Code No: 5FC04   **Date: 14-Aug-2023 (FN)**

B.Tech II-Year II- Semester External Examination, Aug - 2023 (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.*

Bloom's Cognitive Levels of Learning (BCLL)

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

Part - A   **Max.Marks:25**
ANSWER ALL QUESTIONS

		BCLL	CO(s)	Marks
1	List the properties of an algorithm.	L1	CO1	[2M]
2	Which sorting technique do you recommend for sorting google search results. Why?	L5	CO2	[2M]
3	What is the control abstraction of Greedy Method?	L2	CO3	[2M]
4	Discuss about reliability design.	L2	CO4	[2M]
5	What is a graph coloring problem?	L2	CO5	[2M]
6	Write about halting problem.	L1	CO6	[3M]
7	Using step count find the time complexity of sum of 'n' natural numbers.	L3	CO1	[3M]
8	List any four applications of minimum cost spanning trees.	L1	CO3	[3M]
9	What are the implicit and explicit constraints in backtracking?	L2	CO5	[3M]
10	What are the advantages of Dynamic programming method?	L2	CO4	[3M]

Part – B   **Max.Marks:50**
ANSWER ANY FIVE QUESTIONS. EACH QUESTION CARRIES 10 MARKS.

			BCLL	CO(s)	Marks
11.	a)	Explain the role of instance characteristics in finding the time and space complexities with an example.	L4	CO1	[5M]
	b)	Compare Bigoh and Omega notation with examples.	L5	CO1	[5M]
12.	a)	Explain Strassen's Matrix multiplication. Analyze its time complexity.	L4	CO2	[5M]
	b)	Discuss about Binary Search with example.	L2	CO2	[5M]
13.	a)	Find the greedy solution for following job sequencing with deadlines problem n = 7, (p1,p2,p3,p4,p5,p6,p7) = (3,5,20,18,1,6,30), (d1,d2,d3,d4,d5,d6,d7) = (1,3,4,3,2,1,2)	L3	CO3	[5M]
	b)	Find the minimum spanning tree of the following graph using Prim's algorithm.	L3	CO3	[5M]
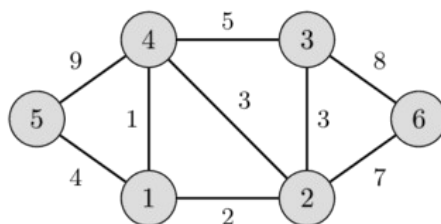
14.		Construct the OBST for the following: The identifier set (a1,a2,a3,a4)=(end, goto, print, stop) with p(1 : 4) = (3,3,1,1), q(0 : 4)= (2,3,1,1,1).	L6	CO4	[10M]
15.	a)	Explain the Graph – coloring problem? Draw the state space tree for m= 3colors and n=4 vertices graph. Discuss the time and space complexity.	L6	CO5	[5M]
	b)	Write about Hamilton cycle problem. State the solution using Backtracking		CO5	[5M]
16.		Discuss in detail about the class P, NP, NP-hard and NP-complete problems. Give examples for each class.	L2	CO6	[10M]
17.	a)	Write an algorithm for Binary search and analyze its time complexity.	L4	CO1	[4M]
	b)	State and Discuss the Single Source Shortest path problem? Give its applications?	L2	CO2	[3M]
	c)	Sort the following sequence of numbers using Merge sort 30, 20, 50, 70, 80, 10, 15, 25.	L5	CO3	[3M]
18.	a)	Solve the following 0/1 Knapsack problem using dynamic programming: n=3,M=6, (p1,p2,p3)=(1,2,5), (w1,w2,w3)=(2,3,4).	L4	CO4	[4M]
	b)	Discuss the 4 – Queen's problem. Generate the portion of the state space tree using backtracking algorithm.	L6	CO5	[3M]
	c)	Write about different types in Branch and Bound method.	L3	CO6	[3M]

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