Name: Enrolment No:	

UPES
End Semester Examination, May 2024

Course: Design and Analysis of Algorithms   **Semester: IV**
Program: BCA (AIML & CSF)   **Time   : 03 hrs.**
Course Code: CSBC-2030   **Max. Marks: 100**

Instructions: Attempt all questions.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Discuss about the different algorithmic design techniques?	4	CO1
Q 2	Discuss the best case and worst-case analysis of quick sort?	4	CO2
Q 3	Explain Huffman coding with an example?	4	CO3
Q 4	What are some real-world applications of counting sort?	4	CO4
Q 5	Discuss 0/1 knapsack problem?	4	CO4

SECTION B
(4Qx10M= 40 Marks)

Q 6	What is the shortest path from A to D using the Bellman-Ford algorithm? Consider the following graph: A -> B (cost 5) A -> C (cost 3) B -> C (cost 2) C -> D (cost 1) D -> A (cost -1)	10	CO3
Q 7	A thief enters a house for robbing it. He can carry a maximal weight of 60 kg into his bag. There are 5 items in the house with the following weights and values. What items should thief take if he can even take the fraction of any item with him? | Item	Weight	Value
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1	5	30		10	CO3

	2	10	40		
	3	15	45		
	4	22	77		
	5	25	90		
Q 8	Can you design a backtracking algorithm for solving the N-queens problem that is more efficient than the standard algorithm? What is the best-case time complexity of a backtracking algorithm for solving the N-queens problem?	**10**	**CO5**
Q 9	Sort the following list using the Radix sort algorithm: 650, 257, 739, 346, 610, 535, 757	**10**	**CO4**
SECTION-C **(2Qx20M=40 Marks)**			
Q 10	Provide a solution to travelling salesman problem using branch and bound method. Discuss the time complexity of the solution. Elaborate in detail.	**20**	**CO5**
Q 11	Explain the algorithm for the below mentioned problem: Suppose we are given a set of tasks specified by pairs of the start time and finish times as T={(1,2), (2,4), (3,4), (3,5), (4,7), (5,9), (6,8), (7,9)}. Select the maximum number of activities that can be performed, assuming that only one single activity can be done at a time.	**20**	**CO4**