Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER– III (New) EXAMINATION – WINTER 2019

Subject Code: 3130702   **Date: 28/11/2019**
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)	Discuss various types of data structures with example.	03
	(b)	What is hash function used for? Give one example of a hash function.	04
	(c)	What is time and space analysis? State and explain time analysis for linear search and binary search method.	07
Q.2	(a)	Compare Array and Link list.	03
	(b)	State disadvantages of simple queue. How to overcome it?	04
	(c)	Write an algorithm for INSERT, DELETE and DISPLAY function of Circular Queue.	07
		OR	
	(c)	Write an algorithm for INSERT operation to insert a node at a given position in a Link list.	07
Q.3	(a)	Discuss height balance tree.	03
	(b)	Discuss Minimal Spanning Tree.	04
	(c)	Write a recursive function to compute factorial of a number. Show usage of STACK in recursion for this function.	07
		OR	
Q.3	(a)	Write an algorithm to find length of a simple link list.	03
	(b)	Write an algorithm to insert a node in a Circular Link List at the FIRST position.	04
	(c)	Write an algorithm for DELETE operation in a Binary search tree.	07
Q.4	(a)	Discuss Threaded Binary Tree.	03
	(b)	Write an algorithm for a non recursive (Iterative) pre order traversal of Binary search tree.	04
	(c)	Create an AVL tree for the following sequence of numbers. Also mention name of action taken. 200, 400, 800, 900, 850, 700, 950, 100, 150	07
		OR	
Q.4	(a)	Define following with respect to Tree: i) M-ary tree ii) Out Degree iii) Leaf	03
	(b)	State at least one efficient representation of a sparse matrix.	04

	(c)	Discuss algorithm of Breadth First Search (BFS) traversal for a Graph. Explain with an example.	**07**
Q.5	**(a)**	Write algorithm for Bubble sort method.	**03**
	(b)	Write algorithm for Merge sort method.	**04**
	(c)	Explain Sequential Files and Indexed Sequential Files Structures	**07**

OR

Q.5	**(a)**	Create 2-3 Tree for the following sequence: 50, 100, 150, 200	**03**
	(b)	Represent following in form of an expression tree: A+B*(C+D)	**04**
	(c)	State and explain collision resolution techniques in hashing.	**07**

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