Basic Chemistry Concepts

1. Matter and Its Properties

- Matter: Anything that occupies space and has mass.

- States of Matter: Solid, liquid, gas, plasma, and Bose-Einstein condensates.

- Physical Properties: Observable without changing composition (e.g., color, density).

- Chemical Properties: Describe how matter interacts (e.g., flammability).

2. Atomic Structure

- Atom: Basic unit of matter with protons, neutrons, and electrons.

- Protons: Positive charge; found in nucleus.

- Neutrons: Neutral charge; found in nucleus.

- Electrons: Negative charge; orbit the nucleus.

3. Periodic Table

- Organized by increasing atomic number.

- Groups: Vertical columns with similar properties.

- Periods: Horizontal rows indicating energy levels.

4. Chemical Bonds

- Ionic Bonds: Transfer of electrons between atoms.

- Covalent Bonds: Sharing of electrons between atoms.

- Metallic Bonds: Electrons shared in a "sea" among metal atoms.

5. States of Matter and Changes

- Physical Changes: Alter appearance, not composition (e.g., melting).

- Chemical Changes: Result in new substances (e.g., rusting).

6. Acids and Bases

- Acids: Substances that release H+ ions in water (e.g., HCl).

- Bases: Substances that release OH- ions in water (e.g., NaOH).

- pH Scale: Measures acidity or alkalinity (0-14).

7. Chemical Reactions

- Indicators: Color change, gas production, temperature change.

- Types: Synthesis, decomposition, single displacement, double displacement.

8. Energy in Chemistry

- Exothermic Reactions: Release energy (e.g., combustion).

- Endothermic Reactions: Absorb energy (e.g., photosynthesis).

- Conservation of Energy: Energy is neither created nor destroyed.

9. Basic Units of Measurement

- Mass: Measured in grams (g).

- Volume: Measured in liters (L).

- Temperature: Measured in Celsius (°C) or Kelvin (K).

10. Environmental Chemistry

- Greenhouse Gases: CO_2, CH_4 contribute to global warming.

- Renewable Energy: Solar, wind, and hydropower are sustainable alternatives.