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.

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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!

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Questions

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1. What are the short fragments of DNA on the lagging strand called?

A. Suzuki.

B. Okazaki.

C. Osaka.

D. Hirosaki.

2. What is the main function of mRNA molecules in gene expression?

A. To facilitate the joining of amino acids.

B. To carry genetic information from the nucleus.

C. To regulate the rate of transcription.

D. To cut and splice nuclear RNA.

3. Why is carbon-14 dating not suitable for materials approximately one billion years old?

A. A Materials approximately one billion years old never had carbon-14 in them originally.

B. B Carbon-14 has a half-life of over 57 million years.

C. C Carbon-14 has a half-life of 5,730 years and becomes undetectable after one billion years.

D. D Potassium-40 destroys carbon-14 in ancient materials.

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

A. Loose connective tissue

B. Dense connective tissue

C. Specialized connective tissue

D. Adipose tissue

5. What are the outer layers of the eye?

A. Choroid, ciliary body, and iris

B. Cochlea

C. Retina

D. Sclera and cornea

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6. What is the significance of a promoter in gene expression?

A. It enhances the stability of RNA.

B. It initiates the transcription of a specific gene.

C. It binds to the coding region of the gene.

D. It controls the translation of RNA to protein.

7. What is the momentum of a 50 kg object traveling at 25 m/s?

A. 1,250 kg-m/s

B. 0.5 kg-m/s

C. 2 kg-m/s

D. 75 kg-m/s

8. What is the term used for muscles in opposing pairs?

A. Competing

B. Contrasting

C. Antagonistic

D. Conflicting

9. What are the reproductive organs of gymnosperms called?

A. Fruits

B. Ferns

C. Cones

D. Flowers

10. An mRNA molecule with a complementary codon is transcribed from the DNA codon ACT. What is the nucleotide sequence of the tRNA anticodon?

A. A UGA

B. B ACT

C. C ACU

D. D UCA

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Answers

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

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Explanations

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1. What are the short fragments of DNA on the lagging strand called?

A. Suzuki.

B. Okazaki.

C. Osaka.

D. Hirosaki.

The short fragments of DNA formed on the lagging strand during DNA replication are known as Okazaki fragments. This term honors the Japanese scientist Reiji Okazaki, who, along with his wife, made significant contributions to our understanding of DNA replication mechanics in the 1960s. During replication, the lagging strand is synthesized discontinuously in short segments as the DNA helix unwinds, which results in the formation of these fragments. The key aspect of Okazaki fragments is that they allow for the efficient replication of DNA, ensuring that both strands can be synthesized simultaneously, despite the fact that DNA polymerase can only add nucleotides in one direction (5' to 3'). On the leading strand, replication occurs smoothly, while on the lagging strand, multiple Okazaki fragments are created and later joined together by the enzyme DNA ligase to form a continuous strand. This process is a fundamental aspect of DNA replication, allowing cells to accurately duplicate their genetic material.

2. What is the main function of mRNA molecules in gene expression?

A. To facilitate the joining of amino acids.

B. To carry genetic information from the nucleus.

C. To regulate the rate of transcription.

D. To cut and splice nuclear RNA.

The main function of mRNA molecules in gene expression is to carry genetic information from the nucleus to the ribosomes, where proteins are synthesized. This process begins with transcription, where DNA is transcribed into mRNA in the nucleus. Once synthesized, mRNA travels out of the nucleus and into the cytoplasm, acting as a template that conveys the specific sequence of nucleotides that correspond to the order of amino acids in a protein. At the ribosomes, this coded information directs the synthesis of proteins through the process of translation, during which tRNA molecules bring the appropriate amino acids, and ribosomes facilitate the assembly of these amino acids into polypeptides, ultimately forming functional proteins. This central role of mRNA in mediating the flow of genetic information is critical for the proper expression of genes and the functioning of cells. Other options relate to different roles in gene expression and protein synthesis, but they do not accurately describe the primary function of mRNA.

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3. Why is carbon-14 dating not suitable for materials approximately one billion years old?

A. A Materials approximately one billion years old never had carbon-14 in them originally.

B. B Carbon-14 has a half-life of over 57 million years.

C. C Carbon-14 has a half-life of 5,730 years and becomes undetectable after one billion years.

D. D Potassium-40 destroys carbon-14 in ancient materials.

Carbon-14 dating is based on the principle of radioactive decay, where carbon-14, a radioactive isotope of carbon, slowly transforms into nitrogen-14 over time. The half-life of carbon-14 is around 5,730 years, meaning that after this period, half of the original amount of carbon-14 in a sample will have decayed. In materials that are approximately one billion years old, the time elapsed is vastly greater than the half-life of carbon-14. After one billion years, the amount of carbon-14 would have decayed to a level that is effectively undetectable, rendering carbon-14 dating ineffective for those ancient materials. This inability to detect carbon-14 in such old samples is what makes this dating method unsuitable; there simply isn't enough of the isotope left to provide a reliable measurement. Therefore, the assertion that carbon-14 becomes undetectable after one billion years accurately reflects why it cannot be applied to such old materials.

