CBSE Class 10 Science Chapter 2: Acids, Bases and Salts – Detailed Notes

Introduction

Chapter 2 of Class 10 Science deals with **Acids**, **Bases and Salts**, a fundamental topic in chemistry that explains the properties, reactions, and applications of these substances in everyday life.

1. What are Acids and Bases?

Acids

- Acids are substances that release H^+ ions (protons) in aqueous solution.
- Examples: Hydrochloric acid (HCl), Sulfuric acid (H₂SO₄), Nitric acid (HNO₃)
- Properties of acids:
 - Sour taste (like lemon juice, vinegar)
 - Turn blue litmus paper **red**
 - React with metals to produce hydrogen gas
 - React with bases to form salt and water (neutralization)

Bases

- Bases are substances that release OH⁻ ions (hydroxide ions) in aqueous solution.
- Examples: Sodium hydroxide (NaOH), Potassium hydroxide (KOH), Ammonium hydroxide (NH4OH)
- Properties of bases:
 - o Bitter taste
 - Slippery feel (like soap)
 - Turn red litmus paper blue
 - React with acids to form salt and water

2. Indicators and Their Use

- Indicators are substances that change color in acidic or basic solutions.
- Common indicators:
 - Litmus paper (red in acid, blue in base)
 - Methyl orange (red in acid, yellow in base)
 - Phenolphthalein (colorless in acid, pink in base)

Example:

- When you dip blue litmus paper in lemon juice (acid), it turns red.
- When you dip red litmus paper in soap solution (base), it turns blue.

3. pH Scale

- The pH scale measures the **acidity or alkalinity** of a solution.
- Scale ranges from 0 to 14:
 - \circ pH < 7: Acidic solution
 - \circ pH = 7: Neutral solution (pure water)
 - \circ pH > 7: Basic solution
- Strong acids have pH close to 0; strong bases have pH close to 14.

Example:

- Lemon juice has pH ~2 (acidic)
- Soap solution has pH ~12 (basic)
- Pure water has pH 7 (neutral)

4. Reactions of Acids and Bases

a) Acid + Metal → Salt + Hydrogen gas

Example: 2HCl+Zn \rightarrow ZnCl₂+H₂

b) Acid + Metal Carbonate -> Salt + Carbon dioxide + Water

Example 2HCl+Na2CO3→2NaCl+CO2+H2O

c) Acid + Base \rightarrow Salt + Water (Neutralization)

Example: HCl+NaOH→NaCl+H₂O

d) Base + Ammonium Salt -> Salt + Ammonia + Water

Example: NaOH+NH₄Cl→NaCl+NH₃+H₂O

5. Salts

- Salts are formed when acids react with bases, metals, or carbonates.
- Salts can be neutral, acidic, or basic depending on the parent acid and base.

- Common salts:
 - \circ Sodium chloride (NaCl) from HCl + NaOH
 - Copper sulfate (CuSO₄)
 - Sodium carbonate (Na₂CO₃)

6. Importance and Uses of Acids, Bases, and Salts

- Acids: Used in fertilizers, cleaning agents, food preservation (vinegar).
- Bases: Used in soap making, paper industry, medicines.
- Salts: Used in food seasoning (table salt), medicines, and various industries.

7. Household Substances and Their pH

Substance	pН	Acidic/Basic/Neutral
Lemon juice	~2	Acidic
Vinegar	~3	Acidic
Milk	~6.5	Slightly acidic
Pure water	7	Neutral
Baking soda (NaHCO3)	~9	Basic
Soap solution	~12	Basic
Bleach solution	~13	Basic

Example Questions

- 1. What happens when zinc reacts with dilute hydrochloric acid? Zinc reacts with dilute hydrochloric acid to produce zinc chloride and hydrogen gas. $Zn+2HCl \rightarrow ZnCl2+H2Zn + 2HCl \rightarrow ZnCl_2 + H_2Zn+2HCl \rightarrow ZnCl2+H2$
- 2. What indicator will you use to test for an acidic solution? Use blue litmus paper; it turns red in acidic solution.