

# Arizona State University (ASU) BIO181 General Biology I Exam 2 Practice (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. How does glucose enter a cell?**
  - A. Through active transport**
  - B. Through facilitated diffusion via glucose transporters**
  - C. By osmosis**
  - D. Through simple diffusion**
- 2. Which of the following is NOT a component required for photosynthesis?**
  - A. Sunlight**
  - B. Chlorophyll**
  - C. Proteins**
  - D. Water**
- 3. What process describes the movement of water across a semipermeable membrane?**
  - A. Diffusion**
  - B. Osmosis**
  - C. Filtration**
  - D. Active transport**
- 4. During what phase of meiosis does separation of homologous chromosomes occur?**
  - A. Prophase I**
  - B. Metaphase II**
  - C. Anaphase I**
  - D. Telophase II**
- 5. What determines the secondary structure of proteins?**
  - A. Covalent bonds between R groups**
  - B. Hydrophobic interactions**
  - C. Hydrogen bonds between the backbone atoms**
  - D. Ionic bonds between charged groups**

**6. What is the significance of the fluid mosaic model?**

- A. It emphasizes the rigid structure of the cell membrane**
- B. It describes the dynamic nature of the cell membrane structure**
- C. It provides a model for DNA replication**
- D. It details the process of photosynthesis**

**7. What role do Helper T Cells play in the immune response?**

- A. Producing antibodies**
- B. Activating other immune cells**
- C. Directly destroying pathogens**
- D. Presenting antigens to pathogens**

**8. How many chromosomes are present in human somatic cells?**

- A. 20 chromosomes**
- B. 23 chromosomes**
- C. 46 chromosomes**
- D. 92 chromosomes**

**9. Which organelle is often referred to as the 'powerhouse of the cell'?**

- A. Nucleus**
- B. Ribosome**
- C. Mitochondria**
- D. Endoplasmic reticulum**

**10. What is the function of enzymes within biological systems?**

- A. They serve as a structural component of cells**
- B. They act as catalysts to speed up chemical reactions**
- C. They provide energy for cellular activities**
- D. They facilitate the movement of substances across membranes**

## **Answers**

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

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## **Explanations**

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## 1. How does glucose enter a cell?

- A. Through active transport
- B. Through facilitated diffusion via glucose transporters**
- C. By osmosis
- D. Through simple diffusion

Glucose enters a cell primarily through facilitated diffusion, which relies on specific transport proteins known as glucose transporters. These proteins are embedded in the cell membrane and enable glucose, a polar molecule, to cross the lipid bilayer efficiently. Facilitated diffusion does not require energy because it transports glucose down its concentration gradient, meaning it moves from an area of higher concentration outside the cell to an area of lower concentration inside the cell. This mechanism is particularly important because glucose is too large and polar to cross the membrane directly through simple diffusion. Transporters specifically recognize glucose and aid in its movement, ensuring that cells can uptake this essential energy source quickly and effectively.

## 2. Which of the following is NOT a component required for photosynthesis?

- A. Sunlight
- B. Chlorophyll
- C. Proteins**
- D. Water

Photosynthesis is a fundamental biological process carried out by plants, algae, and some bacteria that converts light energy into chemical energy in the form of glucose. The primary components required for this process include sunlight, chlorophyll, and water. Sunlight provides the energy necessary for the photosynthetic reactions. Chlorophyll, the green pigment in plants, is crucial because it absorbs light, predominantly in the blue and red wavelengths, and captures that energy to drive the synthesis of glucose. Water acts as both a reactant in the overall photosynthetic equation and as a source of electrons, which are necessary for the light-dependent reactions of photosynthesis. While proteins are essential for many cellular functions and processes, including enzymatic reactions involved in metabolism and growth, they are not direct components required for photosynthesis itself. Therefore, they do not belong to the primary materials that directly participate in the photosynthetic process. This distinguishes them from the other components listed, which are directly involved in capturing energy and converting it into a usable form for the plant.

**3. What process describes the movement of water across a semipermeable membrane?**

- A. Diffusion**
- B. Osmosis**
- C. Filtration**
- D. Active transport**

The movement of water across a semipermeable membrane is specifically referred to as osmosis. This process involves the movement of water molecules from an area of lower solute concentration to an area of higher solute concentration through a membrane that is permeable to water but not to certain solutes. Osmosis is crucial for maintaining cellular functions and homeostasis, as cells regulate their internal environments by controlling water levels. This process is distinct from diffusion, which refers to the general movement of solute molecules from an area of higher concentration to an area of lower concentration and does not specifically pertain to water. Filtration involves the movement of molecules and fluids through a membrane due to pressure differences, while active transport refers to the energy-dependent process that moves substances against their concentration gradient. These distinctions clarify why osmosis is the correct answer, as it specifically describes the behavior of water in relation to solute concentrations across semipermeable membranes.

**4. During what phase of meiosis does separation of homologous chromosomes occur?**

- A. Prophase I**
- B. Metaphase II**
- C. Anaphase I**
- D. Telophase II**

During meiosis, the separation of homologous chromosomes occurs during Anaphase I. At this stage, the homologous pairs, which are aligned at the metaphase plate, are pulled apart by the spindle fibers. Each chromosome from the homologous pair is pulled toward opposite poles of the cell. This action is crucial because it ensures that each daughter cell will receive only one chromosome from each homologous pair, allowing for genetic diversity in the gametes produced. In contrast, other phases mentioned in the question do not involve the separation of homologous chromosomes. For instance, Prophase I is characterized by the pairing of homologous chromosomes and crossing-over, but separation has not yet occurred. Metaphase II involves the alignment of chromosomes but refers to sister chromatids rather than homologous chromosomes, and Telophase II marks the end of meiosis with the formation of four haploid cells, without any homologous pairs being present. Thus, Anaphase I is specifically where the crucial separation of homologous chromosomes takes place in the meiotic process.

