

ONTARIO GRADE 12 UNIVERSITY BIOLOGY (SBI4U) COURSE 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 hormone plays a crucial role in the fight-or-flight response?**
 - A. Cortisol
 - B. Insulin
 - C. Epinephrine
 - D. Thyroxine

- 2. What is the role of an electron carrier in cellular metabolism?**
 - A. It generates ATP from glucose
 - B. It accumulates waste products
 - C. It picks up electrons from energy-rich compounds and donates them to low-energy compounds
 - D. It directly participates in glycolysis

- 3. What is the connection between two neurons called?**
 - A. Synapse
 - B. Dendrite
 - C. Axon
 - D. Neuron body

- 4. Which of the following is NOT a function of the excretory system?**
 - A. Regulation of blood pressure
 - B. Production of urine
 - C. Breakdown of fats
 - D. Excretion of metabolic wastes

- 5. What is free energy?**
 - A. Energy unavailable for work
 - B. Total energy in a system
 - C. Energy released during reactions
 - D. Energy available to do work

- 6. What does it mean for the genetic code to be redundant?**
 - A. There is only one codon for each amino acid
 - B. More than one codon can code for the same amino acid
 - C. A single nucleotide can alter the protein sequence
 - D. Elimination of codons leads to errors in proteins

- 7. Which hormone inhibits the production of FSH by the anterior pituitary?**
- A. Estrogen
 - B. Inhibin
 - C. Progesterone
 - D. Testosterone
- 8. An exergonic reaction is characterized by what type of energy change?**
- A. Energy is absorbed
 - B. Energy is emitted
 - C. No energy is exchanged
 - D. Energy remains constant
- 9. Which component of the cell structure is crucial for maintaining shape and organizing the cell?**
- A. Cytoskeleton
 - B. Cell membrane
 - C. Nucleus
 - D. Endoplasmic reticulum
- 10. What molecule serves as the template for protein synthesis?**
- A. tRNA
 - B. mRNA
 - C. rRNA
 - D. DNA

Answers

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

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Explanations

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1. Which hormone plays a crucial role in the fight-or-flight response?

- A. Cortisol
- B. Insulin
- C. Epinephrine**
- D. Thyroxine

Epinephrine, also known as adrenaline, is the hormone that plays a crucial role in the fight-or-flight response. When an individual perceives a threat, the adrenal glands release epinephrine into the bloodstream. This hormone triggers a series of physiological changes that prepare the body to either confront or flee from the danger. These changes include an increase in heart rate, heightened blood flow to muscles, and enhanced energy production through the release of glucose from energy stores. This rapid response allows the body to react quickly to stressful situations, making it vital for survival. The other hormones listed—cortisol, insulin, and thyroxine—do not directly contribute to the immediate fight-or-flight response. Cortisol is involved in long-term stress responses and helps regulate metabolism and immune responses. Insulin is primarily responsible for glucose uptake and regulation following meals. Thyroxine plays a role in metabolism and development but is not involved in acute stress responses. Thus, epinephrine's specific function in heightening immediate physiological readiness underscores its critical role in managing acute stress through the fight-or-flight response.

2. What is the role of an electron carrier in cellular metabolism?

- A. It generates ATP from glucose
- B. It accumulates waste products
- C. It picks up electrons from energy-rich compounds and donates them to low-energy compounds**
- D. It directly participates in glycolysis

An electron carrier plays a crucial role in cellular metabolism by facilitating the transfer of electrons from energy-rich compounds to low-energy compounds. This process is vital in cellular respiration and photosynthesis, where the movement of electrons helps to create a proton gradient that is used to generate ATP, the energy currency of the cell. By collecting electrons from molecules such as NADH or FADH₂ during metabolic reactions, these carriers ensure that energy is effectively transformed and utilized in biochemical pathways. This transfer of electrons is essential for the oxidation-reduction reactions that drive the processes of energy production, allowing cells to harness energy stored in chemical bonds. While generating ATP and participating in glycolysis are important aspects of metabolism, the specific function of electron carriers is more focused on their role in electron transfer rather than direct energy production or pathway participation. Accumulating waste products is not a function of electron carriers, but rather a byproduct of metabolic processes that involve various cellular components.

