Galen Integrated Human Science Exam 1 Practice (Sample)

Study Guide

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Questions

1. What is the primary purpose of the cardiovascular system?

- **A. To digest food**
- **B. To transport blood, nutrients, gases, and waste**
- **C. To enhance sensory perception**
- **D. To support the immune response**

2. What is a key characteristic of active transport in cellular processes?

- **A. Involves the movement against the concentration gradient**
- **B. Does not require cellular energy**
- **C. Involves simple diffusion across the membrane**
- **D. Always occurs in presence of water**

3. What process involves the movement of a substance from an area of high concentration to an area of low concentration?

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

4. What is the role of a helper molecule within a membrane during facilitated diffusion?

- **A. Assistive movement of substances from high to low concentration**
- **B. Storage of genetic information**
- **C. Production of energy**
- **D. Removal of waste products**

5. Which term describes a gel-like substance found in blood?

- **A. Colloidal**
- **B. Oral**
- **C. Inguinal**
- **D. Patellar**

6. What does the term 'lateral' refer to in anatomical terms?

- **A. Toward the midline**
- **B. Away from the midline**
- **C. Toward the front**
- **D. Away from the back**

7. What function do alveoli serve in the respiratory system?

- **A. To filter out impurities from the air**
- **B. To allow gas exchange to occur**
- **C. To warm incoming air**
- **D. To deliver oxygen to the heart**

8. What type of gene is not expressed if it is paired with a dominant gene?

- **A. Dominant gene**
- **B. Recessive gene**
- **C. Allele**
- **D. Phenotype**

9. What is the anatomical term for the head?

- **A. Thoracic**
- **B. Cephalic**
- **C. Cervical**
- **D. Facial**

10. What term describes fats and oils?

- **A. Carbohydrates**
- **B. Proteins**
- **C. Lipids**
- **D. Nucleic Acids**

Answers

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

Explanations

1. What is the primary purpose of the cardiovascular system?

A. To digest food

B. To transport blood, nutrients, gases, and waste

C. To enhance sensory perception

D. To support the immune response

The primary purpose of the cardiovascular system is to transport blood, nutrients, gases, and waste throughout the body. This system consists of the heart, blood vessels, and blood, and it plays a crucial role in maintaining homeostasis. The cardiovascular system is responsible for delivering oxygen and nutrients to cells while removing carbon dioxide and metabolic waste products. By facilitating this exchange, it ensures that all tissues receive the necessary materials for energy production and cellular function, contributing to overall health and vitality. The other functions listed do not align with the primary role of the cardiovascular system. While digestion is a function of the gastrointestinal system, sensory perception is linked to the nervous system, and immune responses are primarily managed by the lymphatic and immune systems. Thus, option B is the correct answer as it directly reflects the essential functions of the cardiovascular system in the human body.

2. What is a key characteristic of active transport in cellular processes?

A. Involves the movement against the concentration gradient

B. Does not require cellular energy

C. Involves simple diffusion across the membrane

D. Always occurs in presence of water

Active transport is a process that plays a crucial role in maintaining cellular function by moving substances across cell membranes. One key characteristic of active transport is that it involves the movement of molecules against their concentration gradient. This means that substances move from an area of lower concentration to an area of higher concentration, which is contrary to the natural tendency of molecules to diffuse from regions of high concentration to low concentration. To achieve this movement against the concentration gradient, active transport relies on the use of cellular energy, typically from adenosine triphosphate (ATP). This is fundamentally different from passive transport processes, which do not require energy because they allow molecules to move down their concentration gradient. Understanding this distinction is vital in recognizing how cells regulate their internal environments and interact with their external surroundings. The options presented that do not align with the characteristics of active transport—such as the statements indicating it does not require cellular energy, involves simple diffusion, or occurs solely in the presence of water—highlight the unique nature of active transport's reliance on energy and its directional movement of molecules.

3. What process involves the movement of a substance from an area of high concentration to an area of low concentration?

A. Facilitated diffusion

B. Osmosis

C. Diffusion

D. Active transport

The correct choice, diffusion, describes the natural tendency of particles to move from an area where they are in higher concentration to an area of lower concentration. This process occurs spontaneously and is driven by the kinetic energy of the molecules, allowing them to spread out evenly in a given space. In biological systems, diffusion is crucial for many physiological processes, such as the movement of oxygen and carbon dioxide across cell membranes, where it ensures the proper exchange of gases necessary for cellular respiration. The simplicity and efficiency of diffusion make it an essential mechanism for maintaining homeostasis within cells and organisms. While facilitated diffusion and osmosis are specific types of diffusion, they involve additional factors such as carrier proteins and the movement of water, respectively. Active transport, on the other hand, is a process that requires energy to move substances against their concentration gradient, which is fundamentally different from the passive nature of diffusion.

4. What is the role of a helper molecule within a membrane during facilitated diffusion?

A. Assistive movement of substances from high to low concentration

B. Storage of genetic information

C. Production of energy

D. Removal of waste products

The role of a helper molecule, often a protein such as a channel or carrier protein, during facilitated diffusion is to assist the movement of substances across the cell membrane from an area of higher concentration to an area of lower concentration. This process does not require energy, as it relies on the natural movement of molecules down their concentration gradient. Facilitated diffusion is essential for the transport of polar or charged substances that cannot pass directly through the lipid bilayer of the membrane. The helper molecules provide a pathway that allows these substances to cross more easily, ensuring that the necessary nutrients and ions can enter the cell while waste products can exit. The other options do not accurately describe the role of helper molecules in this context. While storage of genetic information involves DNA and does not pertain to facilitated diffusion, the production of energy relates to cellular respiration processes, and the removal of waste products involves various excretory systems rather than the specific function of helper molecules in membrane transport.

