

Advanced Placement (AP) Biology Practice Exam (Sample)

Study Guide



Everything you need from our exam experts!

This is a sample study guide. To access the full version with hundreds of 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. Don't worry about getting everything right, 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, and take breaks to retain information better.

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.

7. Use Other Tools

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

- 1. What is characteristic of a polyploid organism?**
 - A. It has an abnormal number of chromosomes**
 - B. It has additional sets of chromosomes**
 - C. It has one X chromosome inactivated**
 - D. It has reversed chromosomal segments**
- 2. What effect does cooling a reaction have on enzymatic activity?**
 - A. It typically speeds up the reaction rate.**
 - B. It has no impact on the reaction.**
 - C. It slows down the reaction rate.**
 - D. It permanently deactivates the enzyme.**
- 3. How do differential rates of cell elongation in tropism affect plant growth?**
 - A. They leads to uniform growth**
 - B. They result in curvature toward the stimulus**
 - C. They cause plants to disintegrate**
 - D. They hinder movement towards stimuli**
- 4. What does "duplication" describe in genetic terms?**
 - A. Reversing a chromosomal segment**
 - B. Repeating a segment of DNA**
 - C. Removing a chromosomal segment**
 - D. Translocating a segment**
- 5. What is a chemical that carries messages affecting cells in other parts of the body called?**
 - A. Enzyme**
 - B. Amino acid**
 - C. Hormone**
 - D. Neurotransmitter**

- 6. cAMP serves as which type of molecule in cell signaling?**
- A. A receptor**
 - B. A primary messenger**
 - C. A second messenger**
 - D. A transcription factor**
- 7. What is the role of the R group in amino acids?**
- A. It determines the location of peptide bonds**
 - B. It affects the protein's folding structure**
 - C. It confers unique chemical properties**
 - D. It serves as energy storage**
- 8. Which part of the chloroplast is specifically associated with light-independent reactions?**
- A. Thylakoid Space**
 - B. Stroma**
 - C. Outer Membrane**
 - D. Granum**
- 9. What is the term for water molecules attracting to other substances, aiding in processes like capillary action?**
- A. Cohesion**
 - B. Hydrophobicity**
 - C. Adhesion**
 - D. Solubility**
- 10. Which macromolecule is primarily responsible for structural support in plant cells?**
- A. Proteins**
 - B. Carbohydrates**
 - C. Nucleic acids**
 - D. Lipids**

Answers

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

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Explanations

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1. What is characteristic of a polyploid organism?

- A. It has an abnormal number of chromosomes
- B. It has additional sets of chromosomes**
- C. It has one X chromosome inactivated
- D. It has reversed chromosomal segments

A polyploid organism is characterized by having additional sets of chromosomes beyond the typical diploid number. In polyploidy, cells contain multiple complete sets of chromosomes, such as triploid (three sets) or tetraploid (four sets). This condition can arise naturally through processes such as whole genome duplication or through hybridization between species. Polyploidy is common in many plant species and plays a significant role in evolution, speciation, and adaptation. While an abnormal number of chromosomes may suggest a deviation from the normal diploid state, this term is too vague and can apply to other genetic conditions, such as aneuploidy, which involves the gain or loss of individual chromosomes rather than entire sets. The inactivation of one X chromosome pertains specifically to dosage compensation in female mammals and is not relevant to the definition of polyploidy. Similarly, the notion of reversed chromosomal segments relates to chromosomal rearrangements rather than the essence of being polyploid.

2. What effect does cooling a reaction have on enzymatic activity?

- A. It typically speeds up the reaction rate.
- B. It has no impact on the reaction.
- C. It slows down the reaction rate.**
- D. It permanently deactivates the enzyme.

Cooling a reaction generally slows down the reaction rate due to the decrease in kinetic energy among the reacting molecules. Enzymes, which are biological catalysts, rely on molecular motion to facilitate the formation of enzyme-substrate complexes. At lower temperatures, molecules move more slowly, which results in fewer collisions between enzymes and substrates. This decreased likelihood of collisions leads to a reduction in the overall rate of the reaction. It's important to understand that while cooling does not permanently deactivate the enzyme or alter its structure, it can significantly reduce its activity temporarily by influencing the dynamics of the molecular interactions. As the temperature drops, the molecular vibrations and movements necessary for enzyme function diminish, which is why enzymatic reactions are generally most active within an optimal temperature range. Beyond this optimal range, cooling the reaction can lead to a noticeable decrease in reaction speed.

