ROLL NO. _____

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

DipIETE – CS (Current & New Scheme)

Time: 3 Hours **DECEMBER 2018** **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. The memory address of the first element of an array is called
(A) floor address **(B)** foundation address
(C) First address **(D)** base address

b. Which of the following data structure is indexed structure?
(A) linear Array **(B)** linked list
(C) Both **(A)** and **(B)** **(D)** None of these

c. A data structure where elements can be added or removed at either end but not in the middle is
(A) linked list **(B)** stacks
(C) queues **(D)** deque

d. 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 sub-list.
(C) There must be mechanism to delete and/or insert element in list.
(D) Binary search algorithms not efficient when the data elements are more than 1000.

e. Which of the data structure is needed to convert infix notations to postfix notations?
(A) Stack **(B)** Queue
(C) Tree **(D)** Graph

f. Which of the following ways can be used to represent a graph?
(A) Adjancy list **(B)** Adjancy Matrix
(C) Incidence matrix **(D)** All of these

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

h. The depth of a complete binary tree is given by
(A) $D_n = n\log_2 n$ **(B)** $D_n = n\log_2 n+1$
(C) $D_n = \log_2 n$ **(D)** $D_n = \log_2 n+1$

i. The inorder traversal of tree will yield a sorted listing of elements of tree in
(A) Merging **(B)** AVL tree
(C) Binary Tree **(D)** Binary Search Tree

j. The data structure required for breadth first traversal on a graph is
(A) queue **(B)** stack
(C) array **(D)** None of these

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

Q.2 a. What is the difference between static and dynamic memory allocation? Explain register variables? **(8)**

b. What do you understand by recursion? Explain through suitable example. **(8)**

Q.3 a. What is structure? Explain memory allocation of structures. **(6)**

b. Explain Unions. **(6)**

c. What is the use of files? **(4)**

Q.4 a. Explain binary search. **(8)**

b. Explain Bubble Sort. **(8)**

Q.5 a. What is stack? How will you implement a stack using array? **(8)**

b. Why a circular queue is more efficient than simple generic? Implement a circular Queue. **(8)**

Q.6 a. Explain algorithm of Merging linked list. **(6)**

b. What do you understand by Polynomials? Explain. **(4)**

c. Explain deletion of a node from linked list. **(6)**

Q.7 a. Explain the use of circular linked list. **(8)**

b. Explain doubly linked list. **(8)**

Q.8 a. What is a binary tree? Explain binary tree traversals. **(8)**

b. What is binary search tree? Explain algorithm to search using target key in BST? **(8)**

Q.9 a. How a graph can be represented through Adjancy Matrix? Explain BFS. **(8)**

b. What is spanning tree? Explain Minimum Cost spanning tree. **(8)**