

VCE Biology Practice Test (Sample)

Study Guide



Everything you need from our exam experts!

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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. What does 'PAM' refer to in genetic editing?**
 - A. A type of amino acid sequence**
 - B. A sequence of nucleotides near the target DNA**
 - C. A method of DNA sequencing**
 - D. A technique for cloning genes**

- 2. Which component is necessary for the electron transport chain to function correctly?**
 - A. Glucose**
 - B. Oxygen**
 - C. Pyruvate**
 - D. Acetyl-CoA**

- 3. What pigment is responsible for capturing light energy in the chloroplasts?**
 - A. Chloroplastin**
 - B. Carotenoid**
 - C. Chlorophyll**
 - D. Xanthophyll**

- 4. Which of the following is considered a weakness of biofuels?**
 - A. They are made from inedible crops**
 - B. They are cheaper than traditional fuels**
 - C. Potential conflict with food needs**
 - D. They lower nitrous oxide emissions**

- 5. What concept do many first nations people have regarding their connection to the land?**
 - A. It is merely a physical environment**
 - B. It is essential to their identity**
 - C. It represents economic opportunity**
 - D. It serves only as a location for resources**

- 6. What is a requirement for the electron transport chain in aerobic respiration?**
- A. Glucose**
 - B. NADH**
 - C. Oxygen**
 - D. Lactic acid**
- 7. What is a critical outcome of the TRP operon functioning correctly?**
- A. Excessive tryptophan production**
 - B. Efficient cellular metabolism**
 - C. Inhibition of RNA polymerase activity**
 - D. Formation of mutations**
- 8. What percentage of the human genome is suggested to be similar to that of Neanderthals?**
- A. 1-4%**
 - B. 5-10%**
 - C. 10-20%**
 - D. 0-1%**
- 9. What is the significance of using PCR in genetic testing?**
- A. It helps in cloning proteins**
 - B. It amplifies the small samples of DNA for analysis**
 - C. It filters out contaminants**
 - D. It separates DNA fragments**
- 10. What is the role of a structural gene?**
- A. To provide regulatory control over other genes**
 - B. To code for proteins that influence cellular structure or function**
 - C. To code for proteins involved in energy production**
 - D. To maintain DNA integrity**

Answers

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

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Explanations

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1. What does 'PAM' refer to in genetic editing?

- A. A type of amino acid sequence
- B. A sequence of nucleotides near the target DNA**
- C. A method of DNA sequencing
- D. A technique for cloning genes

The term 'PAM' refers to a specific sequence of nucleotides located near the target DNA that is crucial for the functionality of CRISPR-Cas9 gene editing technology. PAM stands for "Protospacer Adjacent Motif," which is a short, conserved sequence that the Cas9 protein recognizes and binds to in the DNA prior to making a cut. This sequence is essential because it helps distinguish between the target DNA and the host organism's own DNA, ensuring that the CRISPR system only targets the intended genetic sequence. The presence of the PAM sequence is a critical factor for the Cas9 protein to initiate the editing process, as the protein is designed to bind to this sequence in order to accurately and efficiently introduce edits in the genome. Without the appropriate PAM sequence, the Cas9 enzyme would not be able to identify the correct target, thus failing to execute the intended genetic modification.

2. Which component is necessary for the electron transport chain to function correctly?

- A. Glucose
- B. Oxygen**
- C. Pyruvate
- D. Acetyl-CoA

The component necessary for the electron transport chain to function correctly is oxygen. In aerobic respiration, the electron transport chain operates by transferring electrons through a series of protein complexes located in the inner mitochondrial membrane. As electrons move through these complexes, they release energy that is used to pump protons across the membrane, creating an electrochemical gradient. Oxygen plays a crucial role at the end of the electron transport chain where it acts as the final electron acceptor. Without oxygen, the chain would back up, stopping the flow of electrons, which would result in a halt of ATP production through oxidative phosphorylation. Therefore, oxygen is essential for the continuation of this metabolic pathway, allowing for the effective synthesis of ATP, which is the energy currency of the cell. The other components listed, such as glucose, pyruvate, and Acetyl-CoA, are important in earlier stages of cellular respiration, like glycolysis and the Krebs cycle, but they are not directly required for the electron transport chain itself to function.

