

K. J. Somaiya College of Engineering, Mumbai-77
 (Autonomous College Affiliated to University of Mumbai)

End Semester Exam
 MAY-JUNE 2021

Max. Marks: 50

Duration: 1 Hr. 45 Min.

Class: SY/TY/LY/B.Tech/M.Tech

Name of the Course: Analysis of Algorithm

Course Code: 2UCC402

Semester: IV

Branch: Computer Engineering

Instructions:

1. All questions are compulsory
2. Draw neat diagrams
3. Assume suitable data if necessary

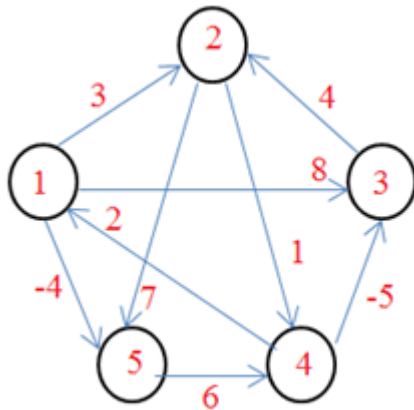
Question No.		Max Marks
Q1 (A)	Objective / MCQ type	10
1.	<p>What is the time complexity of following code:</p> <pre> 1 void function(int n) 2 { 3 int count = 0; 4 5 6 for (int i=n/2; i<=n; i++) 7 8 for (int j=1; j+n/2<=n; j = j++) 9 10 for (int k=1; k<=n; k = k * 2) 11 count++; 12 13 } </pre> <p> a) $O(n)$ b) $O(n^2 \log n)$ c) $O(n^2)$ d) $O(n \log^2 n)$ </p>	02
2.	<p>Consider the strings “Queserasera” and “coursera” What is the length of the longest common subsequence?</p> <p> a) 3 b) 6 c) 5 d) 2 </p>	01
3.	<p>For the given graph, compute the number of all possible combinations of solutions for colour assignment with minimum chromatic number?</p>	02

A	B	C
	D	F
E		

- a) 6
- b) 4
- c) 8
- d) 10

4.

In the given graph



What is the minimum cost to travel from vertex 1 to vertex 3?

- a) 3
- b) 2
- c) 10
- d) -3

02

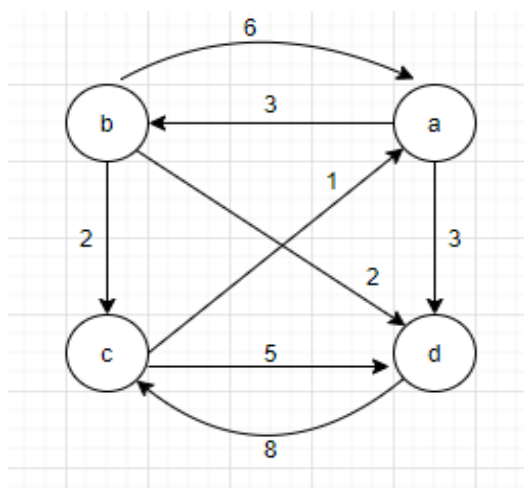
5.

Match Column A with most appropriate answer in Column B. Choose the most appropriate match for Column A from column B.

A	B
1) Complexity calculation	a) Branch and bound problems
2) Problem which works with negative edge values	b) Divide and conquer strategy
3) Pruning of the state space tree	c) Floyd Warshall Algorithm
4) Creating sub-problems and storing	d) Substitution method

02

	the solutions and using iteratively		
	5) Solving a problem recursively	f) Dynamic programming	
	a)1-a,2-b,3-c,4-d,5-f b)1-c,2-a,3-b,4-f,5-d c)1-d,2-c,3-a,4-f,5-b d)1-f,2-d,3-c,4-b,5-a		
6.	<p>Solve the given problem of sum of subsets using backtracking. For given input N=5, M=31 Values= {11, 24, 7, 13, 31} and identify the correct output sequence?</p> <p>a) {0,0,0,0,1},{0,1,1,0,0},{1,0,1,1,0} b) {1,0,0,0,0},{1,1,0,0,0},{0,0,1,0,0} c) {0,1,0,0,0},{1,0,0,0,0},{0,0,1,1,0} d) {0,0,0,1,0},{0,0,1,1,0},{0,0,1,1,1}</p>	01	
Q1 (B)	Attempt any FIVE questions out of the following (any 5 out of 7)	10	
	<p>A. Apply shortest path greedy and dynamic programming algorithms to the given graph.</p> <p>What would be the cost of reaching from source to sink according to greedy and dynamic programming respectively?</p> <p>B. State and Explain the Principle of Optimality. Cite some examples to justify your claims.</p> <p>C. Explain the concept of deterministic and Nondeterministic classes of problems.</p> <p>D. Explain the Control abstraction of divide and conquer algorithm.</p> <p>E. What is dynamic programming? Is this the optimization technique? Give reasons.</p> <p>F. What are the constraints that must be satisfied while solving any problem using backtracking?</p> <p>G. Which are the different methods of solving recurrence? Explain any one with example.</p>		
Q. 2	For given graph Solve for all pair shortest distance using Floyd Warshall's Algorithm. Show all steps.	10	



1. Define the Problem
2. Write Recursive formula
3. Show all updated distance matrix step by step
4. Compute Path with cost for all possible pairs

Q. 3

Explain String Matching technique using Finite Automata. Explain with an example. Compare this approach with naïve string matching technique.

10

OR

Define Longest Common Subsequence Problem. Give Dynamic programming Solution for the given instance of problem.

X= innovation

Y= stationwagon

To solve the same,

1. Define the Problem
2. Define Overlapping sub problem
3. Write Recursive formula
4. Solve by Table formulation and Compute the answer
5. Compute the Longest Common Subsequence with length

Q. 4

Explain how the dynamic strategy helps in minimizing total number of computations in matrix chain multiplication. Solve the given instance to help in deciding over the sequence of matrix chain multiplication.

$N = 6$ $\{4, 10, 3, 12, 20, 7\}$

1. Write Recursive formula
2. Compute maximum required computations
3. Display Computation Matrix and kth Value Matrix
4. Construct tree to compute sequence of multiplication
5. Explain overlapping subproblems property in matrix chain multiplication and Compute Complexity.

10