CHEMISTRY DAILY PLAN

Class: **Date:**

Subject: ***Ion Concentrations*** **Time:**

Soluble salts, acids and bases separate into ions in a solution.

$CaCl_2 \rightarrow Ca^{+2} + 2Cl^-$ The molarity of ions can be different from its compound.
1M 1M 2M

$$M_{ions} = \frac{N_{ion}}{V_{ion}}$$

Problems in Class

1. What are the molarities of the ions Ca^{+2} and NO_3^- produced by the dissociation of 0.2 M of $Ca(NO_3)_2$?

2. If the concentration of SO_4^{-2} ions in a solution of $Al_2(SO_4)_3$ is 0.6 M, find the concentration of Al^{+3}?

3. 0.4 mol of NaCl crystals is added and dissolved in 400 ml 0.3 M NaCl solution. What are the concentration of NaCl, Na^+ and Cl^- after addition?

   Firstly total mol # of NaCl
   n = M x V= 0.3 x 0.4 = 0.12 mol
   n_{total} = 0.4 + 0.12 = 0.52 mol NaCl
   M_{final} = n/V = 0.52/0.4 = 1.3 M

   Dissociation reaction is:

   $NaCl \rightarrow Na^+ + Cl^{-3}$
   1.3 M 1.3 M 1.3 m

4. What will be the concentration of Cl^- ion, if 300 ml of 2 M KCl and 900 ml of 0.5 M $MgCl_2$ solutions are mixed?

   Mol numbers of KCl and $MgCl_2$
   n_{KCl} = M x V= 2 x 0.3 = 0.6 mol
   n_{MgCl2} = 0.5 + 0.9 = 0.45 mol
   V_{final} =0.3 + 0.9 = 1.2 L

   Dissociation reactions are:
   $KCl \rightarrow K^+ + Cl^-$
   0.6 mol 0.6 mol 0.6 mol
   $MgCl_2 \rightarrow Mg^{+2} + 2Cl^-$
   0.45 mol 0.45 mol 0.9 mol
   $M_{Cl}=n_{Cl}/V$ =0.15/1.2=1.25M

5. 500 ml of 0.4 M Ca(NO3)2 solution is mixed with a 500 ml solution of $Al(NO_3)_3$. The concentration of NO_3^- will be 0.7 M in the final solution. What is the initial concentration of $Al(NO_3)_3$?

   mol # of $Ca(NO_3)_2$ is:
   n = M x V=0.4 x 0.5 = 0.2 mol
   If M of $Al(NO_3)_3$ is a M.
   n = M x V= a x 0.5 = 0.5a mol
   Dissociation reactions are:
   $Ca(NO_3)_2 \rightarrow Ca^{+2} + 2NO_3^-$
   0.2 mol 0.2 mol 0.4 mol
   $Al(NO_3)_3 \rightarrow Al^{+3} + 3NO_3^-$
   0.5a mol 0.5a mol 1.5a mol

   Volume after mixed is 1 L.
   Mol number of NO_3^- ion is:
   n_{NO3} = (0.4 + 1.5a) mol
   Molarity of NO_3^- ion is
   $M_{NO3}=n_{NO3}$ / V=(0.4+1.5a)/1
   0.7 = 0.4 + 1.5a
   1.5a =0.3
   a = 0.2 M