

Dr. Babasaheb Ambedkar Open University, Ahmedabad

Term-End Examination : January-2026

Course Name : BSCCS

Date : 17-02-2026

Subject Name : Data Structures

Time : 03:00PM TO 05:15PM

Subject Code : BSCCS-202

Max Marks : 70

Section A

Q.-1. Answer the following (Attempt any three) (30)

- (1) Define Array Data Structure. Explain the need, characteristics, memory representation, and different types of array initialization.
- (2) Explain Linked Lists in detail. Describe structure, types (singly, doubly, circular), and memory representation. Discuss advantages over arrays and applications.
- (3) What is a Queue? Explain different types of queues (Simple, Circular, Priority, Deque). Describe operations and implementations with examples.
- (4) Define Tree Data Structure. Explain terminology (root, node, leaf, height, degree). Describe tree representation and types with diagrams.
- (5) Explain Graph traversal algorithms BFS and DFS with step-by-step procedures and applications.

Section B

Q.-2. Write short notes on any four of the following topics. (20)

- (1) Differentiate clearly between Primitive, Derived, User-defined, and Abstract Data Types.
- (2) Explain circular linked lists. Describe their representation, advantages, and real-life applications with examples.
- (3) Discuss array implementation of stack in detail. Explain stack overflow and underflow with suitable algorithms and diagrams.
- (4) Explain linked list implementation of stack. Compare it with array implementation and discuss advantages.
- (5) Explain graph representation using adjacency matrix and adjacency list. Compare memory requirements and efficiency.
- (6) Write a C program to insert a new element at a given position in an array.

Section C

Q.-3. Choose the correct answer from the options given below. (10)

(1) Array elements are stored in

- | | |
|--------------------------|----------------------|
| A) Non-contiguous memory | B) Sequential memory |
| C) Random memory | D) Virtual memory |

(2) Which operation accesses all array elements?

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

(3) Which operation removes an element?

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

(4) Matrix is represented using

- | | |
|-------------|-------------|
| A) 1D array | B) 2D array |
| C) Stack | D) Tree |

(5) In queue deletion happens at

- | | |
|---------|-----------|
| A) Rear | B) Front |
| C) End | D) Random |

(6) Circular queue removes which problem?

- | | |
|-------------------|--------------|
| A) Underflow | B) Overflow |
| C) Memory wastage | D) Traversal |

(7) Graph with direction is called

- | | |
|-------------|---------------|
| A) Weighted | B) Undirected |
| C) Directed | D) Cyclic |

(8) Sequential file access means

- | | |
|-------------------|-------------------|
| A) Random access | B) Direct access |
| C) Ordered access | D) Indexed access |

(9) Hashing is used for

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

(10) Hash function maps keys to

- | | |
|----------------|----------|
| A) Array index | B) Node |
| C) Queue | D) Stack |

Section D

Q.-4. State whether the following statements are true or false.

(10)

- (1) Float data type stores whole numbers only.
- (2) Array elements are stored in contiguous memory locations.
- (3) Matrix is an example of two dimensional array.
- (4) First node of linked list is called head.
- (5) Stack follows FIFO principle.
- (6) Stack deletion operation is called pop.
- (7) Queue follows FIFO principle.
- (8) Tree is a non-linear data structure.
- (9) Preorder traversal follows Root Left Right.
- (10) Height difference in AVL tree is at most one.
