

15/12/22

K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)
End Semester Exam

Nov/Dec 2022
 B.Tech Program: Computer Engineering
 Examination: SY Semester: IV

Course Code: **1UCEC402**
 Duration: 03 Hours

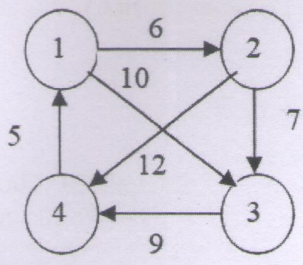
Course Name: **Analysis of Algorithm**
 Max. Marks: 60

- 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)	Define P and NP.	2	1	U
ii)	What are general method for divide and conquer strategy.	2	2	U
iii)	Explain fractional knapsack problem.	2	3	U
iv)	Solve following problem using masters method $T(n) = 7T(n/2) + 18 n^2$	2	1	An
v)	What is the difference between dynamic programming and divide and conquer approach.	2	4	U
vi)	Differentiate Branch and Bound and Backtracking.	2	5	U
vii)	Define Travelling Salesman problem.	2	4	U
viii)	List all string-matching algorithms.	2	6	U
Q.2	Solve any four questions out of six.	16		
i)	Describe various methods to calculate the complexity of recurrence relations	4	1	U
ii)	Apply merge sort to sort the list [40, 29, 45, 67, 83, 59, 11] by using divide and conquer and analyse it.	4	2	An

iii)	Apply job sequencing algorithm and find feasible solution for $N=4$, $(P1, P2, P3, P4) = (100, 10, 15, 27)$ and $(d1, d2, d3, d4) = (2, 1, 2, 1)$	4	3	Ap
iv)	Explain assembly line scheduling problem.	4	4	U
v)	Solve the sum of subset problems using backtracking algorithm for $n=4$, $(w1, w2, w3, w4) = (11, 13, 24, 7)$ and $M=31$.	4	5	Ap
vi)	Explain the naïve string-matching Algorithms with an example.	4	6	U
Q.3 Solve any two questions out of three.		16		
i)	Prove that for the Quick Sort, i. Worst Case time complexity is $T(n) = O(n^2)$ ii. Best Case time complexity is $T(n) = O(n \lg n)$	8	1	An
ii)	Explain minimum cost spanning tree and apply Prim's algorithm on the following graph. Write down its analysis	8	3	An
iii)	Explain Backtracking approach? Explain how it is used in graph coloring?	8	5	U
Q.4 Solve any two questions out of three.		16		
i)	Apply the binary search on the following numbers and derive it's time complexity 50, 31, 71, 38, 77, 81, 12, 33	8	2	Ap

15/12/22
C/AA

ii)	Solve the following using All pair shortest path: 	8	4	Ap
iii)	Describe the Rabin Karp algorithm with an example.	8	6	U