

JLAB Academic Practice Test (Sample)

Study Guide



Everything you need from our exam experts!

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SAMPLE

Questions

- 1. What are the levels of ecological organization?**
 - A. Cell, tissue, organ, system**
 - B. Organism, population, community, ecosystem, biome, biosphere**
 - C. Species, habitat, food chain, biome**
 - D. Individual, society, community, ecosystem**
- 2. What is the primary product of glycolysis?**
 - A. NADH**
 - B. ATP**
 - C. Pyruvate**
 - D. Carbon dioxide**
- 3. What does osmosis refer to?**
 - A. The movement of solutes across a cell membrane**
 - B. The diffusion of water across a semipermeable membrane**
 - C. The active transport of minerals in cells**
 - D. The passive movement of gases within a solution**
- 4. What does the periodic table represent?**
 - A. A classification of molecules**
 - B. A table showing all compounds**
 - C. A table of elements arranged by atomic number**
 - D. A summary of chemical reactions**
- 5. What does malleability refer to?**
 - A. The ability to conduct heat**
 - B. The ability to be bent and rolled into sheets**
 - C. The tendency of a substance to shatter**
 - D. The ability to dissolve in water**
- 6. In terms of vocabulary, which term can be defined as words with similar meanings?**
 - A. Antonyms**
 - B. Synonyms**
 - C. Homonyms**
 - D. Contronyms**

- 7. In the equation $7 - 2(x - 3) = 1$, what is the value of x ?**
- A. $x = 4$**
 - B. $x = 6$**
 - C. $x = 2$**
 - D. $x = 5$**
- 8. What is a solid characterized by?**
- A. A definite volume but no definite shape**
 - B. Free-moving particles with no definite shape**
 - C. A definite shape and volume with particles vibrating in place**
 - D. A state of matter that changes easily**
- 9. Which suffix is typically used to form nouns from verbs?**
- A. less**
 - B. ment**
 - C. er**
 - D. est**
- 10. What is another name for the lymphatic system?**
- A. Respiratory system**
 - B. Immunity system**
 - C. Circulatory system**
 - D. Endocrine system**

Answers

SAMPLE

1. B
2. C
3. B
4. C
5. B
6. B
7. B
8. C
9. B
10. B

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Explanations

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1. What are the levels of ecological organization?

A. Cell, tissue, organ, system

B. Organism, population, community, ecosystem, biome, biosphere

C. Species, habitat, food chain, biome

D. Individual, society, community, ecosystem

The levels of ecological organization are best represented by the sequence that includes organism, population, community, ecosystem, biome, and biosphere. This hierarchy showcases how living organisms are arranged in increasingly complex structures. Starting with the individual organism, this is the basic unit of ecology and refers to a single living entity. A population consists of multiple individuals of the same species occupying a particular area, allowing for interaction and reproduction. Communities encompass all the different populations in a specific area, highlighting the interactions between various species. An ecosystem includes both the biological community and the physical environment, incorporating both living (biotic) and non-living (abiotic) components. Moving further up the organization scale, a biome is a large geographic area characterized by distinct climate and organisms, such as deserts or forests. Finally, the biosphere represents the global sum of all ecosystems, illustrating the intricate interconnections of life on Earth. This structure emphasizes the relationships and interactions at each level, providing a comprehensive framework for studying ecological dynamics and systems. The other options do not accurately represent the full range of ecological organization or focus on a different aspect not central to ecological study.

2. What is the primary product of glycolysis?

A. NADH

B. ATP

C. Pyruvate

D. Carbon dioxide

The primary product of glycolysis is pyruvate. Glycolysis is a metabolic process that occurs in the cytoplasm of the cell, where glucose, a six-carbon sugar, is broken down into two three-carbon molecules of pyruvate. This process involves a series of enzyme-catalyzed reactions and occurs in the absence of oxygen, making it an anaerobic pathway. In addition to pyruvate, glycolysis produces NADH and a net gain of ATP. However, the main goal of glycolysis is to convert glucose into pyruvate, which can then enter the Krebs cycle (or citric acid cycle) for further energy extraction, especially in aerobic conditions. The production of pyruvate is crucial because it serves as a key intermediate that links several metabolic pathways, including fermentation and cellular respiration. While NADH and ATP are also important outputs of glycolysis, they are not the primary end product; instead, they serve as energy carriers. Similarly, carbon dioxide is not produced in glycolysis itself but is generated during the Krebs cycle when pyruvate is further processed. Hence, pyruvate is accurately identified as the primary product of glycolysis.

3. What does osmosis refer to?

- A. The movement of solutes across a cell membrane
- B. The diffusion of water across a semipermeable membrane**
- C. The active transport of minerals in cells
- D. The passive movement of gases within a solution

Osmosis specifically refers to the process in which water molecules move across a semipermeable membrane from an area of lower solute concentration to an area of higher solute concentration. This movement occurs in order to equalize solute concentrations on both sides of the membrane. The key characteristic of osmosis is that it involves the selective passage of water while solutes cannot freely pass through the membrane, making it a critical process for maintaining cellular homeostasis. In contrast, the other options describe different biological and chemical processes. The movement of solutes across a cell membrane refers to general diffusion or active transport, which does not specifically pertain to water. The active transport of minerals involves energy use to move substances against their concentration gradient, while the passive movement of gases relates to gas diffusion rather than the specific movement of water in osmosis. Hence, the definition of osmosis is accurately captured by the diffusion of water across a semipermeable membrane.

