

Unit 9 – Chapter 15: Acid-Base Equilibrium & Buffers

Name _____

Assignment #4: Buffer Problems With Henderson-Hasselbalch

Period _____

Do the following problems using the Henderson-Hasselbalch equation.

- 1) A buffered solution is made by adding 50.0 grams NH_4Cl to 1.00 L of a 0.75 M solution of NH_3 . Calculate the pH of the final solution.

- 2) Calculate the pH after 0.15 moles solid NaOH is added to 1.00 liters of each of the following buffered solutions.
 - a. 0.050 M propanoic acid ($\text{HC}_3\text{H}_5\text{O}_2$, $K_a = 1.3 \times 10^{-5}$) and 0.080 M sodium propanoate ($\text{C}_3\text{H}_5\text{NaO}_2$)
 - b. 0.50 M propanoic acid and 0.80 M sodium propanoate.
 - c. Is the solution in part a still a buffered solution after the NaOH has been added? Explain.

- 3) A buffer solution contains 0.10 moles of acetic acid ($\text{HC}_2\text{H}_3\text{O}_2$) and 0.13 moles of sodium acetate ($\text{NaC}_2\text{H}_3\text{O}_2$) in 1.00 liters.
 - a. What is the pH of this buffer?
 - b. What is the pH of the buffer after the addition of 0.02 moles of KOH?
 - c. What is the pH of the buffer after the addition of 0.02 moles HNO_3 ?

- 4) A buffer solution contains 0.12 moles of propanoic acid ($\text{HC}_3\text{H}_5\text{O}_2$, $K_a = 1.3 \times 10^{-5}$) and 0.10 moles of sodium propanoate ($\text{NaC}_3\text{H}_5\text{O}_2$) in 1.50 liters.
 - a. What is the pH of this buffer?
 - b. What is the pH of the buffer after the addition of 0.01 moles of NaOH?
 - c. What is the pH of the buffer after the addition of 0.01 moles of HI?