

Name: _____

Date: _____

Acid/Base Titration

Objective: To use a primary standard to determine the concentration of an acid solution.

Equipment:

burets	buret clamp	ring stand	stir plate
magnetic stir bar	volumetric flasks	weighing dish	

Materials:

Acid: _____ sodium carbonate

Methyl orange distilled water

Procedure:

1. Record the letter of your unknown on this handout before proceeding further.
2. Partner one: mass between 0.05 and 0.1 g of sodium carbonate in an Erlenmeyer flask. Use the analytical balance and record to the 0.0001 g. Record this value. Dissolve the sodium carbonate in 10 – 20 mL of distilled water.
3. Partner two: Rinse a buret with distilled water and make sure it works properly. Use a funnel to fill the buret with your unknown acid solution. Position the buret in the clamp. If the acid level is above zero, allow some to flow through the stopcock until it is below zero. Record the acid level as “Trial 1 initial volume of acid.”
4. Place a stir plate underneath the stopcock of the buret.
5. Place the Erlenmeyer flask under the acid stopcock.
6. **DO NOT FORGET THE INDICATOR!**
7. Slide a magnet into the flask, try not to splash acid solution on the sides. If necessary, hold a piece of white paper behind the flask so a color change will be easily noticed.
8. Turn on the stir plate. Allow the magnet to freely turn, but not so much that the solution splashes. Dropwise, slowly add acid from the buret into the flask. Allow the acid to be added until a change in color is obtained. The color **MUST** be permanent. This means that it will not go away after moderate shaking, and remains changed for at least 30 seconds.

*** IF THE COLOR IS TOO DARK, ASK FOR ASSISTANCE ON WHAT TO DO NEXT!**

9. Record the volume on the acid buret as “Trial 1 final volume of acid.”
10. Discard the contents of the flask and repeat the titration until time is called. Note that the final volume of trial one will become the initial volume of trial two. If the buret looks like it may run out during the next trial, refill and record the volume of the refilled buret as the initial volume.

Calculations:

1. Write the balanced equation for this acid/base reaction.

For EACH trial:

2. Determine the number of moles of base used.
3. Stoichiometrically determine the number of moles of acid used.
4. Find the volume of acid used.
5. Calculate the molarity of the acid solution.

After all trials are complete:

6. Perform a Q Test to determine if the outermost piece of data is an outlier. Use a 95% confidence level.
7. Report a final average of all concentrations that remain.

Data:

Trial	Mass Sodium Carbonate (g)	V _{initial} HCl (mL)	V _{final} HCl (mL)
1	0.06985	0.25	7.85
2	0.07125	7.85	15.84
3	0.08542	15.84	25.10
4	0.06845	25.10	32.91

Conclusion:

Comment on anything that may have caused a deviation from the “true value.” Since you do not know what the “true value” is, you will want to report all significant errors and possible errors.