A Titration Lab

Purpose: 1. To explore the relationship between end point pH and types of acids and bases.
            2. To learn to calculate concentration based on titration.

Materials: 4 beakers, buret, stirrer and bar, ring stand, clamp, lab pro with pH probe, phenolophthalein, funnel 100 ml graduated cylinder.

Procedure.   Do two titrations.   The first will be HCl with .1 M sodium hydroxide
                                          The second will be acetic acid with .1 M sodium hydroxide

Things to consider

BURET
Put sodium hydroxide in the buret.
Fill above the top line of the buret (it is zero) and run the liquid down to the zero line into a waste beaker.   Use a funnel. AVOID AIR BUBBLES.

BEAKER
Put 20.0 ml of acid into a beaker with 80.0 ml of distilled water.
Use the stirrer and set up the pH probe so that it is in the soln. without hitting the sir bar.
Put 4 - 5 drops of phenolphthalein in the beaker.

pH PROBE

Don't let the probe sit out in the air. When not in use it should be placed in a beaker of water. You may use tap water.

TITRATION
Titrate volume against pH. You will need to use the pH system experiment out of the "Probes and Sensors" folder. **Add NaOH in .5 ml increments until the pH starts to dramatically change. When the pH starts to change dramatically, add the NaOH a couple of drops at a time.**

pH Lab Conclusion Questions
SHORT ANSWER QUESTIONS-- answer in Lab book
1. Circle the approximate end point(s) on your graphs.
2. Describe the primary differences between the two graphs.
3. Why is the curve on the acetic acid graph higher on the pH scale than that of HCl?
4. Why would phenolphthalein not be an appropriate indicator to determine the end point of a titration of ammonia with HCl?

CALCULATIONS--show all work in Lab book
5. What was the concentration of HCl?
6. What was the concentration of HOAc.
7. What was the pH of the HCl?
8. If the Ka of the acetic acid is 1.8×10^{-5}, what was the pH of the acetic acid solution?
9. How many regions of steep slope would you expect to see if carbonic acid was used? Why?