Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

BCA/MCA INTEGRATED - SEMESTER - II EXAMINATION - SUMMER 2025

Subject Code: BC02001011 Date: 29-05-2025

Subject Name: Data Structure

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. Use of simple calculators and non-programmable scientific calculators are permitted.

			Marks
Q.1	**(a)**	Answer the following Questions. 1) Give the full form of LIFO & FIFO 2) Explain linked list? 3) Define Data Structure? 4) What is Primitive Data Types? 5) What are some applications of Data Structure? 6) How do you test for an empty stack? 7) List some common data structures.	**07**
	(b)	1) Full form of DS. 2) Process of inserting an element in stack is called _____ 3) The concatenation of two lists can be performed in O(1) time. Which variation of the linked list can be used? 4) Heap exhibits the property of a binary tree? 5) How do you initialize an array in C? 6) A queue follows _____ 7) What is direct addressing?	**07**
Q.2	**(a)**	Explain BST and how its work in brief.	**07**
	(b)	Give the difference between stack and queue.	**07**
		OR	
	(b)	What are the operations of the stack? Describe below.	**07**

a. isfull ()

b. Push ()

c. Pop ()

d. Top (or peek)

e. IsEmpty ()

Q.3 **(a)** Explain circular linked list and its implementation. **07**

(b) Explain Recursion. **07**

OR

(a) What is data structure? What are various types of data structure? Explain. **07**

(b) What are the applications of stack? Describe below. **07**

The following are the applications of stacks

• Balancing the parenthesis

• Expression Evaluation

• Function call management

Q.4 **(a)** What is tree? Explain in brief with their types and examples. **07**

(b) difference between bubble sort and selection sort **07**

OR

(a) Explain Quick sort and Merge sort with examples. **07**

(b) Difference between DFS & BFS. **07**

Q.5 **(a)** Explain Sparse Matrix and its Representation. **07**

(b) Explain stack in Depth. **07**

OR

(a) Introduction to dynamic memory allocation and explain DMA function malloc (), calloc () & free ()." **07**

(b) What is Hashing in DS? Explain in brief. **07**

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Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

BCA/MCA INTEGRATED - SEMESTER - II EXAMINATION - WINTER 2025

Subject Code: BC02001011 **Date: 28-11-2025**

Subject Name: Data Structure

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. Use of simple calculators and non-programmable scientific calculators are permitted.

			Marks
Q.1	**(a)**	Discuss the various types of data structures with classification into linear and non-linear types.	**07**
	(b)	Define best case, worst case, and average case time complexity.	**07**
Q.2	**(a)**	What is a Stack? Explain the Various Operations Performed on a Stack in Detail.	**07**
	(b)	Explain the concept of a circular queue. How does it solve the limitations of a linear queue? Write algorithms for insertion and deletion in a circular queue.	**07**
		OR	
	(b)	Explain how queues can be implemented using linked lists. Write algorithms for insertion (enqueue) and deletion (dequeue) operations.	**07**
Q.3	**(a)**	What are the different binary tree traversal methods? Explain Inorder, Preorder, and Postorder traversal with suitable examples.	**07**
	(b)	Differentiate: BFS and DFS.	**07**
		OR	
	(a)	A binary tree T has 8 nodes. The inorder and preorder traversals of T yield the following sequence of nodes: **Inorder: P, G, B, Q, A, E, C, D** **Preorder: A, B, P, G, Q, C, E, D** Show its postorder traversal sequence and Draw the binary tree.	**07**
	(b)	What are the different types of collision resolution techniques in hashing? Explain each method with suitable examples.	**07**
Q.4	**(a)**	Differentiate between Sequential, Indexed, and Relative (Random) file organization methods. Illustrate with appropriate use cases and diagrams.	**07**
	(b)	Explain the working of Sequential Search algorithm with suitable examples	**07**
		OR	
	(a)	Explain the working of Binary Search algorithm with suitable examples	**07**

(b) Evaluate the Postfix expression in Tabular Forms : **07**
2 5 3 - * 8 / 4 +

Q.5 **(a)** Sort the following list using Bubble Sort and show all passes: **07**

98, 37, 56, 82, 11, 77, 64, 45, 23, 99

(b) Explain the working of Quick Sort. How is it different from Merge Sort? Illustrate Quick Sort with an example by sorting the following list: **10, 80, 30, 90, 40, 50, 70** **07**

OR

(a) Explain Tower of Hanoi with Suitable Example. **07**

(b) Explain AVL Tree in detail with Suitable Example. **07**

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