## 5. What determines the secondary structure of proteins?

- A. Covalent bonds between R groups
- B. Hydrophobic interactions
- C. Hydrogen bonds between the backbone atoms**
- D. Ionic bonds between charged groups

The secondary structure of proteins is primarily determined by hydrogen bonds that form between the backbone atoms of the polypeptide chain. These bonds occur between the carbonyl oxygen of one amino acid and the amide hydrogen of another, leading to the formation of structures like alpha helices and beta-pleated sheets. This interaction is fundamentally important because it allows the protein to fold in a stable manner, creating characteristic shapes essential for its function. The secondary structure is independent of the side chains (R groups) of the amino acids, as it focuses on the main chain's interactions, demonstrating how localized interactions can lead to distinct structural motifs crucial for the overall protein architecture. The presence of these hydrogen bonds is significant in stabilizing these formations against environmental changes, which is why they are a key focus in understanding protein structure.

## 6. What is the significance of the fluid mosaic model?

- A. It emphasizes the rigid structure of the cell membrane
- B. It describes the dynamic nature of the cell membrane structure**
- C. It provides a model for DNA replication
- D. It details the process of photosynthesis

The significance of the fluid mosaic model lies in its portrayal of the cell membrane as a dynamic and flexible structure. This model illustrates how the components of the membrane, including phospholipids, proteins, cholesterol, and carbohydrates, interact in a way that allows for mobility and fluidity. The term "fluid" refers to the ability of the lipids and proteins to move laterally within the layer, enhancing the functionality of the membrane, such as signaling, transport, and cell recognition. The "mosaic" aspect highlights the diverse arrangement of these components, which contributes to the membrane's complex and varied functions. This conceptualization is crucial for understanding various cellular processes, including the transport of materials into and out of the cell, and the communication between cells, which are essential for the overall vitality and operation of living organisms.

## 7. What role do Helper T Cells play in the immune response?

- A. Producing antibodies
- B. Activating other immune cells**
- C. Directly destroying pathogens
- D. Presenting antigens to pathogens

Helper T cells play a crucial role in the immune response primarily by activating other immune cells. When they recognize antigens presented by antigen-presenting cells, such as dendritic cells or macrophages, they release cytokines that stimulate the proliferation and differentiation of various immune cells, including B cells and cytotoxic T cells. This activation is essential for orchestrating an effective immune response, as it helps to enhance the overall activity of the immune system against infections. By activating B cells, Helper T cells facilitate the production of antibodies that can neutralize pathogens. Additionally, by stimulating cytotoxic T cells, they enhance the ability of the immune system to directly destroy infected or cancerous cells. Therefore, their role as activators is vital for ensuring that the immune response is robust and well-coordinated.

## 8. How many chromosomes are present in human somatic cells?

- A. 20 chromosomes
- B. 23 chromosomes
- C. 46 chromosomes**
- D. 92 chromosomes

Human somatic cells contain 46 chromosomes, which is the total number resulting from the combination of genetic material from both parents. Humans have 23 pairs of chromosomes, making a total of 46 when counted individually. Each pair consists of one chromosome inherited from the mother and one from the father. This diploid chromosome number is crucial for sexual reproduction since it ensures that when gametes (sperm and egg cells) are formed, each will carry only one set of 23 chromosomes, thus maintaining the species' chromosome number across generations. The pairing of chromosomes allows for genetic diversity through processes such as crossing over during meiosis. It also plays a fundamental role in ensuring proper cell division and overall organism development. This chromosomal structure and number are consistent across the majority of somatic cells in the human body, which include all cells except sperm and egg cells.

**9. Which organelle is often referred to as the 'powerhouse of the cell'?**

- A. Nucleus**
- B. Ribosome**
- C. Mitochondria**
- D. Endoplasmic reticulum**

The mitochondria are often referred to as the "powerhouse of the cell" because they are the primary site of adenosine triphosphate (ATP) production through the process of cellular respiration. This process converts the energy stored in glucose and other nutrients into ATP, which serves as the main energy currency of the cell, powering various cellular activities and functions. Mitochondria contain their own DNA, which is indicative of their evolutionary history as once free-living prokaryotic organisms. Their double-membrane structure and presence of cristae (folds in the inner membrane) also reflect the complexity of their role in energy production. The high concentration of mitochondria in energy-demanding tissues, such as muscle and nerve cells, further underscores their importance in meeting cellular energy needs.

**10. What is the function of enzymes within biological systems?**

- A. They serve as a structural component of cells**
- B. They act as catalysts to speed up chemical reactions**
- C. They provide energy for cellular activities**
- D. They facilitate the movement of substances across membranes**

Enzymes play a crucial role in biological systems by acting as catalysts to accelerate chemical reactions. This catalytic function is vital because many biochemical reactions occur at a rate that would be far too slow without the presence of enzymes. Enzymes lower the activation energy required for reactions, thus increasing the rate at which substrates are converted into products. This process allows cells to carry out essential metabolic functions efficiently and effectively under physiological conditions. In addition, enzymes are highly specific, meaning each type of enzyme typically catalyzes only one particular reaction or a set of closely related reactions. This specificity ensures that the metabolic pathways in cells are tightly regulated and occur in a coordinated manner, allowing for precise control over cellular activities. Thus, the primary function of enzymes as catalysts is central to maintaining life processes within living organisms.

# 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](mailto:hello@examzify.com).**

**Or visit your dedicated course page for more study tools and resources:**

**<https://asu-bio181exam2.examzify.com>**

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

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