

Unit 8 – Chapter 14: Acids & Bases

Name _____

Assignment #1: Strong to Weak Acid/Bases, pH Calculations, % Dissociations **Period** _____

- 1) Use Table 14.2 to order the following from the strongest to the weakest base:
 ClO_2^- , H_2O , NH_3 , ClO_4^-

- 2) At 40°C the value of K_w is 2.92×10^{-14} .
 - a. Calculate the $[\text{H}^+]$ and $[\text{OH}^-]$ in pure water at 40°C .
 - b. What is the pH of pure water at 40°C ?
 - c. If the hydroxide ion concentration in a solution is 0.10 M , what is the pH at 40°C ?

- 3) The pOH of a sample of baking soda dissolved in water is 5.74 at 25°C . Calculate the pH, $[\text{H}^+]$, and $[\text{OH}^-]$ for this sample. Is the solution acidic or basic?

- 4) A solution is prepared by mixing 90.0 mL of 5.00 M HCl and 30.0 mL of 8.00 M HNO_3 . Water is then added until the final volume is 1.00 L. Calculate $[\text{H}^+]$, $[\text{OH}^-]$, and the pH for this solution.

- 5) For propanoic acid ($\text{HC}_3\text{H}_5\text{O}_2$, $K_a = 1.3 \times 10^{-5}$), determine
 - a. the concentration of all species present
 - b. the pH
 - c. the percent dissociation of a 0.100 M solution.

- 6) A typical aspirin tablet contains 325 mg of acetylsalicylic acid, $\text{HC}_9\text{H}_7\text{O}_4$. Calculate the pH of a solution that is prepared by dissolving two aspirin tablets in one cup (237 mL) of solution. Assume the aspirin tablets are pure acetylsalicylic acid, $K_a = 3.3 \times 10^{-4}$.
- 7) Using the K_a values in Table 14.2, calculate the percent dissociation in a 0.20 M solution of each of the following acids.
- Nitric acid (HNO_3)
 - Nitrous acid (HNO_2)
 - phenol ($\text{HC}_6\text{H}_5\text{O}$)