Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_

**Microtitration**

**Introduction:**

 Titration is a common method of determining the amount or concentration of an unknown substance. The method is easy to use if the quantitative relationship between two reacting solutions is known. The method is particularly well-suited to acid-base reactions. Titrations are routinely used in industry to analyze products to be sold. Many manufacturers are under strict standards of quality control because their products are sold for public consumptions. These products include antacid tablets, vinegar, fruit juice and household ammonia. In this experiment we will be analyzing the concentration of acetic acid that is contained in regular household vinegar.

**Purpose:** To determine the concentration of hydrogen ions (H+ ions) in regular household vinegar.

**Safety:**

**Make a list of all safety procedures related to this lab.**

**Materials:**

|  |  |
| --- | --- |
| 1.0M NaOH | Spot plate |
| Store bought vinegar | Phenolphthalein |
|  |  |

**Procedure:**

1. Obtain a spot plate, 1.0M NaOH, and vinegar
2. Complete 4 trials of the following:
* Place 20 drops of vinegar into a well on the spot plate
* Add 1 drop of phenolphthalein
* Add 1.0M NaOH, drop by drop, stirring between each drop until the color persists
* Stop when color persists

**Data Table:**

|  |  |  |
| --- | --- | --- |
| **Trial #** | **Drops of vinegar** | **Drops of 1.0M NaOH** |
| **1** |  |  |
| **2** |  |  |
| **3** |  |  |
| **4** |  |  |
| **Average** |  |  |

**Calculations:**

**Copy and complete the following questions in your lab notebook.**

1. Calculate the average number of drops of vinegar used.
2. Calculate the average number of drops of 1.0M NaOH used.
3. Using the average number of drops of each, calculate the molarity of acetic acid in vinegar. Assume that each drop is the same volume. (Molarity Acid) (# drops acid) = (Molarity Base) (# drops base)

**Questions:**

**Copy and complete the following questions in your lab notebook.**

1. What is the formula for acetic acid?
2. What ions are produced when acetic acid ionizes in water?
3. Why is phenolphthalein used in this experiment? What other indicator could be used?
4. Write the balanced equation for the reaction between acetic acid and NaOH.
5. Why did you complete 4 trials as opposed to only one trial?
6. What are some sources of error in the calculation of H+ concentration?
7. How could some of these errors be eliminated?