

OSAT BIOLOGICAL SCIENCES (110) PRACTICE EXAM (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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THE FULL VERSION STUDY GUIDE

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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. Which hypothesis suggests that life could arise from nonliving matter?**
 - A. Cell theory
 - B. Spontaneous generation
 - C. Evolution
 - D. Abiogenesis
- 2. In scientific terms, what does the dependent variable depend on?**
 - A. Manipulations of the experimental variable
 - B. Conditions set by the control variable
 - C. Assessments of the independent variable
 - D. Outcomes of the hypothesis
- 3. What is the term for an inherited characteristic that enhances an organism's chances of survival?**
 - A. Mutation
 - B. Adaptation
 - C. Genetic drift
 - D. Natural selection
- 4. What are the chemicals added to cooling water to control algae and fouling called?**
 - A. Algaecides
 - B. Chemical treatment
 - C. Cooling aids
 - D. Biocides
- 5. What condition would likely stop a cell from committing to division?**
 - A. Abundant nutrients
 - B. Damaged DNA
 - C. High population density
 - D. Proper signaling from growth factors

- 6. What is the role of tRNA in translation?**
- A. Carries mRNA to the ribosome
 - B. Input energy for protein synthesis
 - C. Adds new amino acids to a growing polypeptide chain
 - D. Transcribes DNA into RNA
- 7. What term describes the process in which a stimulus produces a response that opposes the original stimulus?**
- A. Positive feedback
 - B. Negative feedback
 - C. Homeostasis
 - D. Stimulus-response mechanism
- 8. What does postzygotic isolation refer to?**
- A. Isolation before mating
 - B. Individual preferences in mate selection
 - C. Reproductive failure of hybrid offspring
 - D. Geographic separation of populations
- 9. What is the primary focus of scientific inquiry?**
- A. To develop personal opinions
 - B. To question established facts
 - C. To make evidence-based conclusions
 - D. To conduct experiments for entertainment
- 10. Which mutation is most likely to lead to severe changes in protein function?**
- A. Frameshift mutation
 - B. Point mutation
 - C. Silent mutation
 - D. Missense mutation

Answers

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

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Explanations

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1. Which hypothesis suggests that life could arise from nonliving matter?

- A. Cell theory
- B. Spontaneous generation**
- C. Evolution
- D. Abiogenesis

The hypothesis that suggests life could arise from nonliving matter is known as spontaneous generation. This concept dates back to ancient philosophy and was widely accepted until the 19th century when scientists began to challenge and ultimately disprove it through experimental evidence. Spontaneous generation posited that living organisms could originate from inanimate objects or nonliving substances under certain conditions—examples include the belief that maggots could emerge from decaying flesh or that mice could arise from stored grain. While this idea was prominent in early science, further research and experiments demonstrated that life comes from pre-existing life, leading to the abandonment of this hypothesis in favor of more accurate explanations for the origin of life. This shift in understanding paved the way for theories that more accurately describe the development of life on Earth. In contrast, abiogenesis refers to the process by which life arises naturally from nonliving matter in a historical context, typically concerning the origins of life on Earth. It represents the modern scientific understanding that life could originate under specific conditions from simple organic molecules, which differ from the misconceptions associated with spontaneous generation. Cell theory and evolution, while fundamental to biological sciences, do not address the origin of life from nonliving matter directly. Cell theory focuses on the fundamental unit of life being

2. In scientific terms, what does the dependent variable depend on?

- A. Manipulations of the experimental variable**
- B. Conditions set by the control variable
- C. Assessments of the independent variable
- D. Outcomes of the hypothesis

In scientific experiments, the dependent variable is the outcome that researchers measure to see if it changes in response to manipulations or alterations in another variable, known as the independent variable. Essentially, it is the factor that researchers are interested in observing, and it relies on changes made to the independent variable. For instance, if a scientist is testing how different amounts of sunlight affect plant growth, the growth of the plants (the dependent variable) is influenced by the amount of sunlight they receive (the independent variable). Therefore, the dependent variable directly depends on manipulations of the experimental variable, making the first choice the correct answer. Other options involve concepts that do not accurately define the relationship of dependence. The control variable maintains constant conditions and does not influence the dependent variable in a way that would define a direct dependency. Similarly, assessments of the independent variable refer to observations or measurements taken of the independent variable itself rather than the dependent outcome. Lastly, outcomes of the hypothesis are broader conclusions drawn from an experiment rather than a direct causal relationship, making them unrelated to the specific dependence of the dependent variable.

