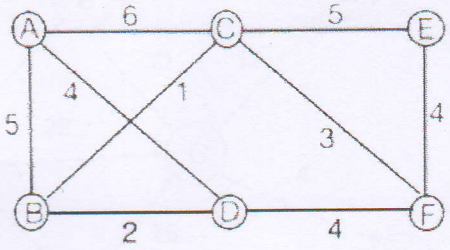
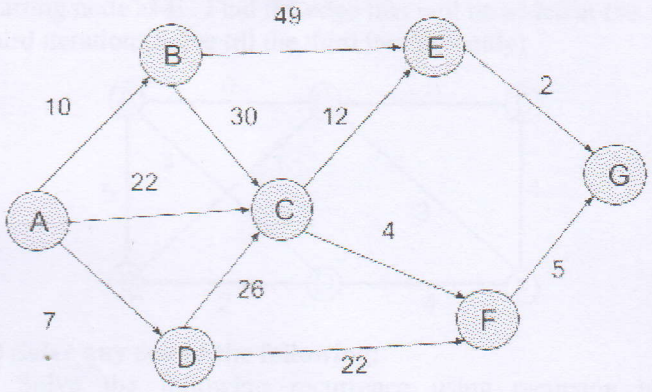
SOMAIYA VIDYAVIHAR UNIVERSITY

Maximum Marks:30	**Semester: January 2023 – May 2023** **Examination: In-Semester Examination**	**Duration:1hr 15 min**
Programme code: 01 **Programme: B.Tech**	**Class:SY**	**Semester:** IV **(SVU 2020)**
Name of the Constituent Colleges: K. J. Somaiya College of Engineering	**Name of the department:** COMP	
Course Code:116U01C402	**Name of the Course:** Analysis of Algorithms	

Question No.		Max. Marks	CO Mapped	BT Level
Q1	a) Consider the given graph and apply Prim's/Kruskal's algorithm to form a minimum spanning tree, considering the starting node as E . Find the edge that will be added at the third iteration.(Solve till the third iteration only)  	05		
	b) Solve any one of the following: i) Solve the following recurrence using recursion tree Method: $T(n)= 1$ for $n=1$ $T(n)= T(1)+T(n-1)+n$ for $n\geq 2$	05	1,2	AP, AN, EV

	ii) Calculate time complexity of following function using step count method:
	`void function(int n)`
	`{`
	`int count = 0;`
	`for (int i=n/2; i<=n; i++){`
	`for (int j=1; j+n/2<=n; j = j++){`
	`for (int k=1; k<=n; k = k * 2){`
	`count++;`
	`}`
	`}`
	`}`
	`}`			

Q2	Write down algorithms for quicksort. Show that best case of quick sort occurs when split has constant proportionality (Prove it using any other choice of splits rather than equal sub division ie, n/2) Sort the following list of elements in ascending order using Quick sort technique. Give the output of each pass. 29 23 17 57 34 89 65 27 **OR** 1. Write down algorithms for finding the maximum and minimum element using a recursive approach. 2. For the given input, Draw the <u>divide and conquer tree diagram</u> to find minimum and maximum of the given Input :- 9,81,33,87,32,19,4,59,40 Also compute complexity of the algorithm using master theorem and recursion tree method.	04 02 04 03 03 04	2	AP,A N,EV
Q3	Find the shortest path from node A to node all other nodes of the distance network shown in figure below using Dijkstra's Algorithm.  	10	2	AP,A N,EV