Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER–II EXAMINATION – WINTER 2020

Subject Code:3620002 Date:05/02/2021

Subject Name:Data Structures

Time:10.30 am to 12.30 pm Total Marks: 56

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Answer the followings: **07**

(1) What is data structure?
(2) Why do we need data structures?
(3) List some common data structures.
(4) How data structures are classified?
(5) Define abstract data type.
(6) What are the types of linked list?
(7) Define degree of a tree.

(b) What is string? Explain string handling functions. Write the applications of String. **07**

Q.2 **(a)** Explain array based implementation of stacks. **07**

(b) Convert the following infix expression to its prefix form using stack A + B – C * D / E + F. Show diagrammatically each step of conversion. **07**

Q.3 **(a)** Write algorithm to delete an intermediate node from a Singly Linked List. **07**

(b) Explain Breadth First Search traversal of Graph using an example. **07**

Q.4 **(a)** What is Circular Linked List? State the advantages and disadvantages of Circular Link List Over Doubly Linked List. Also write advantages of Linked List over an Array. **07**

(b) Explain Depth First Search traversal of Graph using an example. **07**

Q.5 **(a)** Answer the followings: **07**

(1) Define graph.
(2) Define biconnected graph.
(3) Define shortest path problem.
(4) Define adjacent node.
(5) What is directed graph?
(6) What is weighted graph?
(7) Define indegree of a graph.

(b) What do you mean by internal and external sorting? How the insertion sort is done with the array? **07**

Q.6 **(a)** Construct the binary search tree using following elements : **07**
35, 15, 40, 7, 10, 100, 28, 82, 53, 25, 3. Show diagrammatically each step of construction of binary search tree.

(b) What is insertion sort? How many passes are required for the elements to be sorted? Write the function in C for insertion sort? **07**

Q.7 **(a)** What is sorting? Write an algorithm to perform Selection sort. Trace the algorithm for following input values (to arrange them in ascending order). **07**
10 50 0 20 30 10

(b) Explain binary search tree ADT in detail. **07**

Q.8 **(a)** Explain collision resolution technique. **07**

(b) Explain hashing functions. **07**

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