

## Assignment No 3

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Subject: Chemistry-I

Topic: Importance of Titration,  
Spectroscopy and  
Conduct metric titration

## Importance of Titration

### Definition of titration:

Titration is a technique used in chemistry to measure the proportions of chemicals in a solution. It is a relatively simple process and a standard tool in any of the many branches of chemistry. Because of the versatility of the titration technique, many industries depend on various forms of titration to develop or analyze key chemical compounds. Titration is utilized in companies that affect nearly all aspects of society.

### Applications and Uses of Titration:

#### Determining the pH Value

Industries that need to determine pH, such as the food industry, use the process of titration. Certain food items, for example, have a pH value that is not suitable for human use. Here, the titration is used to determine whether or not the pH value present in the food item is appropriate for human consumption.

#### Acid Rain

In Chemical Engineering usually involve an analysis of precipitation and its response to pollution. To quantify the degree of contamination in natural rain water or snow, titration is used. The process is quick and results are reliable. Since most titration processes do not require expensive or specialized equipment, the test can be performed often and in different areas with relatively little effort.

#### Efficacy of Cleaning Products

The Chemical industry manufacturing cleaning products uses titration to determine whether or not cleansers remove bacteria from a surface. Through titration it is possible to identify which cleaning product has the level of acidity necessary to kill bacteria.

## Nutrition

The compounds which make up food products help determine their nutritional implications. Titration is one technique that assists in these studies. The acidity of orange juice, for example, is easily determined using a standard titration process. In this process, an electrode is added to a solution comprised of orange juice and deionized water. The titrate catalyst then measures the acidity of the juice. Manufacturers can use the technique to vary this quality to satisfy customers or those with special nutritional needs.

## Wastewater Analysis

The safety of water is based on its chemical ingredients. By analyzing wastewater, the extent of contamination and the requirements for filtering and cleaning can be determined. Titration is a key mechanism in this analysis. Often, more specialized titration equipment is used in this application that can measure ammonia levels in combination with other reactants to quantify other chemicals present.

## Pharmacology

The development of medication is a precise science that relies on specific measurements of chemical quantities. Titration is thus an important part of the pharmaceutical industry to ensure quality control. Many variations of the titration technique are used, and often specialized equipment for pharmaceutical titration is developed to make the process more efficient.

# Importance of Spectroscopy

## Definition

In Chemistry the science and practice of using spectrometers and spectroscopes and of analysing spectra, the methods employed depending on the radiation being examined. The techniques are widely used in chemical analysis and in studies of the properties of atoms, molecules, ions, etc.

Application of Spectroscopy

## Food Industry

Measurement of water content or the state of water and Mobility of water in food stuffs

Detection and qualification of mass volume, Chemical composition and Structure

Classification based on the material properties

Identification of chemical components

Food authentication

Online process monitoring and control

Quality Control Compliance with trade and safety Standards or consumer acceptability

## Identification of functional group

In group frequency region, the peaks corresponding to different functional groups can be observed. According to corresponding peaks, functional group can be determined.

Each atom of the molecule is connected by bond and each bond requires different IR region so characteristic peaks are observed. This region of IR spectrum is called as finger print region of the molecule. It can be determined by characteristic peaks.

## Detection of impurities

Spectroscopy of the test sample to be determined is compared with the standard compound. If any additional peaks are observed in the IR spectrum, then it is due to impurities present in the compound.

## Quantitative analysis

The quantity of the substance can be determined either in pure form or as a mixture of two or more compounds. It of peaks for standard and test sample is compared. This is called base line technique to determine the quantity of the substance.

## Studying the progress of the reaction

Progress of chemical reaction can be determined by examining the small portion of the reaction mixture withdrawn from time to time. The rate of disappearance of a characteristic absorption band of the reactant group and/or the rate of appearance of the characteristic absorption band of the product group due to formation of product is observed.

## Solution Structure

The only method for atomic -resolution for structure determine of bio macro molecules in aqueous solutions under near physiological conditions or membrane mimetic environments.

## Importance of Conduct metric Titration

### Definition of Conduct meter

It is one of the important electro analytical techniques used in the physiochemical analysis. It is base on the measurement of electrical conductance.

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Application & Uses of Conduct Meter Titration