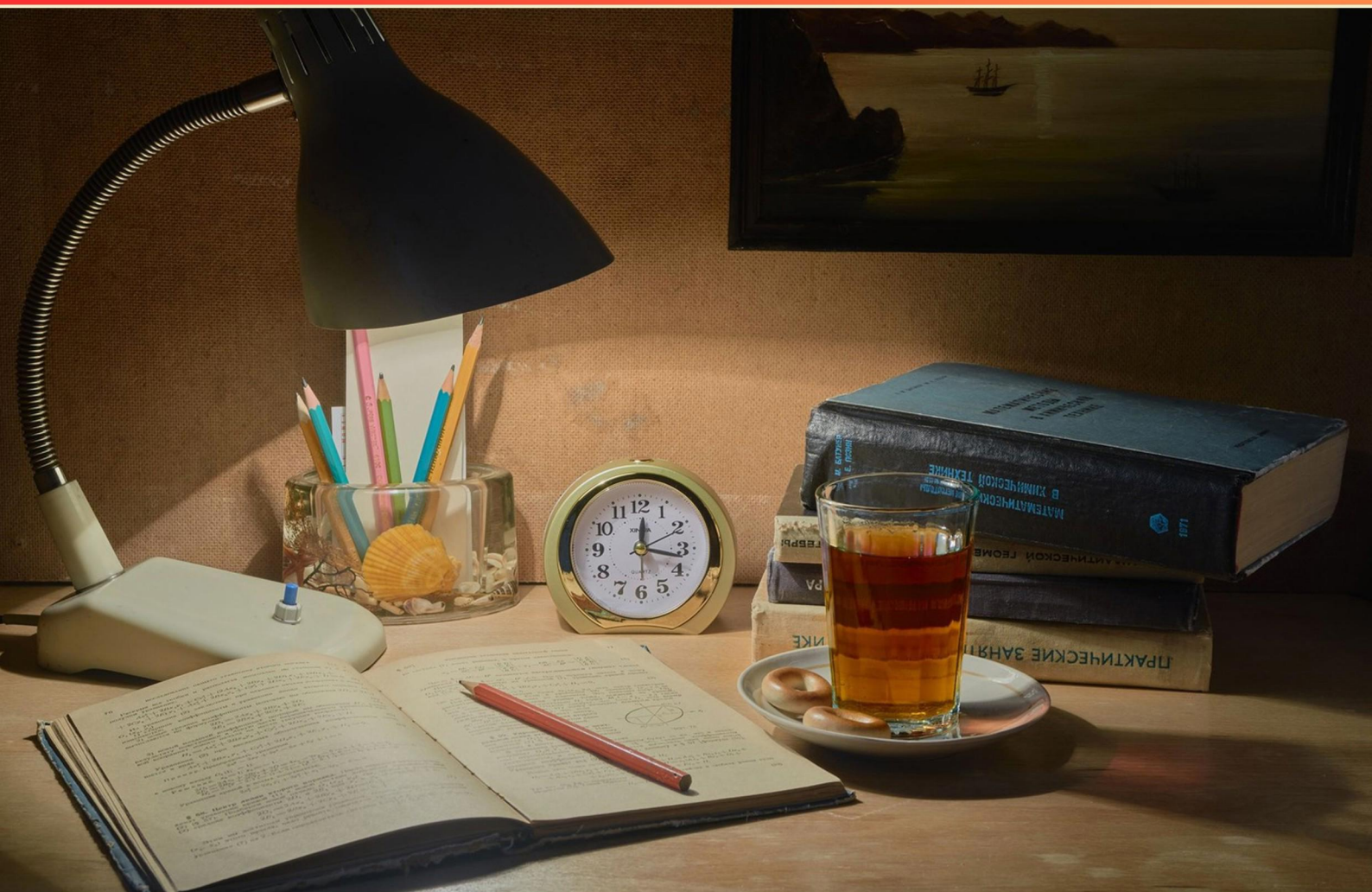


HESI A2 BIOLOGY PRACTICE TEST (SAMPLE)

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 term describes the energy required to start a chemical reaction?**
 - A. Potential energy
 - B. Kinetic energy
 - C. Activation energy
 - D. Thermal energy
- 2. What do gametes carry?**
 - A. All genetic information of an individual
 - B. Half the genetic information of an individual
 - C. No genetic information
 - D. Only mitochondrial DNA
- 3. What are alleles?**
 - A. Different types of chromosomes
 - B. Alternative versions for a gene
 - C. Types of nucleic acids
 - D. Building blocks of proteins
- 4. What is the purpose of the cell cycle?**
 - A. To store and transmit genetic information
 - B. To regulate cell growth and division
 - C. To synthesize proteins and enzymes
 - D. To produce ATP for energy
- 5. Which cellular structure is known as the powerhouse of the cell?**
 - A. Nucleus
 - B. Mitochondrion
 - C. Cytoplasm
 - D. Ribosome
- 6. What essential role do telomeres serve in eukaryotic cells?**
 - A. Regulate gene expression
 - B. Protect chromosome ends
 - C. Facilitate transcription
 - D. Assist in DNA replication

