

ABCTE BIOLOGY PRACTICE EXAM (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- Practice answering questions under realistic conditions,
- Improve accuracy and speed,
- Review explanations to strengthen weak areas, and
- Approach the exam with greater confidence.

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:

1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 – 45 minutes). Review a handful of questions, reflect on the explanations.

3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

6. Repeat and Review

Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

Questions

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- 1. How are daughter cells separated in plant cells?**
 - A. By a cell plate
 - B. By a cleavage furrow
 - C. By a new nuclear membrane
 - D. By lignin-filled membrane
- 2. Which of the following processes involves the engulfing of large particles by a cell?**
 - A. Exocytosis
 - B. Phagocytosis
 - C. Pinocytosis
 - D. Passive transport
- 3. Which of the following processes is a result of environmental pressure on the genotypic variation in populations?**
 - A. A Meiosis
 - B. B Mitosis
 - C. C Sexual reproduction
 - D. D Evolution
- 4. What would most likely occur if the repressor protein could not bind to the operator?**
 - A. Gene transcription would be inhibited.
 - B. Gene transcription would be activated.
 - C. No effect on gene transcription.
 - D. Only certain genes would be expressed.
- 5. Eukaryotes are distinguished by which structural feature?**
 - A. A plasma membrane
 - B. Pili and flagella
 - C. Membrane-bound organelles
 - D. DNA

- 6. What does "true breeding" refer to in classical genetics?**
- A. A The independent segregation of chromosomes during sexual reproduction.
 - B. B A self-fertilized plant that produces offspring with the same traits.
 - C. C An alternation of reproduction modes in an organism's life cycle.
 - D. D The survival of organisms best adapted to their environment.
- 7. What is the effect of temperature on the kinetic energy of particles?**
- A. Higher temperature increases kinetic energy
 - B. Lower temperature decreases kinetic energy
 - C. Temperature has no effect on kinetic energy
 - D. Both higher and lower temperatures do not affect kinetic energy
- 8. What do most prokaryotes primarily ingest?**
- A. Autotrophs
 - B. Other heterotrophic bacteria
 - C. Inorganic matter
 - D. Decaying organic matter
- 9. Which genotype indicates that an individual is heterozygous for two traits?**
- A. AABB
 - B. AaBB
 - C. AaBb
 - D. aabB
- 10. What type of connective tissue is cartilage classified as?**
- A. Loose connective tissue
 - B. Dense connective tissue
 - C. Specialized connective tissue
 - D. Adipose tissue

Answers

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

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Explanations

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1. How are daughter cells separated in plant cells?

- A. By a cell plate**
- B. By a cleavage furrow
- C. By a new nuclear membrane
- D. By lignin-filled membrane

Daughter cells in plant cells are separated by a cell plate, which is formed during the later stages of cell division, specifically during cytokinesis. In plants, instead of forming a cleavage furrow, which occurs in animal cells, vesicles containing cell wall materials gather at the center of the dividing cell. These vesicles fuse to create the cell plate. As more vesicles join in, the cell plate expands outward until it merges with the existing cell wall, effectively dividing the parent cell into two distinct daughter cells. This process is essential because it provides structural support and integrity for the new cells, allowing them to maintain their rigid shape and withstand the internal pressures common in plant cells.

2. Which of the following processes involves the engulfing of large particles by a cell?

- A. Exocytosis
- B. Phagocytosis**
- C. Pinocytosis
- D. Passive transport

Phagocytosis is a specific type of endocytosis that refers to the process where a cell engulfs large particles, including debris, pathogens, or other cells. During phagocytosis, the cell membrane extends around the particle and eventually envelops it to form a vesicle called a phagosome. This phagosome can then fuse with lysosomes to digest the engulfed material, making it an important mechanism for immune response and cellular cleanup. In contrast, exocytosis involves the expulsion of materials from the cell, usually in the form of vesicles merging with the cell membrane to release their contents outside the cell. Pinocytosis refers to the ingestion of small particles or fluids, where the cell membrane invaginates to form small vesicles containing those liquids or solutes, typically rather than larger solid particles. Passive transport is the movement of substances across cell membranes without the need for energy input, typically involving small ions or molecules moving down their concentration gradient, and is not a process of engulfing particles. Understanding these distinctions clarifies why phagocytosis is the correct answer—it directly relates to the engulfing of large particles by cells, highlighting its role in cellular ingestion and immune defense.

