



RAMRAO ADIK INSTITUTE OF TECHNOLOGY, NERUL
(D Y Patil Deemed to be University)

Program: Computer Engineering

End Semester Examination: B.Tech. Semester IV

Course Code: CEC405 Course Name: Design and Analysis of Algorithm

Time: 2 hour

Max. Marks: 60

Instructions: 1. All three questions are compulsory

Que No.	Question	Max. Marks	CO	BT
Q1	Solve any Four			
i)	Explain recurrences and its methods to find complexity of recurrences.	5	CO1	BT2
ii)	What are the components of Dynamic Programming.	5	CO4	BT1
iii)	Write an algorithm for Graph Coloring.	5	CO5	BT4
iv)	Define P, NP, and NP-complete Problems.	5	CO6	BT1
v)	Analyze best, average and worst case time complexity for Quicksort algorithm.	5	CO2	BT4
vi)	Differentiate between Prim's and Kruskal algorithm for minimum Spanning Tree.	5	CO3	BT3

Que. No.	Question	Max. Marks	CO	BT
Q2A	Solve any Two			
i)	Find the applications of Minimum cost Spanning tree.	5	CO3	BT5
ii)	Explain Multistage Graph.	5	CO4	BT2
iii)	Rewrite Dijkstra Algorithm.	5	CO3	BT1
iv)	Discuss Floyd Warshall Algorithm.	5	CO4	BT2
Q2B	Solve any One			
i)	Apply LCS algorithm on following Strings to find LCS. X= "ABABCBABDC" Y= "CDABBADC"	10	CO4	BT5
ii)	Explain 15 Puzzle problem.	10	CO5	BT1



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Que No.	Question	Max. Marks	CO	BT																		
Q3	Solve any Two																					
i)	What do you mean by greedy approach? Apply the same to solve the following knapsack problem, Knapsack Capacity = 20. <table><tr><th>Item (i)</th><th>Value (Vi)</th><th>Weight (Wi)</th></tr><tr><td>1</td><td>18</td><td>9</td></tr><tr><td>2</td><td>25</td><td>3</td></tr><tr><td>3</td><td>27</td><td>4</td></tr><tr><td>4</td><td>10</td><td>3</td></tr><tr><td>5</td><td>15</td><td>6</td></tr></table>	Item (i)	Value (Vi)	Weight (Wi)	1	18	9	2	25	3	3	27	4	4	10	3	5	15	6	10	CO3	BT3
Item (i)	Value (Vi)	Weight (Wi)																				
1	18	9																				
2	25	3																				
3	27	4																				
4	10	3																				
5	15	6																				
ii)	Prove that Vertex Cover is NP-Complete Algorithm.	10	CO6	BT5																		
iii)	Rewrite and analyze selection sort Algorithm.	10	CO1	BT1, BT4																		

Course Outcomes (CO) -Learner will be able to:

CO1: Analyze the running time and space complexity of algorithms.

CO2: Describe, apply and analyze the complexity of divide and conquer strategy.

CO3: Describe, apply and analyze the complexity of greedy strategy.

CO4: Describe, apply and analyze the complexity of dynamic programming strategy.

CO5: Explain and apply backtracking, branch and bound and string-matching techniques to deal with some hard problems.

CO6: Describe the classes P, NP, and NP-Complete and be able to prove that a certain problem is NP-Complete.

BT1- Remembering, BT2- Understanding, BT3- Applying, BT4- Analyzing, BT5- Evaluating, BT6- Creating