

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, NOVEMBER – 2024**

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 two non-linear data structures.
2. Define time complexity of an algorithm.
3. Draw block diagram notation of a singly linked list node.
4. Define a binary tree.
5. Define a complete graph.

(5x2=10)

PART – B
(Maximum Marks : 30)

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

1. Define data structure and explain the different operations of data structure.
2. How to evaluate the postfix expressions $AB * C + D$ - to find the result where $A = 5$, $B = 4$, $C = 6$ and $D = 7$?
3. Compare array and linked list.
4. Draw a binary tree and perform different tree traversals.
5. Explain linear search.
6. Explain adjacency matrix representations of a graph with example.
7. Write an algorithm for pop operation in a linked stack.

(5x6=30)

PART – C

(Maximum Marks : 60)

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

UNIT – I

- III.** (a) Explain the algorithm of infix to postfix conversion using stack ADT. (10)
(b) Explain about priority queue and deque. (5)

OR

- IV.** (a) Describe queue ADT with insert () and delete () operations. (9)
(b) Write short note Circular queue. (6)

UNIT – II

- V.** (a) Explain linked list ADT with the algorithms to insert in last position and display linked list. (10)
(b) Explain doubly linked list ADT. (5)

OR

- VI.** (a) Write an algorithm to search a number in a linked list. (7)
(b) Explain queue implementation using linked list. (8)

UNIT –III

- VII.** Explain the operations of insertion and traversals in a binary search tree with algorithms. (15)

OR

- VIII.** (a) Explain expression tree with an example. (8)
(b) Explain threaded binary tree. (7)

UNIT – IV

- IX.** (a) Explain BFS in a graph with algorithm and example. (9)
(b) Explain bubble sort algorithm with an example. (6)

OR

- X.** (a) Discuss about the all pair shortest path algorithm. (9)
(b) Explain quick sort algorithm. (6)
