

REVIEW UNIT 3: BIOCHEMISTRY PRACTICE QUESTIONS**AP BIOLOGY**

1. Which of the following is an example of a hydrogen bond?
 - a. The peptide bond between amino acids in a protein
 - b. The bond between an oxygen atom and a hydrogen in the carboxyl group of a fatty acid.
 - c. The bond between Na⁺ and Cl⁻ in salt
 - d. The attraction between a hydrogen of one water molecule and the oxygen of another water molecule.
 - e. The bond between carbon and hydrogen in methane
2. A feature of organic compounds NOT found in inorganic compounds is the presence of
 - a. ionizing chemical groups
 - b. electrons
 - c. carbon atoms covalently bonded to each other
 - d. oxygen
 - e. hydrogen bond

Questions 3-7. Choose an item from the list below that is best associated with the following statements.

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|-----------------|----------------|-----------------|
| A. Glycocalyx | B. Cholesterol | C. Triglyceride |
| D. Phospholipid | E. Protein | |

3. Carbohydrate-containing layer at the surface of the plasma membrane
 4. The major component of the fluid bilayer of a plasma membrane
 5. Carrier molecule in the plasma membrane
 6. Steroid affecting the fluidity of the plasma membrane
 7. ATP synthase (synthetase) in the inner mitochondrial and chloroplast membrane
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8. The bonding of two amino acid molecules to form a larger molecule requires
 - a. the release of a water molecule
 - b. the release of a carbon dioxide molecule
 - c. the addition of a nitrogen atom
 - d. the addition of a water molecule
 - e. an increase in activation energy
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9. Which of the following best characterizes the reaction represented below
$$A + B + \text{energy} \rightarrow AB$$
 - a. hydrolysis
 - b. catabolism
 - c. oxidation-reduction
 - d. exergonic reaction
 - e. endergonic reaction

10. Which of the following can be used to determine the rate of enzyme-catalyzed reactions
- rate of disappearance of the enzyme
 - rate of disappearance of the substrate
 - rate of disappearance of the product
 - change in volume of the solution
 - increase in activation energy
11. Which of the following characterizes glomerular filtrate, the fluid that passes from the blood in the glomerulus into the tubule of the nephron?
- It is clear in appearance and contains no glucose
 - It is a concentrated solution of waste products
 - It is identical to blood plasma
 - It is blood plasma that lacks most proteins
 - It is whole blood

Sample Free Response Questions

FRQ A

Water is important for all living organisms. The functions of water are directly related to its physical properties.

- Describe how the properties of water contribute to TWO of the following
 - Transpiration
 - thermoregulation in endotherms
 - plasma membrane structure
- Water serves as a reactant and a product in the carbon cycle. Discuss the role of water in the carbon cycle.
- Discuss the impact of one human activity on the water cycle

FRQ B

The physical form of cells and organisms is often influenced by special structural polymers. Choose one polymer from each of the following three pairs of polymers:

- Pair 1: tubulin . . myosin
- Pair 2: cellulose . . chitin
- Pair 3: messenger RNA . . transfer RNA

For each of the three polymers you have chosen, describe its structure, and role in a cell or organism.

FRQ C

Proteins — large complex molecules — are building blocks of all living organisms. Discuss the following in relation to proteins.

- the chemical composition and levels of structure of proteins
- the roles of DNA and RNA in protein synthesis
- the roles of proteins in membrane structure and transport of molecules across the membrane

FRQ D

Homeostasis, maintaining a steady-state internal environment, is a characteristic of all living organisms.

Choose three of the following physiological parameters and for each, describe how homeostasis is maintained in an organism of your choice. Be sure to indicate what animal you have chosen for each parameter. You may use the same animal or different animals for your three descriptions.

- Blood-glucose levels
- Body temperature
- pH of blood
- Osmotic concentration of the blood
- Neuron resting-membrane potential