College of Engineering Chengannur

(Managed by IHRD, A Govt of Kerala Undertaking)

Department of Computer Engineering

B. Tech. Degree Sixth Semester Computer Science and Engineering	**Academic Year**
Second Internal Examination – June 2021	**2020-2021**

Course Code & Name: **CS302 Design and Analysis of Algorithms**	**Faculty Name: Ah. Siraj**
Duration: 1 Hr	**Max. Marks: 25**

Course Outcomes: At the end of the course the student will be able to

CO1:	Analyze a given algorithm and express its time and space complexities in asymptotic notations.
CO2:	Solve recurrence equations using Iteration Method, Recurrence Tree Method and Master's Theorem to compute time complexity of algorithms.
CO3:	Design algorithms using Divide and Conquer Strategy, Greedy Strategy, Dynamic Programming, Back Tracking, and Branch and Bound Techniques.
CO4:	Apply various operations on Balanced Binary tree structures - AVL, RED-BLACK, B Trees and disjoint sets.
CO5:	Apply Graph Traversals, Spanning Tree and Shortest Path Algorithms..
CO6:	Classify computational problems into P, NP, NP-Hard and NP-Complete.

	PART-A (Answer All Questions)	**CO**	**Marks**
1	Insert the given numbers one by one into an initially empty B-tree of order 3. After each insertion do appropriate actions to maintain it as a B-tree. Mention the checks and steps on each insertion.	CO4	**3**
2	Consider an undirected graph with vertices a, b, c, d. The 6 numbers given are the edge weights of ab, ac, ad, bc, bd, cd. Apply Kruskal's algorithm with **disjoint set operations** to determine the MST of the graph.	CO5	**3**
3	Assume that the first four numbers in the given list as inputs to the dynamic programming algorithm to determine the best matrix chain multiplication order. By applying the algorithm, determine the number of multiplications in the best chain order.	CO3	**4**

	PART-B (Answer All Questions)		
4	Consider a directed graph with vertices a, b, c, d. The 6 numbers given are the edge weights of ab, ac, ad, bc, bd, cd. Apply Dijkstra's algorithm to determine the shortest path from a to d.	CO5	**7**
5	Consider a directed graph with vertices a, b, c, d. The first 3 numbers given are the edge weights of ab, ac, ad. The next three numbers are to be multiplied by -1 and assigned as edge weights of bc, bd, cd. Apply Bellman-Ford algorithm to determine the shortest path from a to d.	CO3	**8**

Note: Data for all the questions are given in the course website roll-number-wise.