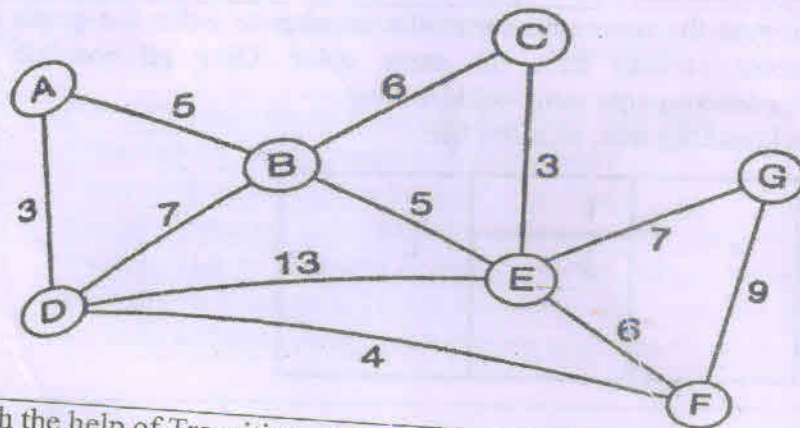




24.05.2023(E)

Maximum Marks: 100		Semester: May 2023 – June 2023	
Programme code: 01		Examination: ESE Examination	
Programme: Computer		Class: SY	Duration: 3 Hrs.
Name of the Constituent College:		Semester: (SVU 2020)	
K. J. Somaiya College of Engineering		Name of the department: Computer	
Course Code: 116U01C402	Name of the Course: Analysis of Algorithms		
Instructions: 1) Draw neat diagrams 2) All questions are compulsory			
3) Assume suitable data wherever necessary			
Que.			

Que. No.	Question	Max. Marks
Q1	Solve any Four	
i)	Explain Growth of a function with the help of a graph	20
ii)	Give difference between Algorithm and Program	5
iii)	Explain the Control abstraction of divide and conquer algorithm.	5
iv)	Which are the different methods of solving recurrence? Explain any one with example.	5
v)	What are the constraints that must be satisfied while solving any problem using backtracking?	5
vi)	Compare Backtracking and Branch and Bound Algorithm techniques	5

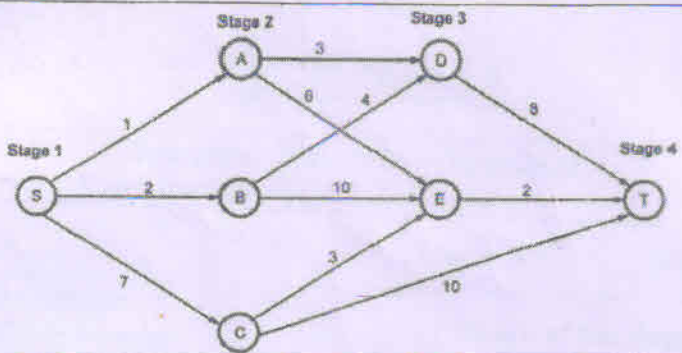
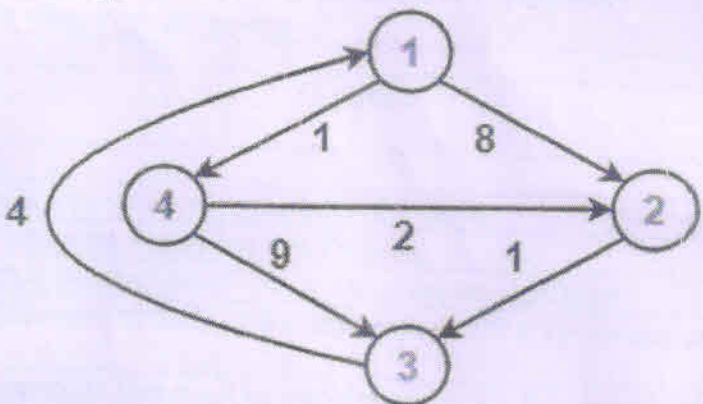
Que. No.	Question	Max. Marks
Q2 A	Solve the following	
i)	Find the MST for the given graph using Kruskal algorithm	10
		5
ii)	With the help of Transition table, find the Automata for the given Pattern P. P=acacaga	5

