Total No. of questions : 6] *Roll No. .....14.....]*

B.Tech(CS/DSML/Cyber Forensic),IVth Semester
End Term Exam June, 2022

DESIGN AND ANALYSIS OF ALGORITHMS (CSL0461)

Time : 03:00 hours Max. Marks : 40

Note: All questions are compulsory.

1.1	Write some important characteristics of the Algorithm?	1	CO1
1.2	What do you understand by algorithm specification? Explain.	2	CO1
	OR		
	How is the performance of the algorithm measured? Explain in detail.		
1.3	Solve the following recurrence relation: $T(n) = 2T(n/2) + 1, T(1) = 1$	3	CO1
	OR		
	Construct the Max and Min heap for the following Data values:		
	41,19,15,7,12,5,23,9,32,11,45,17,4,		
2.1	What is the minimum requirement for a Binary search?	1	CO1, CO5
2.2	Explain Prim's algorithm by taking an example.	2	CO3
	OR		
	What is the difference between a spanning tree and a minimum spanning tree. Write Kruskal's algorithm.		
2.3	Solve the given Fractional Knapsack Problem using the Greedy approach: M=18 N=5 Weights = (3,4,5,6,7) Profits = (15,24,25,36,40)	3	CO2

	OR		
	Explain the tree vertex splitting problem by taking a suitable example.		
3.1	What is the Principle of optimality?	1	CO4
3.2	Compare Greedy and dynamic programming approaches.	2	CO2, CO3
	OR		
	What is a multistage graph? Explain its properties		
3.3	What is Optimal binary Search Tree? Find the optimal Binary Search Tree for the following 3 values: 4,8,5 with P(1)=Q(1) = 0.5, P(2)=Q(2) = 0.3 and P(3)=Q(3) = 0.6	3	CO3
	OR		
	Solve the given 0/1 Knapsack Problem using the Dynamic programming approach: M=12 N=4 Weights = (3,5,2,4) Profits = (25,14,35,16.)		
4.1	Write any two applications of Branch and bound.	1	CO4
4.2	Compare Backtracking and Branch and Bound. Explain 15 – Puzzle Proble m in detail.	2	CO4
	OR		
	What is N- Queens problem. Explain the solution of 8-Queens problem using Backtracking.		
4.3	What is the Graph coloring problem? Explain by taking a suitable example. How a map can be converted into a planar graph?	3	CO4
	OR		
	Explain the Hamiltonian cycle problem by taking a prsuitable example.		
5.1	What is the basic difference between Graph and Tree?	1	CO3, CO4
5.2	Explain the following Terms: (a) NP Hard (b) NP Complete	2	CO5
	OR		
	Explain AVL tree by taking suitable example		

5.3	Explain Insertion and deletion in B- Tree by taking a suitable example	3	CO5
	OR		
	Find the Huffman codes for the following data items: 12,15,23,4,5,25,11,17,28,9 and 15		
6.	Explain how Strassen's matrix multiplication is efficient as compared to classical matrix multiplication. Perform the matrix multiplication on the following matrices A and B, using Strassen's technique. The Elements of A and B are given as: A11=2, A12=5, A21=10, A22=9 and B11=7, B12=15, B21=4, B22=11	10	CO1, CO2
	OR		
	What is Reliability Design? Design a 3 stage system with device types D1, D2 and D3. The cost are $35, $25 and $15 respectively, the cost of the system is to be no more than $ 135. The reliability of each device type is 0.8, 0.7, 0.5 respectively.		

1
135
+ 59
170