OIEL-002

DIPLOMA – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (DECVI) / ADVANCED LEVEL CERTIFICATE COURSE IN ELECTRONICS AND COMMUNICATION ENGINEERING (ACECVI)

Term-End Examination

June, 2017

00504

OIEL-002 : DATA STRUCTURES

Time : 2 hours   *Maximum Marks : 70*

Note : *Attempt any **five** questions. Question no. **1** is **compulsory**. Use of scientific calculator is allowed.*

1. (a) Stack is also called as
    (i)   Last-in First-out (LIFO)
    (ii) First-in First-out (FIFO)
    (iii) Last-in Last-out (LILO)
    (iv) First-in Last-out (FILO)

    (b) A full binary tree with $2n + 1$ nodes contains
    (i)   n-leaf nodes
    (ii) n – 1 leaf nodes
    (iii) n non-leaf nodes
    (iv) n – 1 non-leaf nodes

(c)   The data structure required for breadth first traversal on a graph is

(i)   Queue

(ii) Stack

(iii) Array

(iv) Tree

(d)   A data structure required to evaluate a postfix expression is

(i)   Linked list

(ii) Array

(iii) Queue

(iv) Stack

(e)   _____ is *not* the component of a data structure.

(i)   Operations

(ii) Storage

(iii) Algorithms

(iv) None of the above

(f)   Finding the location of the element with a given value is

(i)   Traversal

(ii) Search

(iii) Sort

(iv) None of the above

(g)   The best average behaviour is shown by

(i)   Quick Sort

(ii) Merge Sort

(iii) Insertion Sort

(iv) Heap Sort   7×2=14

2. (a) Define array. Explain 1-D array with declaration and initialization.   7

     (b) What is the difference between an array and a linked list ? Explain with suitable example.   7

3. (a) What is doubly linked list ? Give one example that uses doubly linked list.   7

     (b) Write an algorithm that will perform an insertion and deletion of a node in a singly linked list.   7

4. (a) What is bubble sort ? Define all the steps of bubble sort as an ascending order of the following data :   7

         55, 22, 77, 91, 65, 12

     (b) What is searching ? List and explain the searching techniques with algorithms.   7

5. (a) What is the difference between a queue and a stack ? Explain priority queue with suitable example.   7

     (b) Define postfix and prefix expressions. Write postfix form of the expression

$$(A + B - C + D) * E.$$ 7

6. (a) Define a Binary tree. Draw a binary tree for the following equations : 7

      (i) $(A + B * C) / (A + B) * C$

      (ii) $A + (B - C) * (E * F) / (G / J)$

  (b) Write an algorithm for the shortest path using breadth first search. 7

7. Write short notes on any **two** of the following : 2×7=14

  (a) Functions and Pointer

  (b) Hashing Function

  (c) Circular Linked List

  (d) Linear and Non-Linear Data Structures

———————