

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZINAGARAM

III B. Tech II Semester Supplementary Examinations November -2025

DESIGN AND ANALYSIS OF ALGORITHMS

(AI&DS)

Time: 3 hours

Max. Marks:

70

Answer any **FIVE** Questions **ONE** Question from **Each unit**

All Questions Carry Equal Marks

		<u>UNIT-I</u>	
1.	a)	Describe the importance of algorithm analysis in problem-solving.	[7M]
	b)	Explain the fundamental concepts of Asymptotic Notation with examples.	[7M]
		(OR)	
2.	a)	Differentiate between various algorithm design techniques with examples.	[7M]
	b)	Apply Randomized Algorithm techniques to solve a given problem.	[7M]
		<u>UNIT-II</u>	
3.	a)	Solve a given problem using the Divide and Conquer approach with Binary Search.	[7M]
	b)	Analyze the efficiency of Merge Sort.	[7M]
		(OR)	
4.	a)	Discuss the Single Source Shortest Path problem using Dijkstra's Algorithm.	[7M]
	b)	Evaluate the significance of Huffman Coding in data compression.	[7M]
		<u>UNIT-III</u>	
5.	a)	Apply Dynamic Programming to solve the 0/1 Knapsack problem. ([7M]
	b)	Solve the Optimal Binary Search Tree problem using Dynamic Programming.	[7M]
		(OR)	
6.	a)	Explain the concept of Multistage Graphs in Dynamic Programming.	[7M]
	b)	Analyze the Traveling Salesperson Problem and discuss an optimal approach.	[7M]
		<u>UNIT-IV</u>	
7.	a)	Solve a given problem using the Backtracking approach.	[7M]
	b)	Implement the Sum of Subsets problem using the Backtracking approach.	[7M]
		(OR)	
8.	a)	Develop an algorithm for solving Graph Coloring using Backtracking.	[7M]
	b)	Evaluate the feasibility of solving the Hamiltonian Cycle problem.	[7M]

		<u>UNIT-V</u>	
9.	a)	Explain the classification of P, NP, NP-Hard, and NP-Complete problems.	[7M]
	b)	Analyze the significance of Non-Deterministic Algorithms.	[7M]
		(OR)	
10.	a)	Design an efficient algorithm based on Cook's Theorem.	[7M]
	b)	Evaluate the impact of Lower Bound Theory in computational complexity.	[7M]
