CHEMISTRY 12 – HYDROLYSIS & TITRATIONS EXTRA PRACTICE

1) What is the net ionic equation for the hydrolysis of NH_4ClO_4? **(1 mark)**

2) What is the equilibrium constant expression for the predominant reaction between the hydrogen oxalate ion, $HC_2O_4^-$, and water? **(1 mark)**

3) Which of the following is true as a result of the predominant hydrolysis of $NaHCO_3$? **(1 mark)**

	Solution	Reason
A.	basic	$K_a > K_b$
B.	basic	$K_b > K_a$
C.	acidic	$K_a > K_b$
D.	acidic	$K_b > K_a$

4) Which of the following represents a basic salt solution? **(1 mark)**

NH_3 NH_4I KNO_3 Na_2CO_3

5) A chemist prepares a solution by dissolving the salt $NaIO_3$ in water.

   a) Write the equation for the dissociation reaction that occurs. **(1 mark)**

   b) Write the equation for the hydrolysis reaction that occurs. **(1 mark)**

   c) Calculate the value of the equilibrium constant for the hydrolysis in part b). **(1 mark)**

6) Calculate the pH of 0.50 M NaF. **(5 marks)**

7) Calculate the initial concentration of an NH_4Cl salt solution that has a pH = 4.80. Begin by writing the equation for the predominant equilibrium reaction. **(5 marks)**

8) Consider the following reaction:

$$2\ HCl_{(aq)} + Ba(OH)_{2\,(s)} \rightarrow BaCl_{2\,(aq)} + 2\ H_2O_{(l)}$$

When 3.16 g samples of $Ba(OH)_2$ were titrated to the equivalence point with an HCl solution, the following data were recorded:

	Volume of HCl added
Trial 1	37.80 mL
Trial 2	35.49 mL
Trial 3	35.51 mL

Using the data, calculate the original [HCl]. **(4 marks)**

9) A 25.0 mL sample of the weak acid H_2S is titrated with 38.2 mL of 0.20 M KOH (a strong base). What is the concentration of the acid? **(3 marks)**

10) What mass of $NaOH_{(s)}$ is required to just neutralize 50.0 mL of 2.0 M H_2SO_4? Begin by writing the balanced equation for the neutralization reaction. **(3 marks)**

Solutions:

1) $NH_4^{+}{}_{(aq)} + H_2O_{(l)} \rightleftarrows NH_{3\,(aq)} + H_3O^{+}{}_{(aq)}$

2) $$K_a = \frac{[C_2O_4^{2-}][H_3O^+]}{[HC_2O_4^-]}$$

3) *B*

4) Na_2CO_3

5) *a)* $NaIO_{3\,(s)} \rightarrow Na^{+}{}_{(aq)} + IO_3^{-}{}_{(aq)}$

b) $IO_3^{-}{}_{(aq)} + H_2O_{(l)} \rightleftarrows HIO_{3\,(aq)} + OH^{-}{}_{(aq)}$

c) $K_b = 5.9 \times 10^{-14}$

6) *8.58*

7) *0.45 M*

8) *1.04 M*

9) *0.15 M*

10) *8.0 g*