3. Which of the following processes is a result of environmental pressure on the genotypic variation in populations?

- A. A Meiosis
- B. B Mitosis
- C. C Sexual reproduction

D. D Evolution

The process that results from environmental pressure on genetic variation within populations is evolution. Evolution refers to the change in heritable traits of a population over successive generations, often driven by mechanisms such as natural selection, genetic drift, and gene flow. In the context of environmental pressures, individuals with traits that confer an advantage in a particular environment are more likely to survive and reproduce. This differential survival and reproduction leads to a shift in the genotypic and phenotypic composition of the population over time. The variations that exist within a population, which stem from genetic differences, provide the raw material upon which evolutionary forces act. In contrast, meiosis and mitosis are processes of cell division; meiosis generates genetic diversity through the formation of gametes and sexual reproduction combines genetic material from two parents but does not directly result from environmental pressures. Thus, while these processes contribute to genetic variation, they are not the end result of environmental pressures acting on that variation as evolution is.

4. What would most likely occur if the repressor protein could not bind to the operator?

- A. Gene transcription would be inhibited.
- B. Gene transcription would be activated.**
- C. No effect on gene transcription.
- D. Only certain genes would be expressed.

If the repressor protein is unable to bind to the operator, it means that the mechanism normally preventing transcription of the associated gene is disrupted. In typical gene regulation scenarios, a repressor protein binds to the operator region of DNA, blocking RNA polymerase from transcribing the gene into mRNA. When the repressor cannot attach to the operator, this blockage is removed, allowing RNA polymerase access to the promoter and facilitating the transcription of the gene. This situation usually results in an increase in gene expression because the absence of the repressor means that the gene is no longer being suppressed. Consequently, the transcription of that gene would be activated, leading to higher levels of mRNA and subsequently increased production of the corresponding protein. Therefore, the inability of the repressor to bind effectively activates the gene, allowing for its expression.

5. Eukaryotes are distinguished by which structural feature?

- A. A plasma membrane
- B. Pili and flagella
- C. Membrane-bound organelles**
- D. DNA

Eukaryotes are distinguished by the presence of membrane-bound organelles, which are specialized structures within the cell that perform distinct functions. This feature is crucial to eukaryotic cells, allowing them to compartmentalize various biochemical processes, thus enhancing efficiency and regulation. Organelles such as the nucleus, mitochondria, endoplasmic reticulum, and Golgi apparatus all exemplify this organizational complexity. The membrane-bound nature of these organelles means they are enclosed by lipid bilayers, creating distinct internal environments that are vital for their specific functions. While eukaryotes do possess a plasma membrane, DNA, and may have pili and flagella, these features are not exclusive to them. Prokaryotic cells also have plasma membranes and DNA, and some possess pili and flagella. The defining characteristic that sets eukaryotes apart from prokaryotes is indeed the presence of membrane-bound organelles, marking them as a more complex form of life.

6. What does "true breeding" refer to in classical genetics?

- A. A The independent segregation of chromosomes during sexual reproduction.
- B. B A self-fertilized plant that produces offspring with the same traits.**
- C. C An alternation of reproduction modes in an organism's life cycle.
- D. D The survival of organisms best adapted to their environment.

"True breeding" in classical genetics refers to organisms that consistently pass down specific traits to their offspring when they self-fertilize or breed within the same variety. This means that when a true breeding plant, for example, is self-pollinated, all of its offspring will exhibit the same traits as the parent. This occurs because true breeding organisms are homozygous for the traits being examined, meaning they have two identical alleles for those traits. This consistency in trait inheritance makes true breeding plants, animals, or other organisms crucial for scientists conducting genetic experiments, as it allows for a clear understanding of how traits are inherited and expressed across generations. The concept was fundamental in Gregor Mendel's experiments with pea plants, where he identified dominant and recessive traits by observing the outcomes of true breeding lines.

