

DiplETE – CS (Current & New Scheme)

Time: 3 Hours

June 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. An array elements are always stored in _____ memory locations.
 (A) Sequential (B) Random
 (C) Sequential and Random (D) None of these
- b. Which data type can be stored in register?
 (A) int (B) float
 (C) long (D) All of these
- c. Size of a union is determined by size of the _____.
 (A) First member in the union (B) Last member in the union
 (C) Biggest member in the union (D) Sum of the sizes of all members
- d. Which of the following properties is associated with a queue?
 (A) First In Last Out (B) First In First Out
 (C) Last in First Out (D) None of these
- e. Linked list is considered as an example of _____ type of memory allocation.
 (A) Dynamic (B) Static
 (C) Compile time (D) None of these
- f. The process of accessing data stored in a serial access memory is similar to manipulating data on a _____.
 (A) Heap (B) Binary Tree
 (C) Array (D) Stack
- g. Which of the following is false about a doubly linked list?
 (A) we can navigate in both the directions
 (B) it requires more space than a single linked list
 (C) The insertion and deletion of a node take a bit longer
 (D) None of these
- h. Binary tree can have how many children?
 (A) 2 (B) any number of children
 (C) 0 or 1 or 2 (D) 0 or 1

- i. To obtain a prefix expression, which of the tree traversals is used?
 (A) Level-order traversal (B) Pre-order traversal
 (C) Post-order traversal (D) In-order traversal
- j. For the adjacency matrix of a directed graph the row sum is the _____ degree and the column sum is the _____ degree.
 (A) in, out (B) out, in
 (C) in, total (D) total, out

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

- Q.2** a. Write a program to find factorial of given number n using recursive function. (8)
 b. Explain register variable. Why we use register variables? Explain. (8)
- Q.3** a. Explain the memory allocation to a structure and union with suitable example. (8)
 b. Explain direct access files. (8)
- Q.4** a. Write a program to find transpose of a given matrix of order 3 x 3. (8)
 b. Explain merge sort with suitable example. (8)
- Q.5** a. Explain various applications of stack in brief. (8)
 b. Explain array and linked list implementation of a queue. (8)
- Q.6** a. Explain singly linked list and write an algorithm to delete a node from beginning. (8)
 b. Explain the process of merging of two sorted linked list. (8)
- Q.7** a. Explain doubly linked list and circular linked list. (8)
 b. Write a program to insert a node after given node information of doubly linked list. (8)
- Q.8** a. Explain linked list representation of binary tree. (8)
 b. Create a binary tree using post-order and inorder (8)
 Post-order : I D B G C H F E A
 Inorder : B I D A C G E H F
- Q.9** a. Explain various ways by which we can represent a graph. (8)
 b. Write kruskal's algorithms for creating a minimum spanning tree for a weighted graph. (8)