

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

Name _____

Assignment #2: Buffer Problems

Period _____

- 1) Calculate the pH after 0.020 mol NaOH is added to 1.00 L of each of the solutions below.
 - a. 0.100 M HONH_2 ($K_b = 1.1 \times 10^{-8}$)
 - b. 0.100 M HONH_3Cl
 - c. pure H_2O
 - d. a mixture containing 0.100 M HONH_2 and 0.100 M HONH_3Cl

- 2) Calculate the pH of a buffer solution prepared by dissolving 21.46 g of benzoic acid ($\text{HC}_7\text{H}_5\text{O}_2$) and 37.68 g of sodium benzoate in 200.0 mL of solution.

- 3) A buffered solution is made by adding 50.0 g NH_4Cl to 1.00 L of a 0.75 M solution of NH_3 . Calculate the pH of the final solution. (Assume no volume change.)

- 4) Calculate the pH after 0.01 mol gaseous HCl is added to 250.0 mL of each of the following buffered solutions.
 - a. 0.050 M NH_3 /0.15 M NH_4Cl
 - b. 0.50 M NH_3 /1.50 M NH_4ClDo the two original buffered solutions differ in their pH or their capacity? What advantage is there in having a buffer with a greater capacity?

- 5) An aqueous solution contains dissolved $\text{C}_6\text{H}_5\text{NH}_3\text{Cl}$ and $\text{C}_6\text{H}_5\text{NH}_2$. The concentration of $\text{C}_6\text{H}_5\text{NH}_2$ is 0.50 M and the pH is 4.20.
 - a. Calculate the concentration of $\text{C}_6\text{H}_5\text{NH}_3^+$ in this buffer solution.
 - b. Calculate the pH after 4.0 g of $\text{NaOH}_{(s)}$ is added to 1.0 L of this solution. (Neglect any volume change).