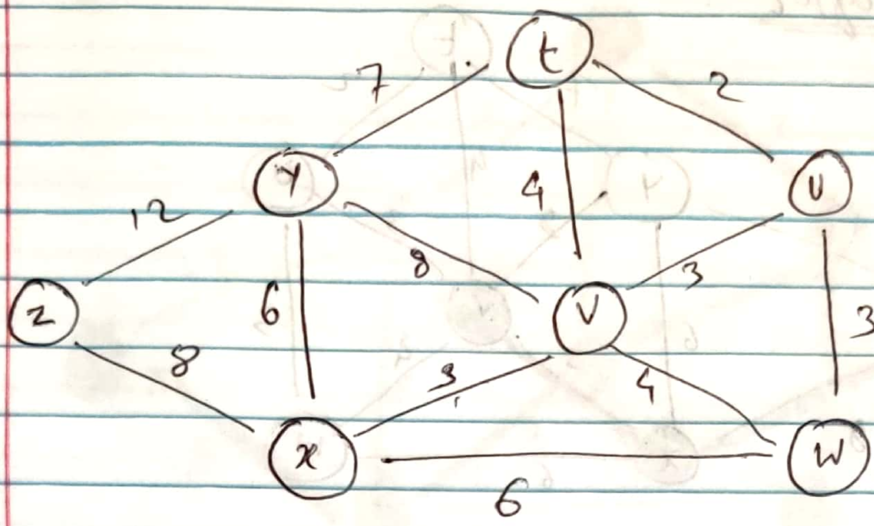
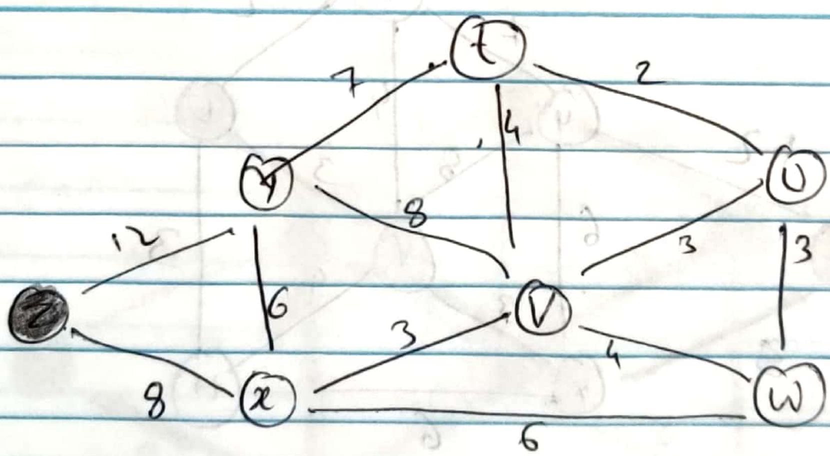
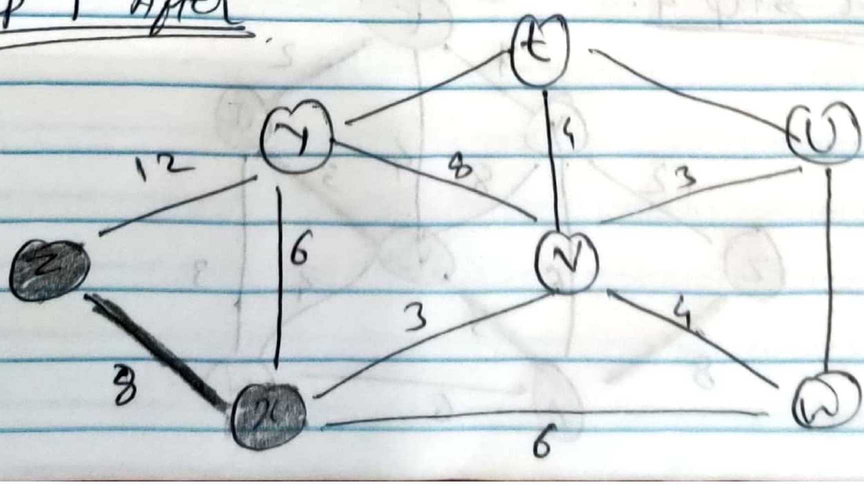
Q. 1.



