

**BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY &
SCIENCE**

(AUTONOMOUS)

I - B. Tech II-Semester Regular/Supplementary Examinations (BR23), June – 2025

DATA STRUCTURES (COMMON TO CSE, CSE-AI&DS, AI&ML, INF)

Time: 3 hours

Max. Marks: 70

*Question Paper consists of Part-A and Part-B
Answer ALL the question in Part-A and Part-B*

PART-A (10X2 = 20M)

| | Marks | CO | BL |
|--|-------|-----|----|
| 1. a) Define Abstract Data Type. | (2M) | CO1 | L1 |
| b) What is the time complexity of linear search in the worst case? | (2M) | CO1 | L1 |
| c) What is a singly linked list? | (2M) | CO2 | L1 |
| d) What is the time complexity to access a node in a singly linked list? | (2M) | CO2 | L1 |
| e) What is a stack? | (2M) | CO3 | L1 |
| f) State the difference between push and pop. | (2M) | CO3 | L2 |
| g) What is a circular queue? | (2M) | CO4 | L1 |
| h) What is FIFO? | (2M) | CO4 | L1 |
| i) What is a binary tree? | (2M) | CO5 | L1 |
| j) What is a collision in hashing? | (2M) | CO6 | L2 |

PART-B (5X10 = 50M)

| | | | |
|---|-------|-----|----|
| 2.a) Write the algorithm and C program for linear search and analyze its complexity. (OR) | 10(M) | CO1 | L3 |
| 3.a) Compare various sorting techniques in terms of time and space complexity. | 10(M) | CO1 | L4 |
| 4.a) Write a program to reverse a singly linked list and explain it. (OR) | 10(M) | CO2 | L6 |
| 5.a) Write algorithms for insertion and deletion in a doubly linked list and illustrate them with diagrams. | 10(M) | CO2 | L3 |
| 6.a) Write a program to implement stack using arrays. Explain push and pop operations. (OR) | 10(M) | CO3 | L6 |
| 7.a) Convert infix expression $(A+B)*(C-D)$ to postfix using stack. | 10(M) | CO3 | L3 |
| 8.a) Implement a queue using a linked list. Write insert and delete functions. (OR) | 10(M) | CO4 | L6 |

- 9.a) Explain the use of queue in scheduling with a real-world example. 10(M) CO4 L2
- 10.a Construct a BST from the values [50, 30, 70, 20, 40, 60, 80] and show all traversals. 10(M) CO5 L3
)
- (OR)
- 11.a Construct a hash table for values [15, 25, 35, 20] using modulo 10 and linear 10(M) CO6 L3
) probing.
