

• BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)

II - B. Tech I-Semester Supplementary Examinations (BR23), Mar - 2026

**ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS (CSE, CSE-AI&DS, AI&ML,
INF)**

Time: 3 hours

Max. Marks: 70

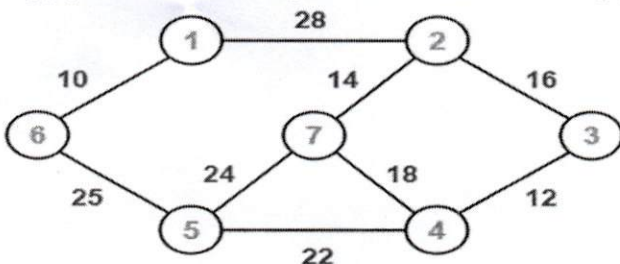
*Question Paper consists of Part-A and Part-B
Answer ALL the question in Part-A and Part-B*

PART-A (10X2 = 20M)

	Marks	CO	BL
1. a) What are the characteristics of an algorithm?	(2M)	CO1	BL1
b) Define space and time complexity	(2M)	CO1	BL1
c) What are the representations of graph?	(2M)	CO2	BL1
d) Define divide and conquer design technique	(2M)	CO2	BL1
e) Write any two characteristics of Greedy Algorithm?	(2M)	CO3	BL1
f) What are the various properties of dynamic programming?	(2M)	CO3	BL1
g) What is a state space tree in Branch and Bound?	(2M)	CO4	BL1
h) What is Backtracking? Give any two advantages	(2M)	CO4	BL1
i) Define Vertex Cover Problem?	(2M)	CO5	BL1
j) What is the difference between NP-Hard and NP-Complete?	(2M)	CO5	BL1

PART-B (5X10 = 50M)

- 2a. Explain various rotations in AVL Trees? Construct AVL Tree for the following numbers 14, 8, 12, 46, 23, 5, 77, 88, 20 10(M) CO1 BL4
- (OR)
- 3a. What is B-Tree? Specify its properties and explain various operations in B-Tree with an example 10(M) CO1 BL4
- 4a. Write an algorithm for Merge sort. Explain with an example 5(M) CO2 BL3
- b. Explain about Depth First Search Traversal technique with an example 5(M) CO2 BL3
- (OR)
- 5a. Write an algorithm for Heap sort. Explain with an example 5(M) CO2 BL3
- b. Explain Binary search algorithm with an example 5(M) CO2 BL3
- 6a. Apply the Kruskals algorithm for the following graph 10(M) CO3 BL3



(OR)

- 7a. Explain Optimal Binary Search Tree (OBST) with example 5(M) CO3 BL3
b. Solve for knapsack problem using Greedy method for the instance $n=5$, profits $(p_1 \dots p_5) = (5, 10, 15, 7, 8)$ and weights $(W_1 \dots W_5) = (1, 3, 5, 4, 1)$ and capacity of sack is $m=5$ 5(M) CO3 BL3

- 8a. How many total solutions exist for the 8-queens problem? Explain with algorithm 10(M) CO4 BL4

(OR)

- 9a. Explain about 0/1 Knapsack using Least Cost Branch and Bound 10(M) CO4 BL4

- 10a. Define NP-Complete? Prove that the Clique decision Problem (CDP) is NP-Complete. 10(M) CO5 BL4

(OR)

- 11a. Explain Traveling Salesperson Decision Problem with example 10(M) CO5 BL4
