Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. / B. Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, APR/MAY 2024

ECE

III Semester

EC7352 - DATA STRUCTURES AND OBJECT ORIENTED PROGRAMMING IN C++

(Regulation 2015)

Time: 3hrs | Max.Marks: 100

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

Q. No	Questions	Marks
1	Define Encapsulation and Data Abstraction.	2
2	What are objects? How are they created?	2
3	What is function overriding? Give example.	2
4	Mention the use of public, private and protected access specifiers and their visibility in the class.	2
5	Convert the given infix expression (A*B + (C/D))-E into postfix & prefix expressions.	2
6	Write a routine to find if the Queue is full.	2
7	What is a minimum spanning tree?	2
8	What is a threaded binary tree? Mention its advantages.	2
9	What is meant by internal and external sorting?	2
10	Perform Insertion sort on the list of integers {58, 26, 90, 34, 71}.	2

PART- B (5 x 13 = 65 Marks)

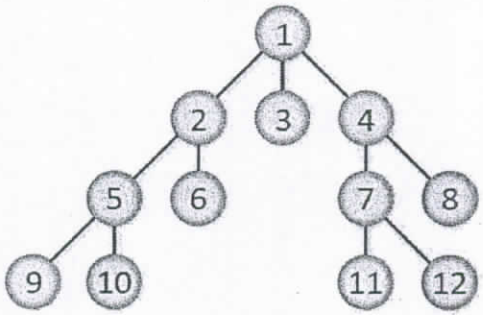
(Restrict to a maximum of 2 subdivisions)

Q. No	Questions	Marks
11 (a) (i)	What is Operator Overloading? Write a C++ program to perform operator overloading on ++ operator to concatenate two strings.	8
(ii)	What is a constructor? List its properties. Explain the various types of constructors with examples.	5
	(OR)	
11 (b) (i)	What is a friend function? Write a C++ program using friend function max() to find the maximum of two numbers a, b which are declared as members in two different classes CA and CB respectively.	8
(ii)	Write a C++ program to demonstrate static data member.	5
12 (a)	Define inheritance in C++. Explain in detail about the various forms of inheritance with block diagrams, Syntax and examples for each.	13
	(OR)	
12 (b)	What is Polymorphism in C++? Explain with an example on how to achieve polymorphism at run time and compile time?	13
13 (a) (i)	Write the algorithms for Push and Pop operations on Stack using Linked list.	8
(ii)	Explain the algorithm for insertion operation at any specific location in a Linked list.	5
	(OR)	
13 (b) (i)	Explain the Enqueue and Dequeue operations performed on a Circular Queue with necessary algorithms.	8
(ii)	Perform Linked list based polynomial addition of $P(x) = 3x^4+2x^3+4x^2+7$ and $Q(x) = 5x^3+4x^2+5$.	5

14 (a)	What is a Binary Tree? Explain the algorithms of Insertion and Deletion in Binary tree with an example.	13
	(OR)	
14 (b)	Construct an expression tree for the expression ((a+b)*c) + ((d*e)/g). Give the outputs when you apply in order, preorder and post order traversals.	13
15 (a)	Explain the algorithms of Merge sort and Heap sort and sort the array with elements: {34, 7, 15, 74, 51, 64} using the same.	13
	(OR)	
15 (b)	What is Binary Search? Write down its algorithm. Find the key '63' in the list given {2, 36, 47, 13, 97, 63, 81, 6, 13} using Binary Search.	13

PART- C (1 x 15 = 15 Marks)

(Q.No. 16 is Compulsory)

Q. No	Questions	Marks
16	Explain the Graph traversal algorithms: Depth First and Breadth First Traversals. With a neat step-by-step schematic, explain Depth First and Breadth First Traversals for the following graph. 	15