Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III(NEW) EXAMINATION – WINTER 2022

Subject Code:3134201 Date:22-02-2023

Subject Name:Data Structures and Algorithms

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Define algorithm. Discuss key characteristics of algorithms.	**03**
	(b)	Arrange the following functions in increasing order of growth. 2^n , n^2 , 1, n log n	**04**
	(c)	Explain Worst Case, Best Case and Average Case Complexity.	**07**
Q.2	**(a)**	Give the difference between Stack and Queue.	**03**
	(b)	Write a brief note on Priority Queue.	**04**
	(c)	Explain how to evaluate postfix expression using stack with suitable example.	**07**
		OR	
	(c)	Write algorithm to insert and delete elements in circular queue.	**07**
Q.3	**(a)**	Explain the structure of Circular linked list.	**03**
	(b)	Write user defined 'C' function to insert node at a specific location in singly linked list.	**04**
	(c)	Write an algorithm of Selection Sort. Also, explain it with suitable example.	**07**
		OR	
Q.3	**(a)**	Compare and contrast array with linked list.	**03**
	(b)	Write user defined 'C' function to delete the last node in doubly linked list.	**04**
	(c)	Write an algorithm of Insertion Sort. Also, explain it with suitable example.	**07**
Q.4	**(a)**	Define following with respect to Tree: i) In Degree ii) Out Degree iii) Leaf	**03**
	(b)	Write a brief note on AVL Tree.	**04**
	(c)	Create an algorithm for multiplying large Integers using divide and conquer approach.	**07**
		OR	
Q.4	**(a)**	Explain double hashing in brief.	**03**
	(b)	Compare and contrast linear search with binary search.	**04**
	(c)	Create an algorithm to find the k^{th} minimum element in a Binary Search Tree.	**07**
Q.5	**(a)**	Give the difference between BFS and DFS.	**03**
	(b)	Explain Backtracking Method.	**04**
	(c)	Explain activity selection problem using greedy method with suitable example.	**07**
		OR	
Q.5	**(a)**	Explain principle of optimality.	**03**
	(b)	Explain Prim's algorithm.	**04**
	(c)	Explain knapsack problem using dynamic programming approach with suitable example.	**07**

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