4. What does the periodic table represent?

- A. A classification of molecules
- B. A table showing all compounds
- C. A table of elements arranged by atomic number**
- D. A summary of chemical reactions

The periodic table is a systematic arrangement of chemical elements, organized primarily by atomic number, which reflects the number of protons in an atom's nucleus. This arrangement not only groups elements with similar properties together but also shows the periodic trends in their behaviors, such as electronegativity and atomic radius. Each element in the table is presented with its chemical symbol, atomic mass, and additional information, making it an essential tool for understanding the elements that compose matter. The organization by atomic number is fundamental because it influences the chemical properties of an element, which are critical for predictions about how different elements will interact in chemical reactions. This representation allows scientists and students of chemistry to quickly access important information about elements, making it a cornerstone of chemical education and research.

5. What does malleability refer to?

- A. The ability to conduct heat
- B. The ability to be bent and rolled into sheets**
- C. The tendency of a substance to shatter
- D. The ability to dissolve in water

Malleability specifically refers to the ability of a material, typically metals, to be deformed under compressive stress. This property allows metals to be shaped by processes such as rolling or hammering into thin sheets without breaking. Malleable materials can easily change shape when subjected to force, making them ideal for a variety of manufacturing processes. This characteristic is crucial in industries where creating metal sheets or intricate shapes is necessary. Although other properties of materials are equally important—such as electrical conductivity, solubility in water, or brittleness—the specific ability to be bent or rolled into sheets defines malleability and is what makes it a key term in materials science and engineering.

6. In terms of vocabulary, which term can be defined as words with similar meanings?

- A. Antonyms
- B. Synonyms**
- C. Homonyms
- D. Contronyms

The term that refers to words with similar meanings is synonyms. Synonyms are words that can be used interchangeably because they convey the same or nearly identical meanings. For instance, "happy" and "joyful," or "fast" and "quick" are examples of synonyms. They enrich language by allowing for variation in expression while conveying the same underlying idea. The other terms listed encompass different concepts. Antonyms refer to words that have opposite meanings, such as "hot" and "cold." Homonyms are words that sound the same or are spelled the same but have different meanings, like "bat" (the animal) and "bat" (used in sports). Contronyms, on the other hand, are words that can have opposite meanings depending on the context, such as "cleave," which can mean both to cut apart and to stick together. Understanding the difference between these terms highlights why synonyms specifically denote words with similar meanings, making them essential for effective communication.

7. In the equation $7 - 2(x - 3) = 1$, what is the value of x?

- A. $x = 4$
- B. $x = 6$**
- C. $x = 2$
- D. $x = 5$

To solve the equation $7 - 2(x - 3) = 1$, we first simplify it step by step. Starting with the original equation, we distribute the -2 through the parentheses: $7 - 2(x - 3)$ becomes $7 - 2x + 6$, since -2 times -3 is +6. This simplifies to: $7 + 6 - 2x = 1$. Combining the constants on the left side gives us: $13 - 2x = 1$. Next, we isolate the term containing x by subtracting 13 from both sides: $-2x = 1 - 13$, $-2x = -12$. Now, to solve for x, we divide both sides by -2, which gives us: $x = -12 / -2$, $x = 6$. Thus, the value of x in the equation is 6, confirming that this solution aligns correctly with the choices provided.

8. What is a solid characterized by?

- A. A definite volume but no definite shape
- B. Free-moving particles with no definite shape
- C. A definite shape and volume with particles vibrating in place**
- D. A state of matter that changes easily

A solid is characterized by having a definite shape and a definite volume, which distinguishes it from other states of matter. The particles in a solid are closely packed together, which allows them to maintain a fixed structure. Although these particles are not rigidly locked in place, they do vibrate in place, meaning they have limited movement, primarily confined to small vibrations around fixed positions. This structural arrangement is what gives solids their characteristic properties, such as being incompressible and maintaining their shape without the influence of external forces. In contrast, the other definitions outline characteristics of liquids or gases, where particles may have more kinetic energy and are less tightly packed, resulting in different behaviors in terms of shape and volume. For instance, liquids have a definite volume but no definite shape, and gases have neither a definite shape nor volume and consist of free-moving particles. The state of matter that changes easily signifies a property inherent to gases or some liquids, as solids generally maintain their state under standard conditions.

9. Which suffix is typically used to form nouns from verbs?

- A. less
- B. ment**
- C. er
- D. est

The suffix "ment" is commonly used to form nouns from verbs. When added to a verb, "ment" helps to create a noun that signifies the action or resulting state of the verb. For example, from the verb "achieve," the noun "achievement" is derived by adding "ment." This transformation highlights the act or process associated with the verb. Additionally, while there are other suffixes that can also form nouns, such as "er" which indicates a person who performs the action of a verb (like "teacher" from "teach"), "ment" specifically refers to the action or a resulting state rather than the agent performing the action. Thus, "ment" is the most appropriate choice when identifying a suffix that transforms a verb into a noun that embodies the concept of that action or state.

10. What is another name for the lymphatic system?

A. Respiratory system

B. Immunity system

C. Circulatory system

D. Endocrine system

The lymphatic system is often referred to as part of the immunity system because it plays a crucial role in the immune response. This system is responsible for transporting lymph, a fluid containing infection-fighting white blood cells, throughout the body. In addition to defending against pathogens, the lymphatic system also helps in the removal of waste products and excess fluids from tissues. By facilitating the movement of lymphocytes and other immune cells, it enhances the body's ability to respond to infections and maintain overall health. In contrast, the other systems mentioned have distinct functions. The respiratory system is primarily involved in gas exchange, the circulatory system focuses on blood transport and nutrient delivery, and the endocrine system regulates hormones. Thus, the lymphatic system's specific connection to immune function makes the term "immunity system" appropriate.