

Classification of Volumetric methods for Analysis

Theory of Indicator and Buffer.

Titrimetric analysis & reference to acid-base.  
Redox titra's.

→ Acid - base "titra" or Neutralisa" titra"

Non-Aqueous "Titration" "

Precipita" "

Complexometric "

Redox "

Spectrometric "

The study of the chemical composition and structure of substances. More broadly, it may be considered the copies of all techniques whereby any exact chemical information is obtained.

→ Acid - base titra

Analysis

Qualitative [quality of material]  
ex - testing or measurements

Quantitative [quantity of material]  
ex - amount or products number.

- \* Classification of Volumetric methods. ~~for Analysis~~
- \* Theory of Indicator and Buffer.
- \* Titrimetric analysis in reference to acid-base redox titrations.

1. Acid - base titration or Neutralisation titration
2. Non-Aqueous titration
3. Precipitation titration
4. Complexometric titration
5. Redox titration
6. Gravimetric analysis

Analysis: The study of the chemical composition and structure of substances. More broadly, it may be considered the coupling of all techniques whereby any exact chemical information is obtained.

### 1. Acid - base titration.

Analysis → Qualitative [ Quality of material ex - testing or measurements ]

Analysis → Quantitative [ Quantity of material ex - amount or products number ]

ex - amount or products number.

→ Volumetric Analysis - A method of Quantitative Chemical analysis in which the amount of a substance is determined by measuring the volume. That is known as Volumetric analysis.

The method of analysis in which we determine the qualitative and quantitative analysis of any sample is known to the help of standard is known as titration.

1. Acid - Base titration.
2. Redox titration.
3. Volumetric titration.
4. Determination of concentration of an unknown solution.
5. Determination of several different unknown values regarding the analyte.
6. Determination - the conc. of an unknown component in a solution.

# Unit 6 Volumetric Analysis

classmate

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## Gravimetric Analysis

- Volumetric analysis is determined by volume means in litres or mL e.g. 1 litre, 500 mL, 250 mL etc

### 1. Acid-base titration

An "acid-base titration" is a method of quantitative analysis for determining the concentration of an acid or base by exactly neutralizing it by a standard solution of base or acid having known concentration. A pH indicator is used to monitor the progress of acid-base titration.

Strong Acid-base titration  
ex -  $\uparrow$  Hydrochloric acid and Sodium hydroxide

Weak Acid-base : Ethanoic acid and Sodium hydroxide

### 2. Non-aqueous titration

" " " " refers to a type of titration in the analyte substance is dissolved in a solvent which does not contain water. Perchloron-dona C other weak acids and bases dissolved in it.

ex :-

etc.

benzene, toluene, carbon tetrachloride

### 3. Precipitation Titration

- It is a type of technique which involves the formation of precipitate during the titration technique.

Means when two liquids are mixed are precipitated and converted into solid form.

ex - Potash Alum (Phitkari) forms when Potassium Sulphate and Aluminium Sulphate is mixed.

- When two liquid are precipitated after titration. From compound we found out concentration. This technique is known as Precipitation Titration.

### Complexometric titration :-

volumetric

" " " is a form of in the formation of a coloured complex is used to indicate the end point of titration

- The complexes are formed by the react<sup>n</sup> of a metal ion (an acceptor, or central atom or a cation) & an anion, a neutral molecule or very rarely a free ion

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### 4. Complexometric Titration :-

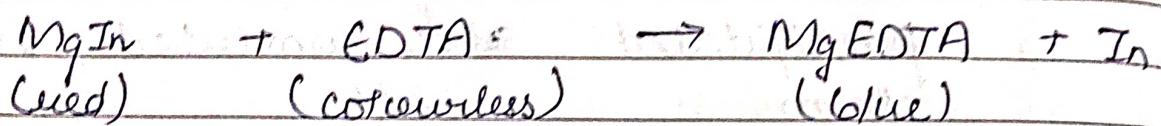
" " is a form of volumetric titration in which the formation of a colored complex is used to indicate the end point of titration

- The complexes are formed by the reaction of a metal ion (an acceptor, or central atom or a cation) & an anion, a neutral molecule or very rarely a free ion

- Chelate  $\rightarrow$  Metal forms a complexometric titration.

When we mix a chelate with metal and reacted to form a complex.

ex - Sample is a metal and Standard is taken as a chelate to form complex



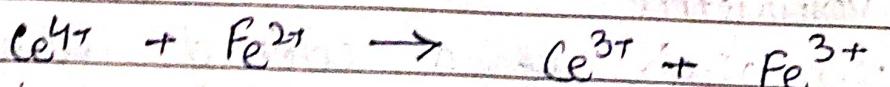
5.

Redox Reaction  $\Rightarrow$

A " " " " is a titra" in  $\in$  the analyte and titrant react through an oxidation - reduction reaction.

One is acting as reducing Agent and other is acting as oxidising agent.

ex - Anilic acid, diphenylamine, eosin green, methylene blue and Nile blue



Unit - Volumetric & Gravimetric. (1)

Definition of volumetric titrimetry, Titrimetry, the equivalence point, the end point.

- ~~Volumetric~~ titrimetry :-

(i) " volume serves as the analytical signal.

Titration :- delivery of a measured volume of a solution of known concentration (the titrant) into another solution (titrand).

Solution in flask or beaker.

[ conc is to be find].

↓ (solution in burette)  
? conc is mostly known

Equivalence point :- the point at which enough titrant has been added to react exactly with the analyte (Stoichiometric point)

i) Indicator - quantities of reductants have been mixed] A substance that changes color in response to a chemical change. [ change color end point comes]

a) End point -

the " at which the indicator changes color so you can tell the equivalence point has been reached. [ means jaha se ham formula apply karke conc pta kar sakte hai. ]

b) Stoichiometric equation :-

mole ratio b/w the titrant and the analyte based on a balanced chemical reaction

Titrimetry : we used

- Burette, flask or beaker, iron stand and clamp.

- Automated titra<sup>n</sup> set-up are also present }

→ Volumetric Titrimetry :

It consist of determination of volume of soln of accurately known concn required to react completely w/ the soln or substance to be determined.

Terms used in volumetric analysis :

i) Standard soln :

" " of known conc.

ii) Titrant :

The substance being titrated.

iii) Titrand :

Standard soln.

(2)

- ~~the~~ Equivalence point :

means of a chemical reac<sup>n</sup> is the point at c<sub>e</sub> chemically equivalent quantities of reactants have been mixed.

and

point of titra<sup>n</sup> at c<sub>e</sub> the amount of titrant added is just enough to completely neutralize the analyte solution.  
[ means type of substance or a soln whose concen<sup>n</sup> is needed to be found.]

the End point : [in back page]