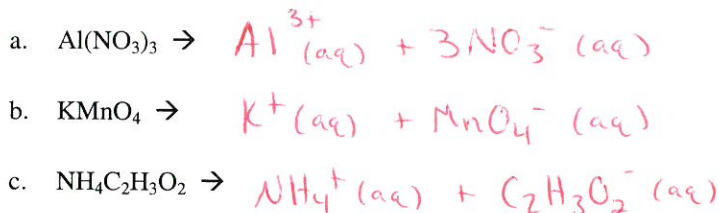


AP Chemistry - Chapter 4 Practice Quiz

Electrolytes

1) Show how each of the following strong electrolytes breaks up into its component ions when dissolved in water:



Molarity

1) A 5.623-g sample of NaHCO_3 is dissolved in enough water to make 250.0 mL of solution. What is the concentration of this solution?

$$\frac{5.623 \text{ g}}{84 \text{ g NaHCO}_3} \cdot 1 \text{ mol NaHCO}_3 = .06694 \text{ mol} \rightarrow \frac{.06694 \text{ mol}}{.250 \text{ L}} = \boxed{0.2678 \text{ M NaHCO}_3}$$

2) Calculate the concentration of all ions present in the following solution: 1.00 g of K_3PO_4 in 250.0 mL of solution.

$$\frac{1.00 \text{ g K}_3\text{PO}_4}{212.3 \text{ g}} \cdot 1 \text{ mol K}_3\text{PO}_4 \cdot \frac{3 \text{ mol K}^+}{1 \text{ mol K}_3\text{PO}_4} \cdot .250 \text{ L soln} = \boxed{.0565 \text{ M K}^+}$$

$$\frac{1.00 \text{ g K}_3\text{PO}_4}{212.3 \text{ g}} \cdot 1 \text{ mol K}_3\text{PO}_4 \cdot \frac{1 \text{ mol PO}_4^{3-}}{1 \text{ mol K}_3\text{PO}_4} \cdot .250 \text{ L soln} = \boxed{.0188 \text{ M PO}_4^{3-}}$$

3) Describe how you would prepare each of the following:

a. 500 mL of 0.250 M NaOH from solid NaOH

$$\frac{.5 \text{ L}}{.250 \text{ L}} \cdot \frac{.250 \text{ mol NaOH}}{1 \text{ mol NaOH}} \cdot \frac{40 \text{ g NaOH}}{1 \text{ mol NaOH}} = \boxed{5 \text{ g NaOH in } 500 \text{ mL vol. flask \& fill to mark w/ H}_2\text{O.}}$$

b. 1.00 L of a 0.50 M solution of H_2SO_4 from concentrated 18 M sulfuric acid

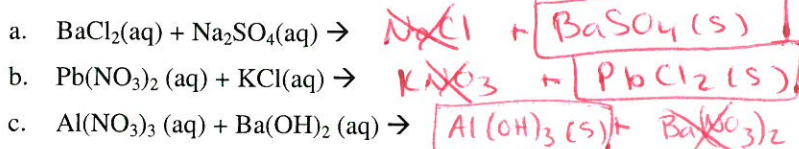
$$(1.00 \text{ L})(.50 \text{ M}) = X(18 \text{ M})$$

$$X = .0278 \text{ L}$$

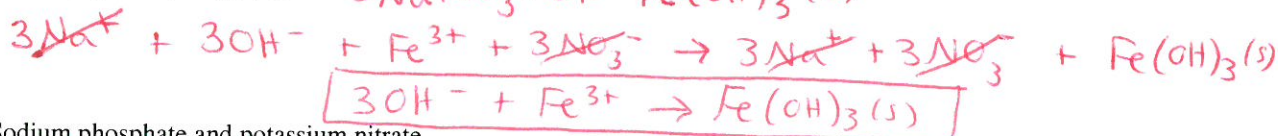
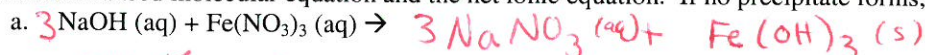
$\boxed{\text{Put } 27.8 \text{ mL of } 18 \text{ M H}_2\text{SO}_4 \text{ in a } 1.00 \text{ L vol. flask \& fill to mark w/ H}_2\text{O.}}$

Precipitation Reactions

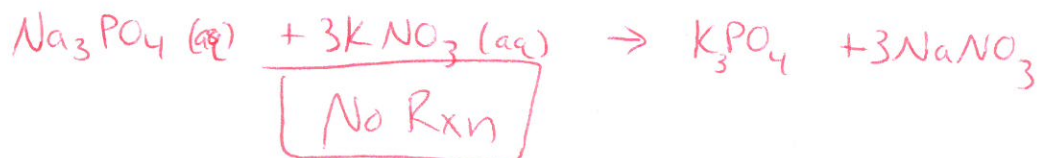
1) When the following solutions are mixed together, what precipitate (if any) will form?

