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# **CONDUCTOMETRIC TITRATIONS & ITS APPLICATIONS.**

**BY, LIPSA SAMAL**

**ASST. PROF (PA & QA), SPLS, CUTM**



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## **CONDUCTOMETRIC TITRATIONS:**

**It Is a process of qualitative chemical analysis in which conc of sample is determined. Which is done by adding areagent( titrant ) of known conc in measured volumes to the sample (anylate ).**

### **TYRES OF CONDUCTOMETRIC TITRATIONS:**

- 1. Acid –base or neutral titrations**
- 2.Replacement or displacement titrations**
- 3. Redox titrations**
- 4. Precipitation titrations**
- 5. Complexometric titrations**
- 6. Non-aqueous titrations**



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## **ACID- BASE OR NEUTRAL TITRATIONS:**

- **STRONG ACID-STRONG BASE**  
**EG: HCL vs NaOH**
- **STRONG ACID-WEAK BASE**  
**EG: HCL vs NH<sub>4</sub>OH**
- **WEAK ACID-STRONG BASE**  
**EG: CH<sub>3</sub>COOH vs NaOH**
- **WEAK ACID -WEAK BASE**  
**EG: CH<sub>3</sub>COOH vs NH<sub>4</sub>OH**



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## **Strong acid strong base:**

- **Fall in conductance due to replacement of high conductivity Hydrogen ions by poor conductivity sodium ions**
- **Rise in conductance due to increase in hydroxyl ions**

## **Weak acid- weak base:**

- **Increase in conductance due to excess of  $\text{CH}_3\text{COOH}$**
- **Constant conductance due to suppression of  $\text{NH}_4\text{OH}$  by  $\text{CH}_3\text{COOH}$**



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## **Strong acid- weak base:**

- **Fall in conductance due to replacement of hydrogen by ammonium ions**
- **Conductance remain constant due to supression of  $\text{NH}_4\text{OH}$  by  $\text{NH}_4\text{Cl}$**

## **Weak acid –Strong base:**

- **Initial decrease in conductance followed by increase due to  $\text{NaOH}$**
- **Steep rise due to excess of  $\text{NaOH}$**



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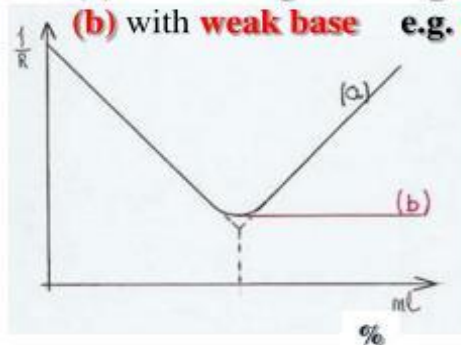
## Outline

### INSTRUMENTAL DETECTION

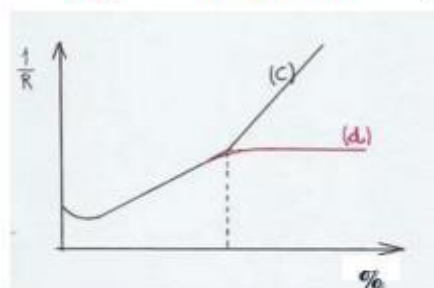
- Advantages
- Types
- Potentiometric end point detection
- Conductometric end point detection

# CONDUCTOMETRIC TITRATION CURVES

**I. Titration of strong acid** (a) with strong base e.g. **HCl** with NaOH  
(b) with weak base e.g. **HCl** with **NH<sub>4</sub>OH**



**II. Titration of weak acid** (c) with strong base e.g. **CH<sub>3</sub>COOH** with NaOH  
(d) with weak base e.g. **CH<sub>3</sub>COOH** with **NH<sub>4</sub>OH**





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## **ADVANTAGE OF CONDUCTOMETRIC TITRATIONS:**

- 1. Does not require indicators since change in conductance is measured by conductometer**
- 2. Suitable for coloured solutions**
- 3. Since end point is determined by graphical means accurate results are obtained with minimum error**
- 4. Used for analysis of turbid suspensions, weak acids, weak bases, mix of weak & strong acids**



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## **Dis advantages of conductometric titration:**

- 1. Increased level of salts in solution masks the conductivity changes  
, in such cases it does not give accurate results**
- 2. Application of conductometric titrations to redox systems is limited  
because, high concentrations of hydronium ions in the solution  
tends to mask the changes in conductance**





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## APPLICATIONS :

- 1. Check water pollution in rivers and lakes**
- 2. Alkalinity of fresh water**
- 3. Salinity of sea water (oceanography)**
- 4. Deuterium ion concentration in water- deuterium mixture**
- 5. Food microbiology- for tracing micro organisms**
- 6. Tracing antibiotics**
- 7. Estimate ash content in sugar juices**
- 8. Purity of distilled and de - ionised water can determined**
- 9. Solubility of sparingly soluble salts like  $\text{AgCl}$ ,  $\text{BaSo}_4$  can be detected**



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**THANK YOU**