3. How do differential rates of cell elongation in tropism affect plant growth?

- A. They leads to uniform growth
- B. They result in curvature toward the stimulus**
- C. They cause plants to disintegrate
- D. They hinder movement towards stimuli

Differential rates of cell elongation in response to environmental stimuli, a process known as tropism, play a critical role in how plants grow and orient themselves. When a plant experiences a stimulus, such as light (phototropism) or gravity (gravitropism), the cells on one side of the plant may elongate more than those on the opposite side. This uneven cell elongation causes the plant to bend toward or away from the stimulus, resulting in curvature. For instance, in phototropism, cells on the side of the plant that is away from the light source elongate more rapidly, causing the plant to bend toward the light. This responses enable the plant to maximize light exposure for photosynthesis, enhancing its growth and development. Therefore, the correct answer illustrates how this mechanism allows plants to adaptively grow toward beneficial stimuli, facilitating their survival and efficiency in acquiring resources.

4. What does "duplication" describe in genetic terms?

- A. Reversing a chromosomal segment
- B. Repeating a segment of DNA**
- C. Removing a chromosomal segment
- D. Translocating a segment

In genetic terms, "duplication" describes the process where a segment of DNA is repeated, resulting in the presence of one or more copies of that segment within the chromosome. This can occur through various mechanisms, such as errors during DNA replication or the unequal crossing over during meiosis. The outcome of duplication can lead to an increase in gene dosage, which may affect gene expression and contribute to evolutionary processes by providing additional genetic material that can acquire new functions over time. This characteristic sets it apart from other genetic modifications, like inversion, deletion, or translocation, which involve rearranging or removing genetic information rather than adding it. Understanding duplications is essential in genetics, as they can be involved in various genetic disorders and evolutionary adaptations.

5. What is a chemical that carries messages affecting cells in other parts of the body called?

- A. Enzyme**
- B. Amino acid**
- C. Hormone**
- D. Neurotransmitter**

A chemical that carries messages affecting cells in other parts of the body is known as a hormone. Hormones are signaling molecules produced by glands in the endocrine system and are released into the bloodstream, allowing them to travel to various tissues and organs, where they exert their effects on growth, metabolism, reproduction, and mood, among other physiological processes. In contrast, enzymes are biological catalysts that speed up chemical reactions but do not primarily serve as signaling molecules. Amino acids are the building blocks of proteins and can serve various roles in the body, including as precursors to hormones, but they do not act as messengers themselves. Neurotransmitters are chemicals that transmit signals across synapses between nerve cells, primarily affecting communication within the nervous system rather than throughout the body as hormones do. Hence, the role of hormones in the communication and regulation of physiological processes makes them the correct answer.

6. cAMP serves as which type of molecule in cell signaling?

- A. A receptor**
- B. A primary messenger**
- C. A second messenger**
- D. A transcription factor**

cAMP, or cyclic adenosine monophosphate, functions as a second messenger in cellular signaling pathways. When an extracellular signal, such as a hormone, binds to a receptor on the cell surface, it often activates an associated G protein. This G protein can then stimulate an enzyme called adenylate cyclase, which converts ATP into cAMP. Once produced, cAMP acts to transmit the signal from the receptor to various intracellular targets, leading to a cascade of cellular responses without the signaling molecule needing to enter the cell itself. This role makes cAMP a vital component in amplifying the signals from hormones and neurotransmitters, facilitating a more significant response in the target cell. As a second messenger, cAMP typically activates protein kinases, such as protein kinase A, which then phosphorylate other proteins, further propagating the cellular signal. This distinction is crucial; it highlights the role of cAMP in signal transduction, contrasting it with molecules like primary messengers, which initiate the signaling process but are not involved in the internal relay of signals. Likewise, receptors and transcription factors have separate roles in signaling pathways, primarily dealing with reception and regulation of gene expression, respectively.

