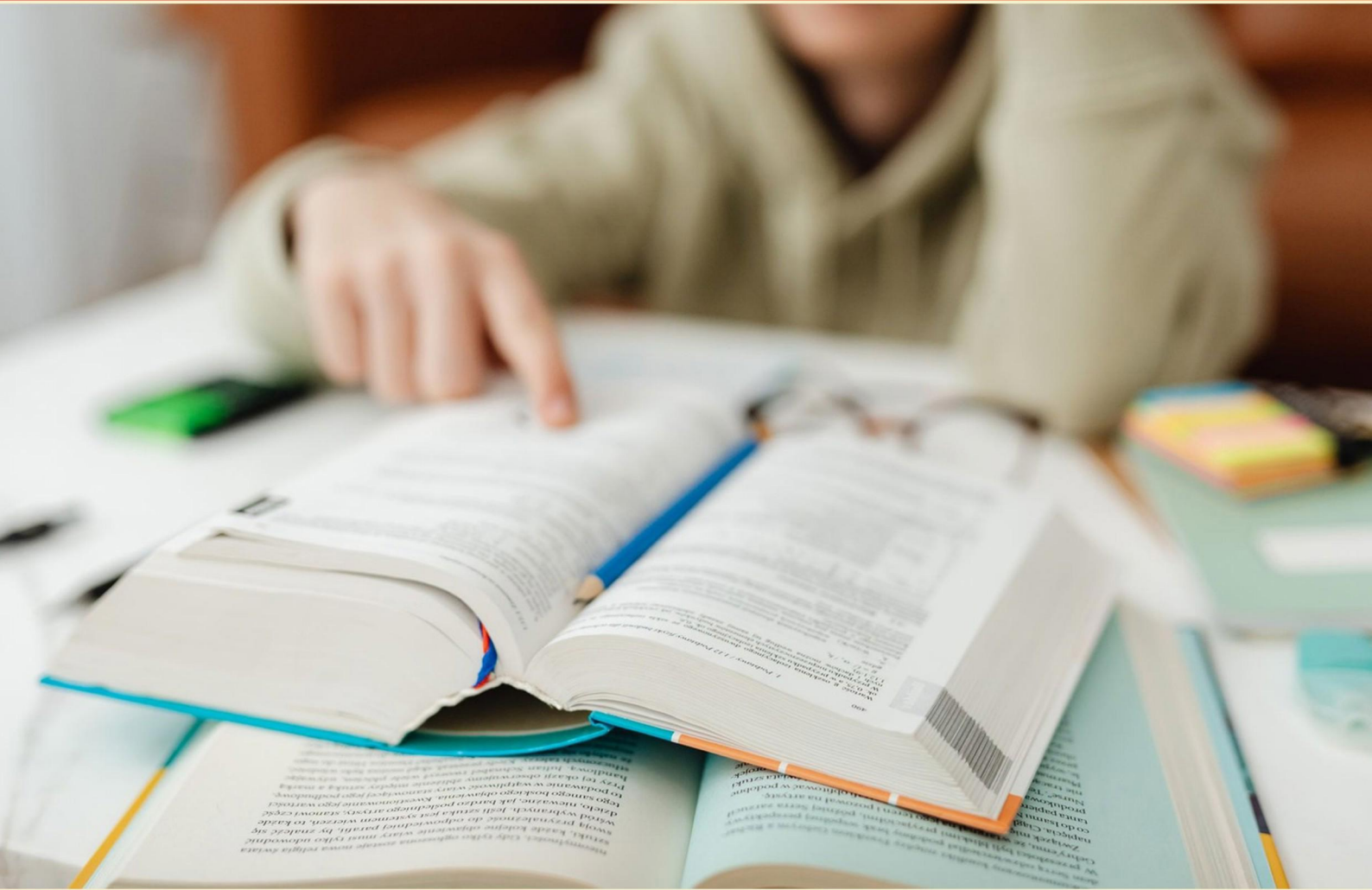


CAMPBELL BIOLOGY PRACTICE TEST (SAMPLE)