3. What is the connection between two neurons called?

- A. Synapse**
- B. Dendrite
- C. Axon
- D. Neuron body

The connection between two neurons is called a synapse. A synapse is the junction at which a neuron communicates with another neuron, muscle cell, or gland cell. When an electrical impulse reaches the synaptic terminal of the connecting neuron, it triggers the release of neurotransmitters. These chemical messengers cross the synaptic cleft and bind to receptors on the postsynaptic neuron, allowing the transmission of signals within the nervous system. This connection is crucial for the functioning of neural circuits and the overall communication in the nervous system, facilitating processes such as reflexes, thoughts, and emotions. Dendrites, while playing an essential role in receiving signals from other neurons, do not represent the connection itself. Axons are the long projections of a neuron that transmit signals away from the neuron's body, but they do not form a connection with another neuron. The neuron body, or soma, houses the cell's core components but is not involved in direct communication between neurons.

4. Which of the following is NOT a function of the excretory system?

- A. Regulation of blood pressure
- B. Production of urine
- C. Breakdown of fats**
- D. Excretion of metabolic wastes

The correct answer highlights that the breakdown of fats is not a function of the excretory system. The excretory system is primarily responsible for removing metabolic wastes, regulating blood pressure, and producing urine. It includes organs such as the kidneys, ureters, bladder, and urethra, which work together to filter blood, remove waste products (like urea and creatinine), and maintain homeostasis in the body. In contrast, the breakdown of fats is a function associated with the digestive and metabolic systems. Specifically, the digestive system is responsible for nutrient absorption and the conversion of fats into usable energy. Moreover, while the excretory system may play a role in the elimination of by-products from fat metabolism, the actual breakdown itself occurs in organs like the liver and involves biochemistry that is separate from excretory functions. Thus, identifying the breakdown of fats as not being a function of the excretory system is accurate.

5. What is free energy?

- A. Energy unavailable for work
- B. Total energy in a system
- C. Energy released during reactions
- D. Energy available to do work**

Free energy refers to the portion of a system's energy that is available to perform work at constant temperature and pressure. This concept is crucial in thermodynamics and biochemistry because it allows us to predict the spontaneity of reactions and the efficiency of energy transfer in biological systems. When considering the definition of free energy, it is important to note that it considers both the enthalpy (total heat content) and the entropy (degree of disorder) of the system. The Gibbs Free Energy, which is commonly used in biological contexts, defines this available energy in relation to temperature and entropy changes. In contrast to choices that refer to energy that is either unavailable for work, total energy, or energy released during reactions, free energy specifically highlights the capacity to perform work. Understanding free energy helps in comprehending metabolic processes, enzyme functions, and the energetics of cellular respiration and photosynthesis, as these phenomena depend heavily on the availability of energy for work.

6. What does it mean for the genetic code to be redundant?

- A. There is only one codon for each amino acid
- B. More than one codon can code for the same amino acid**
- C. A single nucleotide can alter the protein sequence
- D. Elimination of codons leads to errors in proteins

The concept of redundancy in the genetic code refers to the fact that multiple codons can specify the same amino acid. This redundancy is an important feature of the genetic code, which consists of triplets of nucleotides known as codons. Each codon corresponds to a specific amino acid or a stop signal during protein synthesis. For example, the amino acid leucine is coded by six different codons (CUU, CUC, CUA, CUG, UUA, and UUG). This characteristic of the genetic code helps to mitigate the effects of mutations, as a change in one nucleotide might not always lead to a different amino acid being incorporated into a protein. Such redundancy allows for some level of flexibility in the protein synthesis process and can contribute to the overall stability of the organism's proteins, making the system more resilient to genetic variability. Understanding this redundancy is crucial because it highlights the robustness of genetic information and the complexity of protein synthesis, allowing for variation without compromising the functionality of the resulting proteins.

