

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE  
(AUTONOMOUS)

*I – M. Tech I - Semester Regular Examinations (BR25), Feb - 2026*

**DATA STRUCTURES AND ALGORITHMS ANALYSIS  
(CSE)**

Time: 3 hours

Max. Marks: 60

*Answer any Five Questions One Question from One UNIT  
ALL the Questions Carry Equal Marks*

<b>UNIT-I</b>		<b>Marks</b>	<b>CO</b>	<b>BL</b>
1.a)	Explain the concept of stack using linked list representation. Write algorithms for PUSH and POP operations and analyse their time complexity.	12M	CO1	BL2
<b>OR</b>				
2.a)	What is a Circular List? Write a program to search in a circular linked list that has a header node?	6M	CO1	BL2
b)	Define Queue. Write the advantages and disadvantages of Queues.	6M	CO1	BL1
<b>UNIT-II</b>		<b>Marks</b>	<b>CO</b>	<b>BL</b>
3.a)	How can you perform the selection sort and sort the following elements by using the selection sort technique 70, 30, 20, 50, 60, 10,40	6M	CO2	BL5
b)	Explain about Breadth First Search Traversal technique with an example.	6M	CO2	BL2
<b>OR</b>				
4.a)	How Partition is done in Quick Sort? Explain with an example.	6M	CO2	BL2
b)	Explain Merge Sort with suitable example. Discuss its advantages.	6M	CO2	BL2
<b>UNIT-III</b>		<b>Marks</b>	<b>CO</b>	<b>BL</b>
5.a)	Explain the Hash table representation. Describe how data is stored and accessed using hash tables.	6M	CO3	BL2
b)	Explain the open addressing. Describe Linear Probing technique with example.	6M	CO3	BL2
<b>OR</b>				
6.a)	Explain dictionaries in detail using example.	6M	CO3	BL2
b)	Using example demonstrate collision. Write about collision resolution?	6M	CO3	BL4
<b>UNIT-IV</b>		<b>Marks</b>	<b>CO</b>	<b>BL</b>
7.a)	Explain how a Priority Queue is implemented using a Binary Heap	6M	CO4	BL2
b)	Explain the searching operation in a Binary Search Tree with algorithm and example.	6M	CO4	BL5
<b>OR</b>				
8.a)	Define a Priority Queue. Explain its Abstract Data Type (ADT)	6M	CO4	BL2
b)	Explain deletion in a Binary Search Tree. Discuss all three cases with examples.	6M	CO4	BL5

**UNIT-V**

	<b>Marks</b>	<b>CO</b>	<b>BL</b>
9.a) Illustrate Red-Black trees, explain their properties and how they ensure balanced height.	6M	CO5	BL2
b) Explain Splay trees. Describe the splaying operation and its types.	6M	CO5	BL5
<b>OR</b>			
10.a) Explain how AVL tree is different from the binary search tree.	6M	CO5	BL2
b) What is meant by height balanced tree? Write a program to determine the height of an AVL tree?	6M	CO5	BL1

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