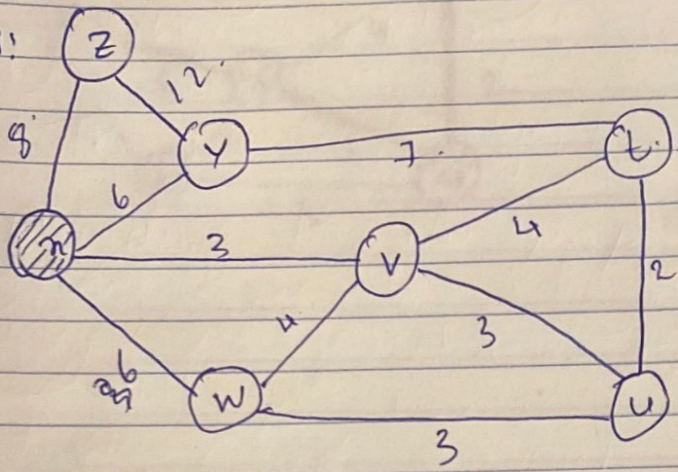
Q.1.) a) Prims:

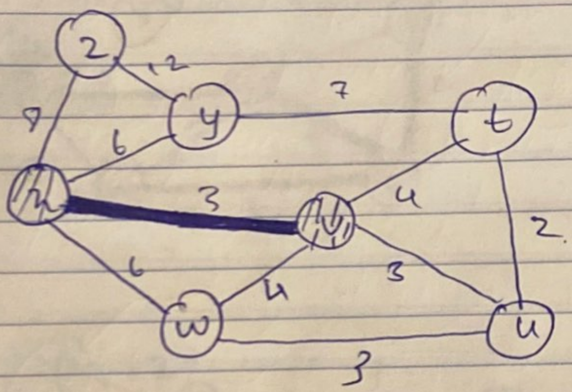


Step 0.

