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)

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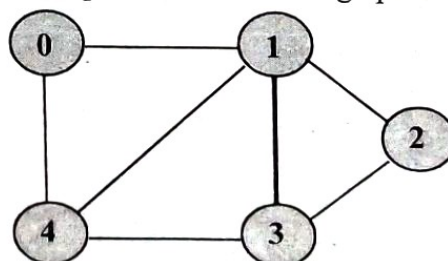
Marks

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
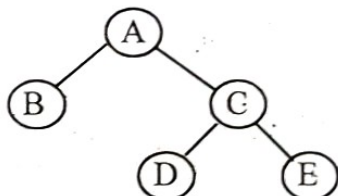
OR

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.

       (i) Directed graph   (ii) Degree of a vertex

       (iii) Cycle   (iv) Complete graph   12

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