One of the important components of your chemistry course is the laboratory experience. You are somewhat familiar with some of the lab equipment, but there is a great deal to be learned about the equipment and safety procedures in a chemistry lab.

A number of important procedures need to be mastered in order for you to be successful in the later experiments of this course. In this introductory experiment, you will have a chance to learn about all of these lab techniques while doing an experiment involving an important chemical reaction.

**OBJECTIVES:**

1. To master the following lab techniques:
   1. Using a Bunsen burner
   2. Handling solid chemicals and solutions
   3. Measuring mass with an analytical balance
   4. Measuring volume with a graduated cylinder and a buret
2. To correctly set up the equipment in order to perform an experiment
3. To observe the reaction between an acid and a base

**MATERIALS:**

***Apparatus***

|  |  |  |  |
| --- | --- | --- | --- |
| Bunsen burner | Electronic balance | Weigh boat | Forcep |
| Large test tube | (2) - 250mL Erlenmeyer flasks | Burette clamp/stand | Striker |
| Test tube clamp | 25mL pipet + suction bulb | 250mL Volumetric Flask | Funnel |
| 50mL burette | 250mL beaker for dH2O/NaOH | 100mL HCl beaker |  |

***Reagents***

- 1 piece of sodium hydroxide - unknown concentration of HCl solution \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

- bromthymol blue dropper bottle *Place value of concentration above*

**PROCEDURE:**

***Part I – preparing a standard basic solution***

1. Prepare a Bunsen burner to be used for heating a solution containing sodium hydroxide.
2. Find the mass of a weigh boat and record the mass in your DATA section.
3. Obtain a pellet of sodium hydroxide using the forceps and place it in the weigh boat. CAUTION: sodium hydroxide is reactive with water so do not touch it with your hands
4. Weigh the sodium hydroxide in the weigh boat and record the mass of the sodium hydroxide in your data section.
5. Quantitatively transfer the sodium hydroxide pellet from the weigh boat to a test tube.
6. Using the 25mL pipet, place a 25mL *aliquot* of distilled water into the large test tube containing the sodium hydroxide pellet. CAUTION: acids and bases may react violently with water in excess amounts.
7. What does the term ALIQUOT mean?
8. If you add 25 mL of **dH2O** (distilled water) to the test tube containing the solid NaOH and dissolve it… Do you have an exact 25 mL solution of NaOH? *YES or NO, then explain your answer. (drawing a picture of this may help)*
9. Gently heat the test tube with the water and sodium hydroxide by circling the test tube around the flame of the Bunsen burner, holding the test tube with the test tube holder. Make sure you are not pointing the test tube at anyone.
10. Once the sodium hydroxide has dissolved (you now have a very basic solution), quantitavely transfer the basic solution into a 250 mL Volumetric flask by using small amounts of water to wash out all the solution from the test tube. Now fill the Volumetric flask to the mark with distilled water and mix accordingly. Ask, Mr. Branco on how to mix this solution if unsure!

***Part II – Acid / Base Titration***

1. Clean out the buret (ask your teacher if you do not know how!)
2. Fill the buret with the unknown acid solution. Place the buret on the ring stand. Record the initial volume of acid solution.
3. Using the 100 mL graduated cylinder obtain 25 mL of your basic solution and place it in the Erlenmeyer flask.
4. Place about 5 drops of bromthymol blue in the Erlenmeyer flask containing the basic solution.
5. Place the Erlenmeyer flask under the buret and begin the **titration** (reaction). Drop the acid solution into the Erlenmeyer until you see a colour change. Always swirl the solution! Record the volume of acid solution left in the buret.
6. Complete steps 2 to 5 again to verify the results.

**DATA & OBSERVATIONS:**

* Determine what information is necessary to place in a data table from the procedure.

**QUESTIONS:**

1. Matter was found in all different phases. Make a list of all solids, liquids and gases used in this experiment.
2. There were a few different SI units (International System of Units) used in this experiment. Review the Procedure and make a list of all of the units that you used in the measurements.
3. Find out what bromthymol blue is, and what is it commonly used for?
4. What do you think the colour change represents in Part II?

**CONCLUSION:**

* Summarize the ideas used in this experiment and any sources of error.