Ppt/Molarity, Stoichiometry and Dilution Ch 4 Sec 1-8 wksht

1. Which of the following solutions contains the largest number of moles of chloride ions:

a. 100.0 mL of 0.30M $AlCl_3$
b. 50.0 mL of 0.60M $MgCl_2$
c. 200.0 mL of 0.40M NaCl

$100.0mL \times \frac{1L}{1000mL} \times \frac{.30mol}{1L} \times \frac{3\ ions\ Cl^-}{1\ mol} = .090\ mol\ Cl^-$

$50.0mL \times \frac{1L}{1000mL} \times \frac{.60mol}{1L} \times \frac{2\ ion\ Cl^-}{1\ mol} = .060\ mol\ Cl^-$

$200.0mL \times \frac{1L}{1000mL} \times \frac{.40mol}{1L} \times \frac{1\ ion\ Cl}{1\ mol} = .080\ mol\ Cl$

2. A 100.0 mL portion of 0.200M potassium hydroxide is mixed with 100.0 mL of 0.200M magnesium nitrate.

a. Write a balanced equation for any reaction that occurs.

$2KOH_{(aq)} + Mg(NO_3)_{2(aq)} \rightarrow Mg(OH)_{2(s)} + 2KNO_{3(aq)}$

HAVE .02mol .02mol
NEED .04 .01 .01mol XS

b. What precipitates forms? $Mg(OH)_2$

c. What mass of ppt is produced?

$100.0mL \times \frac{1L}{1000mL} \times \frac{.200mol\ KOH}{1L} \times \frac{1\ mol\ Mg(OH)_2}{2\ mol\ KOH} \times \frac{58.33\ g}{1\ mol} = .583g$

d. Calculate the concentration of each ion remaining in solution after precipitation is complete.

	$2K^+$	$2OH^-$	Mg^{2+}	$2NO_3^-$	$\rightarrow$	$Mg(OH)_2$	$2K^+$	NO_3^-
have	.020	.020	.020	.040				
need	.040	.040	.010	.020				
used	0	.020	.010	0 mol				
left	.020mol	0mol	.010mol	.040 mol				
	.200L		.200L	.200L				

$[K^+] = .10M$ $[Mg^{2+}] = .050M$

$[OH^-] = 0$ $[NO_3^-] = 2.0M$

3. A 230. mL sample of a 0.275 M $CaCl_2$ solution is left on a hotplate overnight; the following morning the solution is 1.10 M. What volume of water evaporated from the 0.275 M $CaCl_2$ solution?

$.230L \times 0.275M = 1.10M \times V_2$

$V = .0575L = 57.5mL$

$230.mL - 57.5mL$

17.3 mL evaporated.

4. Rust stains can be removed by washing the surface witha dilute solution of oxalci acid, ($H_2C_2O_4$). The reaction is:

$$Fe_2O_{3(s)} + 6H_2C_2O_{4(aq)} \rightarrow 2Fe(C_2O_4)_3^{3-}{}_{(aq)} + 3H_2O_{(l)} + 6H^+_{(aq)}$$

? g 1.0L of 0.14M

a. Is this an oxidation-reduction reaction?

b. What mass of rust can be removed by 1.0L of a 0.14M solution of oxalic acid?

$1.0L \times \frac{0.14mol}{L} \times \frac{1\ mol\ Fe_2O_3}{6\ mol\ H_2C_2O_4} \times \frac{159.7\ g\ Fe_2O_3}{1\ mol\ Fe_2O_3} = 3.7263$

3.7 g Fe_2O_3