

R16

Code No: 133AG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year I Semester Examinations, February - 2024

**DATA STRUCTURES THROUGH C++
(Computer Science and Engineering)**

Time: 3 Hours

Max. Marks: 75

- Note:** i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

- 1.a) Explain how to find the performance of an algorithm. [2]
- b) What is function overloading? [3]
- c) What are the various ways of implementing linked lists? [2]
- d) Write the postfix and prefix form of the expression [3]
 $A + B * (C-D) / (P-R)$
- e) What do you mean by threaded binary tree? [2]
- f) Write the applications of priority queue. [3]
- g) What is pivot element in quicksort? [2]
- h) What is the importance of Heap sort? [3]
- i) Write the applications of Graphs. [2]
- j) Write an algorithm to insert an element into Binary search tree. [3]

PART - B

(50 Marks)

2. Develop a banking program in C++ using class, constructor, member function for (deposit, withdrawal), friend function for (display balance). [10]

OR

- 3.a) What is operator overloading? List the operators that cannot be overloaded and justify why they cannot be overloaded. [5]
- b) Distinguish between Linear and Non Linear Data Structures with an example. [5]

4. Explain the operations of circular linked lists with an example. [10]

OR

- 5.a) Differentiate between stack and queue. [2]
- b) Write a program to find the addition of two polynomials using linked list. [8]

- 6.a) Construct the max heap of the following list of elements. [5+5]
56, 34, 89, 90, 12, 78, 45, 9
- b) Explain how to represent the Binary tree with an example. [5+5]

OR

7. Explain about the binary tree traversals with an example. [10]

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8. Explain the hash tables and the types of hash functions with an example. [10]

OR

9. Write a C++ program to implement the sorting of the elements by using Merge sort. [10]

10.a) Construct the AVL tree of the following list of elements:

67, 45, 54, 78, 82, 30, 26, 15, 9, 50

b) What are the properties of Red-Black tree? [7+3]

OR

11.a) Explain how to represent the graph in memory. [5+5]

b) Explain the deletion operation of B-tree with an example.

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