Chemistry 11

Solution Chemistry III

Name:
Date:
Block:

1. **Titrations**
2. **Titrations Equipment**

Titrations

Warm up…

1. Balance the following neutralization equation:

$$\_\_\_\_ H_2SO_4 + \_\_\_\_ NaOH \rightarrow \_\_\_\_ H_2O + \_\_\_\_ Na_2SO_4$$

2. Write the formulas for the acid and base that will react to give K_2CO_3 and water.

The salt breaks up to become:

Acid: Base:

<u>Acid-Base Titration:</u>

- A method to determine the concentration of an _____ solution by reacting it with another substance of _____ concentration.
- The solution whose concentration is known is called the _____ solution.

Example 1.

A student completely reacted 10.0 mL of HCl with 18.25 mL of 0.100 M NaOH. Calculate the [HCl].

⇒ Balanced equation:

⇒ Calculate the moles of the standardized solution:

⇒ Find the moles of the unknown solution:

⇒ Find the concentration of the unknown solution:

⇒ In one step…

Practice 1:
If 46.2 mL of 2.50 M NaOH is required to neutralize 1.54 M of a phosphoric acid solution, H_3PO_4, what volume of phosphoric acid was needed to reach the equivalence point?

Practice 2:
If 8.60 mL of 0.0994 M HNO_3 is required to neutralize 25.00 mL of a strontium hydroxide solution, what is the molarity of the strontium hydroxide?

Practice 3:
Calculate the molarity of an acetic acid solution (CH_3COOH) if 34.57 mL of this solution are needed to neutralize 25.19 mL of 0.1025 M sodium hydroxide.

Practice 4:
Consider the following results from a titration lab.

5.00 g of NaOH was dissolved to make a 200. mL solution
Below is the volume of the NaOH solution needed to neutralize 25.0 mL H_3PO_4.

	Trial #1	**Trial #2**	**Trial #3**
Initial reading of burette (mL)	0.00	12.45	24.94
Final reading of burette (mL)	12.45	24.94	37.36

a) What is the proper balanced equation?

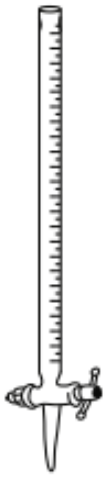
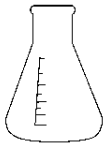
b) What is the concentration of the standardized solution of NaOH?

c) What was the average volume of NaOH was needed?

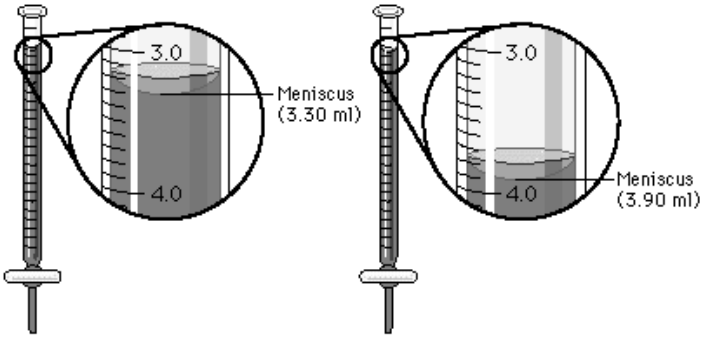
d) What is the concentration of the acid?

<u>Titrations Worksheet</u>

Titration Equipment

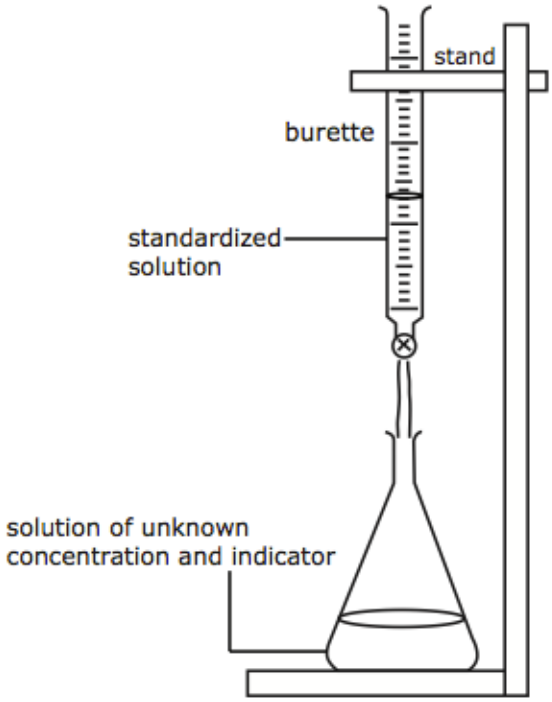
Glassware	Notes
Burette 	• •
Erlenmeyer Flask 	• • • Equivalence Point: • •
Pipette 	• • •

Reading a Burette



- ✓ Make sure to read the <u>bottom</u> of the meniscus
- ✓ Take data from at least _____ trials.
- ✓ Your values from each trial should be close together. If they are not, take another reading to double check!

<u>Titration set-up:</u>



- ➢ **<u>Preparing your glassware:</u>**
  1. Rinse with WATER
  2. Rinse with CHEMICAL
  3. Fill with CHEMICAL