1. **Each Question will carry 20 marks.** 2. **Instruction: Write a long answer. Internal choice is available.**		
Q10	With adequate code: **(a)** Illustrate throwing and re-throwing of exceptions. Implement a user-defined exception handling mechanism. (10+10 marks) **OR** **(b)** Contrast Redefining and Overriding. Add two matrices by overloading binary arithmetic operator +. (10+10 marks)	CO2
Q11	What is the drawback when using a binary search tree? Illustrate how an AVL tree is used to overcome this. Insert the elements 21, 26, 30, 9, 4, 14, 28, 18, 15, 10, 2, 3, 7 into AVL tree by performing the necessary rotations. (5+15 marks)	CO4