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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