Chem 20 Neutralization Titration QUICK LAB

Background Information:
- Discuss the theory of titration. How and why do they work? Use a diagram in your explanation.

- What type of chemistry is based on titrations, and detail at least 3 jobs that have to deal with this branch of chemistry (and how they are related)

Problem:
- Objective 1: to titrate an acetic acid solution with standardized 0.5M NaOH
- Objective 2: to utilize the titration results to calculate the molarity of acetic acid, as well as analyze percent composition

Diagram:
- Draw the set up for a titration labeling all parts including acids and bases

Variables:

Controlled (5)	Manipulated (1)	Responding (3)

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Materials and Procedure:

- <u>Part 1 – Determining the percent composition of vinegar</u>
1. Obtain approximately 50mL of white vinegar and about 100mL standardized NaOH. Record the exact molarity of NaOH.
2. Using a suction bulb, pipet 10.0mL of vinegar solution into a 250mL Erlenmeyer flask
3. Add 3 drops of phelnophthalein
4. Rinse the clean buret with approximately 15mL of NaOH solution and drain into a waste beaker. (as shown by the teacher)
5. Fill the buret with NaOH and note the initial volume of NaOH.
6. Gradually dispense some of the standardized NaOH solution into the flask, swirling constantly. Continue adding NaOH solution, watching the contents of the flask for color change.
7. As the equivalence point approaches, a pinkish color is evident, which initially disappears with swirling. At this point, add NaOH drop by drop rinsing the flask each time and swirling. Stop the titration and take the reading on the buret when the solution remains pale pink for approximately 30seconds. (try to find the faintest pink possible)
8. Repeat steps 2-7 at least 2 more times. If the values differ widely, it would be a good idea to do one more titration. You must obtain 3 titrations within 0.2mL of each other.

Experimental Results:

Table 1:

Molarity of NaOH = 0.50M	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
Initial Buret Reading (mL)					
Final Buret Reading (mL)					
Volume of NaOH used (vf-vi)					
Average volume of NaOH (mL)					

Calculations

1. Write out the balanced formula equation for the titration reaction of acetic acid with NaOH

2. Calculate the molarity of CH3COOH

3. Calculate the mass of acetic acid in 1.00L of solution

4. Calculate the percentage of acetic acid in vinegar (g/mL x 100%)

5. While doing a titration, it is permissible to use a wash bottle to wash down any materials that may have splashed higher up the flask. This would appear to increase the volume of acid in the flask. Why will it have no effect on the results? (1mark)

6. What was the reason for rinsing out the buret with NaOH solution before starting titrations? (1mark)

7. By law, vinegar must be no less than 4% by mass acetic acid. Did your sample meet this specification? (1mark)