CHAPTER 02

Acids, Bases and Salts

Properties of acids and bases:

Properties of acids and bases can be identified by their chemical reactions.

Reaction with metals:

Metals react with most of the acid to displace hydrogen from them hence reaction of acid with metal gives salt and releases hydrogen gas.

Acid + Metal → Salt + Hydrogen gas

- If hydrogen gas is released, we can confirm that given substance is an acid.
- There are few metals, which can react even with bases. They are called as amphoteric metals.

Base + Metal → Salt + Hydrogen gas

Ex.

Zn (Zinc) is amphoteric and can react with bases also.

- All metals react with acids. Few metals react with bases also, which are called amphoteric metals.

Reaction with metal carbonates (or) metal hydrogen carbonates:

- Acids react with metal carbonates (or) metal hydrogen carbonated to form salt with release of carbon dioxide gas. Release of carbon dioxide gas can be observed by brisk effervescence observed, when reaction occurs.
- Reaction between acid and metal carbonate (or) metal bicarbonate can be described as,

  Acid + Metal carbonate/ Metal hydrogen carbonate $\rightarrow$ Salt + CO_2 + Water

- Carbon dioxide released can be passed into limewater. (Limewater is calcium hydroxide chemically). It forms a milky white precipitate of calcium carbonate.

$$Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$$

This further confirms that the compound taken is an acid. Milky white precipitate can be dissolved when excess of carbon dioxide is passed due to formation of calcium bicarbonate.

$CaCO_3 + CO_2 + H_2O \rightarrow Ca(HCO_3)_2$ [Calcium bicarbonate]

This is because calcium carbonate is insoluble and calcium bicarbonate is soluble.

Reaction of acids with bases:

Most of the acids react with almost all bases to form salt and water. We can describe the reaction between an acid and base as,

Acid + Base → Salt + Water

This reaction is also known as neutralization reaction. The reaction of an acid with a base to give salt and water is known as neutralization. These reactions can be observed analytically.

A calculated amount of acid is added in conical flask. A suitable indicator is added.

Ex.

Phenolphthalein indicator, 2 – 3 drops will be added. Base is added to contents of conical flask slowly by stirring. Neutralization point is observation of pink colour.

Neutralization reactions has much analytical importance.