

Algonquin College Health Program Assessment (AC-HPAT) Practice Exam (Sample)

Study Guide



Everything you need from our exam experts!

Copyright © 2025 by Examzify - A Kaluba Technologies Inc. product.

ALL RIGHTS RESERVED.

No part of this book may be reproduced or transferred in any form or by any means, graphic, electronic, or mechanical, including photocopying, recording, web distribution, taping, or by any information storage retrieval system, without the written permission of the author.

Notice: Examzify makes every reasonable effort to obtain from reliable sources accurate, complete, and timely information about this product.

SAMPLE

Questions

SAMPLE

- 1. Which type of transport requires energy to move substances across the plasma membrane?**
 - A. Facilitated diffusion**
 - B. Diffusion**
 - C. Active transport**
 - D. Osmosis**
- 2. What is an ionic compound?**
 - A. A compound formed by two non-metals**
 - B. A compound formed by combining an anion and a cation**
 - C. A pure element that is charged**
 - D. A compound held together by covalent bonds**
- 3. Which element's molar mass is closest to 1 g?**
 - A. Hydrogen**
 - B. Oxygen**
 - C. Carbon**
 - D. Helium**
- 4. Where are the cell's chromosomes stored?**
 - A. Cytoplasm**
 - B. Nucleus**
 - C. Ribosomes**
 - D. Endoplasmic reticulum**
- 5. What is the genotype of an organism?**
 - A. The observable characteristics resulting from environmental interactions**
 - B. The genetic makeup determining an organism's traits**
 - C. The process by which traits are expressed in phenotypes**
 - D. The sum of all genes present in an ecosystem**
- 6. What is an anion?**
 - A. A positively charged ion**
 - B. A neutrally charged particle**
 - C. A negatively charged ion**
 - D. A type of atomic nucleus**

- 7. Which statement about the relationship between genotype and phenotype is true?**
- A. Genotype is always expressed as the phenotype**
 - B. Phenotype results from the interaction of genotype with the environment**
 - C. Genotype has no influence on the phenotype**
 - D. Phenotype determines genetic outcomes**
- 8. What is the most abundant gas in the atmosphere?**
- A. Oxygen**
 - B. Carbon dioxide**
 - C. Nitrogen**
 - D. Argon**
- 9. Which of these is a substrate for cellular respiration?**
- A. Oxygen**
 - B. Glucose**
 - C. Fatty acids**
 - D. Amino acids**
- 10. What are the three categories of symbiotic relationships?**
- A. Competition, Predation, Symbiosis**
 - B. Mutualism, Commensalism, and Parasitism**
 - C. Commensalism, Amensalism, and Neutralism**
 - D. Parasitism, Predation, and Competition**

Answers

SAMPLE

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

SAMPLE

Explanations

SAMPLE

1. Which type of transport requires energy to move substances across the plasma membrane?

- A. Facilitated diffusion**
- B. Diffusion**
- C. Active transport**
- D. Osmosis**

Active transport is the process that requires energy to move substances across the plasma membrane against their concentration gradient. This means that molecules are moved from an area of lower concentration to an area of higher concentration, which is not a spontaneous process and therefore requires energy typically in the form of ATP. In contrast, facilitated diffusion, diffusion, and osmosis are passive processes that do not require energy. Facilitated diffusion uses transport proteins to help move substances across the membrane without the input of energy, while diffusion refers to the movement of particles from a region of higher concentration to one of lower concentration until equilibrium is reached. Osmosis is a specific type of diffusion that involves the movement of water across a selectively permeable membrane. Since all these processes rely on existing concentration gradients, they do not require additional energy input. Thus, the requirement for energy in active transport distinguishes it from these other transport mechanisms.

