CSE

PRN:		Course Code:	CST2501

Third Year **B. Tech** End Semester Examination Winter 2023

Design and Analysis of Algorithm

Day and Date: Wednesday, 29/11/2023 Max Marks: **100**

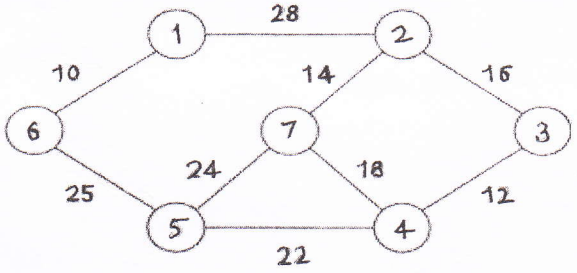
Time: 10.30 am to 1.30 pm Duration: **03** hrs

Instructions: All questions are compulsory.

			Marks	Bloom's Level	CLO
Q.1		**Attempt the following**			
	a)	Explain Tower of Hanoi	08	L1	2
	b)	Solve the recurrence equation by substitution method a. $T(n) = T(n/2) + n$ b. $T(n) = 2T(n/2) + 1$	08	L3	1
		OR			
	b)	Summarize on Algorithm Specification	08		2
Q.2		**Attempt the following**			
	a)	Solve the knapsack problem using greedy approach for the data given below the capacity of knapsack is 20.	08	L3	1

Objects	Profits	Weights
O1	25	18
O2	24	15
O3	15	10

	b)	Solve the Kruskal's algorithm to obtain minimum spanning tree	08	L3	3



OR

	b)	Analyze single source shortest path using Greedy approach	08	L4	3
Q.3		**Attempt any two from the following**			
	a)	Solve All Pair Shortest problem using dynamic approach for the given matrix.	08	L3	3

$$\begin{matrix} 0 & 4 & 11 \\ 6 & 0 & 2 \\ 3 & 99 & 0 \end{matrix}$$

	b)	Outline a three-stage system with device types D1, D2, D3. The costs of devices are \$30, \$15, \$20 respectively. The cost of the system is no more than \$105. The reliability of each device is 0.9,0.8 and 0.5 respectively.	08	L2	1
	c)	Illustrate an optimal binary search tree for n=4 and (a1, a2, a3, a4) = (do, if, int, while). Let p (1:4) = (3,3,1,1) and q (0:4) = (2,3,1,1,1).	08	L2	1

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Q.4 **Attempt any two from the following**

a) Explain the N-Queen problem with the help of an algorithm — 08 — L2 — 4

b) Solve the branch and bound knapsack problem for given data m=15 and n=4 — 08 — L3 — 3

Objects	O1	O2	O3	O4
Profit	10	10	12	18
Weight	2	4	6	9

c) Identify all possible subset of w that sum to m given w = {5,10,12,13,15,18} and m=30. — 08 — L3 — 1

Q.5 **Attempt any Two of the following**

a) Explain Rabin -Karp algorithm with an example — 09 — L5 — 1

b) Analyze PRAM Computational Model — 09 — L4 — 3

c) Recall List Ranking with an example — 09 — L2 — 3

Q.6 **Attempt any Two of the following**

a) Compare N, NP, NP-Hard and NP-Complete problems — 09 — L2 — 4

b) Analyze Node Cover Decision problem is NP Hard problem — 09 — L4 — 1

c) Explain And/or Graph decision Problem — 09 — L5 — 2

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