

Chapter 3 Review - Filled Answers

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1. Carbon - central atom in living systems (likes to form chains and rings).
2. Inorganic molecules - molecules that do NOT contain carbon.
3. Organic molecules - molecules that DO contain carbon.
4. Double bond - two shared pairs of electrons.
5. Isomers - same chemical formula, yet different structural formula.
6. Amino group (-NH₂) - amino functional group.
7. Proteins (polypeptides) - polymers made up of amino acids.
8. Carbohydrates - molecules consisting of carbon, hydrogen, and oxygen.
9. Nucleic acids (DNA and RNA) - DNA and RNA.
10. Lipids - large, nonpolar molecules that do not readily dissolve in polar substances.

11. Difference between organic and inorganic molecules:
 - Organic molecules contain carbon and are usually associated with living organisms.
 - Inorganic molecules typically do not contain carbon and are associated with non-living matter.

12. Functional group and its importance:
 - A functional group is a group of atoms within a molecule that gives it specific chemical properties.They are crucial because they determine how the molecule behaves in chemical reactions.

13. The seven functional groups: Hydroxyl (-OH), Carbonyl (C=O), Carboxyl (-COOH), Amino (-NH₂), Phosphate (-OPO₃²⁻), Methyl (-CH₃), and Sulfhydryl (-SH).

14. Difference between simple and complex carbohydrates:
 - Simple carbohydrates consist of one or two sugar units (monosaccharides and disaccharides).

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- Complex carbohydrates are polysaccharides composed of many sugar units.

15. Proteins composition and importance of shape:

- Proteins are composed of amino acids linked by peptide bonds.

- The overall shape of a protein determines its function, such as catalyzing reactions, transporting molecules, or providing structural support.

16. Three major differences between DNA and RNA:

- DNA is double-stranded; RNA is single-stranded.

- DNA contains deoxyribose sugar; RNA contains ribose sugar.

- DNA has thymine (T) as a base; RNA has uracil (U).

17. Three different kinds of lipids:

- Fats (Triglycerides) - Energy storage molecules made of glycerol and fatty acids.

- Phospholipids - Major components of cell membranes.

- Steroids - Include hormones like testosterone and estrogen.