$S = \{x\}$

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

lightest edge $= \{x, v\}$



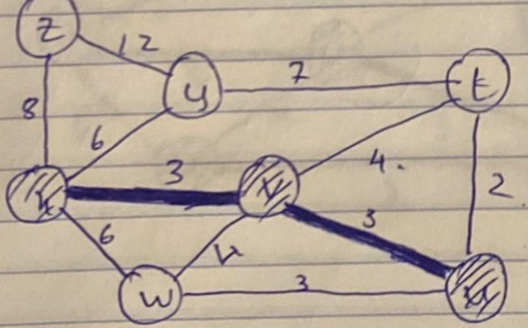
Step 1.1

$S = \{x, v\}$

$V/S = \{y, z, w, \cancel{v}, t, u\}$

$A = \{\{x, v\}\}$

lightest edge $= \{v, u\}$

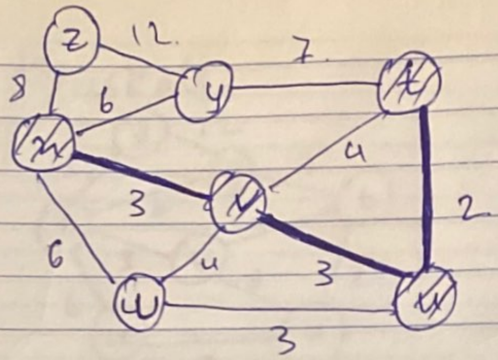


$S = \{x\ v\ u\}$

$V/S = \{y, z, w, t\}$

$A = \{\{x, v\}, \{v, u\}\}$

lightest edge $= \{\{u, t\}\}$

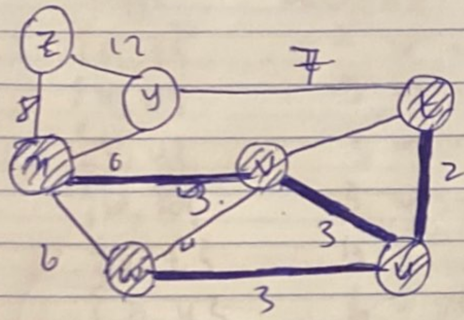


$S = \{x, v, u, t\}$

$V/S = \{y, z, w\}$

$A = \{\{(x, v\}, \{v, u\}, \{u, t\}\}$

lightest ege:- $\{\{u, w\}\}$

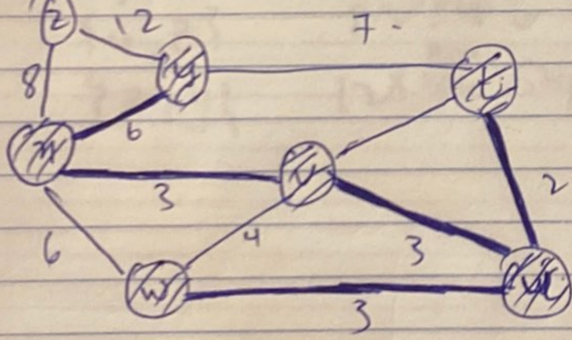


$S = \{x, v, u, t, w\}$

$V/S = \{y, z, \}$ ~~w~~

$A = \{\{x, v\} \{v, u\}, \{u, t\}, \{u, w\}\}$

lightest edge: $\{x, y\}$



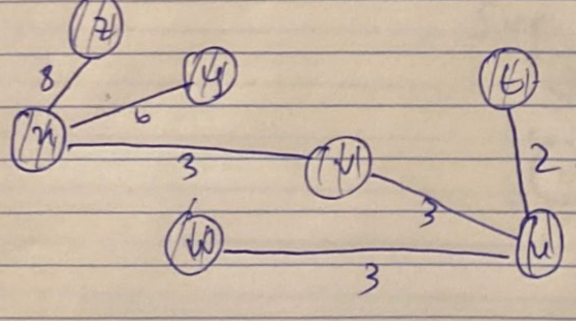
$S = \{x, v, u, t, w, y\}$

$V/S = \{z\}$

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

lightest edge: $\{x, z\}$

final MST:

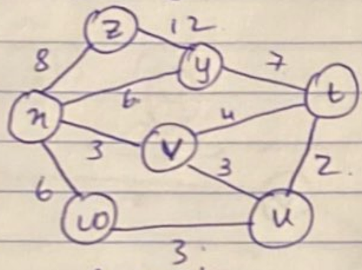


$S = \{x, v, u, t, w, y, z\}$

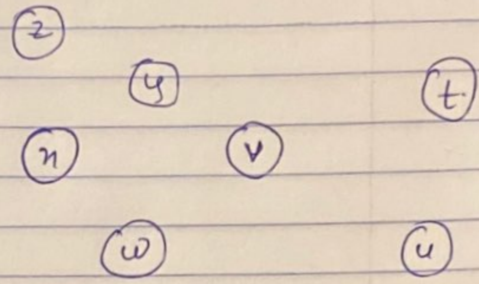
$V/S = \{\emptyset\}$

$A = \{(x, v) (v, u) (u, t) (u, w) (x, y) (x, z)\}\}$

Q1.) b.) Kruskals.



Graph.

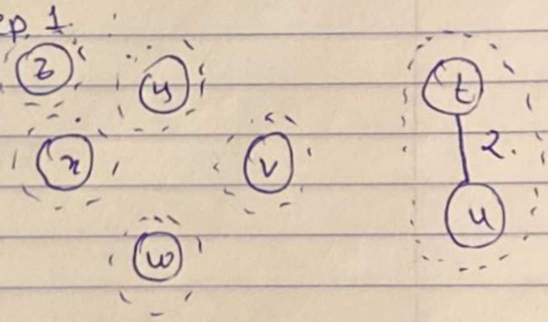


Forest.

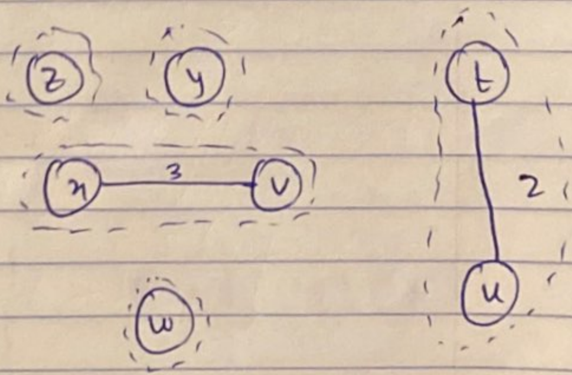
A = { }

edge	weight
{u, t}	2 ✓ step1
{x, v}	3. ✓ Step2
{v, u}	3 ✓ Step3.
{u, w}	3. ✓ Step 4.
{v, t}	4. X form cycle.
{x, y}	6. ✓ step5
{x, w}	6 X forming cycle.
{y, t}	7. X forming cycle
{x, z}	8 ✓ Step 6.
{z, y}	12 X form cycle

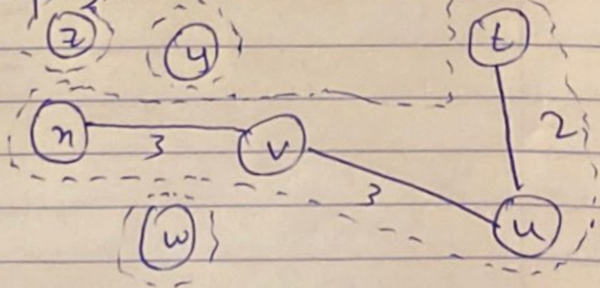
Step 1.



