Buffers and Titrations

1. What is the maximum and minimum pH that can be buffered by each of the following buffers?

Chloroacetic acid – chloroacetate

carbonic acid - bicarbonate

2. For each of the following, determine which form of the buffer (HA or A^-) will be present at higher concentration.

Buffer pKa = 5.75 Solution pH = 4.5

Buffer pKa = 3.75 Solution pH = 4.5

3. Calculate the pH of a 500 mL solution that is:

0.15 M CH_3CO_2H and 0.25 M $CH_3CO_2^-$.

1.6 M fluoride and 1.1 M hydrofluoric acid

4. Calculate the [weak acid] and [weak base] in a solution of hypochlorite and hypochlorous acid buffered at pH 7.0 The total buffer concentration is 50 mM.

Hint: You have two variable and 2 equations – total concentration and Henderson-Hasselbach. Use both and make a substitution.

5. What mass of sodium acetate needs to be added to 500 mL of 1.00 M acetic acid to create a buffer at pH 5.3?

6. Calculate the resulting pH when 10 mL of 0.5 M NaOH is added to a 1.8 L solution of 50 mM hypochlorite buffered at a pH of 7.0

Hint: Note the volume changes in this reaction. Be very careful with moles, volume, and Molarity.