Enrollment No: _____

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B. Tech Mid Semester Exam

Semester: III[rd] **Date: 07-08-2023**
Subject Code: 303105201 **Time: 1hr: 30min**
Subject Name: Data Structures and Algorithms **Total Marks: 40**

Q.1 (A) Answer the following in one line. **(5 Marks)**

(1) List down the names of data structures which are linear in nature.

(2) Given arrays and linked lists, which one of them uses static memory allocation?

(3) Given arrays and linked lists, which one of them uses dynamic memory allocation?

(4) Given arrays and linked lists, which one allows direct access of their elements?

(5) If postponement is the nature of processing, which data structure should be used?

(B) Fill in the blanks, in the following sentences. **(5 Marks)**

(1) A self – referential structure has a _ _ _ _ _ _ _ to itself as one of its members.

(2) A self – referential structure can _ _ _ _ _ _ _ two such structures together.

1. Link 2. Merge 3. Add 4. Move

(3) A stack behaves in a _ _ _ _ _ _ _ manner.

(4) A queue behaves in a _ _ _ _ _ _ _ manner.

(5) A linked list is a _ _ _ _ _ _ _ _ data structure.

Q.2 Attempt any four (Short Questions) **(12 Marks)**

(1) Explain primitive data types in short.

(2) Explain the concept of linear data structures, in short.

(3) Explain and evaluate the following **postfix expression**

2 3 + 7 5 - *

(4) Explain and evaluate the following **postfix expression**

7 3 + 7 5 - /

(5) Explain the **get node ( )** function in the context of **singly linked list.**

Q.3 **Attempt any 2 questions** **(8 Marks)**

(1) Write **Push ( )** and **Pop ( )** functions in a stack implemented using an array.

(2) Write **Add ( )** and **Remove ( )** functions in a Queue implemented using a linked list.

(3) Explain the cases of **stack full** and **stack empty**, while implementing a stack using an array.

Q.4 **(A)**Explain with suitable diagram, and code the function of **Insert ( )** in a **singly linked list.** Assume the node contains an integer value and the nodes are arranged in an ascending order.

(5 Marks)

(B) Explain with suitable diagram, and code the function of **Traverse ( )** in a singly linked list.

(5 Marks)

OR

(B) Explain with suitable diagram and code the function of **Append ( )** in a singly linked list.

(5 Marks