Q. Code: 115861

Reg. No. | | | | | | | | | | | | | |

B.E./ B. TECH.DEGREE EXAMINATIONS, MAY 2024

Fifth Semester

CS18551 – PROGRAMMING AND DATA STRUCTURES

(Regulation 2018/2018A)

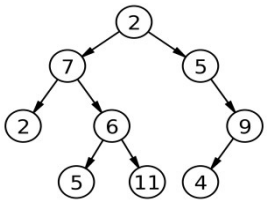
TIME:3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Explain the basic concepts of Object-Oriented Programming	**3**
CO 2	Apply the Inheritance and Polymorphism concepts for real world problems	**5**
CO 3	Implement abstract data types for linear data structures.	**4**
CO 4	Apply non-linear data structures to solve various problems.	**4**
CO 5	Discuss the different methods of organizing large amount of data.	**4**

PART- A(10x2=20Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	How Encapsulation is achieved in c++? Justify with an example.	**1**	**3**
2.	Explain the need of new operator over malloc().	**1**	**2**
3.	Why is 'this' pointer used?	**2**	**4**
4.	Differentiate Function overloading and Function overriding.	**2**	**4**
5.	Compare the advantages and limitations of array over linked list.	**3**	**4**
6.	The following sequence of operation is performed on an empty stack of size 5: Push (1), Push (2), Pop, Push (3), Push (4), Pop, Pop, Push (5), Pop, Pop. Determine the sequences of popped out values.	**3**	**3**
7.	How binary search tree is differing from binary tree?	**4**	**4**
8.	Find the siblings of 6 and height of the given tree.	**4**	**3**



9.	Illustrate the time complexity of insertion sort with an example.	**5**	**3**
10.	Distinguish between linear and binary search technique.	**5**	**3**

PART- B (5x 14=70Marks)

		Marks	CO	RBT LEVEL
11. (a)	Implement a class named BankAccount that represents a bank account. The class should have the following private members accountNumber (string), balance (double). Write a constructor for the BankAccount class that takes parameters for the account number and initial balance. Implement a destructor for the BankAccount class that prints a message indicating that the account is being closed and the account number. Implement member functions within the BankAccount class: ● deposit(double amount): Adds the given amount to the account balance.	**(14)**	**1**	**3**

- withdraw(double amount): Subtracts the given amount from the account balance if sufficient funds are available.
- displayAccountInfo(): Displays the account number and current balance.

Use the constructor to initialize the accounts with appropriate initial balances. Perform deposit and withdrawal operations on the accounts. Demonstrate the automatic invocation of destructors when the account objects go out of scope.

(OR)

(b)	Write a C++ program to demonstrate: a. A scenario where a global function is accessible to two classes. b. An instance where a member function is accessible to another class. c. An example where all member functions are accessible to another class.	**(14)**	**1**	**3**
12. (a)	Creating a class hierarchy with a base class Animal and derived classes representing different types of animals. Implement a member function in the base class that takes an integer parameter representing the number of legs and outputs the information. Create instances of the derived classes and demonstrate the use of inheritance.	**(14)**	**2**	**3**
	(OR)			
(b)	Implement a C++ program with a base class "Animal" and derived classes like "Dog" and "Cat." Override a method, such as "make Sound," in the derived classes to exhibit polymorphism.	**(14)**	**2**	**3**
13. (a)	Develop a program to explain stack and queue implementation using array.	**(14)**	**3**	**3**
	(OR)			
(b)	Write a code to explain the linked list insertion and deletion operations.	**(14)**	**3**	**3**
14. (a)	Describe Dijkstra's algorithm for finding the shortest path in a graph, and provide an example to illustrate its usage.	**(14)**	**4**	**3**
	(OR)			
(b)	Detail the operations and characteristics of a Binary Search Tree (BST), including its implementation and usage, with the relevant example.	**(14)**	**4**	**3**
15. (a)	Write a C++ program for quick sort. Sort the following numbers <52, 73, 27, 18, 64, 2, 32, 75, 81> using quick sort.	**(14)**	**5**	**3**
	(OR)			
(b)	Choose an effective algorithm to search a key from the set of sorted keys. Write its pseudo code and apply it to search 44 from <2,34,44,56,76,87,100,113,115>.	**(14)**	**5**	**3**

PART- C (1x 10=10Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Develop a C++ Program to implement Railway ticket management system using OOPS Concepts.	**(10)**	**2**	**5**