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. What structure is composed of stacked thylakoids within chloroplasts?**
 - A. Stroma
 - B. Granum
 - C. Thylakoid
 - D. Chlorophyll
- 2. In which type of solution is a cell's water concentration greater than that of its surrounding environment?**
 - A. Hypertonic
 - B. Isotonic
 - C. Hypotonic
 - D. Concentrated
- 3. What structure contains centrioles and is involved in cell division?**
 - A. Nucleus
 - B. Centrosome
 - C. Mitochondria
 - D. Golgi apparatus
- 4. Which of the following is not a function of the extracellular matrix?**
 - A. Providing structural support
 - B. Storing genetic material
 - C. Facilitating cell communication
 - D. Attaching cells together
- 5. What term is used to describe the energy associated with the random movement of atoms or molecules?**
 - A. Potential energy
 - B. Kinetic energy
 - C. Thermal energy
 - D. Nuclear energy

6. What type of electron microscope is used to study fine details of cell surfaces?

- A. Transmission Electron Microscope (TEM)
- B. Scanning Electron Microscope (SEM)
- C. Atomic Force Microscope (AFM)
- D. Phase Contrast Microscope

7. What is a primary role of the nuclear lamina within the nucleus?

- A. Energy Production
- B. Maintaining Nuclear Shape
- C. Protein Synthesis
- D. Cell Division

8. What do integrins do in relation to cell membranes?

- A. Transmit signals between the ECM and cytoskeleton
- B. Form tight junctions between cells
- C. Facilitate cell adhesion
- D. Store energy in cells

9. What are the flattened membranous sacs within a cell called?

- A. Cisternae
- B. Vesicles
- C. Filaments
- D. Structures

10. What type of glycoprotein consists of a core protein with many carbohydrate chains attached?

- A. Fibronectin
- B. Proteoglycans
- C. Collagen
- D. Integrins

Answers

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

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Explanations

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1. What structure is composed of stacked thylakoids within chloroplasts?

- A. Stroma
- B. Granum**
- C. Thylakoid
- D. Chlorophyll

The structure composed of stacked thylakoids within chloroplasts is known as a granum. A granum is an essential component of the chloroplast's internal structure, primarily involved in the light-dependent reactions of photosynthesis. Each granum is made up of multiple thylakoids stacked together, which increases the surface area available for capturing light energy. This arrangement facilitates the efficient absorption of light and the subsequent conversion of that energy into chemical energy. The stroma refers to the fluid matrix surrounding the thylakoids within the chloroplasts, where the light-independent reactions (Calvin cycle) occur, but it is not a stack of thylakoids. A thylakoid is an individual membrane-bound compartment within the chloroplast, containing chlorophyll and other pigments necessary for photosynthesis, but does not refer to the stacked form. Chlorophyll is the green pigment found within the thylakoid membranes, crucial for absorbing light energy, but it is not a structural arrangement. Thus, the term granum specifically denotes the stacked organization essential for maximizing light capture in the photosynthetic process.

2. In which type of solution is a cell's water concentration greater than that of its surrounding environment?

- A. Hypertonic
- B. Isotonic
- C. Hypotonic**
- D. Concentrated

In a hypotonic solution, the concentration of water inside the cell is greater than that in the surrounding environment. This means that there are fewer solutes outside the cell compared to the inside. As a result, water moves into the cell to balance the solute concentrations on both sides of the cell membrane. This influx of water can lead to cell swelling, and in some cases, it may even cause the cell to burst if the difference in concentration is significant enough. In contrast, a hypertonic solution has a higher concentration of solutes compared to the inside of the cell, causing water to move out of the cell, which can lead to cell shrinkage. An isotonic solution has equal concentrations of solutes and water inside and outside the cell, resulting in no net movement of water. The term "concentrated" does not specifically refer to a solution type in terms of water concentration compared to the cell and is not relevant in this context.

