O.P.Code: 23CI0601	R23	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year I Semester Regular & Supplementary Examinations November-2025

DATA STRUCTURES & ALGORITHMS

(Computer Science & Information Technology)

Time: 3 Hours **Max. Marks: 70**

PART-A

(Answer all the Questions **10 x 2 = 20** Marks)

1	a	Define asymptotic notations with examples.	CO1	L1	2M
	b	Differentiate between AVL and B-trees.	CO1	L3	2M
	c	What is a heap tree? Give an example.	CO2	L2	2M
	d	Explain graph traversal methods.	CO2	L2	2M
	e	State the principle of greedy method.	CO3	L1	2M
	f	Differentiate between greedy and dynamic programming.	CO4	L3	2M
	g	List the applications of backtracking.	CO4	L2	2M
	h	What is a branch and bound technique?	CO4	L2	2M
	i	Define NP-hard problem.	CO6	L1	2M
	j	State Cook's theorem.	CO6	L1	2M

PART-B

(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2	a	Explain time and space complexity with examples.	CO1	L1	5M
	b	Describe AVL tree operations with examples.	CO1	L2	5M
		OR			
3	a	Explain B-tree structure and its advantages.	CO1	L1	5M
	b	Explain the insertion and deletion in B-trees.	CO1	L2	5M

UNIT-II

4	a	Discuss heap tree creation and operations.	CO2	L4	5M
	b	Explain Quick sort using divide and conquer method.	CO2	L1	5M
		OR			
5	a	Explain merge sort with algorithm and example.	CO2	L1	5M
	b	Discuss graph representation techniques.	CO2	L4	5M

UNIT-III

6	a	Explain job sequencing with deadlines.	CO3	L2	5M
	b	Discuss 0/1 knapsack problem using dynamic programming.	CO3	L4	5M
		OR			
7	a	Explain optimal binary search tree algorithm.	CO3	L2	6M
	b	Explain single source shortest path using Bellman Ford algorithm.	CO3	L2	4M

UNIT-IV

8	a	Describe 8-Queens problem using backtracking.	CO4	L3	6M
	b	Explain sum of subsets problem.	CO4	L2	4M
		OR			
9	a	Explain branch and bound for 0/1 knapsack.	CO4	L2	5M
	b	Explain travelling salesperson using branch and bound.	CO4	L2	5M
		UNIT-V			
10	a	Explain NP-hard and NP-complete problems.	CO6	L2	5M
	b	Discuss clique decision problem.	CO6	L4	5M
		OR			
11	a	Explain chromatic number decision problem.	CO6	L2	5M
	b	Discuss job shop scheduling as NP-hard problem.	CO6	L4	5M

***** END *****