Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) EXAMINATION – WINTER 2021

Subject Code:3130702 Date:19-02-2022

Subject Name:Data Structures

Time:10:30 AM TO 01:00 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.**

Q.1	**(a)**	What is time complexity? Explain with example.	**03**
	(b)	Explain malloc and free functions in 'C'. Also discuss advantages of dynamic over static memory allocation.	**04**
	(c)	Explain following: (i) priority queue (ii) primitive data structures (iii) non-primitive data structures (iv) linear data structures (v) nonlinear data structures (vi) applications of stack (vii) sparse matrix	**07**
Q.2	**(a)**	Write an algorithm for infix to postfix conversion.	**03**
	(b)	Write an algorithm to evaluate postfix expression. Explain working of the algorithm using appropriate example.	**04**
	(c)	Write a 'C' program to reverse a string using stack.	**07**
		OR	
	(c)	Write algorithm to (i) insert, and (ii) delete elements in circular queue.	**07**
Q.3	**(a)**	Write user defined 'C' function to insert node at a specific location in singly linked list.	**03**
	(b)	Write user defined 'C' function to delete node from end in circular linked list.	**04**
	(c)	Write a 'C' program to implement queue using linked list.	**07**
		OR	
Q.3	**(a)**	Write user defined 'C' function to insert node at the end in circular linked list.	**03**
	(b)	Write user defined 'C' function to delete node from a specific location in doubly linked list.	**04**
	(c)	Write a 'C' program to implement stack using linked list.	**07**
Q.4	**(a)**	Construct a binary tree from the traversals given below: Inorder: D, B, A, E, G, C, H, F, I Preorder: A, B, D, C, E, G, F, H, I	**03**
	(b)	Write a short on AVL tree.	**04**
	(c)	Explain the concept of B-tree with suitable example and list its applications.	**07**
		OR	
Q.4	**(a)**	Construct a binary search tree from the following numbers. 38, 13, 51, 10, 12, 40, 84, 25, 89, 37, 66, 95	**03**
	(b)	Explain BFS and DFS.	**04**
	(c)	Explain B+ tree with example.	**07**
Q.5	**(a)**	Explain Prim's algorithm.	**03**
	(b)	Write a 'C' program for selection sort.	**04**
	(c)	List out different hash methods and explain any three.	**07**

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OR

Q.5	**(a)**	Define terms with respect to file: fields, records, database	**03**
	(b)	Compare sequential and binary search methods.	**04**
	(c)	Apply quick sort for the following data: 9, 7, 5, 11, 12, 2, 14, 3, 10, 6	**07**

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