3. What structure contains centrioles and is involved in cell division?

- A. Nucleus
- B. Centrosome**
- C. Mitochondria
- D. Golgi apparatus

The centrosome is the correct structure that contains centrioles and plays a crucial role in cell division. It is an organelle found in eukaryotic cells and serves as the main microtubule organizing center. During cell division, specifically in mitosis, the centrosome duplicates so that each new daughter cell receives one centrosome. The centrioles, which are cylindrical structures made up of microtubules, are found within the centrosome and are essential for the formation of the spindle apparatus that helps segregate chromosomes during cell division. This spindle apparatus is critical for ensuring that each daughter cell has the appropriate number of chromosomes. The other structures mentioned do not have this specific function in cell division. The nucleus, for instance, is the cellular organelle that houses genetic material but does not directly contribute to the organization of microtubules or the division processes. Mitochondria are primarily involved in energy production, and the Golgi apparatus is responsible for modifying, sorting, and packaging proteins and lipids but does not play a role in the physical process of cell division.

4. Which of the following is not a function of the extracellular matrix?

- A. Providing structural support
- B. Storing genetic material**
- C. Facilitating cell communication
- D. Attaching cells together

The extracellular matrix (ECM) plays several crucial roles in tissue structure and function, but storing genetic material is not one of its functions. The ECM is composed of a network of proteins and carbohydrates that provides structural support, facilitates cell communication, and aids in the attachment of cells to one another and to the surrounding tissue. These functions contribute to the overall integrity and functionality of tissues in multicellular organisms. In contrast, genetic material, which consists of DNA, is stored and managed within the cell nucleus, not the ECM. The ECM may influence gene expression and cellular behavior through biochemical signals, but the genetic information itself is localized within the cell, primarily in the nucleus. This distinction highlights the specific roles of both the ECM and the nucleus in the life of a cell.

5. What term is used to describe the energy associated with the random movement of atoms or molecules?

- A. Potential energy
- B. Kinetic energy
- C. Thermal energy**
- D. Nuclear energy

The term that describes the energy associated with the random movement of atoms or molecules is thermal energy. This type of energy is a manifestation of the microscopic kinetic energy of particles; as atoms and molecules vibrate and move randomly, they exhibit thermal energy. In a substance, higher thermal energy corresponds to higher temperatures, as more energetic particles move more rapidly. Thermal energy is crucial in various biological processes since it influences reactions, the behavior of molecules, and the overall temperature of organisms and their environments. While kinetic energy refers to the energy of motion more generally, it does not specifically address the random movements at the atomic or molecular level. Potential energy relates to the stored energy within a system, such as chemical energy within bonds, and nuclear energy pertains to the energy stored in the nucleus of an atom. Thus, thermal energy is the most precise term for the energy attributed to molecular motion.

6. What type of electron microscope is used to study fine details of cell surfaces?

- A. Transmission Electron Microscope (TEM)
- B. Scanning Electron Microscope (SEM)**
- C. Atomic Force Microscope (AFM)
- D. Phase Contrast Microscope

The Scanning Electron Microscope (SEM) is specifically designed to study the fine details of cell surfaces. This type of electron microscope provides three-dimensional images of samples by scanning them with a focused beam of electrons. As the beam interacts with the specimen, secondary electrons are emitted, which are collected to form a high-resolution image. One of the key advantages of SEM is its ability to produce detailed topographical images, making it an invaluable tool for examining the surface structures and characteristics of cells at a very high magnification. This is particularly useful for studying cell membranes, surface proteins, and any external structures, such as cilia or flagella, that are important for cell function and interaction with their environment. In contrast, the Transmission Electron Microscope (TEM) is better suited for examining the internal structures of cells, as it provides images by transmitting electrons through a thinly sliced specimen. Other microscopes like the Atomic Force Microscope (AFM) serve different purposes, such as measuring forces between a sharp probe and the sample surface, or characterizing samples at the nanoscale without relying on electron beams. The Phase Contrast Microscope is primarily used for live cell imaging to enhance contrast in unstained, transparent specimens, thereby focusing on different applications than

7. What is a primary role of the nuclear lamina within the nucleus?

- A. Energy Production
- B. Maintaining Nuclear Shape**
- C. Protein Synthesis
- D. Cell Division

