PERCENTAGE OF ACETIC ACID IN VINEGAR
Microlab

Name_____

Period _____

Purpose: To determine the percentage of acetic acid in vinegar by titration.

Theory:

Acid/base indicators, like the phenolphthalein used in this experiment, change colors depending upon the amount of acid or base in the solution. Phenolphthalein indicator is colorless in acid solutions like vinegar. When an excess of base (like sodium hydroxide) is added, the phenolphthalein will turn pink.

In an acid/base titration, generally the amount of base needed to neutralize a given amount of acid is determined experimentally. In this experiment, the number of drops of sodium hydroxide will be counted until all the acid is neutralized as indicated by the indicator turning pink. Five trials will be done, and the average number of drops will be determined.

Procedure:

1. Place a 24-well reaction plate on a piece of plain white paper to help you more clearly see the results of this activity.

2. Squeeze slowly and place ten drops of vinegar into one of the reaction plate wells.

3. Place one drop of the phenolphthalein indicator solution into the well to which you just added the vinegar. Stir with a plastic toothpick. You should observe a colorless solution.

4. To the same well, squeeze gently and add one drop at a time, the NaOH solution. Count each drop, until the colorless sample turns pink and stays pink. You must stir the solution after each drop of sodium hydroxide has been added to obtain the proper results. As you approach the endpoint (the point at which the solution turns pink and stays pink) you will notice an increase in the amount of stirring necessary to return the solution to its colorless state.

5. Record the number of drops of sodium hydroxide solution used. Repeat the procedure <u>five</u> more times in separate and unique wells in the reaction plate, then average the number of drops of sodium hydroxide solution used. The first well is a practice trial and the number of drops is not recorded.

Data:

Number of drops of NaOH:

TEST 1 _____ TEST 2 _____ TEST 3 _____ TEST 4 _____ TEST 5 _____

AVERAGE NUMBER OF DROPS = _____

Calculations:

Average number of drops of NaOH = _____ drops
Concentration of NaOH = 0.2 molar
Number of drops of vinegar per trial = 10 drops
Molar mass of acetic acid = 60.0 g/mole
Assuming in acetic acid 1 liter = 1000g

Percentage of acetic acid = $\dfrac{(\_\_\_ \text{ drops NaOH})(0.2M \text{ NaOH})(60.0g/\text{mole acetic acid})(100\%)}{(10 \text{ drops vinegar})(1000 \text{ g/liter acetic acid})}$

Show Your Work!!!

Conclusion: Write sentences!
        What did you learn from this experiment? Could this procedure be used for other acidic solutions? Give an example.