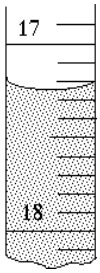
Name: _____ Block: _____ Date:_____

Titration Pre-Lab

The Buret

Before use, the buret should be rinsed first with water and then with several portions of the solution to be used. To do this:

1. Add the small portion of solution with the stopcock closed
2. Remove the buret from its clamp
3. Tip and rotate the buret so that the solution rinses the entire inside surface.
4. Discard this rinse solution and repeat once or twice.



*Reads 17.24 mL **not** 18.76 mL*

Three factors to be aware of:

1. Remove air bubbles from the tip
   a. Open the stopcock fully
   b. Let a flow of liquid wash out the bubble
2. Read the liquid level very carefully!
   a. **MUST** be done **both** before and after liquid is dispensed
3. Zero is at the top and the buret reads down

To use the Buret:

1. Fill buret near the top
   a. adjust the liquid level to be below the top mark
   b. *NOT* necessary to set it to 0.00!
2. After the tip is clear of bubbles, you need to read the buret level.
   a. Read the meniscus at eye level

Reading Buret:

1. Read the buret before titration.
   a. This is your initial point.
2. After the titration is done, read the buret again.
   a. This is your end point
3. The difference between the initial and the end point is the volume used in the titration.

Questions:

1. How do you remove air bubbles from the buret tip?

2. Before you start using a buret, you what do what first?

3. Why is rotating the buret important when rinsing it out?

4. When reading the buret, make sure to read the _____.
5. Use the burets to the right to answer a-c:
   a. What is the initial reading of the buret?_____
   b. What is the end point reading? _____
   c. What is the volume used in the titration?_____

Beginning of Titration

End of titration

6. To the right one buret is labeled 'Initial', the other buret is 'Final'. Draw the correct level of the solution in each buret, if the initial volume is 1.0 mL and the final volume is 6.5 mL. Be sure to draw the meniscus properly. What is the volume of the solution delivered?

Initial

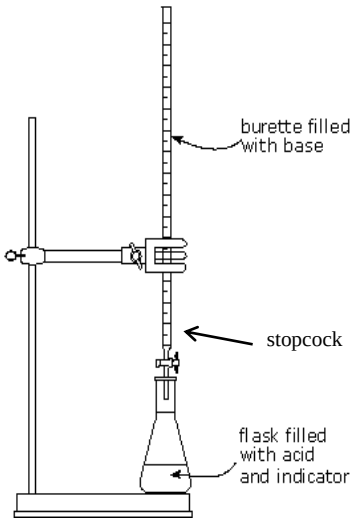
Final

Setup for a Titration *(use page 517-520)*

When an acid reacts with a base, a salt and water is formed. This type of reaction is known as a neutralization reaction. ***Neutralization*** reactions are essential in your body, in industry, and in the environment. Limestone is often is added to lakes that are extremely acidic from pollution. Limestone consists mainly of the base calcium carbonate.

Neutralization reactions are also useful in determining the concentration of an unknown acidic or basic solution. A ***titration*** is exact process of determining the concentration of an unknown acid or base utilizing the neutralization reaction. During a titration, a solution in which the concentration is known of a base, the ***standard solution*** is gradually added to an acidic solution of unknown concentration. At the point of neutralization, the amount of base

must equal the amount of acid is called the ***equivalence point***. The equivalence point is reached when the acid-base indicator causes a color changes- it tells you it's time to quit. The color change is called the ***end point.*** Therefore, when done correctly, the *equivalence point* and the *end point* coincide. At the equivalence point the equation $\mathbf{M_aV_a = M_bV_b}$ **(a** =acid & **b**=base) can be used to determine the unknown's concentration, thus its pH. You can also reverse the titration procedure so a standard acid solution is used to titrate an unknown basic solution.



1. Looking at the setup to the left, list all the lab equipment needed in a titration:

2. What is the purpose of a titration?

3. What a standard solution?

4. What is the equivalence point and how do you know you have reached it?

5. Why is the equivalence point important?

6. What is the end point?

7. How do you know you are getting close to the end point?

8. Look at page 513, what is the pH or pH range of phenolphthalein when the solution is:

Clear: _____ Pale pink: _____ Dark pink: _____

9. If it took 34mL of 0.05M base solution to neutralize 120mL of an acid solution with unknown concentration. For this titration, what was the concentration of the acid?

10. It takes 54 mL of 0.1M sodium hydroxide to neutralize 125 mL of a hydrochloric acid solution, what is the concentration of the hydrochloric acid?

11. If it takes 50 mL of 0.5M potassium hydroxide solution to completely neutralize 125mL of sulfuric acid solution, what is the concentration of the sulfuric acid solution?

The Experiment:

You will be titrating the standard solution, 0.1M sodium hydroxide, to determine the concentration of a hydrochloric solution. Phenolphthalein will be the indicator used. An acid solution with phenolphthalein in it will be clear. If base is added a drop at a time, a pink tint will linger longer and longer after each drop, meaning it is getting close to the equivalence point. The equivalence point is when the solution finally stays pink.

1. What neutralization reaction is actually occurring? Balance it.

2. What is the standard solution in this lab?