AP Chemistry Lab
Titration Labs

Pre-Lab Questions

1) What is meant by the term standardization?
2) What is a primary standard?
3) KHP is an abbreviation for the compound potassium hydrogen phthalate, it is not the molecular formula for the compound. What is its formula and molar mass?
4) What is meant by the term "*accurately* weigh out *approximately* 4 g of NaOH"?
5) Write the net ionic equation for the reaction between NaOH and KHP.
6) Write the net ionic equation for the reaction between NaOH and acetic.
7) What do all the stoichiometries have in common in this lab?

Procedure
Prepare your lab book for this experiment. Follow the detailed procedures shown in the lecture.

Prepare the Titrant
1) Clean a 1-L bottle and label it with your name and approximately 0.1M NaOH.
2) Accurately weigh out approximately 4g of NaOH pellets. Dissolve this in distilled water in the bottle you just prepared. Mix this thoroughly and shake every time you pour from it.

Standardize the Titrant
1) Weigh out approximately 0.6-0.8 g (accurate to 0.0001g) of KHP. Place this in an Erlenmeyer flask, along with 100 mL of distilled water, and two drops of phenolphthalein.
2) Prepare a buret with the NaOH as outlined in lecture.
3) Place the flask on a stir plate and begin to titrate to equivalence with the NaOH.
4) Repeat two more times or until three satisfactory trials are performed.

Determine the Percentage of Acetic Acid in Vinegar
1) Accurately measure out 5.0 mL of vinegar into an Erlenmeyer flask and mass it so you have more significant digits.
2) Add 100 mL of distilled water and two drops of phenolphthalein.
3) Prepare a buret with the NaOH as outlined in lecture.
4) Place the flask on a stir plate and begin to titrate to equivalence with the NaOH.
5) Repeat two more times or until three satisfactory trials are performed.

Sample Data Table

	Sample 1	Sample 2	Sample 3
Mass of KHP Used			
Initial Buret Reading			
Final Buret Reading			
Volume of NaOH used			
Moles KHP Present			
Molarity of NaOH			
Average Molarity of NaOH			

Post Lab Questions
These questions can be answered in the data tables.

1) Calculate the concentration of the standardized NaOH solution. Report this as an average.

2) Calculate the *percentage* of acetic acid in the vinegar used in this lab. Report this as an average.

These questions should be answered as essays at the end of the lab.

Imagine the following procedural errors were made. Explain what effect, if any, they would have on the outcome of the lab.

3) After rinsing the buret with distilled water, the buret is filled with the standard NaOH solution; the KHP is titrated to its equivalence point.

4) Extra water is added to the 0.6-gram sample of KHP.

5) An indicator that changes color at pH 5 is used to signal the equivalence point of the vinegar titration.

6) An air bubble passes unnoticed through the tip of the buret during the titration

Create a table to numerically show how the following would affect the concentration of the vinegar determined in the experiment. Make sure you show the correct calculation in one column and the incorrect one in another column.

7) The student thought the formula of KHP contained one potassium, one hydrogen, and one phosphorus atom.

8) The student recorded a value of 0.6001 g of KHP used but it was actually 0.6100 g.