7. Which hormone inhibits the production of FSH by the anterior pituitary?

- A. Estrogen
- B. Inhibin**
- C. Progesterone
- D. Testosterone

Inhibin is the hormone responsible for inhibiting the production of Follicle-Stimulating Hormone (FSH) by the anterior pituitary. In males, inhibin is secreted by Sertoli cells in the testes, and its primary role is to provide negative feedback to the pituitary gland. This feedback mechanism helps regulate the production of sperm by controlling the levels of FSH, which stimulates spermatogenesis. In females, the secretion of inhibin occurs in the ovaries and helps regulate FSH levels during the menstrual cycle. By inhibiting FSH production, inhibin aids in the balance of follicle development and ensures that ovarian function is properly regulated. While estrogen and progesterone do have roles in the feedback mechanisms regulating the menstrual cycle, their primary actions do not specifically target FSH in the same direct manner that inhibin does. Testosterone, on the other hand, primarily regulates the production of luteinizing hormone (LH) and has effects on other hormones, but it is not directly responsible for inhibiting FSH production. Thus, the action of inhibin is the key factor in the control of FSH levels in the body.

8. An exergonic reaction is characterized by what type of energy change?

- A. Energy is absorbed
- B. Energy is emitted**
- C. No energy is exchanged
- D. Energy remains constant

An exergonic reaction is characterized by a release of energy, which is why the choice indicating that energy is emitted is correct. In these types of reactions, the products have lower energy than the reactants, resulting in a decrease in free energy. This release of energy often manifests in the form of heat, light, or work, making it spontaneous under standard conditions. During an exergonic reaction, the difference in free energy (ΔG) is negative, indicating that the system releases energy to the surroundings as the reaction proceeds towards equilibrium. This concept is critical in understanding metabolic processes, where energy is often harvested from exergonic reactions to drive endergonic reactions, which require energy input. The incorrect options represent scenarios that do not align with the nature of exergonic reactions. For instance, reactions characterized by energy absorption would be classified as endergonic, while scenarios involving no energy exchange or constant energy would not describe the energetic movement typically seen in exergonic reactions.

9. Which component of the cell structure is crucial for maintaining shape and organizing the cell?

- A. Cytoskeleton**
- B. Cell membrane
- C. Nucleus
- D. Endoplasmic reticulum

The cytoskeleton is essential for maintaining the shape and organization of the cell due to its network of protein filaments and tubules. It provides structural support, enabling cells to withstand mechanical stress and maintain their integrity. The cytoskeleton plays a key role in various cellular processes including cell division, the movement of organelles within the cell, and cell signaling. By providing a framework that anchors organelles in place, the cytoskeleton ensures that the cell maintains its shape and functions effectively. The other components mentioned, while important, serve different primary functions. The cell membrane acts as a protective barrier and regulates the movement of substances in and out of the cell but does not provide significant structural support. The nucleus is primarily responsible for storing genetic material and coordinating cell activities such as growth and metabolism. The endoplasmic reticulum is involved in protein and lipid synthesis; it contributes to the overall function of the cell but is not primarily focused on maintaining the cell's shape. Therefore, the cytoskeleton stands out as the crucial component for maintaining cell structure and organization.

10. What molecule serves as the template for protein synthesis?

- A. tRNA
- B. mRNA**
- C. rRNA
- D. DNA

The molecule that serves as the template for protein synthesis is mRNA, or messenger RNA. During the process of transcription, mRNA is synthesized from a DNA template. It carries the genetic information from the DNA in the nucleus to the ribosomes in the cytoplasm, where protein synthesis occurs. The sequence of nucleotides in the mRNA is read in sets of three bases called codons, which correspond to specific amino acids. This codon sequence essentially dictates the order in which amino acids are added to the growing polypeptide chain during translation, thus determining the structure and function of the resulting protein. In contrast, tRNA (transfer RNA) is involved in the translation process by bringing the appropriate amino acids to the ribosome based on the codons in the mRNA, but it does not act as a template itself. rRNA (ribosomal RNA) forms a crucial part of the ribosomes, serving as a structural and functional component, but again, it does not serve as a template for protein synthesis. DNA is the original source of genetic information and is transcribed into mRNA, but during actual protein synthesis, it is the mRNA that acts as the template.

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://sbi4ucourse.examzify.com>

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

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