

Dr. Babasaheb Ambedkar Open University
Term End Examination February – 2026

Course	: BCA	Date	: 13-02-2026
Subject Code	: BCAMA-202/BCAOL-202	Time	: 03:00pm to 05:15pm
Subject Name	: Data Structure using C	Duration	: 02.15 Hours
		Max. Marks	: 70

Section A

Answer the following (Attempt any three) (30)

1. Explain Linear Data Structure with diagram in detail.
2. Explain Non-Linear Data Structure with diagram in detail.
3. List out and explain basic terminologies of Tree Data Structure.
4. Explain Depth First Search (DFS) and Breadth First Search (BFS) and differentiate between them.
5. List out various types of Sorting and explain Bubble Sort in detail.

Section B

Answer the following (Attempt any four) (20)

1. List out and explain various terminologies of an Array.
2. Define Sparse Matrices with example.
3. Define Dynamic Memory Allocation in brief.
4. What are different types of Linked-List? Explain any one in detail.
5. Define Stack Data Structure in detail.
6. Define Binary Tree, Full Binary Tree and Complete Binary Tree.

Section C

Part – A (Multiple Choice Questions) (10)

Q-1 Data structure is best defined as:

- | | |
|---|------------------------------------|
| A) programming language | B) A collection of algorithms only |
| C) organized way of storing and managing data | D) type of operating system |

Q-2 Which of the following is a non-linear data structure?

- | | |
|----------|----------|
| A) Array | B) Stack |
| C) Queue | D) Tree |

Q-3 In C language, array index always starts from:

- | | |
|-------|-------------|
| A) 1 | B) 0 |
| C) -1 | D) Size – 1 |

Q-4 Which array operation involves visiting each element exactly once?

- | | |
|--------------|-------------|
| A) Insertion | B) Deletion |
| C) Traversal | D) Sorting |

Q-5 Which data structure is most suitable for implementing recursion?

- A) Queue
- B) Array
- C) Stack
- D) Linked List

Q-6 In a singly linked list, each node contains:

- A) Only data
- B) Only address
- C) Data and address of next node
- D) Address of previous node

Q-7 Which data structure follows the FIFO (First In First Out) principle?

- A) Stack
- B) Queue
- C) Tree
- D) Graph

Q-8 In a binary tree, the maximum number of children a node can have is:

- A) 1
- B) 2
- C) 3
- D) Unlimited

Q-9 Binary search algorithm can be applied only on:

- A) Any array
- B) Unsorted array
- C) Sorted array
- D) Linked list only

Q-10 Which sorting algorithm repeatedly swaps adjacent elements if they are in the wrong order?

- A) Selection sort
- B) Insertion sort
- C) Bubble sort
- D) Quick sort

Part – B (State whether the following statements are true or false)

(10)

- 1 Linear data structures store elements in a sequential manner where each element is connected to its previous and next element.
- 2 Static data structures can change their size during program execution.
- 3 In a two-dimensional array, elements are stored in the form of rows and columns.
- 4 Linked lists require contiguous memory allocation for storing nodes.
- 5 A circular linked list has the last node pointing to NULL.
- 6 Overflow condition in a stack occurs when attempting to insert an element into a full stack.
- 7 Deque allows insertion and deletion of elements from both ends.
- 8 In a binary tree, leaf nodes are the nodes that have no children.
- 9 Linear search technique does not require the data to be sorted.
- 10 Merge sort uses the divide-and-conquer technique.