3. What is the term for an inherited characteristic that enhances an organism's chances of survival?

- A. Mutation
- B. Adaptation**
- C. Genetic drift
- D. Natural selection

The term that describes an inherited characteristic that enhances an organism's chances of survival is known as adaptation. Adaptations are features that have evolved over time through the process of natural selection, allowing organisms to better fit their environment and increase their reproductive success. These characteristics can be structural, behavioral, or physiological and are essential for organisms to thrive in their specific habitats. Adaptation is crucial for the process of evolution, as it helps populations to respond effectively to changes in their environment. For example, animals in cold climates may develop thicker fur as an adaptation to conserve heat, while plants in arid regions might evolve deep root systems to access water more efficiently. In contrast, mutation refers to a change in the DNA sequence that can generate genetic diversity, but not all mutations are beneficial or enhance survival. Genetic drift involves random changes in allele frequencies within a population, which can lead to significant evolutionary changes over time but isn't specifically tied to increased survival or reproduction. Natural selection is the process through which adaptations are favored and become more common in a population, but the term itself does not refer to the adaptations themselves. Thus, adaptation is the accurate term for the inherited characteristics that aid in survival.

4. What are the chemicals added to cooling water to control algae and fouling called?

- A. Algaecides
- B. Chemical treatment**
- C. Cooling aids
- D. Biocides

The chemicals that are specifically added to cooling water systems to control algae and fouling are typically referred to as algaecides. Algaecides are formulated to inhibit the growth of algae, which can thrive in aquatic environments, especially in the presence of sunlight and nutrients. This is crucial in industrial cooling systems, as uncontrolled algae growth can lead to fouling, which reduces the efficiency of heat exchange and can ultimately damage the system. Though "biocides" could also be applicable in a broader sense, as biocides encompass a wider range of chemicals that can kill or inhibit the growth of various microorganisms, including bacteria and algae, algaecides are specifically targeted towards algae. "Chemical treatment" is a general term and does not specify the purpose or type of chemicals being added to the water. "Cooling aids" is also not specific and does not capture the function of controlling biological growth in the system. Thus, the most precise term for the chemicals aimed at controlling algae growth in cooling water systems is algaecides.

5. What condition would likely stop a cell from committing to division?

- A. Abundant nutrients
- B. Damaged DNA**
- C. High population density
- D. Proper signaling from growth factors

A cell would likely halt its division process if it detects damaged DNA, which is the rationale behind choosing that answer. The integrity of the genetic material is crucial for a cell to proceed with division. If the DNA is damaged, the cell employs various checkpoint mechanisms, particularly during the G1 and G2 phases of the cell cycle, to assess the extent of the damage. If repair is not possible, the cell can enter a state of senescence or trigger apoptosis to prevent the propagation of potentially harmful mutations. This protective mechanism helps maintain the stability and integrity of the organism as a whole. In contrast, conditions such as abundant nutrients, high population density, and proper signaling from growth factors typically promote cell division. Abundant nutrients provide the necessary resources for growth and replication. High population density can sometimes trigger contact inhibition, but this is context-dependent and not as direct a factor in preventing division as damaged DNA. Proper signaling from growth factors promotes cell proliferation and survival, motivating the cell to continue through the division cycle. Therefore, damaged DNA is the most critical factor that would stop a cell from committing to division.

6. What is the role of tRNA in translation?

- A. Carries mRNA to the ribosome
- B. Input energy for protein synthesis
- C. Adds new amino acids to a growing polypeptide chain**
- D. Transcribes DNA into RNA

The role of tRNA, or transfer RNA, in translation is to add new amino acids to a growing polypeptide chain. During the translation process, tRNA molecules transport specific amino acids from the cytoplasm to the ribosome, where protein synthesis occurs. Each tRNA has an anticodon region that is complementary to a codon on the mRNA strand. When a tRNA matches its anticodon with the corresponding codon on the mRNA, it delivers its attached amino acid to the ribosome. This process facilitates the assembly of amino acids in the correct order, dictated by the sequence of the mRNA, ultimately forming a polypeptide that will fold into a functional protein. This choice highlights the crucial function of tRNA as the molecule responsible for translating the genetic code into chemical structure. Other options, while related to biological processes, do not accurately define the unique role of tRNA in translation. For instance, tRNA does not carry mRNA to the ribosome, nor does it transcribe DNA into RNA. Additionally, input energy for translation is supplied by ATP and GTP, not directly by tRNA itself.

