

# Acids, Bases, and Salts

## Definitions

- **pH scale:** Measures acidity or alkalinity of solutions.
  - pH 7: Neutral
  - pH < 7: Acidic (higher concentration of H<sup>+</sup> ions)
  - pH > 7: Basic (higher concentration of OH<sup>-</sup> ions)
- **pH indicators:** Litmus paper, methyl orange, etc., used to determine pH.
- **Acids:** Substances that produce H<sup>+</sup> ions in aqueous solution.
- **Bases:** Substances that produce OH<sup>-</sup> ions in aqueous solution.
- **Neutralization:** Reaction between an acid and a base to form a salt and water.

## Properties of Acids and Bases

- **Acids:**
  - React with metals to produce hydrogen gas and a salt.
  - React with bases to produce a salt and water.
  - React with carbonates to produce a salt, water, and carbon dioxide.
- **Bases:**
  - React with acids to produce a salt and water.
  - React with ammonium salts to produce a salt, water, and ammonia.

## Strength of Acids and Bases

- **Strong acids:** Completely ionize in solution, producing a high concentration of H<sup>+</sup> ions.
- **Weak acids:** Partially ionize in solution, producing a low concentration of H<sup>+</sup> ions.

- **Strong bases:** Completely ionize in solution, producing a high concentration of OH<sup>-</sup> ions.
- **Weak bases:** Partially ionize in solution, producing a low concentration of OH<sup>-</sup> ions.

## Types of Oxides

- **Metal oxides:** Typically basic, react with acids to form salts.
- **Non-metal oxides:** Can be acidic, neutral, or amphoteric.
  - Acidic oxides: React with bases to form salts.
  - Neutral oxides: Do not react with acids or bases.
  - Amphoteric oxides: Can react with both acids and bases.

## Salt Preparation

- **Titration:** Used to prepare soluble salts from a soluble acid and base.
- **Neutralization of insoluble base:** Acid is added to excess base, followed by filtration and evaporation.
- **Metal reacting with acid:** Produces salts of certain metals.
- **Precipitation:** Mixing solutions containing soluble salts to form an insoluble precipitate.

## Ion and Gas Identification

- **Ion identification:** Use flame tests, precipitation reactions, or pH indicators.
- **Gas identification:** Use litmus paper, limewater, or pop test.

### Remember:

- Practice balancing chemical equations and writing ionic equations.
- Understand the properties and reactions of acids, bases, and salts.
- Be familiar with the different methods of preparing salts.
- Practice identifying ions and gases based on their characteristic properties.