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PRN No.	

PAPER CODE	U313-231(RE)

December 2023 (REEXAM)

TY B.TECH (SEMESTER - I)

COURSE NAME: DESIGN AND ANALYSIS OF ALGORITHM

Branch:Computer Engineering **COURSE CODE: CSUA31208**

(PATTERN 2020)

Time: [2 Hrs] **[Max. Marks: 60]**

Instructions to candidates:

1) **Figures to the right indicate full marks.**
2) **Use of scientific calculator is allowed**
3) **Use suitable data wherever required**
4) **All questions are compulsory. Solve any two sub questions each from each Question 1 ,2, 3,4,5,and 6 respectively**

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a) When analyzing large genomic datasets, identifying patterns and relationships within the DNA sequences is a challenging task. Identify a suitable divide and conquer strategy for efficiently analyzing genomic sequences. And perform the analysis of the poposed technique.	[5]	1	Apply
	b) Search engines need to index and sort a large number of web pages based on relevance to search queries. Identify a sorting algorithm that manage the index data efficiently, facilitating faster search results retrieval and perform it's analysis.	[5]	1	Apply
	c) Solve the given the recurrence relation of an algorithm $T(n) = 2\,T(n/2) + n^2 \log n$, to calculate it's time complexity as per master's theorem?	[5]	1	Apply
Q2	a) Solve the given problem (Knapsack) using greedy method. Find out the profit earned and the fraction of objects chosen. No. of objects = 3 , M =20 P1 ,P2, P3 = (50,60,48) and W1, W2, W3 = (15, 13,10)	[5]	2	Apply
	b) Solve the given problem (Job Scheduling with deadlines) using greedy method. Find out the profit earned and the sequence of jobs chosen. Let n = 6, (P1,P2,P3,P4,P5,P6) = (50,45,40,30,25,10) (d1,d2,d3,d4,d5,d6) = (4,1,3,1,2,2)	[5]	2	Apply

	c) Solve the following instance of knapsack using Dynamic Programming.(Tabulation Method) n = 3, (w1, w2, w3) = (2, 3, 4) and m = 6, (p1, p2, p3) = (1, 2, 5)	[5]	2	Apply
Q3.	a) "LC search strategy proven to be better than LIFO for 0/1 knapsack". Make use of the following problem to justify your answer. Generate state space tree for LIFO and LC. w=(5,4,3), p=(6,5,4) and M=7	[5]	3	Apply
	b) Solve the following TSP problem using Branch and Bound 1 2 3 4 1 | 0 10 15 20 | 2 | 5 0 9 10 | 3 | 6 13 0 12 | 4 | 8 8 9 0 |	[5]	3	Apply
	c)If you are given 4 Queen's problem specification then make use of backtracking algorithimic strategy for placement of queen's i. without constraints ii. with explicit constraints iii. with implicit constraints iv. problem states v. solution states vi. answer states	[5]	3	Apply
Q.4	a) Demonstrate 3-CNF Satisfiability is NP-complete. Consider the formula (y1 $\leftrightarrow$ (y2 $\wedge$ $\neg$ x2)) for the explanation.	[5]	4	Understand
	b)Demonstrate Social networking resembles "Vertex cover" problem. Justify your answer and prove it is NP Hard Problem.	[5]	4	Understand
	c) Comapre tractable and intractable problems and demonstrate appropriate algorithmic strategy to be implemented for both types of problems.	[5]	4	Understand
Q.5	a) Demonstrate randomized quicksort algorithm and give its time complexity.	[5]	5	Understand
	b) Demonstrate genetic algorithm with suitable example.	[5]	5	Understand
	c)Demonstrate mutation and crossover function of genetic algorithm, with suitable example.	[5]	5	Understand
Q.6)	a) Demonstrate the PRAM architecture in detail.	[5]	6	Understand
	b)Demonstrate BRENT's Theorem with suitable example.	[5]	6	Understand
	c) Demonstrate parallel evaluation of an expression tree Consider the following arithmetic expression for the construction of tree((7 – (21 / 3))*3) + ((9 * (10 – 8)) + 5)	[5]	6	Understand