7. What term describes the process in which a stimulus produces a response that opposes the original stimulus?

- A. Positive feedback
- B. Negative feedback**
- C. Homeostasis
- D. Stimulus-response mechanism

The process in which a stimulus produces a response that opposes the original stimulus is known as negative feedback. This mechanism is crucial in maintaining homeostasis within biological systems. For instance, when blood glucose levels rise after eating, the body responds by secreting insulin, which lowers glucose levels by facilitating cellular uptake. This regulation illustrates how negative feedback serves to bring the system back to a set point, promoting stability and balance. In contrast, positive feedback amplifies the response rather than opposing it. For example, during childbirth, the release of oxytocin increases contractions, which then prompts further oxytocin release, thus creating an escalating effect until delivery occurs. Homeostasis refers to the overall process of maintaining stable internal conditions, which often involves negative feedback mechanisms, but it is not the term that specifically describes the opposing response to a stimulus. The stimulus-response mechanism describes the general concept of how organisms respond to stimuli but does not specify whether that response opposes or enhances the initial stimulus. Therefore, the answer that best fits the description of a response that counteracts the original stimulus is negative feedback.

8. What does postzygotic isolation refer to?

- A. Isolation before mating
- B. Individual preferences in mate selection
- C. Reproductive failure of hybrid offspring**
- D. Geographic separation of populations

Postzygotic isolation refers to mechanisms that prevent species from producing viable or fertile offspring after fertilization has occurred. This type of isolation typically comes into play when two different species mate and produce hybrid offspring. These hybrids may be sterile or may suffer from reduced viability, preventing them from successfully contributing to the gene pool of either parent species. The correct response highlights how postzygotic isolation affects the reproductive success of hybrid offspring, often resulting in scenarios where even if two species successfully mate, the resulting offspring do not survive or are unable to reproduce. This reproductive barrier plays a crucial role in maintaining distinct species over time by preventing gene flow between them. In contrast, the other options reflect different concepts of reproductive isolation. Isolation before mating, such as through behavioral differences or temporal separation, represents prezygotic barriers. Individual preferences in mate selection also pertain to prezygotic isolation, as they determine whether individuals will mate at all. Geographic separation of populations relates to how physical barriers can separate species thereby limiting interactions and is also a form of prezygotic isolation since it prevents mating from occurring in the first place. Thus, the focus on reproductive outcomes after mating is what distinctly characterizes postzygotic isolation.

9. What is the primary focus of scientific inquiry?

- A. To develop personal opinions
- B. To question established facts
- C. To make evidence-based conclusions**
- D. To conduct experiments for entertainment

The primary focus of scientific inquiry is to make evidence-based conclusions. This process involves systematically gathering and analyzing data through observation and experimentation to understand natural phenomena. Scientists seek to develop theories and models that can accurately explain and predict behaviors in the natural world. By basing conclusions on empirical evidence, scientific inquiry ensures that findings are reliable and valid, allowing researchers to build on one another's work and advance knowledge in various fields. Focusing on evidence allows scientists to move beyond subjective opinions and beliefs, leading to more concrete outcomes in research. While questioning established facts is a part of scientific inquiry, especially in re-evaluating theories in light of new evidence, the ultimate aim is to foster understanding through data-driven conclusions. Conducting experiments for entertainment does not align with the serious and methodical approach required in scientific research, as it disregards the foundational goal of seeking knowledge and understanding in a systematic way.

10. Which mutation is most likely to lead to severe changes in protein function?

- A. Frameshift mutation**
- B. Point mutation
- C. Silent mutation
- D. Missense mutation

A frameshift mutation is likely to lead to severe changes in protein function due to the way it alters the reading frame of the genetic code. When a frameshift mutation occurs, whether through the insertion or deletion of nucleotides, it changes how the nucleotides are grouped into codons during translation. This shift affects all downstream amino acids, often resulting in an entirely different protein sequence, which can lead to a nonfunctional protein or one with drastically altered activity. This contrasts with point mutations, which typically only result in the alteration of a single amino acid within the protein. While this can affect protein function, especially if the amino acid is critical for activity, the overall structure and function of the protein may still remain largely intact. Silent mutations, on the other hand, do not change the amino acid sequence due to the redundancy in the genetic code; thus, they typically have no impact on protein function. Missense mutations can also alter a single amino acid, potentially affecting the protein, but generally not to the severe extent of a frameshift mutation that disturbs the entire translation reading frame.

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://osatbiosciences110.examzify.com>

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

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