Shri R.L.T.College of Science, Akola

Department of Chemistry

B.Sc. II Year Semester-III

Unit-II

Volumetric Analysis

Introduction:

- Analytical chemistry is the branch of chemistry which deals with the analysis of substances, which is mainly divided into two main classes.
- Qualitative Analysis & Quantitative Analysis.
- Quantitative Analysis: The basic Principle of Quantitative analysis is to determine the amount of a given sample.
- **There are many methods of Quantitative Analysis such as**
- **1.** Volumetric Analysis
- 2. Gravimetric Analysis
- 3. Refractometery
- 4. Polarimetry
- 5. Fluorimetry and Photometry
- 6. Electrochemical, Chromatography and biological methods.

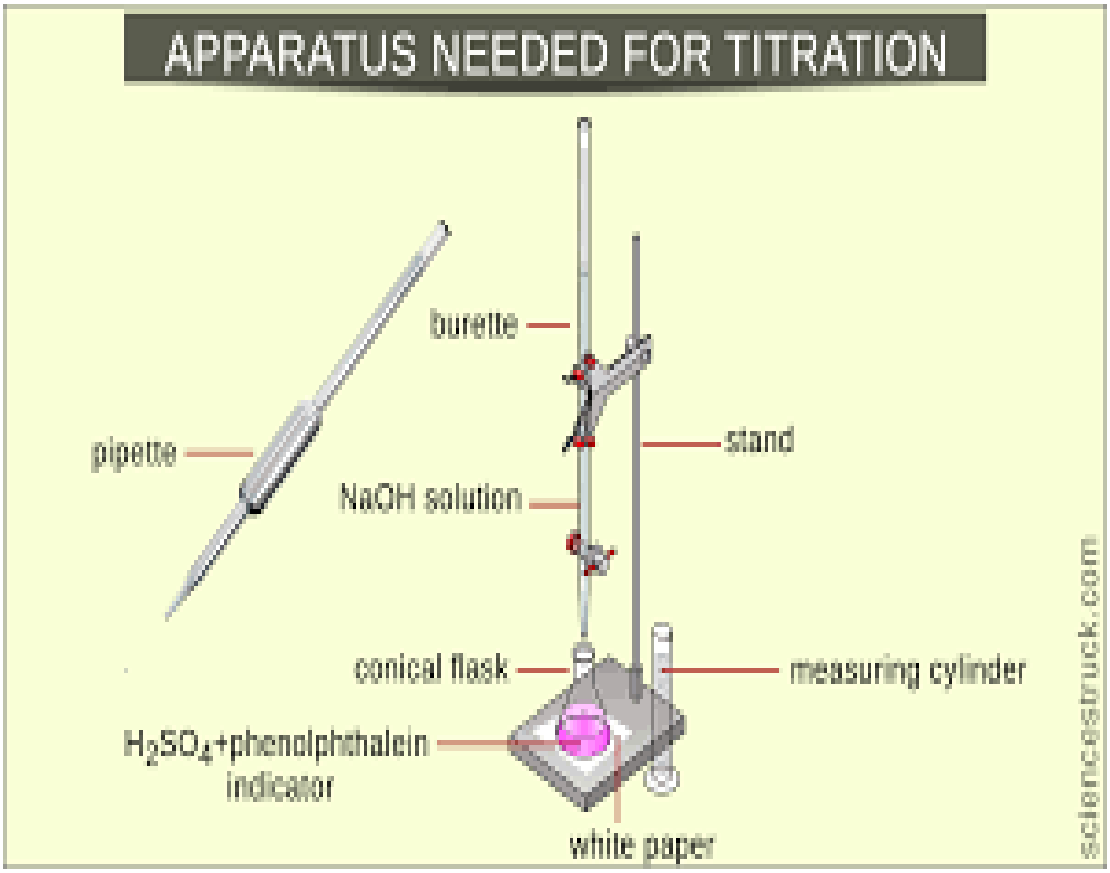
Volumetric Analysis:

