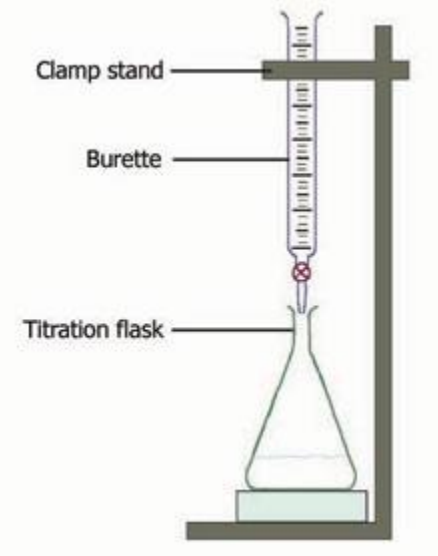
WODSS SCIENCE
SCH 3UI

Name: _____
Date: _____

Titrations



Titration – a process used to **determine the concentration** of an acidic or basic solution **by reacting it with a solution of known concentration**

Standard solution – a solution of known concentration. The standard solution goes into a burette, a long narrow glass tube. The **solution that goes in the burette** is called the **titrant.**

The unknown solution is placed in an Erlenmeyer flask, along with a chemical indicator, which will change colour when the reaction between the acid and base is complete.

The titrant is added slowly to the unknown sample, until the unknown is neutralized and the reaction between the two is complete.

Equivalence Point – the **point in a titration when the number of moles of acid is stoichiometrically equal to the number of moles of base**.

End-Point – the **point in a titration when the acid-base indicator first changes colour** indicating that the **unknown has been neutralized**.

At least three trials should be performed during a titration to improve the reliability of the calculated concentration. The average volume of titrant is calculated, and it is this volume that is used to calculate the concentration of the unknown.

Demonstration: Mrs. Tripur has found an old bottle of rust removing solution that primarily consists of oxalic acid ($H_2C_2O_4$) but the concentration is not indicated. To determine its concentration, she will titrate 10 mL samples of this solution with a standard solution of _____mol/L sodium hydroxide, NaOH. She will add a couple of drops of phenolphthalein indicator to the acid, which has a pink endpoint.

Chemical Reaction: _____

Observation Table:

Trial	Practice	1	2	3	Average of 3
Initial burette reading (mL)	0.2	14.3	27.8	0.4	
Final burette reading (mL)	14.3	27.8	41.1	13.8	
Volume of NaOH (mL)					

Calculations:

Summary of Calculations:

1) Calculate average volume of titrant needed to neutralize the unknown.
2) Write the balanced chemical equation.
3) List given concentrations and volumes of reactants.
4) Calculate moles of the standard solution (n=
5) Use mole ratio to find moles of unknown solution
6) Calculate concentration of unknown solution (C =

Tips for reading measurements on a burette:

- Position yourself so that you are eyelevel with the liquid you are measuring.
- Take your reading at the bottom of the meniscus
- Note that 0 is at the top of the burette and 50 is at the bottom, so count DOWN.

Ex. 2 A 10 mL sample of rain water is analyzed by titration to determine its sulfuric acid (H_2SO_4) content. A standard 0.200 mol/L solution of sodium hydroxide, NaOH, is used for the titration. The results for three trials are shown below. What is the concentration of sulfuric acid in the water sample?

Trial	1	2	3	Average
Initial burette reading (mL)	0.7	14.3	27.8	
Final burette reading (mL)	14.3	27.8	41.1	
Volume of NaOH (mL)				

Solution: