

Seat No. \_\_\_\_\_

**QP-6368**

Total No. of Pages : 3

**MAR/APR 2025 SUMMER EXAMINATION**  
**12329 Bachelor of Computer Application(BCA) NEP 2.0**  
**Sub. Name: Data Structures**  
**Sub. Code: 109899**

Day and Date: JUNE ,10-06-2025

Total Marks: 80

Time: 10:30 AM To 01:30 PM

Instructions:

- Special Inst.: 1) Que. 1 and Que. 8 are compulsory.  
2) Attempt any FOUR questions from Que. No. 2 to Que. No. 7.  
3) Figures to the right indicates marks.

- Q1) A. Multiple Choice Questions(10 questions for 1 mark each) [10]**
- i. In a sparse matrix, most of the elements are:**
- A. Non-zero
  - B. Zero
  - C. Negative
  - D. Positive
- ii. Which data structure is used in BFS (Breadth First Search) of a graph?**
- A. Stack
  - B. Queue
  - C. Array
  - D. Tree
- iii. Which data structure uses LIFO (Last In, First Out) principle?**
- A. Queue
  - B. Stack
  - C. Array
  - D. Linked List
- iv. In a circular queue, how do you check if the queue is full?**
- A.  $\text{rear} == \text{size} - 1$
  - B.  $(\text{rear} + 1) \% \text{size} == \text{front}$
  - C.  $\text{front} == \text{rear}$
  - D.  $\text{rear} == \text{front} - 1$
- v. Which of the following data structures allows insertions and deletions from both ends?**
- A. Queue
  - B. Stack
  - C. Deque
  - D. Priority Queue

vi. A binary tree with 'n' nodes has how many edges?

- A. n
- B. n - 1
- C. n + 1
- D. 2n

vii What is the result of evaluating the postfix expression 6 3 2 4 + - \*?

- A. 74
- B. -18
- C. 22
- D. 40

viii In a singly linked list, what does the last node point to?

- i. A. Itself
- B. The head node
- C. NULL
- D. Random node

ix. What is the primary disadvantage of arrays?

- A. Fixed size
- B. Dynamic resizing
- C. Random access
- D. Efficient memory usage

x. Which of the following is not a type of queue?

- A. Circular Queue
- B. Deque
- C. LIFO Queue
- D. Priority Queue

B. Short answer question(Any two out of three)

1. Define linked list. Compare linked list with arrays.
2. What is a binary search tree (BST)? Explain insertion and searching in BST.
3. What is recursion? Explain factorial and Fibonacci sequence using recursion.

Q2) What is Queue? Describe Queue operations using array.

[10]

Q3) Write an algorithm to insert a node at the beginning, middle, and end of a singly linked list.

[10]

Q4) Define a graph. Explain adjacency matrix and adjacency list representation with examples.

[10]



Q5) Explain the representation of a 2D array in memory. Write a program to add two [10]  
matrices.

Q6) Write and explain the bubble sort and selection sort algorithms with step-by-step [10]  
examples.

Q7) What is hashing? Explain the concept of hash tables. Describe different hash [10]  
functions and explain any two collision resolution techniques with examples.

Q8) Write short note on (Any Four out of Six) [20]

a. Matrices and Sparse Matrices [5]

b. Classification of Data Structure [5]

c. Operations of Linked List [5]

d. Collision with Collision Resolution [5]

e. Applications of Queue [5]

f. AVL Trees [5]

### End Of Question Paper

**Important Note for Chief Exam Officer / SRPD Coordinator / Sr Supervisor/ Student -**

This Question Paper may be distributed for following Subjects as common code.

सदरची प्रश्नपत्रिका खालील विषयांकरिता वितरित करता येईल.

1] (12329) Bachelor Of Computer Application (NEP2.0) (109899) Data Structures Part 1 SEM 2