7. What is the effect of temperature on the kinetic energy of particles?

- A. Higher temperature increases kinetic energy**
- B. Lower temperature decreases kinetic energy
- C. Temperature has no effect on kinetic energy
- D. Both higher and lower temperatures do not affect kinetic energy

Higher temperature increases the kinetic energy of particles due to the nature of thermal energy. As the temperature of a substance rises, the particles within that substance gain more energy, causing them to move more rapidly. This increase in movement reflects a corresponding increase in kinetic energy, which is essentially the energy of motion. In the context of molecular behavior, when temperature increases, the average speed of the molecules increases, leading to more vigorous collisions between them. This relationship is foundational in thermodynamics and is often illustrated using the kinetic molecular theory, which describes how temperature and kinetic energy are directly proportional. Consequently, the understanding of this principle is essential for explaining various phenomena in physics and chemistry, such as changes in states of matter, diffusion rates, and reaction kinetics.

8. What do most prokaryotes primarily ingest?

- A. Autotrophs
- B. Other heterotrophic bacteria
- C. Inorganic matter
- D. Decaying organic matter**

Prokaryotes, particularly bacteria, play a crucial role in the decomposition of organic matter in ecosystems. Most heterotrophic bacteria, which comprise a significant portion of prokaryotic life, primarily ingest decaying organic matter as their primary source of energy and nutrients. This process of breaking down dead plants and animals, as well as waste materials, is essential for nutrient cycling in ecosystems. The capability to decompose organic materials allows prokaryotes to thrive in various environments, contributing to soil health and the recycling of nutrients essential for other forms of life. These bacteria break down complex organic compounds into simpler substances, releasing nutrients back into the ecosystem for use by autotrophs, such as plants. In contrast, autotrophs generally refer to organisms that produce their own food from inorganic substances, which prokaryotes do not ingest. Inorganic matter itself isn't a food source for most bacteria, as they typically require organic compounds for their metabolic processes. While some prokaryotes can consume other bacteria, it is not the primary source for most. Thus, decaying organic matter serves as the foundational energy source for most prokaryotes, aligning with their ecological role as decomposers.

9. Which genotype indicates that an individual is heterozygous for two traits?

- A. AABB
- B. AaBB
- C. AaBb**
- D. aabB

The genotype that indicates an individual is heterozygous for two traits is represented by two different alleles for each trait. In this case, "AaBb" illustrates this concept clearly. The first part of the genotype, "Aa," indicates that the individual has one dominant allele (A) and one recessive allele (a) for the first trait, making it heterozygous for that trait. The second part, "Bb," shows that this individual also has one dominant allele (B) and one recessive allele (b) for the second trait, again indicating heterozygosity for that trait. As a result, "AaBb" reflects heterozygosity across two traits simultaneously, which is essential for understanding concepts like genotype expression and trait inheritance in biology.

10. What type of connective tissue is cartilage classified as?

- A. Loose connective tissue
- B. Dense connective tissue
- C. Specialized connective tissue**
- D. Adipose tissue

Cartilage is classified as specialized connective tissue due to its unique structure and function that differentiate it from other types of connective tissues. Unlike loose or dense connective tissues, which primarily provide support and structure through collagen and elastic fibers, specialized connective tissues like cartilage have a high concentration of a gel-like ground substance and specialized cells known as chondrocytes. This distinct composition allows cartilage to offer specific functions, such as providing flexible support, cushioning joints, and allowing for smooth movement of bones in articulating surfaces. Its avascular nature (lack of blood vessels) and the way it can withstand compression further emphasize its specialization compared to other connective tissues. In contrast, loose connective tissue serves to bind organs and provides space for blood vessels and nerves, while dense connective tissue provides strength and support through densely packed fibers. Adipose tissue, which stores fat, is also classified as a type of loose connective tissue rather than a specialized type. Thus, the classification of cartilage as specialized connective tissue acknowledges its specific role and specialized structural features within the broader category of connective tissues.

Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at hello@examzify.com.

Or visit your dedicated course page for more study tools and resources:

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We wish you the very best on your exam journey. You've got this!

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