

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER – 2023**

DATA STRUCTURES

[Maximum Marks: **100**]

[Time: **3 Hours**]

PART-A

[Maximum Marks: **10**]

I. (Answer *all* questions in one or two sentences. Each question carries **2** marks)

1. Define time complexity and space complexity.
2. List Big o notations.
3. List the operations of LIST ADT and its purpose.
4. Define the terms sibling and depth.
5. Which is the data structure used in Depth First search? (5 x 2 = 10)

PART-B

[Maximum Marks: **30**]

II. (Answer *any five* of the following questions. Each question carries **6** marks)

1. Describe basic data structure operations. And write printArray() operation.
2. Describe List ADT and its operations in detail with example.
3. Write short note on Threaded binary trees.
4. Define expression tree. Draw an expression tree for $a-b*c/d$.
5. Write binary search algorithm. How it become more efficient than linear search.
6. Describe graph ADT with DFS().
7. Describe the methods of memory allocation and deallocation for nodes in Linked List. (5 x 6 = 30)

PART-C

[Maximum Marks: **60**]

(Answer *one* full question from each Unit. Each full question carries **15** marks)

UNIT – I

- III. a. What is stack ADT? Explain in detail how to implement its operation using array. (10)
- b. List any two applications of stack. Write an algorithm to convert decimal to binary using stack with example. (5)

OR

- IV. a. Explain queue ADT operations with algorithms. (10)
- b. Describe priority Queue and Dequeue. (5)

UNIT – II

- V. a. Describe linked list ADT and any four linkedlist ADT operations. (10)
- b. Write down Push() and Pop() in stack ADT using Linked List. (5)

OR

- VI. a. Explain in detail about how to implement queue using Linked List ADT. (10)
- b. Draw and illustrate with notes on doubly linked list. (5)

UNIT- III

- VII. a. Explain BSTADT with operations insert (), find() and delete(). (10)
- b. Write the structure of binary tree using linked list. Draw with an example. (5)

OR

- VIII. a. Explain BSTADT with operations insert(), inorder (), preorder () and postorder(). (10)
- b. Draw a binary tree and explain any two key terms related with it. (5)

UNIT - IV

- IX. a. Write Floyd-Warshall algorithm and illustrate with example. (10)
- b. Define adjacency matrix of a graph. Draw a graph and illustrate the same. (5)

OR

- X. a. How to implement quicksort algorithm? Illustrate with example. (10)
- b. Write Linear search algorithm. Illustrate it with example. (5)