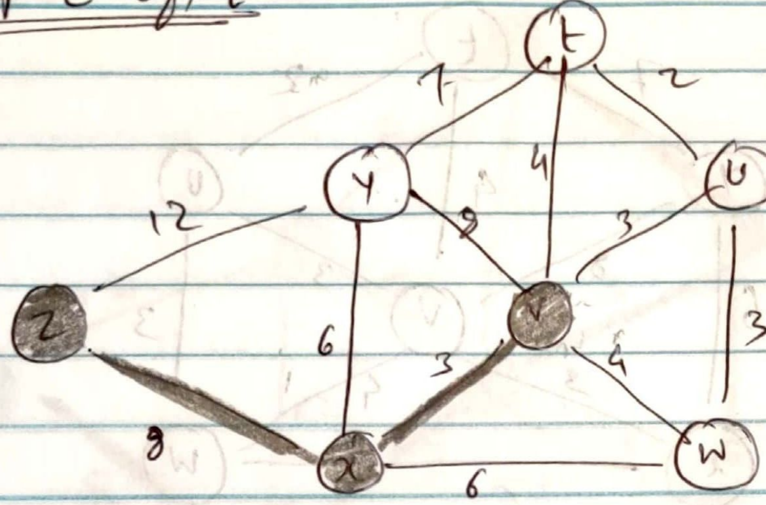
Step 0.



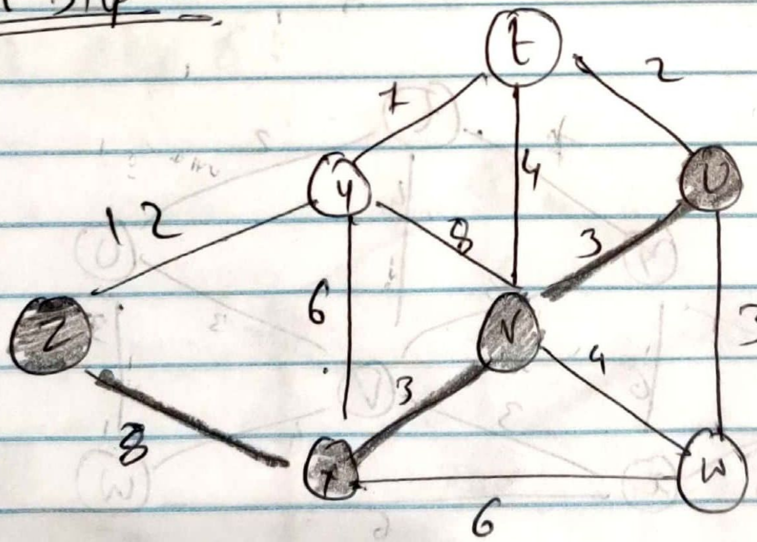
Step 1 After



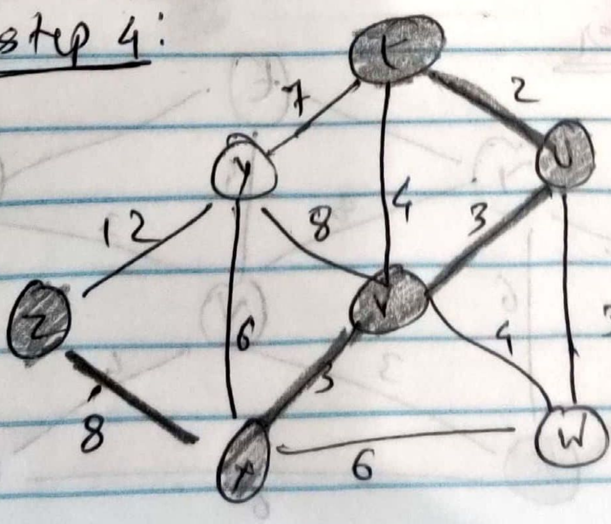
Step 2 after :



After step 3 :



After step 4 :