Q2 A	Solve 8 -puzzle problem for the given initial and goal state using branch and bound strategy	10																		
	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <table border="1"> <tr><td></td><td>1</td><td>3</td></tr> <tr><td>4</td><td>2</td><td>5</td></tr> <tr><td>7</td><td>8</td><td>6</td></tr> </table> <p>Initial</p> </div> <div style="text-align: center;"> <table border="1"> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> <tr><td>7</td><td>8</td><td></td></tr> </table> <p>Goal</p> </div> </div>		1	3	4	2	5	7	8	6	1	2	3	4	5	6	7	8		
	1	3																		
4	2	5																		
7	8	6																		
1	2	3																		
4	5	6																		
7	8																			

Q 2 B	Solve any One																						
i)	Find all the subsets of the given weight vector $w = \{5, 11, 13, 24\}$ having required sum $M = 29$ using backtracking method.	1																					
ii)	Prince, the jewel thief wants to rob a jewellers shop. He can carry weight up to 10kg only Without getting caught. Using dynamic programming approach, help him choose the box of jewels so as to have a most profitable robbery. The weight and profit of the jewel boxes is as follows. (Boxes are packed and it will be risky to open during stealing them) <table><tr><td>Box of Jewel</td><td>Pearl</td><td>Ruby</td><td>Topaz</td><td>Emerald</td><td>Diamond</td><td>Gold</td></tr><tr><td>Weight (in kg.)</td><td>2</td><td>4</td><td>3</td><td>6</td><td>5</td><td>2</td></tr><tr><td>Profit</td><td>3</td><td>12</td><td>5</td><td>60</td><td>14</td><td>4</td></tr></table>	Box of Jewel	Pearl	Ruby	Topaz	Emerald	Diamond	Gold	Weight (in kg.)	2	4	3	6	5	2	Profit	3	12	5	60	14	4	10
Box of Jewel	Pearl	Ruby	Topaz	Emerald	Diamond	Gold																	
Weight (in kg.)	2	4	3	6	5	2																	
Profit	3	12	5	60	14	4																	

Que. No.	Question	Max. Marks
Q3	Solve any Two	20
i)	Solve Matrix Chain Multiplication for the order $\langle 4, 10, 3, 12, 20 \rangle$	10
ii)	<p>Define Longest Common Subsequence Problem. Give Dynamic Programming Solution for the given instance of problem. $X = \text{Notebook}$ $Y = \text{Facebook}$ To solve the same,</p> <ol style="list-style-type: none"> Write Recursive formula Solve by Table formulation and Compute the answer Compute the Longest Common Subsequence with length 	10
iii)	<p>For the given graph, compute the minimum chromatic number to color the graph such that no two adjacent vertices have the same color. Give all possible combinations of such color assignments using backtracking. Draw state space tree, backtracking tree, solution tree.</p> <div style="text-align: center;"> </div>	10

Que. No.	Question	Max. Marks
Q4	Solve any Two	20
i)	<p>Solve the given problem instance of Multistage graphs with forward or backward (either of the methods) To solve the same,</p> <ol style="list-style-type: none"> Write the recursive formula Compute the answer Construct the answer 	10

		
ii)	<p>For Given graph, apply Floyd Warshall's Algorithm to compute all pairs shortest distance. Show all steps</p> 	10
iii)	<p>Write down algorithms for merge sort. Sort the following list of elements in ascending order using Merge sort technique.</p> <p style="text-align: center;">27 10 12 20 25 13 55 22</p> <p>Also compute complexity of the algorithm using Master theorem and Recursion tree method.</p>	10

Que. No.	Question	Max. Marks
Q5	(Write notes / Short question type) on any four	20
i)	What is NP Completeness and reducibility	5
ii)	Write short note on Randomised Algorithm	5
iii)	Explain Dynamic programming technique with suitable example	5
iv)	Explain Master Theorem in detail with the help of suitable example	5
v)	Explain the concept of Naïve string matching with the help of suitable example	5
vi)	Explain different complexity classes with suitable examples	5