Code No.: AI405PC	R20	H.T.No.			8	R						

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
II–B.TECH–II–Semester End Examinations (Supply) - December- 2025
DESIGN ANALYSIS OF ALGORITHMS
(CSM)

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

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 20 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(20 Marks)**

1. a)	What is an algorithm?	[2M]
b)	Define space complexity?	[2M]
c)	Demonstrate Disjoint set operations?	[2M]
d)	What is sum of subsets problem?	[2M]
e)	Define dynamic programming?	[2M]
f)	What is optimal binary search tree?	[2M]
g)	Define Feasible solution?	[2M]
h)	What is Knapsack Problem?	[2M]
i)	Describe Bounding function?	[2M]
j)	State the Cooks Theorem.	[2M]

PART-B **(50 Marks)**

2.	Define Time complexity. Describe asymptotic notations Big Oh (O), Omega (Ω) and Theta (Θ) notations and show their behavior using graphical representation.	[10M]
	OR	
3.	Simulate Quick sort algorithm for the following example. 25,36,12,4,5,16,58,54,24,16,9,65,78	[10M]
4.	Explain briefly about 4-queens problem with backtrack solution and explain with example.	[10M]
	OR	
5.	Discuss union and find algorithms in detail with suitable example.	[10M]
6.	Define merging and purging rules in 0/1 knapsack problem.	[10M]
	OR	
7.	State the Job Sequencing with deadlines problem. Find an optimal job sequence to the n = 5 Jobs where profits (P1, P2, P3, P4, P5) = (20, 15, 10, 5, 1) and deadlines (d1, d2, d3, d4, d5) = (2, 2, 1, 3, 3).	[10M]
8.	What is Minimum cost spanning tree? Explain an algorithm for generating minimum cost Spanning tree and list some applications of it.	[10M]
	OR	
9.	State the Greedy Knapsack? Write the algorithm for Greedy knapsack and also compute the time complexity.	[10M]

10. Solve the Travelling Salesman problem using branch and bound algorithms for the following cost matrix. [10M]

	1	2	3	4
1	0	4	1	3
2	4	0	2	1
3	1	2	0	5
4	3	1	5	0

OR

11. Discuss in detail about the class P, NP, NP-hard and NP-complete problems. Give examples for each class. [10M]

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