

**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 probing. 10(M) CO6 L3

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