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UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, December 2020

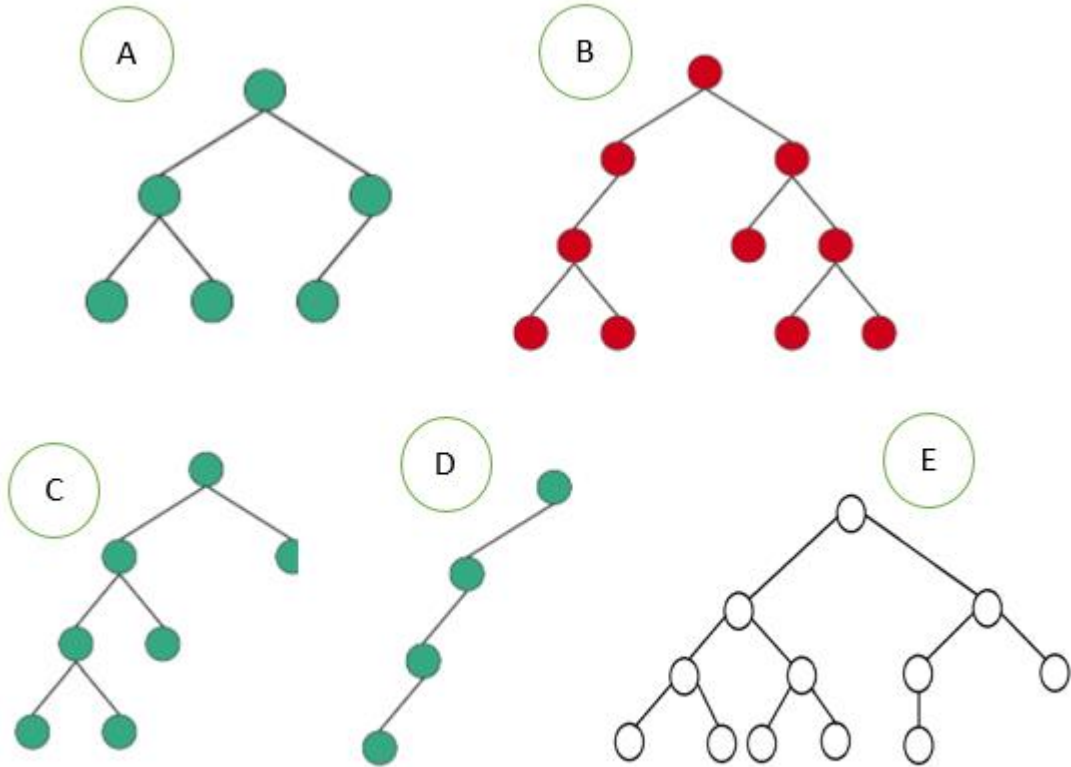**Course: Data Structures and Algorithms**   **Semester: V**
Program: B.Tech. Mechatronics   **Time: 3 hrs.**
Course Code: CSEG 3019   **Max. Marks: 100**
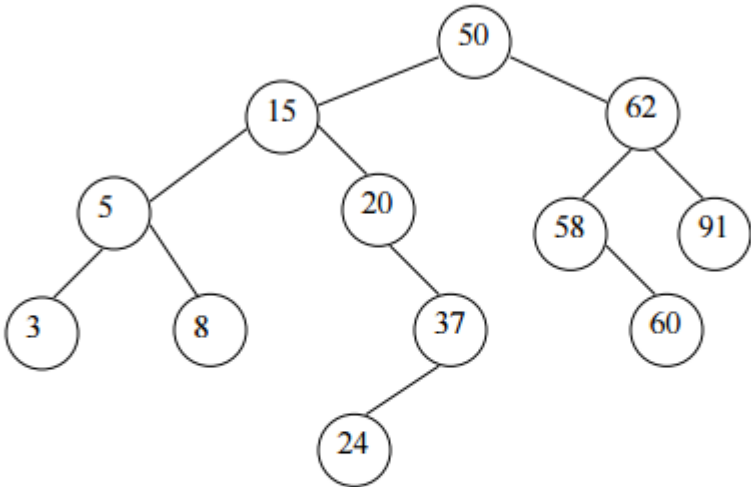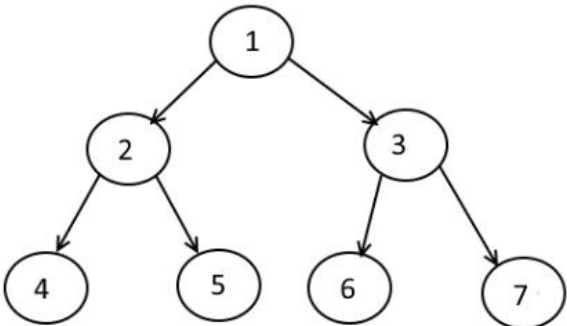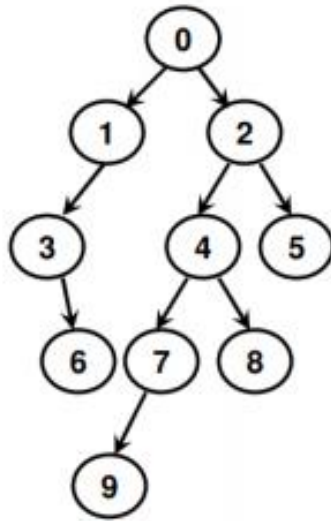
SECTION A (30 marks)
1. **Each Question will carry 5 marks.**
2. **Instruction: Complete the Statement/Select the correct answer(s)**

