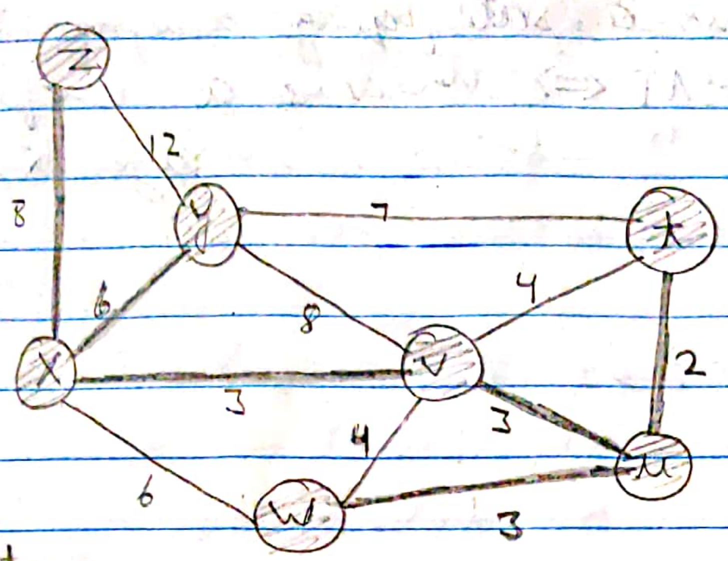
Q 1.)



S = {X}

Iteration 1

u	X	Y	Z	W	V	t	u
Key[u]		6	8	6	3	∞	∞
pred[u]		X	X	X	X	NIL	NIL

Minimum is {V} . So, S = {X, V}
A = {XV}

Iteration 2

u	X	Y	Z	W	V	t	u
Key[u]		6	8	4		4	3
pred[u]		X	X	V		V	V

Minimum Key[u] is u.
So, S = {X, V, u}
A = {XV, Vu}

Iteration 3

u	X	Y	Z	W	V	t	u
Key[u]		6	8	3		2	
pred[u]		X	X	u		u	

Minimum Key[u] is t.

So, $S = \{x, v, u, t\}$

$A = \{xv, vu, tu\}$

Iteration 4

u	X	Y	Z	W	V	t	u
Key[u]		6	8	3			
pred[u]		X	X	u			

Minimum Key[u] is W.

So, $S = \{x, v, u, t, w\}$

$A = \{xv, vu, tu, wu\}$

Iteration 4

u	X	Y	Z	W	V	t	u
Key[u]		6	8				
pred[u]		X	X				

Minimum Key[u] is Y

$S = \{x, v, u, t, w, Y\}$

$A = \{xw, vu, tu, wu, xY\}$

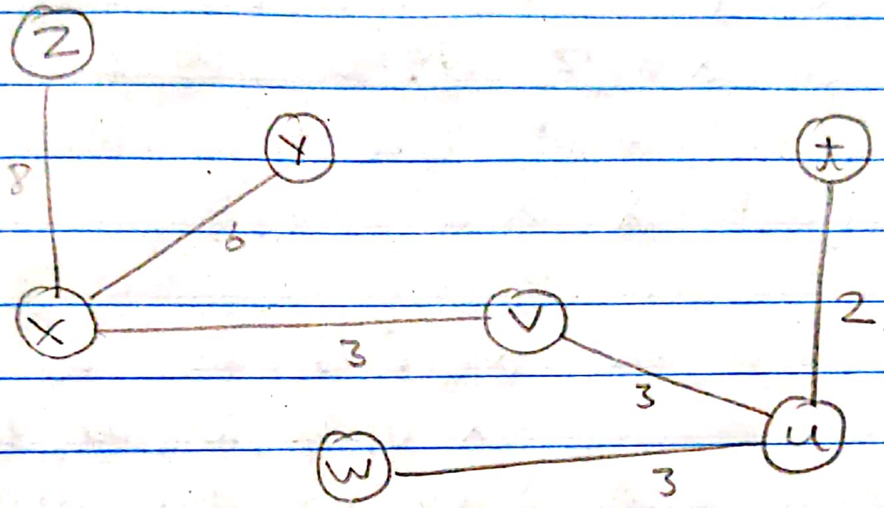
Iteration 5

u	X	Y	Z	W	V	t	u
			8				
			X				

$S = \{x, v, u, t, w, y, z\}$

$A = \{xw, vu, tu, wv, xy, xz\}$

Final MST is



2) Decision version of problem:
Does there exist a set Union of size K?

Vertex-Cover $\leq$ New Problem

Consider an instance of Vertex cover problem $G = (V, E)$.
Define S is such that it covers all the edges incident on each vertex.

Now, it can be seen that
a set Union of size $\leq K \iff$ a vertex cover of size K

So, this is a polynomial time reduction.

This proves that the new-problem is NP-complete.