UPES
UNIVERSITY OF TOMORROW

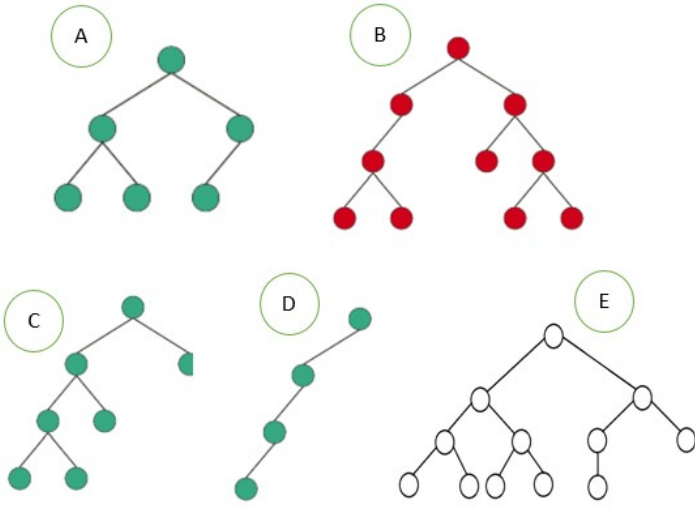## UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Supplementary Examination, May 2022

Course: Data Structures using C   Semester: 2
Program: B.Tech Computer Science + LLB Cyber Law   Time   : 03 hrs.
Course Code: INFO111   Max. Marks: 100

Instructions: Answer all the questions

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Mention the need of Pointers in Data Structures.	4	CO1
Q 2	Write the insertion algorithm of linked list.	4	CO2
Q 3	State the difference between Stack and Queue on the topic of it's real world application, structure and operations in that ADT.	4	CO3
Q 4	Find the type of binary three A,B,C,D,E belongs to	4	CO4
Q 5	Construct AVL Tree for the following sequence of numbers 50 , 20 , 60 , 10 , 8 , 15 , 32 , 46 , 11 , 48 Perform the following operations a. Insert 50 b. Insert 20 c. Insert 60 d. Insert 10	4	CO4

	SECTION B **(4Qx10M= 40 Marks)**		
Q 6	Explain step-by-step procedure of binary search method with the help of example. Write the program to input an integer array in sorted order by the user at run time and search a number using binary search method.	**10**	**CO1**
Q 7	Draw the classification of various non-primitive data structures. Explain the structure of each data structure with an example.	**10**	**CO1**
Q 8	Begin with the following binary search tree, **draw** the BST that results after the operation or sequence of operations is performed. (**All questions are independent and each question starts from the BST as following**) a. Insert 7 b. Insert 7, 1, 55, 29, and 19 c. Delete 8 d. Delete 8, 37, and 62 e. Insert 7, delete 8, insert 59, delete 60, insert 92, delete 50. f. Display the output produced by an inorder traversal g. Display the output produced by a preorder traversal h. Display the output produced by a postorder traversal.	**10**	**CO3**
Q 9	How will the efficiency of Algorithm be calculated. Give the notations used to calculate the efficiency. **OR** Write a C program to perform stack operations. Demonstrate it with an example.	**10**	**CO3**

	SECTION-C **(2Qx20M=40 Marks)**			
Q 10	a) Explain the Quick Sort algorithm along with its code. Solve the given problem below. (15 Marks) b) Discuss the time complexities in best and worst cases with examples.(5 Marks)		**20**	**CO2**
Q 11	a) Solve the below given tree and find the level order, preorder, postorder and inorder traversal pattern. Solve each traversal separately and shown the traversal order with step descriptions.(10 Marks) b) Discuss the searching algorithm ordered sequential search and it's working with an example.State the analysis of the algorithms in terms of best, worst, average cases if the key is found and not found.(10 Marks) **OR** (a) Define Hashing.(4 Marks) (b) Give the various types of Hash Functions (6 Marks) (c) What is Collision Resolution and discuss the various strategy to avoid this. (10 Marks)		**20**	**CO4**