S.No.	Question	CO
Q1	What is exception handling? State the various exception handling mechanism of C++ with its purpose?	CO1
Q2	State the difference between Stack and Queue on the topic of it's real world application, structure and operations in that ADT.	CO2

Q3	Find the output of the below given Vector Program
	#include <vector>
	#include <iterator>
	using namespace std;
	
	int main() {
	   vector<int>Veclist;
	   vector<int>::iterator vecIt;
	   ostream_iterator<int> screen(cout, " ");
	   Veclist.push_back(3);
	   Veclist.push_back(5);
	   Veclist.push_back(7);
	   vecIt= Veclist.begin();
	   ++vecIt;
	   Veclist.erase(vecIt);
	   Veclist.push_front(9);
	   copy(Veclist.begin(), Veclist.end(),screen);
	   cout<< endl;
	   return 0;
	}
		CO2

Q4	Mention the need of Pointers in Data Structures.	CO2

	Find the type of binary three A,B,C,D,E belongs to	
Q5		CO3
Q6	How will the efficiency of Algorithm be calculated. Give the notations used to calculate the efficiency.	CO4

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SECTION B (50 marks)

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

Q7	Define a class student with the following specification
	Private members of class student
	   - admno as integer
	   - sname as string
	   - eng. math, science as float
	   - total as float
	ctotal() - a function to calculate eng + math + science with float return type.
	Public member function of class student
	takedata() - Function to accept values for admno, sname, eng, science and invoke ctotal() to calculate total.
	showdata() - Function to display all the data members on the screen including the calculated total.
		CO1

Q8	Draw the classification of various non primitive data structures in C++. Explain the structure of each data structure with an example.	CO1

Q9	Discuss the structure of linked list and the CPP program to implement linked list..	CO2
Q10	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.	CO3
Q11	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. (OR) (b) 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.	CO3

1. **Each Question will carry 20 marks.**
2. **Instruction: Write long answer.**

Q12	(a) (1) Discuss the searching algorithm ordered sequential search and it's working with an example. (2) Discuss the searching algorithm uordered sequential search an it's working with an example. (3) State the analysis of both the algorithms in terms of best, worst, average cases if the key is found and not found. (OR) (b) (1) Define Hashing.(5 Marks) (2) Give the various types of Hash Functions (6 Marks) (3) What is Collision Resolution and discuss the various strategy to avoid this. (10 Marks)	CO4