H.T No

Regulations: A17

(An Autonomous Institution)

Code No: 6FC04 **Date: 06-Aug-2022 (FN)**

B.Tech II-Year II- Semester External Examination, July/August - 2022 (Supplementary)

DESIGN AND ANALYSIS OF ALGORITHMS (CSE and IT)

Time: 3 Hours **Max.Marks:75**

Note: *a) No additional answer sheets will be provided.*
b) All sub-parts of a question must be answered at one place only, otherwise it will not be valued.
c) Missing data can be assumed suitably.

ANSWER ANY 5 OUT OF 8 QUESTIONS. EACH QUESTION CARRIES 15 MARKS.

Bloom's Cognitive Levels of Learning (BCLL)

Remember	L1	Apply	L3	Evaluate	L5
Understand	L2	Analyze	L4	Create	L6

			BCLL	CO(s)	Marks
1.	a)	Explain the performance analysis of an algorithm in terms of time and space complexity.	L2	CO1	[8M]
	b)	Give the algorithm for addition of two matrices and determine the time complexity of this algorithm by frequency – count method.	L4	CO1	[7M]
2.	a)	Write Divide–And–Conquer recursive Merge sort algorithm and derive the time complexity of this algorithm.	L3	CO2	[8M]
	b)	Apply binary search on a list of elements to find the key element using divide and conquer	L3	CO2	[7M]
3.	a)	Find an optimal solution to the knapsack instance n=7 objects and the capacity of knapsack m=15. The profits and weights of the objects are $(P_1,P_2,P_3,P_4,P_5,P_6,P_7)=(10,5,15,7,6,18,3)$, $(W_1,W_2,W_3,W_4,W_5,W_6,W_7)=(2,3,5,7,1,4,1)$ respectively.	L3	CO3	[8M]
	b)	Explain Kruskal's Minimum cost spanning tree algorithm with suitable example.	L2	CO3	[7M]
4.	a)	Explain how Matrix – chain Multiplication problem can be solved using dynamic programming with suitable example.	L2	CO4	[8M]
	b)	Solve the following instance of 0/1 KNAPSACK problem using Dynamic programming n=3, (W1, W2, W3)=(2, 3, 4), (P1, P2, P3) = (1, 2, 5), and m=6.	L3	CO4	[7M]
5.	a)	What is a Hamiltonian Cycle? Explain how to find Hamiltonian path and cycle using backtracking algorithm.	L2	CO5	[8M]
	b)	Give the 0/1 Knapsack LCBB algorithm. Explain how to find optimal solution using variable – tuple sized approach.	L2	CO5	[7M]
6.	a)	Explain the non-deterministic algorithms and write solution for sorting problem with non-deterministic.	L2	CO6	[8M]
	b)	Explain modular Arithmetic.	L2	CO6	[7M]
7.	a)	Discuss the Amortized analysis with an example.	L2	CO1	[5M]
	b)	Distinguish between Merge sort and quick sort.	L2	CO2	[5M]
	c)	Discuss the single-source shortest paths algorithm with a suitable example.	L2	CO3	[5M]
8.	a)	Explain Reliability Design Problem with suitable example.	L2	CO4	[5M]
	b)	Show that the computing time of function Optimal Binary Search Tree is *O (n2)*.	L3	CO5	[5M]
	c)	Differentiate between NP-complete and NP-Hard.	L4	CO6	[5M]

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