UPES
End Semester Examination, December 2023

Course: **Data Structure**
Semester: III
Program: B.Tech (ECE + CE)   **Time: 03 hrs.**
Course Code: CSEG2045   **Max. Marks: 100**

Instructions: All the questions are compulsory.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Define AVL trees. What is a balance factor in AVL trees?	2+2	CO4
Q 2	What is traversing? What are different types of transversing?	2+2	CO5
Q 3	What is a linked list? How a singly linked list can be represented as a circular linked list?	2+2	CO2
Q 4	Differentiate between Linear and Non-linear data structure.	4	CO1
Q 5	What is a graph. Give an example of representation of a graph using adjacency matrix.	4	CO5

SECTION B
(4Qx10M= 40 Marks)

Q 6	What is minimum –cost spanning tree? Discuss Prim's algorithm with examples. Or Explain threaded binary trees in detail. Also, discuss the difference between binary tree and threaded binary tree using example.	10	CO4
Q 7	Explain breadth first algorithm used for transversing the graph?	10	CO5
Q 8	What is internal and external sorting? Write a function in C/C++ for insertion sort?	10	CO1
Q 9	What is a Complete binary tree? Write procedure for post order traversal in a binary tree?	10	CO4

	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	Explain the searching algorithms used in data structures? Write a program using C/C++ to perform searching operation using linear and binary search? Or What is a shortest path tree? Explain Dijkstra's algorithm in details? Also, state its difference with Bellman -Ford algorithm?	20	CO2, CO5
Q11	Explain stack and queue ADT? Write a program to implement stack and queue data structures using linked list in C/C++?	20	CO4, CO3