Course Code: 1961225 Roll No: **MLRS-R19**

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
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III B.Tech II Sem Supply End Examination, January 2023

Algorithms Design and Analysis

(Information Technology)

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

Note: 1. Question paper consists: Part-A and Part-B.
2. In Part – A, answer all questions which carries 20 marks.
3. In Part – B, answer any one question from each unit.
Each question carries 10 marks and may have a, b as sub questions.

PART- A

(10*2 Marks = 20 Marks)

1.	a)	What is Omega notation?	2M	CO1	BL1
	b)	What are the characteristics of an algorithm?	2M	CO1	BL1
	c)	Write an algorithm of simple union	2M	CO2	BL1
	d)	Let w = (5, 10, 10, 25) and m = 25. Find all possible subsets of W that sum to M by using fixed tuple length	2M	CO2	BL3
	e)	Write the applications of Dynamic Programming	2M	CO3	BL1
	f)	Write the formula for cost of the node in an optimal binary search tree	2M	CO3	BL1
	g)	Write the control abstraction algorithm of greedy method for the subset Paradigm	2M	CO4	BL1
	h)	What is Spanning tree?	2M	CO4	BL1
	i)	What is the relation between P and NP?	2M	CO5	BL1
	j)	What is Principle of Bounding?	2M	CO5	BL1

PART- B

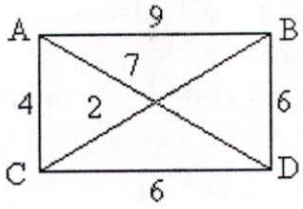
(10*5 Marks = 50 Marks)

2	a)	Solve the following recurrence relation by using the substitution method $T(n)=4T(n/2)+n^2$, Where $n>1$ and is a power of 2.	5M	CO1	BL3
	b)	Write a recursive algorithm of Binary search and also compute the time complexity of the same	5M	CO1	BL3
		OR			
3		Derive the time complexity of Quick sort in an average case	10M	CO1	BL6
4	a)	Explain how to solve the graph coloring by using Back tracking	5M	CO2	BL4
	b)	Write an algorithm of sum of subsets	5M	CO2	BL3
		OR			
5		Explain how to improve disjoint set operations with an example	10M	CO2	BL4

6	a)	Write an algorithm of 0/1 Knapsack problem	5M	CO3	BL3
	b)	Explain about the Reliability design	5M	CO3	BL4

OR

7		Solve the traveling sales person problem by using the dynamic programming.	10M	CO3	BL3



8	a)	Explain the Single Source Shortest path problem with an example	5M	CO4	BL4
	b)	Find the optimal solution by using job sequencing with deadlines for the following jobs with n=6, (p1.....p5) = (20, 15,10, 7,5, 3) and (d1,.....d5) = (3,1,1,3,1,3)	5M	CO4	BL3

OR

9		Write an algorithm of Kruskal's method of Minimum cost Spanning tree and also analyze the complexity of the same	10M	CO4	BL3

10	a)	Explain about classes of NP-Hard and NP-Complete	5M	CO5	BL4
	b)	Is it Job sequencing with deadlines problem is NP-Hard or NP-Complete. Justify your answer	5M	CO5	BL3

OR

11		Draw the portion of the state space tree generated by LCBB for the following knapsack instances: n=5, (P_1, P_2, P_3, P_4, P_5) = (10, 15, 6, 8, 4) (W_1, W_2, W_3, W_4, W_5) = (4, 6, 3, 4, 2) and m = 12	10M	CO5	BL3

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