GUJARAT TECHNOLOGICAL UNIVERSITY
B.VOC- SEMESTER–II EXAMINATION – SUMMER 2022

Subject Code:21120201   **Date:26-07-2022**

Subject Name:Data Structures

Time:10:30 AM TO 12:30 PM   **Total Marks:50**

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)**	Give the difference between structure and union.	**05**
	(b)	What is Data Structure? Explain the types of data structures in detail.	**05**
Q.2	**(a)**	Write an algorithm to perform enqueue and dequeue operations in a queue.	**05**
	(b)	Convert following infix expression into postfix (reverse polish) format. A ^ B * C - D + E / F / (G + H)	**05**
		OR	
	(b)	Write an algorithm for evaluation of postfix expression and evaluation the following expression showing every status of stack in tabular form. 7 5 2 + * 4 1 1 + / -	**05**
Q.3	**(a)**	Define Queue. What are the benefits of circular queue over Queue?	**05**
	(b)	Write an algorithm for stack operations Push, Pop and Empty. Assume stack is implemented using array.	**05**
		OR	
Q.3	**(a)**	Explain Time and space complexity of an algorithm.	**05**
	(b)	What is linked list? Explain Singly and doubly linked list.	**05**
Q.4	**(a)**	What is AVL tree? State and explain the different rotations in AVL tree with examples.	**05**
	(b)	Construct binary search tree for the following data: 10,3,15,22,6,45,65,23,78,34,5 Find inorder, preorder and postorder travesal.	**05**
		OR	
Q.4	**(a)**	Define 2-3 tree. Describe the characteristic of 2-3 tree.	**05**
	(b)	Define height of the binary tree. Define height balanced tree with its advantages. Construct a height balanced binary tree (AVL tree) for the following data: 42,06,54,62,88,50,22,32,12,33	**05**
Q.5	**(a)**	What is graph? Explain various representations of graph.	**05**
	(b)	Explain the trace of bubble sort on following data. 42,23,74,11,65,58,94,36,99,87	**05**
		OR	
Q.5	**(a)**	What is searching? Explain binary search with example.	**05**
	(b)	Write the algorithm for quick sort and sort the following numbers according to it. 25, 85, 60, 10, 58, 47, 35,16, 72,50	**05**

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