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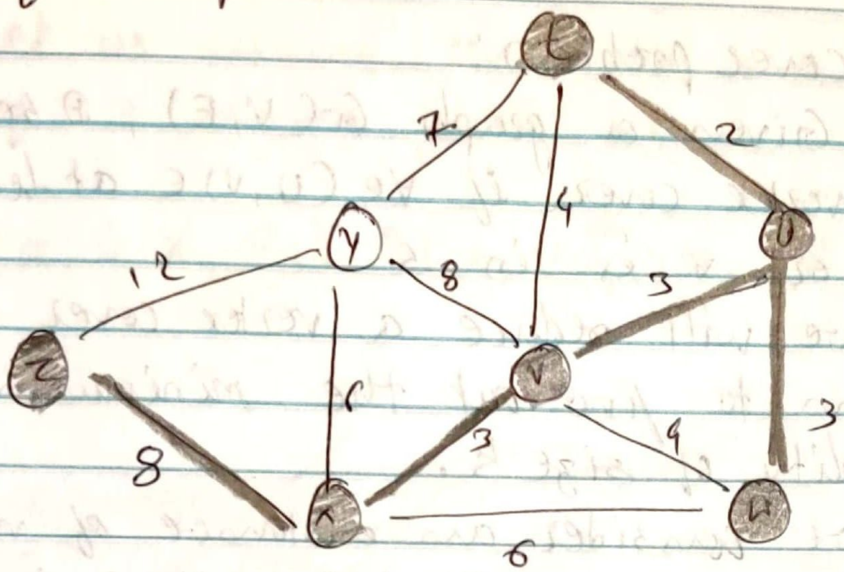
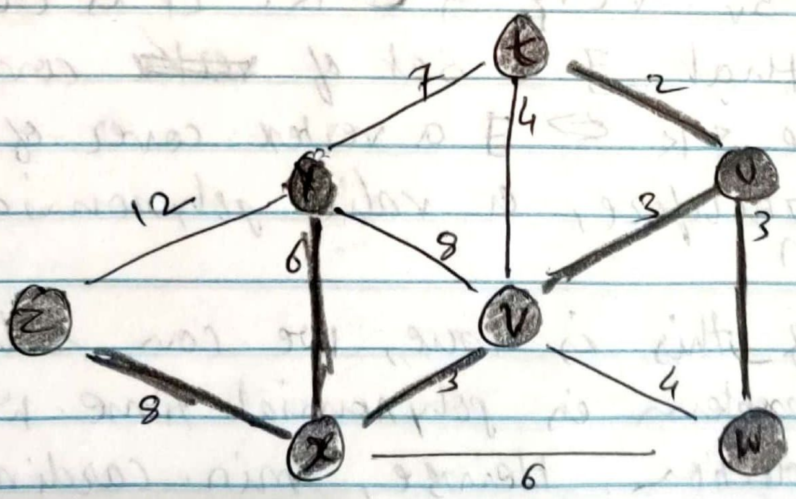


After step 6 :



Q.2. Vertex cover problem:

Given a graph $G=(V,E)$, A set $S \subseteq V$ is a vertex cover if $\forall e(U,V) \in$ at least one of U or V is in S.

We will reduce a vertex cover of size $\underline{\underline{k}}$ problem to find out the minimum cardinality of size k.

We consider an existence of vertex cover problem $G=(V,E)$ & k. Let us ~~dfind~~ define $U = E$, S_v = {collection of all edges incident on v}.

$S = \{S_v : v \in V\}$ & $k = k$. It is easy to see that $\exists$ a set of ~~vertex~~ cover problem of size $\leq k \Leftrightarrow \exists$ a vertex cover of size $\leq k$

Therefore, a valid polynomial time reductn

If this is true, we can solve vertex cover problem in polynomial time. which is contradiction. Hense, min. cardinality problem is N.P. complete.

Let us assume there are 3 combinations of 3 subsets given as

$(x_1 \vee x_2 \vee_3) \wedge (x_1 \vee \bar{x}_2 \vee x_3) \wedge (\bar{x}_1 \vee \bar{x}_2 \vee x_3)$