

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

May-June 2026		
(B. Tech / M. Tech.) Program: Computer Engineering Scheme I/II/IIB/III:III		
Regular Examination: SY Semester: IV		
Course Code: CEC402 and Course Name: Analysis of Algorithms		
Date of Exam: 21-05-26	Duration: 02.5 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 two questions out of three: (05 marks each)	10		
a)	Solve the following recurrence relations using Master's method. (i) $T(n) = 4T(n/2) + n^2$ (ii) $T(n) = 16T(n/4) + n$		1	Ap
b)	Explain job sequencing with deadline with an example.		3	U
c)	Explain min- max algorithm with example by using divide and conquer and do its analysis.		2	U
Q 2	Solve any two questions out of three: (05 marks each)	10		
a)	Explain different asymptotic notations with the help of an example and graph.		1	U
b)	Show the steps and find number of shifts to find the Pattern "aabc" in the Text String "abaaabccb" using Naïve String Matching Method.		6	Ap
c)	Explain how Graph coloring problem can be solved with backtracking using suitable example.		5	U
Q.3	Solve any two questions out of three. (10 marks each)	20		
a)	Apply quick sort algorithm to sort the list {E,X,A,M,P,L,E} by using divide and conquer approach. Analyze complexity of Quick sort for the best and worst case.		2	Ap
b)	Write an algorithm for the multistage graph problem . Apply Dynamic programming method to solve the following multistage graph problem using forward approach.		4	Ap

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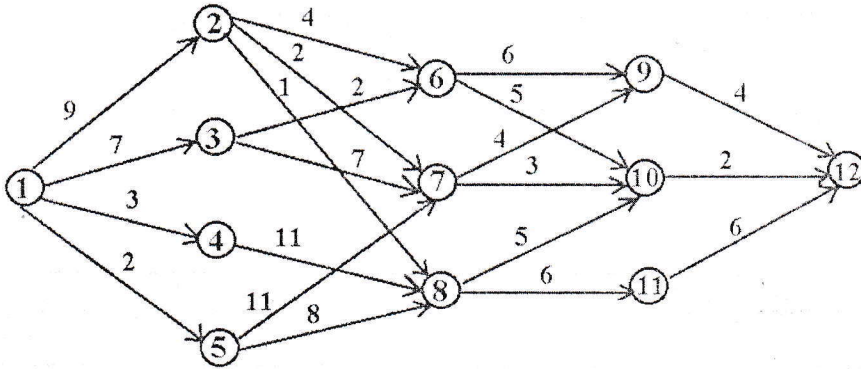
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c)	Solve the sum of subsets problem using backtracking for the following: $n = 5, M = 17, W = \{2, 7, 8, 9, 15\}$. Show the entire state space tree and find all the solutions.		5	Ap
Q.4	Solve any two questions out of three. (10 marks each)	20		
a)	Write an algorithm to find the Longest Common Subsequence between the two strings using Dynamic Programming. Also find the LCS for the following strings: X = "AMERICA" Y = "ARMENIA".		4	Ap
b)	Write an algorithm for the Fractional Knapsack problem. Apply a greedy approach to solve the knapsack problem for the following. $n = 6, p = (18, 5, 9, 10, 12, 7), w = (7, 2, 3, 5, 3, 2), m = 18$.		3	Ap
c)	Write selection sort algorithm, explain it with an example and derive its time complexity(best, worst, average)		1	U
