Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA INTEGRATED– SEMESTER -III EXAMINATION –SUMMER-2021

Subject Code: 4430602 **Date: 18/09/2021**

Subject Name: Data Structures

Time: 02:30 PM TO 5:00 PM **Total Marks: 70**

Instructions:

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

Q.1	**(a)**	Answer the following questions:-	**07**
		(i) Write down various notation used in algorithm analysis with proper explanation.	**04**
		(ii) What is Cursor implementation of Linked List?	**03**
	(b)	Define following terms with example	**07**
		(i) Height and depth of binary tree	**02**
		(ii) Trie structure	**03**
		(iii) Acyclic Graph	**02**
Q.2	**(a)**	Write down various hashing function with the help of suitable example.	**07**
	(b)	Write an algorithm of Quick Sort or Heap Sort to explain O (nlog (n)) recursive or non recursive algorithm.	**07**
		OR	
	(b)	Compare Linear Search and Binary Search algorithm on their usage	**07**
Q.3	**(a)**	Compare singly Linked List and doubly linked list with the help of following algorithm. (i) Add element at beginning (ii) Delete element	**07**
	(b)	Differentiate Simple Queue and Circular Queue with the help of Enqueue (add element in queue) and Dequeue (delete element from queue) algorithm.	**07**
		OR	
Q.3	**(a)**	How Stack used in the concepts of function calling and recursion.	**07**
	(b)	Answer the following questions	**07**
		(i) insert following elements in AVL Tree and print them in Post order traversal 1,34,556,55,67,21,7,8,9,0,87,5,64	**05**
		(ii) Create an expression tree of (c-d)/(x-y)	**02**
Q.4	**(a)**	Write down various Graph representations with the help of suitable example.	**07**
	(b)	Answer the following questions	**07**
		(i) Differentiate between Perfect Binary tree , Full binary Tree and Complete Binary tree	**04**
		(ii) Convert following expression in to postfix expression (a-(b/c)*d/(e-f)/g)	**03**
		OR	
Q.4	**(a)**	Write an algorithm to delete element from binary search tree and explain all cases with the help of suitable example.	**07**
	(b)	Write an algorithm of Breath First Search algorithm along with suitable example of digraph of 6 vertexes.	**07**
Q.5	**(a)**	Write an algorithm of topological sort and explain it with the help of suitable example of 5 vertexes.	**07**
	(b)	Answer the following questions	**07**

(i) Write short note on KWIC indexing. **04**

(ii) Write down the method of converting general tree in to binary tree. **03**

OR

Q.5 **(a)** Write an algorithm to add two sparse matrices with the help of Linked List representation of sparse matrix. **07**

(b) What is Spanning Tree? Write down Kruskal's algorithm to convert Graph into minimal spanning tree with the help of example of six vertexes Graph. **07**

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