Ontario Grade 11 University Biology Practice Text (Sample)

Study Guide

Everything you need from our exam experts!

Questions

1. What is the primary function of bile in digestion?
   A. To break down carbohydrates
   B. To emulsify fats
   C. To digest proteins
   D. To neutralize acids

2. What phenomenon occurs when similar traits arise in unrelated organisms?
   A. Convergent evolution
   B. Divergent evolution
   C. Adaptive radiation
   D. Speciation

3. What term describes a group of organisms that can interbreed and produce fertile offspring in nature?
   A. Family
   B. Species
   C. Genus
   D. Order

4. What is the primary muscle involved in the process of inhalation?
   A. Transversus Abdominis
   B. Diaphragm
   C. External Intercostals
   D. Rectus Abdominis

5. What type of organism usually requires external sources for thermoregulation?
   A. Ectotherm
   B. Endotherm
   C. Vertebrate
   D. Somatic cell

6. What feature is unique to the right atrium of the heart?

A. It pumps oxygenated blood

B. It receives blood from the lungs

C. It collects deoxygenated blood from the body

D. It has thicker walls than the ventricles

7. What term is used to describe bacteria that have a spiral shape?

A. Bacillus

B. Spirillus

C. Coccus

D. Staphylococcus

8. What is the term for a haploid cell?

A. Diploid

B. Gamete

C. Zygote

D. Chromatid

9. What are gallstones primarily composed of?

A. Cholesterol

B. Bile salts

C. Calcium deposits

D. Protein

10. What concept explains how alleles can mask or influence the expression of other alleles?

A. Law of completeness

B. Law of dominance

C. Law of interaction

D. Law of distinction

Answers

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

Explanations

1. What is the primary function of bile in digestion?

A. To break down carbohydrates

B. To emulsify fats

C. To digest proteins

D. To neutralize acids

The primary function of bile in digestion is to emulsify fats. Bile, which is produced by the liver and stored in the gallbladder, contains bile salts that facilitate the breakdown of large fat globules into smaller droplets. This process, known as emulsification, increases the surface area of fats, making them more accessible to digestive enzymes, such as lipase, which can further break down the fats into fatty acids and glycerol. Emulsification is critical for the efficient digestion and absorption of dietary fats in the small intestine. While bile does perform other functions, such as aiding in the neutralization of stomach acids when it enters the small intestine, its most crucial role in digestion pertains to fat emulsification, enabling the body to utilize dietary fats effectively.

2. What phenomenon occurs when similar traits arise in unrelated organisms?

A. Convergent evolution

B. Divergent evolution

C. Adaptive radiation

D. Speciation

Convergent evolution is the phenomenon where similar traits or characteristics emerge in different species that do not share a recent common ancestor. This typically occurs when these unrelated organisms adapt to similar environments or ecological niches, leading to the development of analogous structures. For instance, the wings of bats and insects are both adaptations for flight, although bats are mammals and insects are entirely different organisms with separate evolutionary paths. In contrast, divergent evolution involves species with a common ancestor evolving different traits due to varied environments. Adaptive radiation refers to a single ancestral species rapidly diversifying into multiple forms to adapt to different ecological niches. Speciation is the process by which new species form, often as a result of reproductive isolation or genetic divergence. Each of these processes emphasizes different aspects of evolution, whereas convergent evolution is specifically focused on the emergence of similar traits in unrelated lineages due to similar selection pressures.

3. What term describes a group of organisms that can interbreed and produce fertile offspring in nature?

A. Family

B. Species

C. Genus

D. Order

The term that describes a group of organisms that can interbreed and produce fertile offspring in nature is "Species." In biological classification, a species is defined as the most basic unit of classification, comprising individuals that share common characteristics and can reproduce with one another under natural conditions. This reproductive capability and the production of fertile offspring are critical aspects that distinguish one species from another. The concept of species is integral to understanding biodiversity and the relationship among different organisms. While families, genera, and orders represent broader taxonomic levels encompassing multiple species, it is the species level that focuses specifically on interbreeding potential and reproductive isolation, which are crucial for maintaining the integrity of each group over time.

4. What is the primary muscle involved in the process of inhalation?

A. Transversus Abdominis

B. Diaphragm

C. External Intercostals

D. Rectus Abdominis

The primary muscle involved in the process of inhalation is the diaphragm. When the diaphragm contracts, it moves downward, increasing the volume of the thoracic cavity. This expansion creates a negative pressure that allows air to be drawn into the lungs. As the diaphragm is the main muscle responsible for initiating inhalation, its action is crucial for proper respiratory function. While other muscles, like the external intercostals, assist in the process by elevating the rib cage and further increasing lung volume, they do not play as fundamental a role as the diaphragm. The transversus abdominis and rectus abdominis primarily function in processes related to posture and core stabilization, rather than in active inhalation. Understanding the diaphragm's key role helps clarify how the respiratory system operates during breathing.

