



**Multiple-Choice Questions for Unit 1:
Chemistry of Life**

Directions: Read each question. Select the **most** appropriate answer from the provided choices. Use the formula sheet in this book for this section. Always decide which answer choice is the **most** accurate for each question. You may use a calculator in this section.

Analyze the information about the following protein.

View A

Met-His-Glu-Asp-Val-His-Try-Val-His-Iso-Met-Asp-His-Val-Glu-Phe-Phe-Val

View B

Met-His,-**Alpha Helix with 6 amino acids**, His-Iso-Met-Asp, **Beta Pleated Sheet for final amino acids**

1. Proteins experience an extensive folding process that is directed by the chaperone proteins. Due to this folding, proteins have very intricate structures. Which statement is correct after examining these two views of the protein fragment?
 - (A) View A provides the overall three-dimensional tertiary structure of the protein.
 - (B) View B provides the periodic folding patterns reinforced through hydrogen bonding that are characteristic of the secondary structure of a protein.
 - (C) View A provides the combination of many subunits that occurs in the quaternary structure of a protein.
 - (D) View B provides the sequence of amino acids that is common in the primary structure of a protein.
2. Jillian and Jared are college students that have just experimentally isolated a molecule. How would they determine if the unknown compound was an organic molecule?
 - (A) They would measure the solubility of the molecule in water.
 - (B) They would see if adding an ion such as potassium would disrupt the structure.
 - (C) They would try to see if there were two oxygen molecules held together by a double covalent bond.
 - (D) They would try to see if there were 2 or more carbons linked together by covalent bonds.



3. Hydrogen bonds are biologically important. Hydrogen bonds are intermolecular attractions that form between whole molecules. All of the following examples display hydrogen bonding **EXCEPT**
- (A) the high specific heat of water because much energy is needed to keep breaking hydrogen bonds.
 - (B) the alpha helix structure present in proteins.
 - (C) keeping together the two complementary strands of nucleotides in DNA.
 - (D) formation of disulfide bridges between sulfur-containing amino acids.
4. A team of researchers performed an experiment where they measured the percentage of the four major organic molecules in cells. They have given the average percentage for the cells they have measured in the following table. Through research they have expected percentages to use for comparison.

What elements are most abundant in lipids?

- (A) Carbon, hydrogen, oxygen and nitrogen are most abundant.
- (B) Sulfur, potassium and magnesium are most abundant.
- (C) Carbon and hydrogen are most abundant.
- (D) Carbon, nitrogen and phosphorous. are most abundant.



5. What elements are abundant in proteins that are mostly absent from the lipids?
- (A) Oxygen is the only atom that answers this questions.
 - (B) Oxygen, nitrogen and sulfur are the only atoms that answers this questions.
 - (C) Phosphorous and magnesium are the only atoms that answers this questions.
 - (D) Sodium and calcium are the only atoms that answers this questions.
6. Water striders glide easily on top of the water surface. What allows this ease of movement for the water striders?
- (A) Ice is less dense than liquid water.
 - (B) The high specific heat of water allows for this motion of the water strider.
 - (C) Covalent bonding between the water strider body and the water surface.
 - (D) Hydrogen bonding at the water surface creates a surface tension.



7. Nucleic acids are very important in biological organisms. All living organisms use nucleic acids. Which of these is not a function of RNA?
- (A) RNA can be used as an intermediate to convert DNA to proteins.
 - (B) RNA can bind to amino acids and carry them to the ribosomes.
 - (C) RNA is the genetic material in modern day yeast.
 - (D) RNA was the genetic material in an extinct ancient prokaryote.
8. Nucleic acids are very important in biological organisms. All living organisms use nucleic acids. What is a major structural difference when DNA is compared to RNA?
- (A) DNA is mostly double stranded.
 - (B) RNA is mostly double stranded.
 - (C) RNA uses deoxyribose as its primary sugar.
 - (D) DNA uses uracil as one of its nitrogenous bases.
9. Geckos have a unique ability in that they are able to walk upside down on the ceiling. Geckos' toe pads have surfaces of momentary charged particles that are mostly nonpolar. The ceiling has a nonpolar surface as well. What allows this unusual trait of suspending their weights upside down?
- (A) The surfaces have ionic bonds between the cations in the gecko and the anions on the ceiling.
 - (B) The surfaces have hydrogen bonds due to the predictable charged surfaces.
 - (C) The surfaces have covalent bonds that hold the gecko onto the surface of the ceiling very strongly.
 - (D) The surfaces have very numerous weak temporary van der Waals interactions that hold the gecko to the ceiling surface.