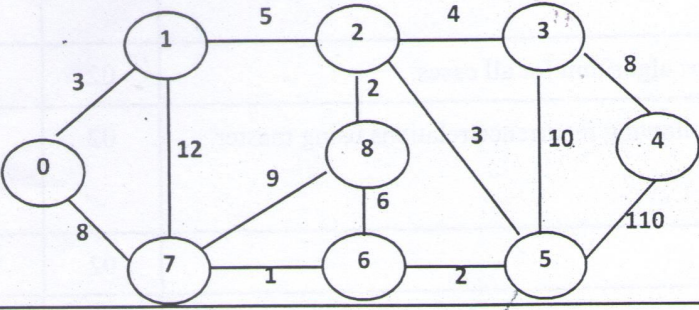## K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

August 2023 B. Tech. Computer Engineering Scheme II	
Examination: SY	Semester: IV
Course Code: CEC402	Course Name: Analysis of Algorithms
Date of Exam: 25/08/2023	Duration: 2.5 Hours Max. Marks: 60

Instructions:
(1) All questions are compulsory.
(2) Draw neat diagrams wherever applicable.
(3) Assume suitable data, if necessary.

		Max. Marks	CO	BT level
Q 1	Solve any six questions out of eight:	12		
i)	Differentiate between Greedy approach and Dynamic Programming Approach.	02	4	Ap
ii)	Write complexity of Quick sort algorithm for all cases.	02	2	U
iii)	Calculate the complexity of following recurrence relations using master method $T(n) = 2T(n/2) + n$	02	1	Ap
iv)	What is knapsack problem?	02	3	U
v)	Explain Bounding function with respect to backtracking.	02	5	U
vi)	Explain P and NP classes.	02	1	U
vii)	List 4 problems that can be solved using Dynamic Programming?	02	4	U
viii)	Explain preprocessing in KMP algorithm.	02	6	U
Q.2	Solve any four questions out of six.	16		
i)	Apply backtracking to solve the 4 Queens problem.	04	5	U
ii)	Explain Asymptotic notations with the help of graph.	04	1	U
iii)	Write an algorithm to find an element from a list of given elements using divide and conquer approach. Also derive its time complexity.	04	2	An
iv)	Explain different string matching algorithms	04	6	U
v)	Solve the following job sequencing with deadlines problem. n=7, M=15 Profits=(3, 5, 20, 18, 1, 6, 30) Deadlines=(1, 3, 4, 3, 2, 1, 2).	04	3	Ap
			4	Ap

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vi)	Find the LCS for the following two strings "ACBAED and "ABCBE".	04	4	Ap
Q.3	Solve any two questions out of three.	16		
i)	Apply Merge sort to sort the following numbers. Also derive time complexity of Merge sort for all cases. 28, 310, 79 , 3 , 77 , 18 , 21 ; 33	08	2	Ap
ii)	What is backtracking? How it is applied in graph coloring problem?	08	5	Ap
iii)	Apply Kruskal's algorithm on the following graph.	08	3	Ap
Q.4	Solve any two questions out of three.	16		
i)	Write an algorithm to match the pattern using Rabin Karp algorithm, explain it and analyze its time complexity.	08	6	U
ii)	Describe the Travelling salesman problem and discuss how to solve it using dynamic programming with an example.	08	4	U
iii)	Write Insertion sort algorithm and derive its time complexity	08	1	An

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