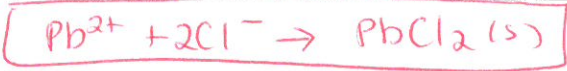


2) Write the balanced molecular equation and the net ionic equation. If no precipitate forms, write "no reaction".



b. Sodium phosphate and potassium nitrate



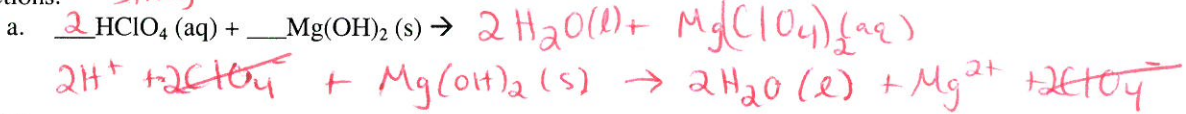


c. Lead (II) nitrate and sodium chloride

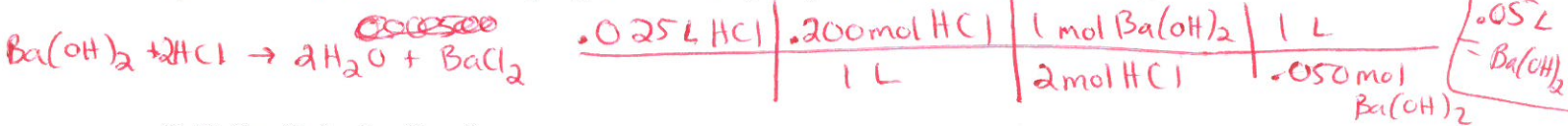


Acid-Base Reactions

1) Write the balanced molecular, complete ionic, and net ionic equations for each of the following acid-base reactions.



2) What volume of 0.0500 M Ba(OH)₂ will react completely with 25.00 mL of 0.200 M HCl?



Oxidation-Reduction Reactions

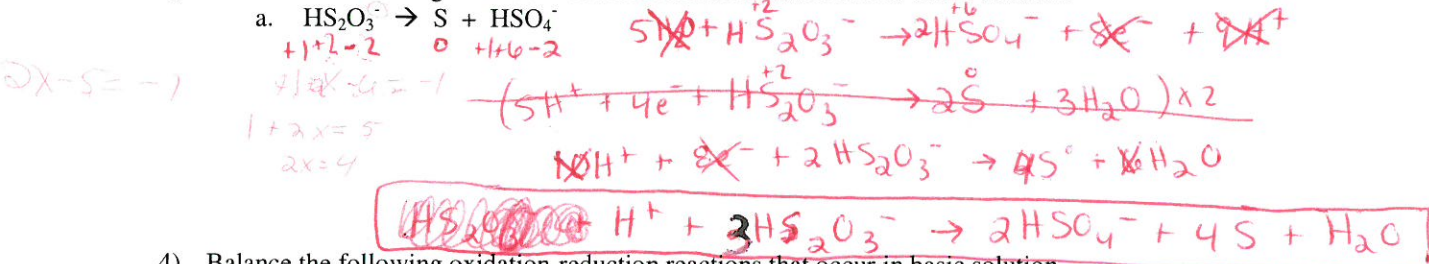
1) Assign oxidation states for all atoms in each of the following compounds:

- a. KMnO₄ +1 +7 -2
- b. NiO₂ +4 -2
- c. Fe₃O₄ +8/3 -2
- d. As₂O₃ +3 -2
- e. Ca(NO₃)₂ +2 +5 -2
- f. NO₂¹⁻ +3 -2

2) Specify which of the following are oxidation-reduction reactions, and identify the oxidizing agent, the reducing agent, the substance being oxidized, and the substance being reduced.

- a. $Zn(s) + 2HCl(aq) \rightarrow ZnCl_2(aq) + H_2(g)$
 R - H OA - HCl
 O - Zn RA - Zn
- b. $Cr_2O_7^{2-}(aq) + 2OH^{-}(aq) \rightarrow 2CrO_4^{2-}(aq) + H_2O(l)$
 No Redox
- c. $CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(g)$
 R - C OA - O₂
 O - C RA - CH₄

3) Balance the following oxidation-reduction reaction that occurs in acidic solution.



4) Balance the following oxidation-reduction reactions that occur in basic solution.

