CHEMISTRY

Class – X

Chapter 2 : Acids, Bases and Salts

Topic : Acids and Bases

➢Acids and Bases

➢Sour and bitter tastes of food are due to acids and bases present in them respectively.

➢If a person is suffering from the problem of acidity due to overeating, then we suggest him to take baking soda solution as remedy.

➢It is based on the fact that, acids and bases have an ability to nullify the effect of each other.

➢**How can we decide sour and bitter substances without tasting them ?**

➢It is possible using acid-base indicators such as litmus, phenolphthalein, methyl orange etc.

➢Acids are sour in taste and change the colour of blue litmus to red.

➢Bases are bitter in taste and change the colour of red litmus to blue.

What are Acid-Base indicators ?

- Those substances which give different colours in acidic and basic mediums and indicate the presence of acid or base in a solution are called acid-base indicators.
- For example, litmus, phenolphthalein, methyl orange etc.
- Litmus is a natural indicator. It is a purple dye which is obtained from lichen (Plant belonging to division thallophyta). When the litmus solution is neither acidic nor basic, its colour is purple.

- Turmeric, red cabbage leaves, coloured petals of flowers like Hydrangea, petunia, Geranium etc. are other examples of natural indicators which indicate the presence of acid or base in a solution. These are also called acid-base indicators or simply indicators.
- You have noticed that, the stain of curry on a white cloth becomes reddish-brown when soap (which is basic in nature) is scrubbed on it. It turns yellow again when cloth is washed with plenty of water.

- Phenolphthalein and methyl orange are the examples of synthetic acid-base indicators.
- **Q.** You have been provided with three test-tubes. One of them contains distilled water and the other two contains an acidic solution and a basic solution respectively. If you are given only red litmus paper, how will you identify the content of each test tube ?

Colours of Litmus in Different Mediums

- Neutral medium – Purple
- Acidic medium – Red
- Basic medium – Blue
- Litmus is also available as paper strips in two variants i.e. red litmus and blue litmus.
- An acid turns a moist blue litmus paper to red.
- A base turns a moist red litmus paper to blue.

- **Synthetic acid-base indicators**
- **Colour of Methyl orange in Different Mediums**
- In a neutral medium – Orange
- In acidic medium – Red
- In basic medium – Yellow
- **Colour of Phenolphthalein in Different Mediums**
- In a neutral medium – Colourless
- In acidic medium – Remains colourless
- In basic medium – Pink

Olfactory Indicators

- There are certain substances which give different odour in acidic and basic mediums. These substances are called **olfactory indicators.** Onion, Clove oil and Vanilla extract etc. are the examples of olfactory indicators. These indicators retain their characteristic smell in acidic medium, but they lose their smell in basic medium. Thus, these indicators can be used to detect, whether a solution is acidic orbasic in nature.
- Olfactory indicators can be used to determine null point in acid-base titration called **olfactory titration.**

- **Activity 2.1**
- Collect the following samples from science laboratory-
- Hydrochloric acid (HCl)
- Sulphuric acid (H_2SO_4)
- Nitric acid (HNO_3)
- Acetic acid (CH_3COOH)

- Sodium hydroxide (NaOH)
- Calcium hydroxide [$(Ca(OH)_2$]
- Potassium hydroxide (KOH)
- Acetic acid (CH_3COOH)
- Magnisium hydroxide [$(Mg(OH)_2$]
- Ammonium hydroxide (NH_4OH)
- Put a drop of each of these solutions on a watch glass and test with a drop of following indicators-

- Red litmus solution
- Blue litmus solution
- Phenolphthalein solution
- Methyl orange solution
- What change in colour do you observe with each of these indicators. Tabulate your observations in following table-

Sample	Red litmus	Blue litmus	Phenolphthalein	Methyl orange

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