5. What type of organism usually requires external sources for thermoregulation?

A. Ectotherm

B. Endotherm

C. Vertebrate

D. Somatic cell

Ectotherms are organisms that rely primarily on external environmental sources to regulate their body temperature. Unlike endotherms, which generate sufficient internal heat through metabolic processes to maintain a constant body temperature, ectotherms depend on their surroundings to heat or cool themselves. This means that ectotherms like reptiles and amphibians often bask in the sun to raise their body temperature or seek shade or water to cool down. In contrast, endotherms, such as mammals and birds, possess mechanisms to create their own body heat, allowing them to maintain a stable internal temperature regardless of external conditions. Vertebrates encompass both ectothermic and endothermic organisms, while somatic cells refer to non-reproductive cells in multicellular organisms and are not related to thermoregulation in the context of organisms as a whole. Understanding the differences between these categories clarifies why ectotherms are specifically characterized by their reliance on external sources for thermoregulation.

6. What feature is unique to the right atrium of the heart?

A. It pumps oxygenated blood

B. It receives blood from the lungs

C. It collects deoxygenated blood from the body

D. It has thicker walls than the ventricles

The right atrium of the heart uniquely functions as the chamber that collects deoxygenated blood from the body. It receives blood through two major veins: the superior vena cava and the inferior vena cava. This blood, which is returning from the systemic circulation, is low in oxygen and high in carbon dioxide. Once the right atrium fills with deoxygenated blood, it passes this blood into the right ventricle, which then pumps it to the lungs for oxygenation. Other features mentioned, such as pumping oxygenated blood, receiving blood from the lungs, and having thicker walls than the ventricles, do not apply to the right atrium. The left atrium is responsible for receiving oxygenated blood from the lungs, while the ventricles, particularly the left ventricle, have thicker walls to generate the force needed to pump blood throughout the body. Thus, the right atrium's specific role in the circulatory system is critical for maintaining efficient blood flow and oxygen delivery.

7. What term is used to describe bacteria that have a spiral shape?

A. Bacillus

B. Spirillus

C. Coccus

D. Staphylococcus

The term used to describe bacteria that have a spiral shape is "spirillus." Bacteria are classified into different shapes, and spirillus specifically refers to those that exhibit a corkscrew or spiral form. This shape can influence the movement of the bacteria, often allowing them to navigate through viscous environments. In contrast, bacillus refers to rod-shaped bacteria, coccus indicates spherical-shaped bacteria, and staphylococcus is a specific arrangement of cocci where the bacteria cluster together in a spherical formation resembling bunches of grapes. Understanding these classifications is crucial in microbiology, as the shape of bacteria can provide insights into their behavior, ecology, and roles in various environments.

8. What is the term for a haploid cell?

A. Diploid

B. Gamete

C. Zygote

D. Chromatid

A haploid cell is defined as a cell that contains only one complete set of chromosomes. In organisms that reproduce sexually, haploid cells are produced during meiosis and are crucial for reproduction, as they combine during fertilization to form a diploid zygote. The most common examples of haploid cells are gametes, which include sperm and egg cells in animals and pollen and ovules in plants. The other terms provided do not accurately describe a haploid cell. Diploid cells contain two complete sets of chromosomes, one from each parent. A zygote is the result of the fusion of two gametes, making it diploid. A chromatid is one half of a duplicated chromosome and doesn't refer to the overall ploidy of the organism. Therefore, the term that correctly identifies a haploid cell is gamete.

9. What are gallstones primarily composed of?

A. Cholesterol

B. Bile salts

C. Calcium deposits

D. Protein

Gallstones are primarily composed of cholesterol, which can crystallize and form solid stones in the gallbladder. Although bile salts, calcium deposits, and proteins play roles in the composition of gallstones, they are not the main constituents. Cholesterol gallstones form when there is too much cholesterol in the bile, and the bile cannot dissolve it, leading to the formation of crystals that become stones. Bile salts help to keep cholesterol dissolved in bile; however, an excess of cholesterol can overwhelm this mechanism. Calcium deposits can be found in some types of gallstones, but the most common form is cholesterol-based. Proteins are present in bile but do not primarily contribute to gallstone formation. Thus, the correct focus on cholesterol as the primary component differentiates it from the other substances listed.

10. What concept explains how alleles can mask or influence the expression of other alleles?

A. Law of completeness

B. Law of dominance

C. Law of interaction

D. Law of distinction

The concept that explains how alleles can mask or influence the expression of other alleles is known as the Law of Dominance. This principle, first described by Gregor Mendel in his foundational work on inheritance patterns, states that in a heterozygous genotype (where two different alleles for a trait are present), one allele can dominate the other, determining the phenotype (the observable traits). In cases of dominant and recessive alleles, the dominant allele will express its trait regardless of the presence of the recessive allele. For instance, if an individual has one dominant and one recessive allele for a specific trait, such as flower color, the dominant allele will manifest in the flower's color, while the recessive allele does not contribute to the observable trait. This concept is fundamental in understanding genetic inheritance and is crucial for predicting the characteristics of offspring based on their parental alleles. The other options do not accurately capture this important genetic principle. The Law of Completeness and the Law of Interaction are not established concepts in classical genetics, and the Law of Distinction does not pertain to how alleles function in terms of dominance or recessiveness. Understanding the Law of Dominance helps clarify how specific traits are inherited and expressed in organisms.