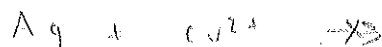
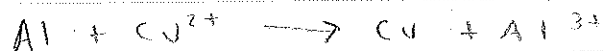


(1) poll



(2) poll

The electrons are lower in energy in

the silver metal - in experiment, Ag keeps its electrons

(3) poll (same question)

(4) poll

The electrons are lower in energy

the copper metal

(5) poll



The electrons are moving from where to where?

Is this rxn balanced?

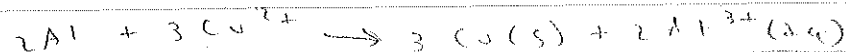
copper  $\rightarrow$  silver

no - it is not charge balanced.

(6) poll

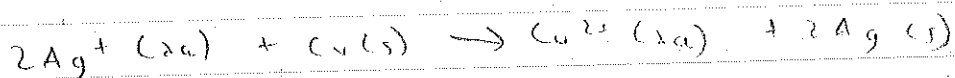
(7) poll:

when will these rxn stop?



- when the systems come to equilibrium.

what is the equilibrium constant?

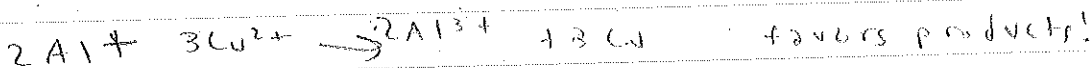


$$K = \frac{[\text{Cu}^{2+}]}{[\text{Ag}^+]^2}$$



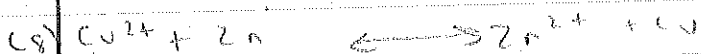
$$K = \frac{[\text{Al}^{3+}]^2}{[\text{Cu}^{2+}]^3}$$

ratio of conc of ions  $\rightarrow$  use electrochem to measure [ ]'s.



$$\Delta G = -RT \ln K$$

oxidation - loss of electrons

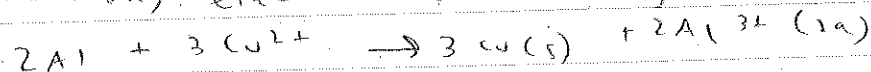


A) left

B) right

- Cu metal is more stable than Zn metal so  $e^-$  move to more stable place

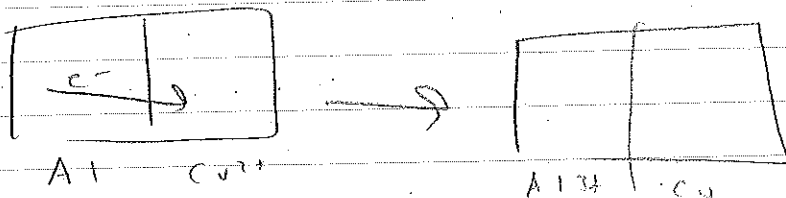
c9) How many electrons are moving in this rxn!



$$\boxed{6}$$

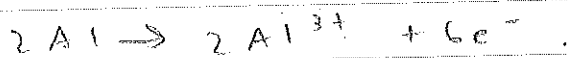
c10) same question

Free energy of  $2Al + 3Cu^{2+} \rightarrow 3Cu + 2Al^{3+}$   
 ↓ oxidized      ↓ reduced



oxidation - loses elec  
 $2Al \rightarrow 2Al^{3+} + 6e^{-}$

reduction - atom gains elec  
 $3(2e^{-} + Cu^{2+} \rightarrow Cu)$



oxidizing agent  $\rightarrow$  undergoes reduction  
 reducing agent  $\rightarrow$  undergoes oxidation

(ii) what is oxidizing agent?