5. Which term describes a gel-like substance found in blood?

A. Colloidal

B. Oral

C. Inguinal

D. Patellar

The term that describes a gel-like substance found in blood is "colloidal." In the context of blood, colloids refer to substances that consist of small particles suspended in a liquid, which in this case is plasma. Blood plasma, which is the liquid component of blood, contains proteins, electrolytes, hormones, and waste products, all of which give it a gel-like texture. This colloidal nature is crucial for maintaining blood volume and viscosity, as well as playing a role in the transport of various substances throughout the body. Other options, such as "oral," "inguinal," and "patellar," do not relate to the composition of blood. "Oral" pertains to the mouth, "inguinal" refers to the groin area, and "patellar" relates to the kneecap. Thus, they do not describe any component or characteristic of blood, making colloidal the appropriate choice in this context.

6. What does the term 'lateral' refer to in anatomical terms?

A. Toward the midline

B. Away from the midline

C. Toward the front

D. Away from the back

In anatomical terminology, 'lateral' is defined as being situated away from the midline of the body. This means that structures that are described as lateral are positioned toward the sides of the body, as opposed to being close to the center. For instance, when referring to the arms or legs, the terms ‘lateral’ would highlight how these limbs extend outwards from the trunk of the body. Understanding the concept of midline is crucial, as it's an imaginary vertical line that divides the body into left and right halves. Therefore, any structure that is more distant from this midline is categorized as lateral. This term is commonly used in various contexts, such as when comparing the positions of organs. For instance, the ears are lateral to the nose because they are located further away from the midline of the face.

7. What function do alveoli serve in the respiratory system?

A. To filter out impurities from the air

B. To allow gas exchange to occur

C. To warm incoming air

D. To deliver oxygen to the heart

Alveoli are small, balloon-like structures located at the end of the respiratory tree in the lungs, and their primary function is to facilitate gas exchange. They provide a vast surface area where oxygen from inhaled air can diffuse into the blood while allowing carbon dioxide in the blood to be expelled into the air. This process is essential for maintaining the oxygen levels in the bloodstream and removing carbon dioxide, a waste product of metabolism. The structure of the alveoli, featuring thin walls and a rich blood supply from surrounding capillaries, optimizes this exchange process, making it more efficient. This unique design enables the lungs to effectively manage the respiratory needs of the body, ensuring that oxygen is delivered to tissues and organs while carbon dioxide is removed efficiently. Other options describe functions that are related to the respiratory process but do not specifically highlight the primary role of the alveoli in gas exchange. For instance, filtering impurities, warming air, and delivering oxygen are actions that are part of the broader respiratory system but do not occur directly within the alveoli themselves. The actual gas exchange happens primarily in these tiny sacs, making their role crucial in the respiratory system.

8. What type of gene is not expressed if it is paired with a dominant gene?

A. Dominant gene

B. Recessive gene

C. Allele

D. Phenotype

The concept of dominant and recessive genes is fundamental in genetics. A recessive gene does not manifest its phenotype if a dominant gene is present in the pair of alleles. In this context, alleles are the different forms of a gene, and when two alleles are present—one dominant and one recessive—the dominant allele's trait will be expressed, overshadowing the effect of the recessive allele. The dominant allele has the ability to mask the presence of the recessive allele, meaning that if an individual has at least one dominant allele, the recessive gene's influence will not be visible in the organism's traits or characteristics. In contrast, the dominant gene expresses its trait regardless of whether it is paired with another dominant gene or a recessive gene. Understanding why recessive genes remain unexpressed in the presence of a dominant gene is crucial for interpreting genetic inheritance patterns, as it explains how certain traits are passed down through generations and can sometimes skip a generation when only recessive alleles are inherited without a dominant counterpart. This foundational concept in genetics allows for predictions about potential traits in offspring based on the genotypes of the parents.

9. What is the anatomical term for the head?

A. Thoracic

B. Cephalic

C. Cervical

D. Facial

The anatomical term for the head is "cephalic." This term is derived from the Greek word "kephalē," which means "head." In anatomical terminology, "cephalic" is used to describe structures or regions located in or pertaining to the head. It is a foundational term in anatomy that helps to define related concepts and structures, such as the cephalic vein, which is a major vein located in the arm but is named for its relationship to the head and neck area. The other terms listed refer to different anatomical regions or characteristics. "Thoracic" pertains to the chest area, while "cervical" refers to the neck region. "Facial" specifically relates to the face, which is part of the head but does not encompass the entire head structure. Understanding these distinctions is essential in anatomy, as it aids in clear communication and specificity when discussing human body parts and systems.

10. What term describes fats and oils?

A. Carbohydrates

B. Proteins

C. Lipids

D. Nucleic Acids

The term that describes fats and oils is "lipids." Lipids are a diverse group of compounds that are insoluble in water but soluble in organic solvents. They play several vital roles in biological systems, including energy storage, serving as structural components of cell membranes, and acting as signaling molecules. Fats and oils, which are types of lipids, store energy in a highly efficient form and can also provide insulation and protection for organs. Understanding the classification of biomolecules is crucial. Carbohydrates are primarily involved in providing energy and structuring cells, while proteins are made up of amino acids and function in numerous roles such as structural support and catalyzing biochemical reactions. Nucleic acids, such as DNA and RNA, are involved in the storage and transmission of genetic information. Hence, only lipids encompass fats and oils among the main types of biological macromolecules.