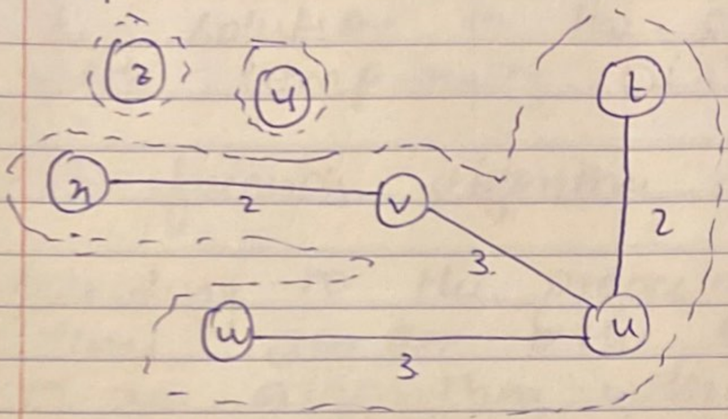
Step 2.



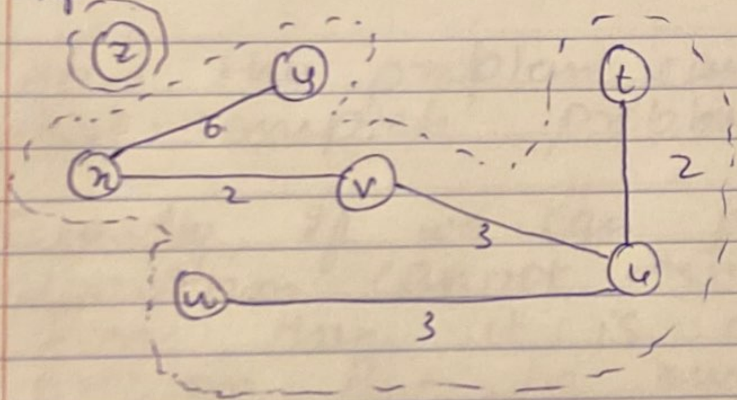
Step 3.



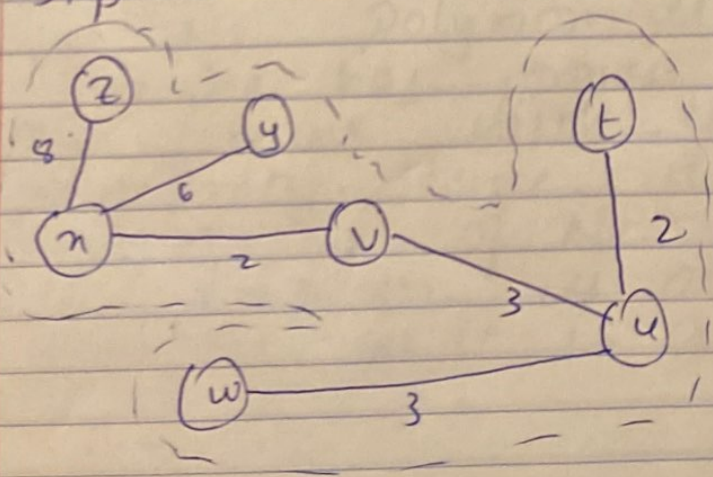
Step 4.



Step 5.



Step 6.



Find MST.

Q2) The solution to the problem is running with complexity $O(2^n)$

The friends algorithm also runs in $O(2^n)$

According to the property of polynomial time ~~the an~~ & the worst case complexity of an algorithm which is running in polynomial time is $O(n^k)$ with k as some constant.

Hence the problem cannot be an NP-complete problem

Secondly, if we can prove that the algorithm cannot run in polynomial time then it is an NP-complete problem. But in our condition our friend has found a solution which runs with a complexity which is in polynomial time ~~hence~~. and ~~his~~ he has proven that his solution also runs with the same time complexity. Hence it does not follow the ~~A~~ rules of NP-completeness, hence the problem is not a NP complete problem as it is a NP or a P problem.