2. What is an ionic compound?

- A. A compound formed by two non-metals**
- B. A compound formed by combining an anion and a cation**
- C. A pure element that is charged**
- D. A compound held together by covalent bonds**

An ionic compound is specifically defined as a compound that results from the combination of an anion (negatively charged ion) and a cation (positively charged ion). This relationship arises from the transfer of electrons, where one atom donates electrons to another, leading to the formation of ions. The electrostatic attraction between these opposite charges holds the ions together in a crystalline structure, characterized by elevated melting and boiling points, as well as electrical conductivity when dissolved in water or melted. The identification of ionic compounds is key in understanding chemical bonding. Typically, ionic compounds are formed between metals and non-metals, where the metal tends to lose electrons and the non-metal tends to gain them. This fundamental concept in chemistry underlines the role of ionic bonds in forming stable compounds with distinct properties. The other options do not accurately capture this definition. Compounds formed by two non-metals primarily involve covalent bonding rather than ionic bonding. A pure element that is charged does not constitute a compound; instead, it refers to an individual ion. Lastly, a compound held together by covalent bonds does not qualify as an ionic compound, as covalent bonds involve the sharing of electrons rather than the transfer and attraction of charged particles.

3. Which element's molar mass is closest to 1 g?

A. Hydrogen

B. Oxygen

C. Carbon

D. Helium

Hydrogen indeed has a molar mass that is closest to 1 g. The molar mass of hydrogen is approximately 1.008 g/mol, making it the lightest element on the periodic table. This lightweight characteristic is significant, especially in various chemical reactions, as it allows for a higher rate of kinetic activity and influences the properties of different compounds. In comparison, oxygen has a molar mass of about 16 g/mol, which is considerably higher than hydrogen. Carbon has a molar mass of approximately 12 g/mol, reflecting its position as a central element in organic chemistry. Helium, being a noble gas, has a molar mass around 4 g/mol, still more than that of hydrogen but lightweight nonetheless. Understanding these values is important for students in health and science fields as it relates to stoichiometry and the calculation of reactions involving different gases and elements.

4. Where are the cell's chromosomes stored?

A. Cytoplasm

B. Nucleus

C. Ribosomes

D. Endoplasmic reticulum

The chromosomes of a cell are stored in the nucleus, which serves as the control center of the cell. The nucleus is a membrane-bound organelle that contains the genetic material (DNA) organized into chromosomes. This arrangement allows for the protection of DNA and the regulation of gene expression, as well as facilitating processes such as replication and transcription. The nucleus is central to many cellular functions, providing a distinct environment where genetic information can be accessed and utilized efficiently. This structural organization is vital for cell division and the careful preservation of genetic information across generations. In contrast, other cellular components such as the cytoplasm, ribosomes, and endoplasmic reticulum have different functions related to metabolism, protein synthesis, and cellular transport, but they do not store chromosomes.

5. What is the genotype of an organism?

- A. The observable characteristics resulting from environmental interactions
- B. The genetic makeup determining an organism's traits**
- C. The process by which traits are expressed in phenotypes
- D. The sum of all genes present in an ecosystem

The genotype of an organism refers to its specific genetic makeup, which includes all the alleles present for a given trait or traits. This genetic composition plays a crucial role in determining an organism's characteristics, known as phenotypes, which are the observable traits influenced by both the genotype and the environment. Understanding the genotype is essential in fields such as genetics, biology, and health sciences, as it helps in predicting how traits may be passed on to the next generation and how they may manifest in terms of physical or behavioral traits. The other options do not accurately define genotype. The observable characteristics resulting from environmental interactions describe the phenotype rather than the genotype. The process by which traits are expressed in phenotypes again refers to the interaction between genetic makeup and environmental factors, separate from the actual genetic blueprint itself. The sum of all genes present in an ecosystem touches on ecological genetics but does not define the specific genetic makeup of an individual organism, which is what the term genotype specifically refers to.

6. What is an anion?

- A. A positively charged ion
- B. A neutrally charged particle
- C. A negatively charged ion**
- D. A type of atomic nucleus

An anion is defined as a negatively charged ion. This occurs when an atom gains one or more electrons, resulting in an excess of negative charge relative to the number of positively charged protons in the nucleus. The gaining of electrons diminishes the overall electrical balance, leading to a net negative charge. Understanding the formation of anions is essential in various fields, including chemistry and biology, as they play crucial roles in chemical reactions and biological processes. For example, many biological molecules, such as nucleic acids and proteins, can carry anionic charges that influence their structure and function in physiological environments. In contrast, the formation of positive ions (cations) involves the loss of electrons, which is what distinguishes anions from cations. A neutral particle lacks overall charge, while an atomic nucleus refers to the central part of an atom made up of protons and neutrons, not directly related to the concept of ion charge. This background helps clarify why the definition of an anion is specifically linked to a negatively charged ion.

