Bases :

Bases are substances that can accept protons (H+) or donate a pair of valence electrons.

Arrhenius Theory: According to Svante Arrhenius, bases are substances that increase the concentration of hydroxide ions (OH) when dissolved in water.

BrønstedLowry Theory: In this theory, a base is defined as a substance that can accept a proton from an acid, which is a proton donor.

Lewis Theory: A Lewis base is an atom, ion, or molecule that donates an electron pair to form a covalent bond with a Lewis acid.

Properties of Bases:

- Have a bitter taste and slippery texture.
- Change the color of red litmus paper to blue.
- Conduct electricity in aqueous solution.
- React with acids to form salt and water, a reaction known as neutralization.
- pH Scale: Bases have a pH greater than 7 on the pH scale, which ranges from 0 to 14.
- Strength of Bases: Bases can be categorized as strong or weak, depending on their ability to dissociate in water.

Examples of Bases:

- Sodium hydroxide (NaOH), commonly known as lye.
- Potassium hydroxide (KOH), used in soaps and detergents.
- Ammonia (NH3), found in many household cleaners.

Uses of Bases:

- In medicine, for example, magnesium hydroxide as an antacid.
- In agriculture, to neutralize acidic soils.
- In cleaning agents, to dissolve grease and proteins.

Types of Bases:

Bases are substances that can accept protons or donate a pair of electrons to form a bond. They are classified based on their strength, solubility, and the number of hydroxyl ions they can produce.

Strong Bases: These are bases that ionize completely in an aqueous solution, producing a high concentration of hydroxide ions (OH). Examples include sodium hydroxide (NaOH) and potassium hydroxide (KOH).

Weak Bases: These bases do not ionize completely in water and produce a lower concentration of hydroxide ions. An example is ammonia (NH3), which partially ionizes to form ammonium (NH4+) and hydroxide ions.

Alkalis: A subset of bases that are soluble in water. All alkalis are bases, but not all bases are alkalis. For instance, sodium hydroxide is both a base and an alkali because it dissolves in water to give hydroxide ions.

Classification Based on Solubility:

- Soluble Bases: These are bases that dissolve in water to produce hydroxide ions. They are also known as alkalis, as mentioned above.

- Insoluble Bases: These bases do not dissolve in water and are often found as precipitates. An example is copper(II) hydroxide (Cu(OH)2).

Classification Based on the Number of Hydroxyl Ions:

- Monoacidic Bases: These bases can produce one hydroxide ion per molecule during dissociation. An example is KOH, which yields one potassium ion (K+) and one hydroxide ion (OH) in solution.

- Diacidic Bases: These bases can produce two hydroxide ions per molecule. An example is calcium hydroxide (Ca(OH)2), which dissociates to form one calcium ion (Ca2+) and two hydroxide ions.

- Triacidic Bases: These bases can produce three hydroxide ions per molecule. An example is

aluminum hydroxide (Al(OH)3), which yields one aluminum ion (Al3+) and three hydroxide ions.

Classification Based on Acidity:

- Monoacidic Bases: Bases that can neutralize one equivalent of an acid. For example, NaOH can neutralize one equivalent of hydrochloric acid (HCl).

- Polyacidic Bases: Bases that can neutralize more than one equivalent of an acid. Calcium hydroxide is an example, as it can neutralize two equivalents of HCl.

Classification Based on Strength and Concentration:

- Concentrated Bases: These are aqueous solutions with a high percentage of a base.They are usually strong and can be hazardous due to their corrosivity.

- Diluted Bases: These solutions have a lower percentage of the base and are less hazardous. They can be either strong or weak bases but are less concentrated than their counterparts.