

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER – 2022**

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. List any four data structure operations.
2. List any two application of stack.
3. Write the ADT representation of Linked List.
4. State the properties of Binary Search tree.
5. Differentiate directed and undirected graph.

(5 x 2 = 10)

PART-B

[Maximum Marks: 30]

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

1. Write the postfix equivalent of the following infix expression.
a) $(A+B) - (C-D)*E/F$ b) $A-(B+C)/D*E$
2. Explain Dequeue with example.
3. Explain the List ADT.
4. Explain Linked List. Write an algorithm to insert an element at kth position.
5. Construct a Binary search tree by inserting values 50,25,70,80,10,60,30 in that order by placing value 50 as root of the tree.
6. Explain Expression tree with example.
7. Explain adjacency matrix and adjacency list representation of graph with example. (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) Write the algorithm for converting infix into postfix expression. (8)
- (b) Explain Stack ADT with its operations. (7)

OR

- IV. (a) Write the algorithm for insertion and deletion operation in Circular Queue ADT. (10)
(b) Describe Time Complexity and Space complexity. (5)

UNIT – II

- V. (a) Write the algorithm to implement Stack using Linked List. (10)
(b) Difference between Static memory allocation and dynamic memory allocation. (5)

OR

- VI. (a) Write the algorithm to implement Queue using Linked List. (10)
(b) Explain Doubly Linked List. (5)

UNIT- III

- VII. Write the algorithm for tree traversals with example. (15)

OR

- VIII. (a) Write the algorithm for the three cases of deletion in Binary Search tree. (10)
(b) Explain threaded binary tree. (5)

UNIT - IV

- IX. (a) Explain DFS and BFS with example. (12)
(b) Explain the terms in a graph (a) Path (b) Cycle (c) Degree. (3)

OR

- X. (a) Explain quicksort algorithm. (9)
(b) Explain binary Search algorithm. (6)
