

**PRAGATI ENGINEERING COLLEGE: SURAMPALEM  
(AUTONOMOUS)**

**III B.Tech I Semester Supplementary Examinations, May - 2024**

**DESIGN AND ANALYSIS OF ALGORITHMS  
(Common to CSE & IT)**

**Time: 3 hours**

**Max. Marks: 70M**

**Answer ONE Question from each Unit  
All Questions Carry Equal Marks**

Q. No.	Questions	BTL	CO	Marks
<b>UNIT – I</b>				
1.	a) What are the features of an efficient algorithm? Explain with an example.	K1	CO1	7M
	b) Write the algorithm to find a factorial of a given number. Derive its efficiency.	K3	CO1	7M
<b>OR</b>				
2.	a) Explain the general plan for analyzing the efficiency of a recursive algorithm.	K2	CO1	7M
	b) Discuss the Pseudo code conventions for expressing algorithms.	K1	CO1	7M
<b>UNIT – II</b>				
3.	a) Write Divide-And-Conquer recursive Merge sort algorithm and derive the time complexity of this algorithm.	K3	CO2	7M
	b) Perform binary search on list of elements to find the key element using divide and conquer, and also estimate the time complexity.	K3	CO2	7M
<b>OR</b>				
4.	a) Write the control abstraction for divide and conquer technique. State few applications of divide and conquer.	K1	CO2	7M
	b) Explain Prim's Algorithm with suitable example.	K2	CO2	7M
<b>UNIT – III</b>				
5.	a) Solve the following instance of 0/1 KNAPSACK problem using Dynamic programming. $n = 3$ , $(W_1, W_2, W_3) = (2, 3, 4)$ , $(P_1, P_2, P_3) = (1, 2, 5)$ , and $m = 6$ .	K4	CO3	7M
	b) Compare and contrast divide and conquer, greedy and dynamic programming problem solving strategies.	K2	CO3	7M
<b>OR</b>				
6.	a) Explain the Travelling Sales person problems with an example and analyze its recurrence relation.	K3	CO3	7M
	b) Explain Principle of optimality in Dynamic Programming with suitable example.	K2	CO3	7M
<b>UNIT – IV</b>				
7.	a) Explain the basic principle of Backtracking and list the applications of backtracking.	K1	CO4	7M
	b) Consider the sum of subset problem $n=4$ , $sum=13$ , and $w_1=3$ , $w_2=4$ , $w_3=5$ and $w_4=6$ . Solve the problem using backtracking	K4	CO4	7M

OR					
8.	a)	Explain briefly about N-Queens Problem. Construct state space tree for placing 4-Queen's.	K1	CO4	7M
	b)	How Knapsack problem can be solved using Backtracking. Explain with an example.	K2	CO4	7M
UNIT – V					
9.	a)	Explain the features of nondeterministic algorithms.	K1	CO5	7M
	b)	Briefly explain about NP-hard and NP-complete problems.	K2	CO5	7M
OR					
10.	a)	Describe Cook's theorem.	K2	CO5	7M
	b)	Explain in detail about P, NP and NP-complete classes.	K1	CO5	7M