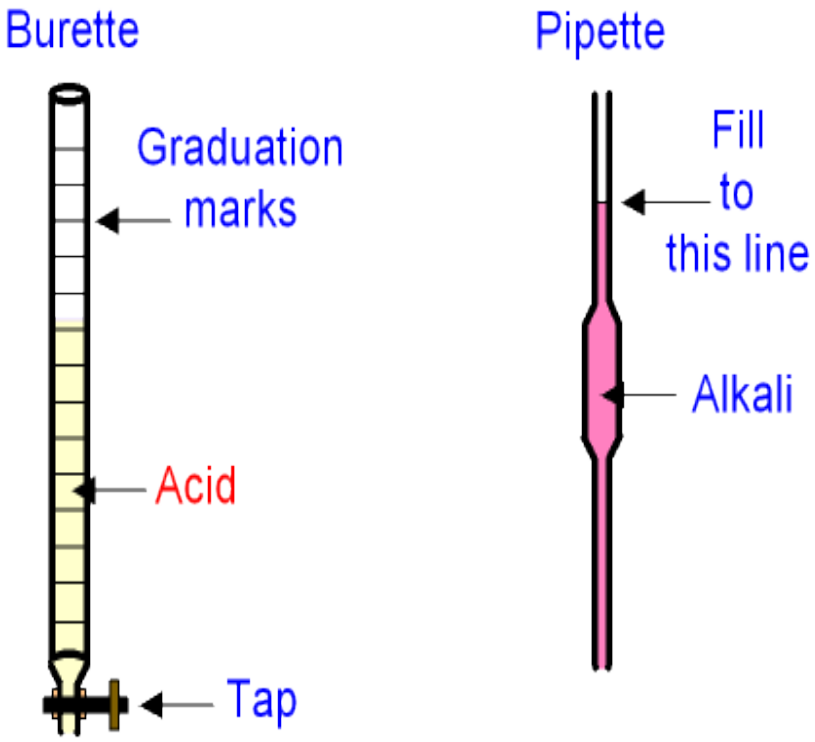
- Volumetric analysis is a quantitative analysis in which volume of known concentration solution (standard) required to react with a solution of unknown concentration is determined.

Volumetric reactions are

1. Simple and easy
2. Fast and can be done on site.
3. Less Expensive
4. Estimation of content or Assay of Chemical
5. Precise and accurate-depends on method and specificity.

Apparatus Needed for Volumetric Analysis:





Important Terms:

1. **Titration:**

Titration is the process of determining the volume of the known strength (concentration) solution required to react with a known volume of unknown strength solution.

2. Titrant and Titrate:

The solution taken in a burette use in titration is called the titrant and the solution taken in a conical flask is called titrate.

3. Equivalence Point or Theoretical end point:

The volume at which reaction actually completed by addition of stoichiometric amount of titrant is known as equivalence point or theoretical end point.

4. Indicator:

A substance which is used for the visual detection of the completion of a particular reaction to determine the end point of a titration is called as indicator.

5. End Point:

The volume at which the completion of the reaction is observe by using an indicator is called the end point, the visual observation is colour change or fluorescence or turbidity formation.

6. Titration error:

In practice, there is difference between equivalence point and end point. This difference is known as titration error.

Requirements of volumetric Analysis

1. The chemical reaction must be simple and takes place quantitatively to form known product.
2. The reaction shows some marked changes in some properties at equivalence point.
3. It should be stoichiometric.
4. It should be free from side reactions
5. It should be specific for the substances to be analysed.

6. The end point should be well defined and shows visible change by the use of indicator,
7. The reaction should be relatively fast.

Advantages of volumetric Analysis

1. These analysis required simple apparatus like burette, pipette, conical flask, etc.
2. The analysis process does not involve laborious operations.
3. It can be performed quickly and results obtained readily.
4. This method is more precise and accurate.
5. Depending upon the nature of substances to be analysed different types of titrimetric methods can be used.