

Extra

Date : 26-05-22

K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22 (Autonomous College Affiliated to University of Mumbai)				
End Semester Exam				
May 2022				
Program: B. Tech (Computer Engineering)				
Examination: SY Semester: IV				
Course Code: 1UCEC402		Course Name: Analysis of Algorithms		
Duration: 03 Hours		Max. Marks: 60		
Instructions:				
(1) All questions are compulsory.				
(2) Draw neat diagrams wherever applicable.				
(3) Assume suitable data, if necessary.				
Q. No.	Question	Max. Marks	CO	BT Level
Q 1	Solve any six questions out of eight:	12		
i)	If $f(n) = \Theta(n \log n)$, when $n = 10$, $t = 1000$ ms. Find t when $n = 50$.	2	1	L1
ii)	Explain P and NP classes.	2	1	L2
iii)	Specify Recurrence relation of Quick Sort for Best case Performance.	2	2	L2
iv)	Explain Minimum Cost Spanning Tree	2	3	L1
v)	Describe the advantages of Dynamic programming. How it differ from Divide and Conquer.	2	4	L2
vi)	What is the complexity of the following problems? (a) Bellman Ford (b) All Pairs Shortest Path	2	4	L2
vii)	Write and explain estimated cost function used in 15 Puzzle Problem.	2	5	L1
viii)	Specify Time Complexity of Naïve string-matching algorithm,	2	6	L2
Q.2	Solve any four questions out of six.	16		
i)	Solve the following Recurrence Relation: $T(n) = T(n/3) + T(2n/3) + n^2$ $n > 1$ $= 1$ $n = 1$	4	1	Ap
ii)	Write an Algorithm to find Min and Max value in an array using Divide and Conquer approach.	4	2	U
iii)	Solve the given problem of job sequencing with deadlines. Number of jobs = 6 Profit (1:6) = {300,400,250,200,350,450} Deadline(1:6) = {2,2,4,2,3,3,}	4	3	Ap
iv)	Find the longest common subsequence for the following two strings. X = ACBAED Y = ABCABE	4	4	Ap

v)	Solve the sum of subset problem using backtracking for following. $W = \{ 4, 6, 8, 10 \}$ $M = 14$	4	5	Ap																									
vi)	Write an algorithm to perform pattern matching using Knuth Morris Pratt (KMP) algorithm.	4	6	U																									
Q.3	Solve any two questions out of three.	16																											
i)	Explain Worst Case, Best Case and Average Case Time Complexity of Selection Sort and Insertion Sort.	8	1	U																									
ii)	Write an Algorithm to sort an array using Merge Sort and Analyze its Best, Worst and Average case Time Complexity	8	2	U																									
iii)	Apply Dijkstra's algorithm on the following graph. Consider vertex 0 as source	8	3	Ap																									
Q.4	Solve any two questions out of three.	16																											
i)	Find minimum path cost between vertex s and t for following multistage graph using dynamic programming.	8	4	Ap																									
ii)	Solve the following Travelling Salesperson Problem using Branch and Bound.	8	5	Ap																									
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iii)	Write an algorithm to perform pattern matching using Rabin Karp algorithm and analyze its time complexity.	8	6	U																									