



TED (15) – 4133

(REVISION — 2015)

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Signature [Signature]

**FOURTH SEMESTER DIPLOMA EXAMINATION IN  
ENGINEERING/TECHNOLOGY — APRIL, 2017**

**DATA STRUCTURES**

(Common for CT and CHM)

[Time : 3 hours

(Maximum marks : 100)

**PART — A**

(Maximum marks : 10)

Marks

I Answer the following questions in one or two sentences. Each question carries 2 marks.

1. Define LIFO data structure with an example.
2. Write two advantages of linked lists over lists using arrays.
3. Define a binary search tree.
4. What is the purpose of Warshall's algorithm ?
5. What is linear search ?

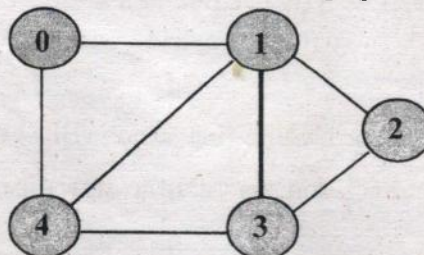
(5 × 2 = 10)

**PART — B**

(Maximum marks : 30)

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

1. Evaluate the following postfix expressions and write the result where A = 5, B = 4, C = 9 and D = 10.  
(a) ABC\*+D-                      (b) AB\*C+D-
2. Write the algorithm to delete the first node in a linked list.
3. Write the algorithm for Push() operation of a stack using linked list.
4. What is an expression tree ? Draw the expression tree of A + B\* C-D.
5. Write the algorithm for post order traversal of a BST.
6. Write a note on priority queue.
7. Draw the adjacency list representation of the graph shown below :



(5 × 6 = 30)



Marks

PART — C

(Maximum marks : 60)

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

UNIT — I

- III (a) Explain about the basic data structure operations. 9  
(b) What is a circular queue ? What are the advantages of a circular queue over an ordinary queue ? 6

OR

- IV (a) Explain about the stack ADT. 8  
(b) Describe complexity of algorithms and Big O notation. 7

UNIT — II

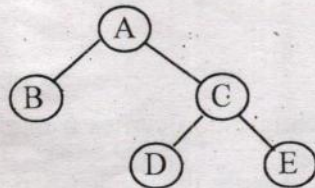
- V (a) Draw and explain about a doubly linked list. 6  
(b) Describe the list ADT in detail. 9

OR

- VI (a) Explain about implementing a queue using linked list. 9  
(b) Write the algorithm for printing the data values of the nodes in a linked list. 6

UNIT — III

- VII (a) Describe the deletion operation of a node from a BST citing the three different cases in the operation. 9  
(b) Show the inorder, preorder and postorder traversals of the tree shown below :



6

OR

- VIII (a) Define a binary tree. 3  
(b) Write the algorithm for inorder traversal of a BST. 6  
(c) Explain about how a binary tree is represented in memory. 6

UNIT — IV

- IX (a) Define graph. 3  
(b) Write a short note on the following with appropriate diagrams. 12  
(i) Directed graph (ii) Degree of a vertex  
(iii) Cycle (iv) Complete graph

OR

- X (a) Write the algorithm for breadth-first-search (BFS) of a graph. 8  
(b) Explain about the quick sort algorithm to sort a list of numbers. 7