TED (15) -4133
(Revision- 2015)

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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE – APRIL -2020.

DATA STRUCTURES

(Maximum Marks : 75) [Time : 2.15 hours]

PART–A

Marks

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

1. Write the average time complexity of linear search and binary search.
2. Write the four basic data structure operations.
3. Draw block diagram notation of a node of a doubly linked list and label it.
4. Which traversal of a binary search tree can be used for sorting.
5. What are the two ways to represent a graph. (3x2=6)

PART - B

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

1. Explain time complexity of binary search with an example array of 8 or 16 sorted numbers. Show the array indices, calculation of values of low, mid and high of each step.
2. Write algorithm of the two major operations of stack.
3. Write the steps in insert a node in front and also to insert a node in the back of an already existing singly linked list.
4. Write the steps to insert a node in between an already existing doubly linked list.
5. Write recursive functions to calculate height/depth and total number of nodes of a B S T.
6. Draw a graph with set of vertices V(G) = {0,1,2,3,4} and the set of edges E(G) ={(0,1), (1,2), (2,3),(3,4), (0,4), (1,4),(1,3)}. Hence show adjacency matrix and adjacency list.
7. Write algorithm for bubble sort and explain with an example with minimum 5 numbers.

[4x6 =24]

PART - C

(Answer **any of the three** units from the following. Each full question carries 15 marks)

UNIT I

III Explain queue operations to insert, delete, queue-full, queue-empty and for printing the queue elements. (15)

OR

IV Write functions to convert infix expression to postfix expression using stack. (15)

UNIT- II

V Write list operations to insert, delete, find and print operations using array. (15)

OR

VI Write linked list ADT for inserting a node at front, deleting a node at front, deleting a node at last and to print the linked list. (15)

UNIT- III

VII Write recursive algorithm for in-order, pre-order and post-order traversals on a BST and explain their difference with an example BST with minimum 5 nodes and height=3. (15)

OR

VIII Write ADT for insert ( ), delete ( ), find ( ) operations of BST. (15)

UNIT – IV

IX (a) Explain functions for breadth first search graph traversal. (8)

(b) Explain functions for depth first search graph traversal. (7)

OR

X (a) Write algorithm of quicksort? (6)

(b) Using minimum 7 elements, explain quicksort showing pivot, array indexes, array index values of lower, upper elements of each partition in each step. (9)

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