R22

Code No: R22A6617

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

III B.Tech I Semester Supplementary Examinations, June 2025

Design and Analysis of Computer Algorithms

(CSE-AIML & B.Tech-AIML)

Roll No										

Time: 3 hours **Max. Marks: 60**

Note: This question paper contains two parts A and B
Part A is compulsory which carries 10 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

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			BCLL	CO(s)	Marks
		PART-A (10 Marks)			
		(Write all answers of this part at one place)			
1	A	Define Big-O notation?	**L2**	**CO-I**	**[1M]**
	B	What is asymptotic analysis?	**L1**	**CO-I**	**[1M]**
	C	Define Prim's algorithm?	**L3**	**CO-II**	**[1M]**
	D	What is a connected component in a graph?	**L2**	**CO-II**	**[1M]**
	E	What is the OBST?	**L2**	**CO-III**	**[1M]**
	F	Define Held-Karp algorithm?	**L3**	**CO-III**	**[1M]**
	G	What is the time complexity of solving the Hamiltonian Cycle using back tracking?	**L5**	**CO-IV**	**[1M]**
	H	What is Prunnig?	**L1**	**CO-IV**	**[1M]**
	I	What is NP-Complete problem?	**L4**	**CO-V**	**[1M]**
	J	How does Branch and Bound ensure that the optimal solution is found?	**L4**	**CO-V**	**[1M]**
		PART-B (50 Marks)			
		SECTION-I			
2	A	Describe performance analysis, space complexity and time complexity?	**L6**	**CO-I**	**[5M]**
	B	Define Quick sort? Simulate Quick sort algorithm for the following example 25,36,12,4,5,16,58,54,24,16,9,65,78?	**L3**	**CO-I**	**[5M]**
		OR			
3	A	Give the general procedure of divide and conquer method?	**L2**	**CO-I**	**[5M]**
	B	Explain Strassen's matrix multiplication and its time complexity *?*	**L3**	**CO-I**	**[5M]**
		SECTION-II			
4	A	Explain AND/OR graphs?	**L1**	**CO-II**	**[5M]**
	B	Explain Prim's algorithm for minimal spanning tree with an example?	**L3**	**CO-II**	**[5M]**
		OR			
5	A	State the Greedy Knapsack Problem?	**L2**	**CO-II**	**[5M]**

	B	How does path compression optimize the Find operation in disjoint sets?	**L4**	**CO-II**	**[5M]**
		SECTION-III			
6	A	Explain 0/1 knapsack problem dynamic programming?	**L2**	**CO-III**	**[5M]**
	B	Differentiate between greedy method and dynamic programming?	**L5**	**CO-III**	**[5M]**
		OR			
7	A	State dynamic programming. Explain with one application?	**L3**	**CO-III**	**[5M]**
	B	What is the time complexity of the OBST algorithm, and how does it compare to constructing a regular binary search tree?	**L4**	**CO-III**	**[5M]**
		SECTION-IV			
8	A	What is a graph coloring problem?	**L1**	**CO-IV**	**[5M]**
	B	Provide example graph and use backtracking to find a Hamiltonian cycle?	**L5**	**CO-IV**	**[5M]**
		OR			
9	A	Give the solution to the 8 queen's problems using backtracking?	**L2**	**CO-IV**	**[5M]**
	B	What is the Sum of Subsets Problem, and how is it solved using backtracking?	**L5**	**CO-IV**	**[5M]**
		SECTION-V			
10	A	Write and explain the Cooks theorem?	**L2**	**CO-V**	**[5M]**
	B	Difference between NP-hard and NP-complete problems?		**CO-V**	**[5M]**
		OR			
11	A	Write the non-deterministic sorting algorithm and also analyze its complexity?	**L4**	**CO-V**	**[5M]**
	B	Discuss about general method of branch and bound technique?	**L1**	**CO-V**	**[5M]**

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