3. What pigment is responsible for capturing light energy in the chloroplasts?

- A. Chloroplastin**
- B. Carotenoid**
- C. Chlorophyll**
- D. Xanthophyll**

The pigment responsible for capturing light energy in the chloroplasts is chlorophyll. Chlorophyll is crucial for the process of photosynthesis, as it absorbs light, primarily in the blue and red wavelengths, and reflects green light, which is why plants appear green. This absorption of light energy initiates a series of biochemical reactions that convert carbon dioxide and water into glucose and oxygen, providing the necessary energy for the plant and, indirectly, for most life on Earth. While other pigments like carotenoids and xanthophylls also play roles in photosynthesis—mainly in protecting the plant from excess light and contributing to light absorption—they are not the primary pigments responsible for capturing light energy. Chloroplastin is not a recognized pigment in the context of photosynthesis in plants. Thus, chlorophyll is the correct answer due to its central role in harvesting light energy effectively.

4. Which of the following is considered a weakness of biofuels?

- A. They are made from inedible crops**
- B. They are cheaper than traditional fuels**
- C. Potential conflict with food needs**
- D. They lower nitrous oxide emissions**

The consideration of conflict with food needs is a significant weakness of biofuels because their production can divert valuable agricultural resources—such as land, water, and nutrients—away from food crops. This can lead to increased prices and reduced availability of food, particularly in regions where food security is already a concern. When biofuels are produced from food crops like corn or sugarcane, they compete directly with food production, potentially exacerbating hunger and malnutrition in vulnerable populations. The balance between energy production and food supply is a critical issue that policymakers must navigate when promoting the use of biofuels. In contrast, the other options do not highlight weaknesses. While it is true that biofuels can be made from inedible crops, this aspect does not inherently represent a weakness; instead, it may suggest a positive avenue for sustainable fuel production. The statement about biofuels being cheaper than traditional fuels reflects an economic advantage rather than a weakness, and mentioning the reduction of nitrous oxide emissions speaks to the environmental benefits of biofuels, which is a strength in the context of climate change mitigation. Thus, the conflict with food needs most accurately captures a significant drawback of biofuel production.

5. What concept do many first nations people have regarding their connection to the land?

- A. It is merely a physical environment**
- B. It is essential to their identity**
- C. It represents economic opportunity**
- D. It serves only as a location for resources**

Many First Nations people view their connection to the land as essential to their identity. This belief is deeply rooted in their cultures and traditions, where the land is not just a physical space but a living entity that sustains their way of life, provides spiritual and cultural significance, and shapes their community relationships. The land is intertwined with their histories, stories, and practices, influencing their social structures and cultural traditions. This intrinsic connection is reflected in their stewardship of the environment, where land management practices emphasize sustainability and respect for nature. Such a perspective fosters a sense of responsibility to protect and preserve the land not just for the present, but for future generations, further reinforcing its importance in defining who they are as people and communities.

6. What is a requirement for the electron transport chain in aerobic respiration?

- A. Glucose**
- B. NADH**
- C. Oxygen**
- D. Lactic acid**

The requirement for the electron transport chain in aerobic respiration is oxygen. This process occurs in the inner mitochondrial membrane and relies on oxygen as the final electron acceptor in the chain. This means that after electrons are transferred through a series of protein complexes, they ultimately combine with oxygen to form water. This step is critical since it allows the continued operation of the electron transport chain; without oxygen, the electron transport chain would become backed up, halting ATP production. While NADH is also important because it donates electrons to the chain, oxygen's role as the final electron acceptor is essential to ensure that the entire process moves forward and produces energy efficiently. Glucose and lactic acid do not play a direct role in the electron transport chain itself; glucose is primarily involved in glycolysis, and lactic acid is a byproduct of anaerobic respiration. Thus, oxygen is the essential component needed for the proper functioning of the electron transport chain in aerobic respiration.

