ROLL NO. _____

Code: DC54/DC104 **Subject: DATA STRUCTURES**

DipIETE – CS (CURRENT & NEW SCHEME)

Time: 3 Hours **JUNE 2017** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: **(2×10)**

a. Which of the following data structure is linear data structure?
(A) Trees **(B)** Graphs
(C) Arrays **(D)** None of these

b. The operation of processing each element in the list is known as
(A) Sorting **(B)** Merging
(C) Inserting **(D)** Traversal

c. Linked lists are best suited
(A) for relatively permanent collections of data
(B) for the size of the structure and the data in the structure are constantly changing
(C) for both of above situation
(D) for none of above situation

d. The elements of an array are stored successively in memory cells because
(A) by this way computer can keep track only the address of the first element and the addresses of other elements can be calculated
(B) the architecture of computer memory does not allow arrays to store other than serially
(C) Both **(A)** and **(B)**
(D) None of these

e. Which of the following is not the required condition for binary search algorithm?
(A) The list must be sorted
(B) There should be the direct access to the middle element in any sublist
(C) There must be mechanism to delete and/or insert elements in the list
(D) None of these

f. Which of the following data structure stores the homogeneous data elements?

(A) Arrays **(B)** Records
(C) Pointers **(D)** None

g. When new data are to be inserted into a data structure, but there is no available space; this situation is usually called
(A) Underflow **(B)** Overflow
(C) Houseful **(D)** Saturated

h. The situation when in a linked list START=NULL is
(A) Underflow **(B)** Overflow
(C) Houseful **(D)** Saturated

i. A data structure where elements can be added or removed at either end but not in the middle
(A) Linked lists **(B)** Stacks
(C) Queues **(D)** Deque

j. When inorder traversing a tree resulted E A C K F H D B G; the preorder traversal would return
(A) FAEKCDBHG **(B)** FAEKCDHGB
(C) EAFKHDCBG **(D)**FEAKDCHBG

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. What do you mean by storage or lifetime of variables? Explain with example. **(8)**

b. What do you mean by recursion? Explain stack overhead in recursion with example. **(8)**

Q.3 a. What is the difference between structure and union? How to define the structure? **(8)**

b. What do you mean by file? How many types of files are there? **(8)**

Q.4 a. Write a program in C for carrying out manipulations such as finding the sum of elements of an array and adding two arrays. **(8)**

b. Explain binary search. **(8)**

Q.5 a. What is stack? Give array implementation of stack. **(8)**

b. Give the distinction between stack, queue and circular queue. **(8)**

Q.6 a. What is linked-list? What are the advantages of linked-list over array? **(8)**

b. Give the concept of sorting and reversing of linked list. **(8)**

Q.7 a. What do you mean by circular linked-list? What are the problems with singly linked lists? How it can be overcome? **(8)**

b. Write a program to insert a node in a Doubly linked list. **(8)**

Q.8 a. What do you mean by Tree? How to represent a binary tree? **(8)**

b. Give the order of Binary tree traversal operations. **(8)**

Q.9 a. What is depth-first traversal and breadth-first traversal? **(8)**

b. What is minimum-cost spanning tree? Explain. **(8)**