Qs1 soln:- Minimum Spanning tree :-

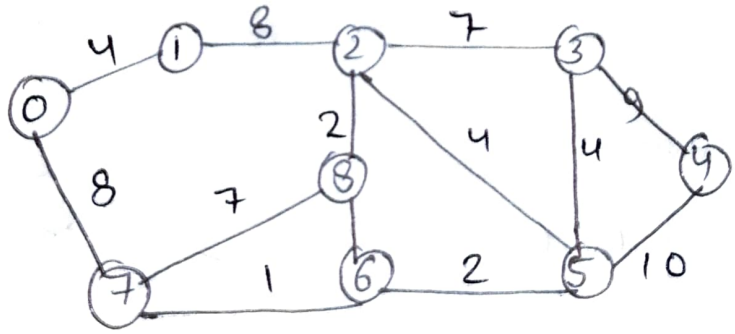
It is spanning tree which has minimum total cost. If we have linked undirected graph with a weight combin with each edge. then the cost of spanning tree would be the sum of the cost of its edge.

Application — In design of network including computer networks, telecommunication network transportations network.

Qs2 soln:-

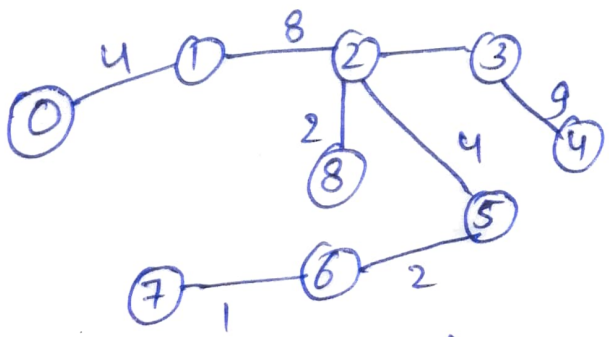
	Prim	Dijkstra	Bellman Ford.
Time complexity	$(O(V+E)\log n)$	$O(E\log n)$	$O(VE)$
Space	$O(V+E)$	$O(V^2)$	$O(N)$

Qs3 soln:-



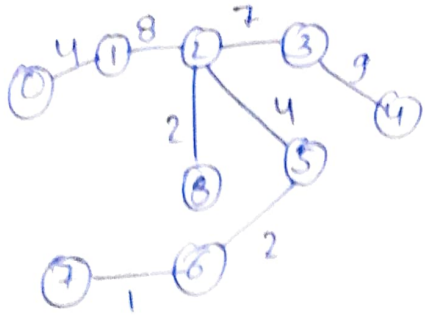
(1) Kruskals -

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



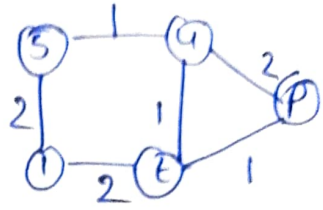
Min wt = 37

(ii) Prim



min wt = 37.

Q4 Sol^{n}:— Let we have
Initial Shortest path
$S \rightarrow V \rightarrow t$

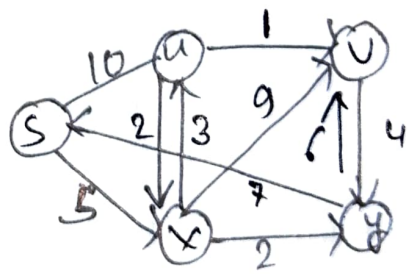


(a.) if we increase every edge by 10 units then also Shortest path is same.

(b.) if we multiplied every edge by 10 units then also Shortest path is same.

Q5 Sol^{n}:— Dijkstra —

node	list forms
u	8
v	9
x	5
y	7



Bellman —

0	10	11	5	7
0	8	9	5	7
0	8	9	9	7

Q6-soln—

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

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

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

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

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

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