

Roll.No.

24UACT2002

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN  
(AUTONOMOUS)

(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)  
Chromepet, Chennai - 600 044.

B.C.A. - END SEMESTER EXAMINATIONS - NOVEMBER 2025  
SEMESTER - I

**24UACT2002 - Data Structures**

Total Duration : 2 Hrs.30 Mins.

Total Marks : 60

### Section B

Answer any **SIX** questions ( $6 \times 5 = 30$  Marks)

1. Define data structure. Describe its basic operations.
2. Write an algorithm to insert an element into a linear array and explain it with an example.
3. Compare infix, postfix, and prefix (Polish) notations with suitable examples.
4. Write an algorithm to push and pop elements in a stack using an array.
5. Define a queue. Explain the basic characteristics and operations of a queue.
6. Compare the working of a simple queue and circular queue with suitable examples.
7. Write an algorithm to insert a node at the beginning of a singly linked list.
8. Analyze and justify the traversal order produced by Depth-First Search (DFS) and Breadth-First Search (BFS).

### Section C

Answer any **THREE** questions ( $3 \times 10 = 30$  Marks)

9. Apply the concept of searching by writing algorithms for Linear Search and Binary Search.
10. Analyze the role of the runtime stack in recursive function calls.
11. Examine the role of double-ended queues (deque) in solving both stack and queue-related problems. Support your evaluation with examples.
12. Describe various hash functions used in hashing. Analyze how the choice of hash function impacts search efficiency and collision rate.
13. Construct a Binary Search Tree (BST) using the elements [40, 20, 10, 30, 60, 50, 70]. Evaluate the effect of inserting and deleting specific nodes (e.g., 20 and 60) on the structure.

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