Acid Base Equilibrium Review Worksheet

1. State whether the following combinations will make a buffer?
   b. HCOOH and HCOONa b. HOBr and $LiBrO_2$
   c. HOCl and NaOCl d. $LiCH_3COO$ and CH_3COOH

2. State whether the following salts are acidic, basic or neutral?
   a. KIO_3 b. $Ba(NO_2)_2$ c. $CoBr_2$ d. $(C_4H_9)_2NH_2Cl$ e. Na_2SO_3

3. HCOOH is a weak acid with a Ka =1.8 * 10^{-4}. It is titrated with a 0.100M KOH solution?
   a. What is the pH of 4.00L of a 0.200M solution?
   b. What is the pH when 1.00 L of KOH is added to the weak acid solution?
   c. What is the pH when 4.00 L of KOH is added to the weak acid solution?
   d. What is the pH when 8.00L of KOH is added to the weak acid solution?
   e. What indicator would be used for this titration?

4. 100.0 mL of a 4.00M $NaNO_2$ solution is titrated with a 2.00M HCl solution. If the Ka of HNO_2 is 1.7 * 10^{-4} what is the pH
   a. Before titration begins?
   b. When 80.0 mL of the HCl is added?
   c. $\frac{1}{2}$ way to the equivalence point?
   d. When the equivalence point is reached?
   e. When 300.0mL of the HCl is added?
   f. Which indicator would be used for this titration?

5. 300.0mL of a 1.00M $NaNO_2$ is mixed with 200.0mL of a 1.00 M HNO_2.
   a. What is the pH of the solution if the Ka of HNO_2 = 1.7 * 10^{-4}?
   b. What is the pH if 200.0mL of a 1.00M HNO_3 is added to the solution?
   c. What is the pH if 100.0 mL of a 1.00M KOH is added to the solution?
   d. What is the pH if 50.0mL of a 1.00M HI is added to 250.0 mL of the buffer solution?
   e. How many mL of a 2.00M LiOH would need to be added to destroy the orig. buffer?

6. A certain weak base, A^{1-}, has a K_b of 1 x 10^{-4}. A buffer prepared by mixing equal amounts of $A^{1-}$and HA has a pH of ___?

7. A certain weak acid HX has a K_a = 1 x 10^{-10}. A buffer is prepared with $[H^{1+}]$ = 1 x 10^{-10} M. How many mL of 2.0 M HX would have to be added to 200. mL of 1.0 M KX to make the buffer?

1a) yes b) no c) yes d) yes 2a) basic b) basic c) acidic d) acidic e) basic 3a)2.222 b) 2.890 c) 3.745 d) 8.28 e) phenolphthalein 4a) 9.186 b) 3.946 c) 3.770 d) 1.823 e) .301 f) methyl red 5a) 3.946 b) 3.167 c) 4.372 d) 3.593 e) .100L LiOH 6) 10 7) 100.0mL