7. Which statement about the relationship between genotype and phenotype is true?

A. Genotype is always expressed as the phenotype

B. Phenotype results from the interaction of genotype with the environment

C. Genotype has no influence on the phenotype

D. Phenotype determines genetic outcomes

The statement that phenotype results from the interaction of genotype with the environment is accurate because it captures the essence of how an organism's traits are developed. The genotype refers to the genetic makeup of an individual, which consists of the alleles inherited from their parents. However, the phenotype, which is the observable characteristics or traits, doesn't arise solely from the genotype. Environmental factors such as nutrition, climate, and exposure to toxins can significantly influence how the genotype is expressed. This concept highlights the importance of the environment in shaping traits, making it clear that the relationship between genotype and phenotype is not a direct one-to-one correspondence. Instead, it involves complex interactions that can lead to variations in phenotype even among individuals with identical genotypes. This understanding is fundamental in fields such as genetics, biology, and medicine, where acknowledging both genetic and environmental factors is crucial for fully grasping how traits are expressed in living organisms.

8. What is the most abundant gas in the atmosphere?

A. Oxygen

B. Carbon dioxide

C. Nitrogen

D. Argon

The most abundant gas in the atmosphere is nitrogen, which comprises about 78% of the Earth's atmosphere by volume. This significant presence plays a crucial role in various processes, including the nitrogen cycle, which is essential for life as it helps in the formation of amino acids and proteins necessary for all living organisms. Understanding the composition of the atmosphere is fundamental in fields such as environmental science and biology, as it helps explain phenomena such as air quality, climate change, and the biodiversity of ecosystems. While other gases like oxygen are vital for respiration and combustion, they are present in much smaller amounts, constituting about 21% of the atmosphere. Carbon dioxide and argon are present in even lesser concentrations, with carbon dioxide being important for photosynthesis and global warming discussions. Thus, nitrogen's dominance highlights its essential role in supporting life and maintaining atmospheric balance.

9. Which of these is a substrate for cellular respiration?

- A. Oxygen**
- B. Glucose**
- C. Fatty acids**
- D. Amino acids**

The most relevant substrate for cellular respiration among the options provided is glucose. Glucose plays a central role in the metabolic pathway known as glycolysis, where it is broken down to produce energy in the form of ATP. During this process, glucose undergoes oxidation, and its chemical energy is harnessed by the cell. While other options such as fatty acids and amino acids can also serve as substrates for cellular respiration, they are typically utilized in different metabolic pathways or during specific circumstances. Fatty acids undergo beta-oxidation to enter the Krebs cycle, and amino acids can be deaminated and converted into intermediates that enter cellular respiration pathways. However, glucose is the primary and most direct substrate for the initial stages of cellular respiration, making it the most straightforward answer in the context of this question. Additionally, oxygen is not a substrate but rather an essential reactant used in the final electron transport chain to accept electrons and form water.

10. What are the three categories of symbiotic relationships?

- A. Competition, Predation, Symbiosis**
- B. Mutualism, Commensalism, and Parasitism**
- C. Commensalism, Amensalism, and Neutralism**
- D. Parasitism, Predation, and Competition**

The three categories of symbiotic relationships are mutualism, commensalism, and parasitism. Mutualism refers to a relationship where both species benefit from the interaction. An example of this is bees and flowering plants; bees get nectar for food, while helping plants with pollination. Commensalism describes a relationship where one species benefits while the other is neither helped nor harmed. An instance of this would be barnacles attaching to a whale; the barnacles gain mobility and access to food while the whale is generally unaffected. Parasitism involves a relationship where one species (the parasite) benefits at the expense of the other (the host). An example of this is ticks feeding on a mammal's blood; the tick gains nutrition while potentially harming the mammal in the process. This categorization is significant as it helps in understanding ecological interactions and the complex dynamics of ecosystems. The other options include terms and concepts that do not accurately represent the three main types of symbiotic relationships and therefore do not fit within this classification framework.