



**University of Tikri College of
Pharmacy Department
Third Stage**

Inorganic Pharmaceutical Chemistry laboratory

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Introduction

- **Inorganic Chemistry** : can be broadly defined as the area of research concerned with metal ions and metal complexes and their clinical applications. Medicinal inorganic chemistry is a relatively new research area grown from the discovery of the anticancer agent cisplatin. Indeed, the therapeutic value of metal ions has been known for hundreds and thousands of years. Metals such as arsenic have been used in clinical studies more than 100 years ago, whilst silver, gold and iron have been involved in 'magic cures' and other therapeutic applications for more than 5000 years.

Importance of Inorganic Pharmaceuticals

Inorganic pharmaceuticals are useful in any of the following ways:

1. Useful medicinally for their therapeutic purpose. Example: Astringents and Antimicrobials etc .
2. Useful as pharmaceutical aids. Example: Bentonite, talc etc .
3. To change the reaction of body fluid. To acidify or alkalise. Example: Antacids, alkalis , Mineral acids .
4. Replacing or replenishing the normal content of body fluids. Example: Sodium , Potassium, calcium, chloride, phosphate etc .
5. Useful as reagents to carry out the reactions. Example: Catalysts (platinum, nickel) Oxidizing and reducing agents.
6. Useful in Pharmaceutical analysis. Example: Titrants such as potassium permanganate etc..

Important terms and expression:

- **Titration:** it is the process of drop by drop addition of standard solution in a burette with a known concentration into the solution in the beaker with an unknown concentration. This addition is continued until the end point is reached. The aim of this process is to determine the unknown concentration via the concentration of the standard solution by measuring the volume of used up solutions during process
- **Equivalent point** is the point at which the reaction between standard substance and unknown substance is complete. The point is determined practically (experimentally) by using one of the suitable indicators
- **End Point:** It is the point at which the reaction between standard substance and unknown substance completes. The point is determined practically (experimentally) by using one of the suitable indicators

Titration Error: It is the difference (in volumes) between equivalent point (theoretical) and end point that is measured practically in titration process.

Indicator ;ssecorp notiartti ot dedda si hcihw ecnatsbus a si tl : 'nseod ti hguohtlat participate in the reaction, one of its physical properties (e.g .Color change(changes clearly.

A standard solution: is a solution of known normality or molarity.

Standardization fo ytilamron ro ytiralom eht fo notianimreted eht si : :yb enod si notiazidradnatS .notiartti yb notiulos a

a.dradnats yradnoces eht ,notiulos dradnats rehtona fo esu eht (

b hgih a fo ecnatsbus a fo elpmas dehgiew ylluferac a fo esu eht (.dradnats yramirp eht ,ytirup

The primary standard should:

- Be of high purity and known composition.**
- be stable.**
- not be hygroscopic or efflorescent.**
- Be readily available and of low cost.**
- Have high equivalent weight to minimize errors during weighing.**

$$\text{no. of moles} = \frac{\text{weight (g)}}{\text{molecular weight (g/mole)}}$$

$$\text{no. of equivalents} = \frac{\text{weight (g)}}{\text{equivalent weight (g/eq.)}}$$

- **Molarity (M)** :is an expression used to determine the concentration of a solution in terms of number of moles of the reagent per liter of the solution

$$\text{Molarity (M)} = \frac{\text{no. of moles}}{\text{volume of solution (L)}}$$

- **Normality (N)** :is an expression used to determine the concentration of a solution in terms of number of equivalents of the reagent per liter of the solution

$$\text{Normality (N)} = \frac{\text{no. of equivalents}}{\text{volume of solution (L)}}$$

Home work . Calculate the molarity of 100ml of an aqueous solution contain
1.7gm of NH₃

Home work .calculate the normality of a 500ml solution containing 20gm of NaOH

Glassware and instrument:



beaker



glass stirrer



graduated cylinders



washing bottle



volumetric flask



fume hood



conical flask



burette



burette stand



burette clamp



spatula



watch glass



tripod stand



wire gauze



Bunsen burner



bulb pipette



electrical balance



oven