POST-LAB ACID-BASE EQUILIBRIUM

1. Define equivalence point.
2. Consider the following titration of a weak acid with a strong base, which is what was done in the experiment you just completed. Suppose we titrated 100.0 mL of 0.100 M acetic acid (CH₃COOH) with 0.100 M NaOH.

ANSWER THE FOLLOWING SHOWING YOUR CALCULATIONS:

a) What would be the pH of the acetic acid before any base is added? (Ka = 1.8 x 10⁻⁵)
b) What would be the pH after 20.0 mL of NaOH has been added?
c) What would be the pH after 40.0 mL of NaOH has been added?
d) What would be the pH after 50.0 mL of NaOH has been added?
e) What would be the pH after 60.0 mL of NaOH has been added?
f) What would be the pH after 99.0 mL of NaOH has been added?
g) What would be the pH after 100.0 mL of NaOH has been added?
h) What would be the pH after 101.0 mL of NaOH has been added?
i) What would be the pH after 110.0 mL of NaOH has been added?

3. Using the values for pH that you calculated in #2, make a plot of pH vs. mL of NaOH added.

4. Looking at your graph, where would you determine the pH of the equivalence point to be?

5. At what pH would the acetic acid have the best buffering capacity?
6. What is the role an indicator plays in titration?
7. What type of chemical are indicators?
8. In a titration, an indicator must be chosen using what criteria?
9. What is the difference between the equivalence point and the end point?