The primary role of the nuclear lamina within the nucleus is maintaining the nuclear shape. The nuclear lamina is a dense fibrillar network found inside the inner nuclear membrane, primarily composed of intermediate filaments called lamins. This structure provides mechanical support to the nucleus, helping it retain its shape and architecture, much like scaffolding. It also plays a crucial role in organizing the chromatin and anchoring nuclear pores, contributing to the overall integrity of the nuclear envelope. While energy production, protein synthesis, and cell division are essential cellular processes, they are not functions attributed to the nuclear lamina. Energy production occurs in the mitochondria, protein synthesis takes place primarily in ribosomes in the cytoplasm, and cell division involves various stages and structures like the mitotic spindle, not the lamina itself. Therefore, the correct answer reflects the specific structural and supportive role that the nuclear lamina serves in the cell nucleus.

8. What do integrins do in relation to cell membranes?

A. Transmit signals between the ECM and cytoskeleton

B. Form tight junctions between cells

C. Facilitate cell adhesion

D. Store energy in cells

Integrins play a crucial role in the interaction between cells and their external environment, particularly in transmitting signals between the extracellular matrix (ECM) and the cytoskeleton. They are transmembrane proteins that connect the ECM outside the cell to the cytoskeleton inside the cell. When integrins bind to components in the ECM, they can activate intracellular signaling pathways that influence various cellular functions, including cell proliferation, survival, and migration. This signaling capability is essential for maintaining tissue integrity and facilitating communication between cells and their surrounding matrix. It allows cells to respond to changes in their environment, thus playing a significant role in processes such as development, wound healing, and immune responses. In contrast, the other options refer to functions that integrins do not perform. While integrins do indeed facilitate cell adhesion, this function is more about connecting cells to the ECM rather than signaling. Tight junctions involve different proteins that help in sealing cells together to prevent leakage; therefore, this is not a role of integrins. Storing energy in cells generally relates to organelles like mitochondria or structures like glycogen granules, which is unrelated to the function of integrins.

9. What are the flattened membranous sacs within a cell called?

A. Cisternae

B. Vesicles

C. Filaments

D. Structures

Flattened membranous sacs within a cell are called cisternae. Cisternae are typically associated with the endoplasmic reticulum and the Golgi apparatus, where they play crucial roles in the processing, folding, and transport of proteins and lipids. The structure of cisternae facilitates the compartmentalization of cellular functions, allowing for efficient processing and modifications to occur separately from the cytosol. In the context of cellular organization, vesicles are small, membrane-bound sacs that transport substances within the cell but are not flat or membranous in the same manner as cisternae. Filaments refer to thread-like structures, such as cytoskeletal components, and do not describe membranous sacs. The term structures is too vague and does not specifically refer to any recognized cellular component. Thus, cisternae are the most accurate term for describing these flattened membranous sacs.

10. What type of glycoprotein consists of a core protein with many carbohydrate chains attached?

- A. Fibronectin
- B. Proteoglycans**
- C. Collagen
- D. Integrins

The type of glycoprotein that consists of a core protein with many carbohydrate chains attached is proteoglycans. These molecules play essential roles in the extracellular matrix and cellular signaling. The core protein serves as a backbone to which numerous glycosaminoglycan (GAG) chains are covalently linked. This unique structure allows proteoglycans to retain water and contribute to the hydration and resilience of tissues, particularly in cartilage. The large, negatively charged carbohydrate chains attract water and facilitate nutrient diffusion, as well as providing lubrication. In contrast, fibronectin, collagen, and integrins are also important components of the extracellular matrix but do not primarily fit the definition of a glycoprotein with extensive carbohydrate attachment like proteoglycans. Fibronectin is involved in cell adhesion and has fewer carbohydrate attachments compared to proteoglycans. Collagen provides structural integrity to connective tissues and is primarily composed of protein without the extensive carbohydrate components characteristic of proteoglycans. Integrins are transmembrane proteins that facilitate cell adhesion and communication but are not classified as glycoproteins with a core protein structure supported by multiple carbohydrate chains.

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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:

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

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