

Comprehension Questions - Module 2: Basic Chemistry

Atomic Structure

1. Explain how the structure of an atom determines its chemical properties.
2. Compare and contrast protons, neutrons, and electrons in terms of their location, charge, and role in chemical bonding.
3. How do isotopes of the same element differ, and why are some isotopes useful in biological research?

Chemical Bonds

1. Describe the differences between ionic, covalent, and hydrogen bonds, and give examples of each in biological systems.
2. Explain how the polarity of water molecules contributes to its unique properties.
3. How do chemical bonds store energy, and how is this energy released in biological processes?

Water and Solutions

1. Explain how water's properties (cohesion, adhesion, surface tension, specific heat) are important for life.
2. Compare and contrast acids, bases, and buffers, and explain their importance in biological systems.
3. How does pH affect biological molecules and processes?

Chemical Reactions

1. Explain the difference between endergonic and exergonic reactions, and give examples of each in living organisms.
2. How do enzymes catalyze chemical reactions, and why are they essential for life?
3. Describe the relationship between reactants, products, and activation energy in chemical reactions.

Biological Molecules Overview

1. How do the four major classes of biological molecules (carbohydrates, lipids, proteins, nucleic acids) differ in structure and function?
2. Explain how the structure of biological molecules relates to their function.