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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, APRIL - 2025

DATA STRUCTURES

[Maximum marks: 100]   [Time: 3 Hours]

PART – A
Maximum marks: 10

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

1.   Define ADT.

2.   Write any two advantages of linked list.

3.   Define a full binary tree.

4.   Define a graph.

5.   Compare indegree and outdegree of a directed graph.   (5 x 2 = 10)

PART – B
Maximum marks: 30

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

1.   Explain complexity of algorithms and Big Oh(O)notation.

2.   Write algorithms for insertion operations on a priority queue.

3.   Describe list using array.

4.   Write algorithm for implementation of stack using linked list.

5.   Explain linked list representation of binary tree.

6.   Describe Expression trees.

7.   Write binary search algorithm.   (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)   Describe a queue ADT with insert and delete operations.   (9)

      (b)   Define a circular queue. What are the advantages of using a circular queue?   (6)

<p align="center">**OR**</p>

IV.   (a)   Describe a stack ADT with push and pop operations.   (8)

      (b)   Write an algorithm for postfix evaluation using stack.   (7)

<p align="center">**UNIT – II**</p>

V.   (a)   Explain the implementation of queue with linked list.   (9)

      (b)   Explain the procedure for deleting a specific element from a linked list.   (6)

<p align="center">**OR**</p>

VI.   (a)   Describe a doubly linked list. Explain the memory allocation and de-allocation for a linked list node.   (9)

      (b)   Write short note on circular linked list.   (6)

<p align="center">**UNIT - III**</p>

VII.   (a)   Describe the deletion operation of a node from a BST.   (9)

      (b)   Describe Threaded binary tree with an example.   (6)

<p align="center">**OR**</p>

VIII. (a)   Write algorithm for pre order and post order traversal of a BST.   (9)

      (b)   Describe the find operation of a BST.   (6)

<p align="center">**UNIT – IV**</p>

IX.   (a)   Explain functions for BFS graph traversal.   (9)

      (b)   Write Wars hall's all pair shortest path algorithm.   (6)

<p align="center">**OR**</p>

X.   (a)   Explain functions for DFS graph traversal.   (9)

      (b)   Write algorithm for quick sort.   (6)

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