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Reg. No. ....

(REVISION — 2015)

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2019

**DATA STRUCTURES**

[Time : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

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

1. Define complexity of an algorithm.
2. List four basic data structure operations.
3. Give pictorial representation of a circular linked list.
4. Define a binary tree.
5. Differentiate indegree and outdegree of a directed graph.

(5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. Define data structure. Compare Linear and Non-linear data structures.
2. Describe a List ADT with find() and printList() functions.
3. Explain a linked list with insertion and deletion of a new node at beginning.
4. Explain linked representation of binary trees.
5. Describe expression trees.
6. Discuss directed and weighted graph.
7. Explain binary search algorithm.

(5×6 = 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. 8  
 (b) Explain infix, prefix and postfix notations. Using stack, evaluate the postfix expression  $2\ 3,\ 4 + * 6 -$  7

OR

- IV (a) Describe a stack ADT with push and pop operations. 8  
 (b) Explain priority queue and dequeue with suitable examples. 7

UNIT -- II

- V (a) Explain the algorithm to implement a stack using LinkedList ADT. 8  
 (b) Describe a doubly linked list. Explain how memory is allocated and deallocated for a linked list node. 7

OR

- VI Explain a LinkedList ADT with insert(), delete(), find() and printList() operations. 15

UNIT -- III

- VII (a) Explain a BST ADT traversal algorithms with a neat diagram. 8  
 (b) Draw a complete binary tree and explain the following terms.  
 (i) degree of a node (ii) level of a tree  
 (iii) depth of a node (iv) sibling of a node 7

OR

- VIII (a) Describe binary search trees. Explain the deletion of a node from BST. 8  
 (b) Explain threaded binary trees with the help of an example. 7

UNIT -- IV

- IX (a) Explain adjacency matrix and adjacency list representation of a graph. 8  
 (b) Explain Warshall's algorithm for all-pairs shortest path. 7

OR

- X (a) Explain DFS and BFS graph traversal algorithms. 8  
 (b) Explain how a set of numbers can be sorted using quick sort method. 7