4. 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.

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5. What are the outer layers of the eye?

A. Choroid, ciliary body, and iris

B. Cochlea

C. Retina

D. Sclera and cornea

The outer layers of the eye consist of the sclera and the cornea. The sclera is the tough, white outer layer that provides structure and protection to the eye. It constitutes the majority of the eye's outer surface and helps maintain its shape. The cornea, on the other hand, is the transparent front part of the eye that covers the iris and pupil. It plays a critical role in focusing light onto the retina. Together, the sclera and cornea form a protective outer barrier and aid in the eye's optical functions, allowing light to enter while safeguarding the internal structures. This structural integrity is essential for maintaining overall visual health and performance. In contrast, other options include parts of the eye, such as the choroid and retina, but these are not classified as the outer layers.

6. What is the significance of a promoter in gene expression?

A. It enhances the stability of RNA.

B. It initiates the transcription of a specific gene.

C. It binds to the coding region of the gene.

D. It controls the translation of RNA to protein.

The significance of a promoter in gene expression lies in its role as the site where RNA polymerase binds to initiate transcription. A promoter is a specific DNA sequence located upstream of a gene, and it is crucial for the regulation of gene expression. When transcription factors and RNA polymerase bind to the promoter region, they create the necessary conditions for the synthesis of messenger RNA (mRNA) from the DNA template. This process marks the beginning of gene expression, allowing the information encoded in the gene to be transcribed into RNA, which can subsequently be translated into a protein. Thus, the promoter is essential for the precise control of when and how much of a protein is produced in a cell.

7. What is the momentum of a 50 kg object traveling at 25 m/s?

A. 1,250 kg-m/s

B. 0.5 kg-m/s

C. 2 kg-m/s

D. 75 kg-m/s

To calculate the momentum of an object, you can use the formula: Momentum (p) = mass (m) × velocity (v). Here, the mass of the object is given as 50 kg, and its velocity is 25 m/s. Plugging these values into the formula: p = 50 kg × 25 m/s = 1,250 kg-m/s. This calculation shows that the momentum of the 50 kg object traveling at 25 m/s is indeed 1,250 kg-m/s, confirming that the answer provided is correct. The units of momentum, kg-m/s, are derived from the product of mass in kilograms and velocity in meters per second, reflecting the inertia of the object in motion in a straightforward manner.

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8. What is the term used for muscles in opposing pairs?

A. Competing

B. Contrasting

C. Antagonistic

D. Conflicting

The term "antagonistic" is used to describe muscles that work in opposing pairs. This concept is fundamental in understanding how muscles function to produce movement in the body. When one muscle contracts (the agonist), its antagonist muscle relaxes, allowing for coordinated movement and control. For instance, during the bending of the elbow, the biceps brachii flexes while the triceps brachii must relax to allow this motion. Understanding muscles as antagonistic pairs is crucial in fields such as anatomy, physiology, and physical training, as it highlights how balance and coordination are maintained within the muscular system. Other terms like "competing," "contrasting," or "conflicting" do not appropriately describe this functional relationship among muscles, as they do not convey the biological mechanism of cooperation between muscles to achieve movement.

9. What are the reproductive organs of gymnosperms called?

A. Fruits

B. Ferns

C. Cones

D. Flowers

The reproductive organs of gymnosperms are known as cones. Gymnosperms, which include plants like pines, spruces, and firs, produce seeds that are not enclosed in an ovary, unlike angiosperms (flowering plants). In gymnosperms, the male cones (pollen cones) produce pollen grains, which contain the male gametes, while the female cones (seed cones) contain the ovules that develop into seeds after fertilization. The structure and function of cones enable gymnosperms to effectively reproduce and disseminate their genetic material. Understanding this concept is important for grasping the differences in reproductive strategies between gymnosperms and other plant groups.

10. An mRNA molecule with a complementary codon is transcribed from the DNA codon ACT. What is the nucleotide sequence of the tRNA anticodon?

A. A UGA

B. B ACT

C. C ACU

D. D UCA

To determine the nucleotide sequence of the tRNA anticodon that corresponds to the mRNA transcribed from the DNA codon ACT, it's important to understand the base pairing rules between nucleotides. In this scenario, the DNA codon is ACT. During transcription, DNA is converted into mRNA, and the complementary bases follow specific pairings: adenine (A) pairs with uracil (U) in RNA, and cytosine (C) pairs with guanine (G). Therefore, when the DNA sequence ACT is transcribed into mRNA, it becomes UGA. Next, tRNA molecules have anticodons that are complementary to the codons present in mRNA. Since the mRNA codon is UGA, we will match it with the corresponding tRNA anticodon. The base pairing rules still apply, so for UGA, the tRNA anticodon will pair as follows: - U (in mRNA) pairs with A (in tRNA) - G (in mRNA) pairs with C (in tRNA) - A (in mRNA) pairs with U (in tRNA) Therefore, the tRNA anticodon that corresponds to the mRNA codon UGA is ACU. This

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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:

https://abctebiology.examzify.com

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

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