**Salt Lake Community College, Chemistry Department**

**Chem 1110 Workshop 12**

**Topic: Acids and Bases Part II**

***Objective:***

* **Buffer Solutions**
* **To be able to make calculations of titrations and concentration of acids**
* **Acidity and Basicity of Salt Solutions**

**Buffer:** A combination of substances that act together to prevent a drastic change in pH; usually a weak acid and its conjugate base

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**Acid- Base Titration:**

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**Acidity and Basicity of Salt Solutions:**

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**Practice Problems:**

1. Find [H3O+] and the pH in a solution prepared by dissolving 0.900 g of Ca(OH)2 in water and diluting the solution to a final volume of 800 mL.

**Ca(OH)2** 🡪 **Ca2+ + 2 OH-**

Step 1: mass🡪 moles (/ MM)

0.900 g x 1 mol/ 74 g = 0.0122 mol Ca(OH)2

Step 2: moles/ V (L) = M

0.0122 mol Ca(OH)2 / 0.800 L = 0.0153 M

 [OH-] = 2 (0.0153) = 0.0306 M

Step 3: pOH= - log [OH-]

 = - log (0.0306) = 1.5

pH + pOH = 14 = 12.5

**[H+] = 10-pH = 3.2 x 10-13 M**

2. What is the pH of a solution prepared by dissolving 150.0 g KOH in enough water to make 7.867 L solution? KOH 🡪 K+  + OH-

150.0 g KOH x 1 mole/ 56.08 g = 2.67 mole KOH , 2.67 mol [OH-]

M= moles of solute/ Liters of solution = 2.67 mol/ 7.867 L= 0.339 M[OH-]

pOH = - log [OH-] = 0.47

pH + pOH = 14

**pH = 13.5**

3. What volume of 0.100 M NaOH (aq) is needed to titrate 200.0 mL of 0.200 M H2SO4 (aq) to the neutralization point?

**2 NaOH + H2SO4 🡪 Na2SO4 + 2 H2O**

M= moles of solute/ Liters of solution

0.200 = moles/ 0.200 L = 0.04 moles H2SO4

0.04 moles H2SO4 x 2 mol NaOH/ 1 mol H2SO4 = 0.08 mol NaOH

M= moles of solute/ Liters of solution

**V= mole/ M = 0.08 mol/ 0.100 = 0.800 L NaOH or 800 mL**

4. Calculate the pH of a buffer solution containing 0.015 M HClO and 0.025 M ClO-.

The Ka for HClO is 3.0x10-8.

pH= pKa + log [ClO-]/ [HClO] **🡪 7.74**

5. For a solution of the weak acid HC2H3O2(aq), state whether the H3O+(aq) concentration will increase, decrease, or stay the same if: (There is no volume change in questions a, b, and c.)

(a) we add some NaC2H3O2 (sodium acetate) \_**decrease**\_\_\_\_\_ .

(b) we add some HCl \_**increase**\_\_\_\_\_\_.

(c) we add some NaCl \_\_**stay the same**\_\_\_\_.