Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III EXAMINATION – SUMMER 2020

Subject Code: 3130702 Date:27/10/2020

Subject Name: Data Structures

Time: 02:30 PM TO 05:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			Marks
Q.1	**(a)**	Differentiate between data types and data structures.	**03**
	(b)	Answer the followings: (1) Give examples of Linear and Non-Linear Data Structures. (2) What do you mean by Abstract Data Types?	**04**
	(c)	Discuss and write a program to implement queue functions using arrays.	**07**
Q.2	**(a)**	Distinguish between stack and queue.	**03**
	(b)	What is top of stack? Why stack is called LIFO list?	**04**
	(c)	What is a circular queue? How do you check the queue full condition? Write an algorithm to count the nodes in a circular queue.	**07**
		OR	
	(c)	Explain creation, insertion and deletion of doubly linked list with example.	**07**
Q.3	**(a)**	What are binary trees? Mention different types of binary trees with example.	**03**
	(b)	What is a graph? Explain various representations of graphs.	**04**
	(c)	Write an algorithm to add a node into a binary search tree.	**07**
		OR	
Q.3	**(a)**	What is B -tree of order m? Draw a B-tree of order 3.	**03**
	(b)	Construct a binary tree having the following traversal sequences: Preorder traversal A B C D E F G H I Inorder traversal B C A E D G H F I	**04**
	(c)	Discuss algorithm of Breadth First Search (BFS) traversal for a Graph. Explain with an example.	**07**
Q.4	**(a)**	Explain Sequential file organizations and list its advantages and disadvantages.	**03**
	(b)	How access of record is performed in multi key file organization?	**04**

	(c)	Describe various collision resolution techniques in hashing.	**07**

OR

Q.4	**(a)**	Explain indexed sequential file structure.	**03**
	(b)	Explain minimal spanning tree.	**04**
	(c)	What is hashing? What are the qualities of a good hash function? Explain any two hash functions in detail.	**07**
Q.5	**(a)**	Define topological sort?	**03**
	(b)	Compare sequential searching with binary searching in detail.	**04**
	(c)	Examine the algorithm for Insertion sort and sort the following array: 77, 33, 44, 11, 88, 22, 66, 55	**07**

OR

Q.5	**(a)**	What do you mean by internal and external sorting?	**03**
	(b)	Write an algorithm for quick sort.	**04**
	(c)	What is Binary Search Tree? Construct a binary search tree for the following elements 21, 16, 24, 18, 22, 25, 26, 27, 29, 33	**07**