7. What is the role of the R group in amino acids?

- A. It determines the location of peptide bonds
- B. It affects the protein's folding structure
- C. It confers unique chemical properties**
- D. It serves as energy storage

The R group, or side chain, of an amino acid plays a crucial role in defining the unique chemical properties of that amino acid. Each amino acid has a distinct R group that can vary in size, shape, charge, and polarity, which influences how the amino acid behaves in a protein as well as its interactions with other amino acids and molecules. This variability is fundamental because it determines the amino acid's reactivity and the overall chemical characteristics of the protein that it forms, impacting properties such as hydrophobicity, acidity, and basicity. These distinct characteristics contribute to the protein's functionality and can affect aspects such as enzyme activity, binding affinities, and structural integrity. While the other choices touch on relevant aspects of protein structure and function, they do not encapsulate the fundamental role of the R group as effectively as the assertion regarding unique chemical properties. For instance, while the R group does influence protein folding and interactions, the primary role centered around the diverse characteristics of the R groups is what makes them critical in defining the function and structure of proteins.

8. Which part of the chloroplast is specifically associated with light-independent reactions?

- A. Thylakoid Space
- B. Stroma**
- C. Outer Membrane
- D. Granum

The part of the chloroplast that is specifically associated with light-independent reactions, also known as the Calvin cycle, is the stroma. The stroma is the liquid-filled space surrounding the thylakoids, and it contains enzymes, metabolites, and the necessary substrates for the synthesis of glucose during the light-independent reactions. During photosynthesis, the light-dependent reactions occur in the thylakoid membranes, where light energy is converted into chemical energy in the form of ATP and NADPH. These energy carriers are then utilized in the stroma during the light-independent reactions to convert carbon dioxide into glucose. The stroma's environment is optimal for these reactions, providing the necessary conditions and molecules for the assembly and reduction of carbon compounds. The other options are involved in different functions within the chloroplast. The thylakoid space is where the light-dependent reactions take place, the outer membrane provides a boundary for the chloroplast but does not participate in photosynthesis, and the granum is a stack of thylakoids where the light-dependent reactions happen but not the light-independent reactions. Thus, the stroma is the critical site for the light-independent reactions, making it the most accurate answer to the question.

9. What is the term for water molecules attracting to other substances, aiding in processes like capillary action?

- A. Cohesion**
- B. Hydrophobicity**
- C. Adhesion**
- D. Solubility**

The term for water molecules attracting to other substances is adhesion. This is a crucial property that allows water to stick to other materials, which is especially significant in various biological and physical processes, such as capillary action. In capillary action, adhesion enables water to climb up thin tubes or within the small pores of materials, counteracting the force of gravity. Adhesion occurs because water is a polar molecule, meaning it has a partial positive charge on one end and a partial negative charge on the other. This polarity allows water to form hydrogen bonds with other polar substances. For example, when water interacts with the cellulose fibers in plant xylem, it adheres to those surfaces, helping facilitate the movement of water from roots to leaves. Recognizing the role of adhesion in biological systems is vital for understanding how plants transport water and nutrients, as well as other phenomena such as the behavior of water in soils and its interactions with various surfaces. This property differentiates adhesion from cohesion, which refers specifically to the attraction between water molecules themselves. In contrast, hydrophobicity describes a lack of affinity for water, and solubility pertains to the ability of substances to dissolve in water.

10. Which macromolecule is primarily responsible for structural support in plant cells?

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

The correct answer is carbohydrates, as they play a crucial role in providing structural support in plant cells. The primary carbohydrate involved in this function is cellulose, which is a major component of the plant cell wall. Cellulose is a polysaccharide composed of long chains of glucose units linked by beta-1,4-glycosidic bonds. This structure gives plant cells rigidity and strength, allowing them to maintain their shape and resist external pressures. In addition to cellulose, other polysaccharides such as hemicellulose and pectin also contribute to the structural integrity of plant cell walls. These carbohydrates work together to form a robust framework that supports the plant's overall structure and plays a key role in processes such as growth and transport of water and nutrients. While proteins, nucleic acids, and lipids have their own important functions within the cell, they do not primarily serve the structural support role that carbohydrates, specifically in the form of cellulose, provide in plant cells.

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://ap-biology.examzify.com>

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