PRN:		Course Code:	AMT1503

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

Design and Analysis of Algorithm

Day and Date: Monday, 04/12/2023 Max Marks: **100**

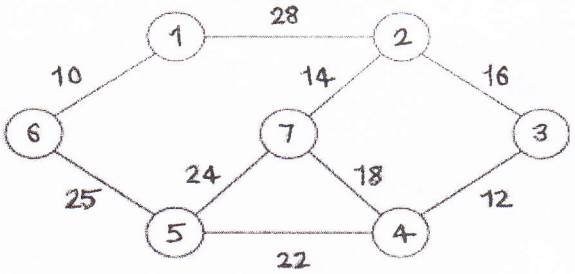
Time: 10.30 am to 1.30 PM Duration: **03** hrs

Instructions: All questions are compulsory.

			Marks	Bloom's Level	CO
Q.1		**Attempt the following**			
	a)	Solve the given recurrence relation using Substitution method $T(n)=T(n/2)+n+1$ $T(n)=1$ for $n>=1$	08	L3	1
	b)	Evaluate Stassen's matrix Multiplication for given problem $A=\begin{matrix}2 & 3\\ 3 & 2\end{matrix}$ $B=\begin{matrix}1 & 2\\ 2 & 1\end{matrix}$	08	L1	2
		OR			
	b)	Demonstrate Asymptotic notation	08	L2	3
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 $\begin{matrix}0 & 4 & 11\\ 6 & 0 & 2\\ 3 & 99 & 0\end{matrix}$	08	L5	1
	b)	Explain travelling salesman problem with an example.	08	L3	3
	c)	Outline a three-stage system with device types D1, D2, D3. The costs of devices are \$30, \$15, \$20 respectively. The cost of the	08	L2	1

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system is no more than $105. The reliability of each device is 0.9,0.8 and 0.5 respectively.

Q.4	**Attempt any two from the following**				
	a)	Explain the N-Queen problem with the help of an algorithm	08		2
	b)	Identify all possible subset of w that sum to m given w = {5,7,10,12,15,18,20} and m=35.	08	L2	2
	c)	Explain m-Coloring of graph using Backtracking.	08	L5	1
Q.5	**Attempt any Two of the following**				
	a)	Explain Rabin Karp algorithm with an example.	09	L4	4
	b)	Elaborate Packet Routing	09	L6	2
	c)	Explain the fundamental techniques of MESH	09	L3	1
Q.6	**Attempt any Two of the following**				
	a)	Explain the relationship between N, NP, NP-Hard, NP-Complete	09	L5	3
	b)	Prove that Clique decision problem is NP-Complete	09	L4	3
	c)	Explain Directed Hamiltonian Cycle decision Problem	09	L3	1

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