Q1 Minimum spanning tree–

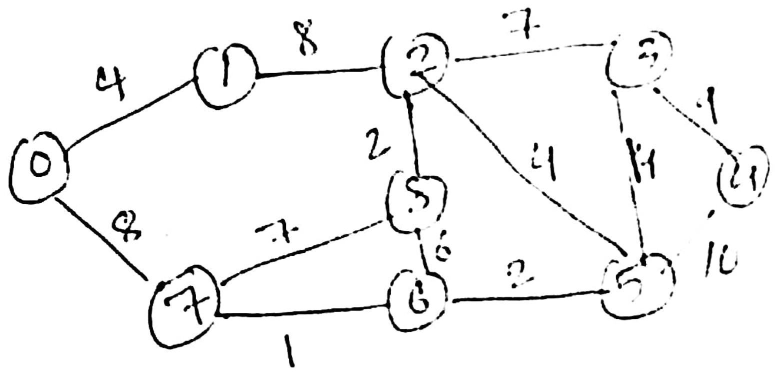
It is spanning tree which has minimum total cost. If we have a linked undirected graph with a weight combine with each edge. then the cost of spanning tree would be the sum of the cost of its edge.

Application – in design of networks including computer networks, telecommunication network, transportation networks

Q2

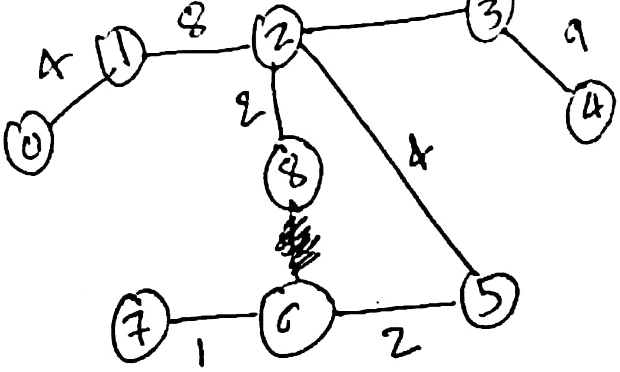
	Prim	Dijkstra	Bellmann ford
Time Compl	$O((V+E)\log V)$	$O(E \log V)$	$O(VE)$
Space	$O(V+E)$	$O(V^2)$	$O(N)$

Q3



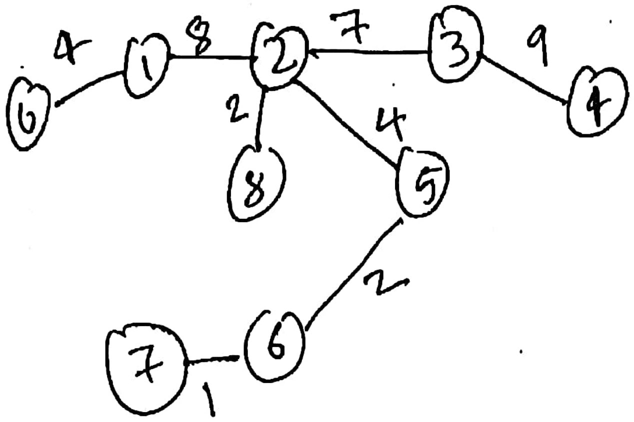
i) Krushkals

[1, 2, 2, 4, 4, 6, 7, 7, 8, 8, 9, 10, 11, 14]



Min wt = 37

(ii) Prim

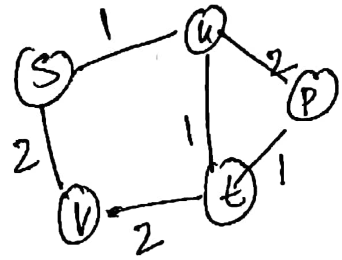


min wt = 37

Q4) let we have

initial shortest path

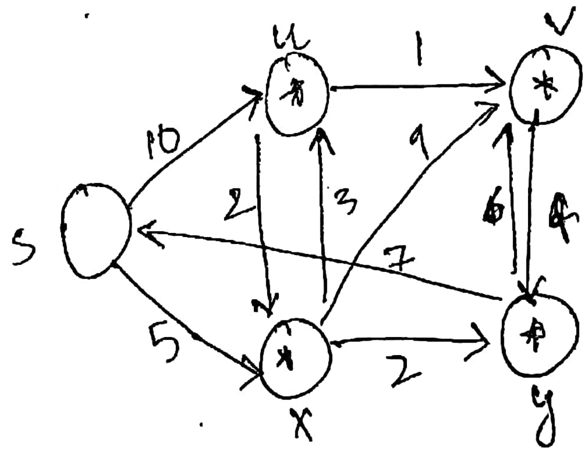
s → v → t.



a) if we increase every edge by 10 units then also shortest path is same.

b) If we ~~incre~~ multiplied every . edge by 10 units then also shortest path is same

Q5) Dijkstra



node	dist from s
u	8
v	9
x	5
y	7

Bellman

s	u	v	x	y
0	~~∞~~ 10	~~∞~~ 11	~~∞~~ 5	~~∞~~ 7
0	~~10~~ 8	~~11~~ 9	5	7
0	8	9	5	7

Q6

$$A_0 = \begin{bmatrix} 0 & \infty & 6 & 3 & \infty \\ 3 & 0 & \infty & \infty & \infty \\ \infty & \infty & 0 & 2 & \infty \\ \infty & 1 & 1 & 0 & \infty \\ \infty & 4 & \infty & 2 & 0 \end{bmatrix}$$

$$A_1 = \begin{bmatrix} 0 & \infty & 6 & 3 & \infty \\ 3 & 0 & 9 & 6 & \infty \\ \infty & \infty & 0 & 2 & \infty \\ \infty & 1 & 1 & 0 & \infty \\ \infty & 4 & \infty & 2 & 0 \end{bmatrix}$$

$$A_2 = \begin{bmatrix} 0 & \infty & 6 & 3 & \infty \\ 3 & 0 & 9 & 6 & \infty \\ \infty & \infty & 0 & 2 & \infty \\ \infty & 1 & 1 & 0 & \infty \\ \infty & 4 & 13 & 2 & 0 \end{bmatrix}$$

$$A_3 = \begin{bmatrix} 0 & \infty & 6 & 3 & \infty \\ 3 & 0 & 9 & 6 & \infty \\ \infty & \infty & 0 & 2 & \infty \\ \infty & 1 & 1 & 0 & \infty \\ \infty & 4 & 13 & 2 & 0 \end{bmatrix}$$

$$A_4 = \begin{bmatrix} 0 & 4 & 4 & 3 & \infty \\ 3 & 0 & 7 & 6 & \infty \\ \infty & 3 & 0 & 2 & \infty \\ \infty & 1 & 1 & 0 & \infty \\ \infty & 3 & 3 & 2 & 0 \end{bmatrix}$$

$$A_5 = \begin{bmatrix} 0 & 4 & 4 & 3 & \infty \\ 3 & 0 & 7 & 6 & \infty \\ \infty & 3 & 0 & 2 & \infty \\ \infty & 1 & 1 & 0 & \infty \\ \infty & 3 & 3 & 2 & 0 \end{bmatrix}$$