7. What is a critical outcome of the TRP operon functioning correctly?

- A. Excessive tryptophan production**
- B. Efficient cellular metabolism**
- C. Inhibition of RNA polymerase activity**
- D. Formation of mutations**

The correct answer is related to efficient cellular metabolism because the TRP operon serves a crucial role in regulating the synthesis of tryptophan in bacterial cells, particularly in *Escherichia coli*. When tryptophan levels are sufficient in the environment, the TRP operon is turned off, reducing the production of enzymes involved in tryptophan biosynthesis. This regulation allows the cell to conserve energy and resources by not producing unnecessary proteins. When the operon functions correctly, it ensures that the synthesis of tryptophan occurs only when it is needed, thereby optimizing cellular metabolism and energy usage for the bacterium. This efficient regulation is critical not just for tryptophan production, but for the overall metabolic balance in the cell, which can positively affect growth and development.

8. What percentage of the human genome is suggested to be similar to that of Neanderthals?

- A. 1-4%**
- B. 5-10%**
- C. 10-20%**
- D. 0-1%**

The suggestion that 1-4% of the human genome is similar to that of Neanderthals is based on significant genetic research comparing modern humans with Neanderthal DNA. Studies have shown that after the interbreeding between anatomically modern humans and Neanderthals, a small percentage of DNA was passed down through generations. This percentage, typically cited as being between 1% and 4%, indicates that non-African modern human populations have inherited some genetic material from Neanderthal ancestors. This admixture is particularly notable in populations outside Africa since Neanderthals primarily inhabited Europe and Asia. As a result, this genetic legacy is more pronounced in these populations compared to those in Africa, where such interbreeding did not occur. Understanding this percentage is crucial for comprehending human evolution and the resulting genetic diversity found in today's populations, as well as the implications for traits and diseases influenced by Neanderthal alleles. Other ranges suggested, such as 5-10% or higher percentages, do not align with current genetic evidence, which supports the lower estimate.

9. What is the significance of using PCR in genetic testing?

- A. It helps in cloning proteins
- B. It amplifies the small samples of DNA for analysis**
- C. It filters out contaminants
- D. It separates DNA fragments

The significance of using PCR (Polymerase Chain Reaction) in genetic testing primarily lies in its ability to amplify small samples of DNA for analysis. This technique allows researchers to take a tiny amount of genetic material and create millions of copies of it, making it feasible to conduct detailed examinations, such as those required in medical diagnostics, forensic investigations, and research applications. Amplification is crucial because many biological samples, such as those obtained from blood, saliva, or tissue, may contain only minute amounts of DNA that are insufficient for analysis using standard techniques. By increasing the quantity of DNA through PCR, scientists can perform various tests more accurately and reliably. This technique has revolutionized fields like genetics, molecular biology, and medicine, enabling the detection of genetic disorders, the identification of pathogens, and the study of genetic variations. The other choices refer to processes or concepts related to molecular biology but do not appropriately describe the primary role of PCR in genetic testing. For instance, protein cloning and contaminant filtering are important in genetics but are not the central function of PCR. Similarly, while separating DNA fragments is a crucial technique in molecular biology, it is typically achieved through methods like gel electrophoresis rather than PCR.

10. What is the role of a structural gene?

- A. To provide regulatory control over other genes
- B. To code for proteins that influence cellular structure or function**
- C. To code for proteins involved in energy production
- D. To maintain DNA integrity

The role of a structural gene is to code for proteins that influence cellular structure or function. These genes are essential because they provide the instructions necessary for the synthesis of proteins, which are critical for various biological processes within the cell. Structural genes can code for a wide range of proteins, including enzymes, structural components like collagen, and other functional proteins involved in various metabolic pathways. This foundational aspect allows organisms to develop and maintain their cellular structures and perform necessary physiological functions. Underpinning this is the fact that proteins are involved in nearly every cellular activity, contributing to the organism's overall health and viability. Thus, structural genes are integral in determining both the form and functional capabilities of cells in an organism.

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://vcebiology.examzify.com>

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

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