- 7. Which biological macromolecule is considered the main energy fuel source?**
- A. Proteins
 - B. Fats
 - C. Nucleic acids
 - D. Carbohydrates
- 8. Which type of RNA brings amino acids to the ribosome during protein synthesis?**
- A. Messenger RNA (mRNA)
 - B. Ribosomal RNA (rRNA)
 - C. Transfer RNA (tRNA)
 - D. Small nuclear RNA (snRNA)
- 9. What type of epithelium is associated with absorption and secretion processes, often ciliated?**
- A. Pseudostratified epithelium
 - B. Simple cuboidal epithelium
 - C. Stratified squamous epithelium
 - D. Transitional epithelium
- 10. What does autocrine action in hormones refer to?**
- A. Hormones that act on nearby cells
 - B. Hormones that act on the same cell that produced them
 - C. Hormones that travel through the bloodstream
 - D. Hormones that are secreted into ducts

Answers

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

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Explanations

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1. What term describes the energy required to start a chemical reaction?

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

The term that describes the energy required to start a chemical reaction is activation energy. This energy is essential because it provides the necessary input to break bonds in the reactants, allowing the reaction to proceed. Each chemical reaction has its own activation energy, which can vary depending on the nature of the reactants and the conditions under which the reaction occurs. For reactions to occur, the molecules must collide with sufficient energy to overcome this initial barrier. Once the activation energy threshold is surpassed, the reaction can continue, often releasing energy in the form of heat or light in the process. Understanding activation energy is crucial in fields such as chemistry and biochemistry, particularly in the study of reaction kinetics and enzyme functioning, as enzymes lower the activation energy required, allowing biological reactions to occur at a much faster rate under physiological conditions. Potential energy refers to stored energy based on position, while kinetic energy relates to the energy of motion. Thermal energy pertains to the temperature and kinetic energy of molecules in a substance but does not specifically address the energy needed to initiate reactions.

2. What do gametes carry?

- A. All genetic information of an individual
- B. Half the genetic information of an individual**
- C. No genetic information
- D. Only mitochondrial DNA

Gametes carry half the genetic information of an individual because they are formed through a process called meiosis. In sexual reproduction, each parent contributes one gamete (sperm from the male and egg from the female), and these gametes combine during fertilization to form a zygote. This zygote then contains a full set of genetic information, half of which is inherited from each parent. The reason gametes carry only half the genetic information is due to the reduction in chromosome number during meiosis. In humans, for example, somatic cells (non-reproductive cells) contain 46 chromosomes, organized in 23 pairs. However, gametes are haploid, meaning they contain only 23 chromosomes—one from each pair. This ensures that when the sperm and egg fuse, the resulting zygote has the correct diploid number of chromosomes, maintaining the species' chromosome count through generations.

3. What are alleles?

- A. Different types of chromosomes
- B. Alternative versions for a gene**
- C. Types of nucleic acids
- D. Building blocks of proteins

Alleles are alternative versions of a gene that arise from mutations and occur at the same locus on homologous chromosomes. Each gene can have multiple alleles, leading to variations in traits, such as flower color or blood type. For instance, in pea plants, the gene for flower color can exist as a purple allele or a white allele. These different versions of the gene result in observable differences in characteristics. Understanding alleles is crucial in genetics as they contribute to the variation in traits among individuals within a population. This is a fundamental concept in heredity and evolution since the combination of alleles inherited from parents determines the genotype and contributes to the phenotype of an organism. The presence of various alleles in a population is also essential for natural selection and contributes to genetic diversity.

4. What is the purpose of the cell cycle?

- A. To store and transmit genetic information
- B. To regulate cell growth and division**
- C. To synthesize proteins and enzymes
- D. To produce ATP for energy

The cell cycle serves a vital purpose in regulating cell growth and division, which is essential for the development, repair, and maintenance of multicellular organisms. Through a series of well-orchestrated phases—G1, S, G2, and mitosis—cells undergo a systematic process of growth, DNA replication, and division into two daughter cells. This ensures that each new cell receives an accurate and complete set of genetic material. During the G1 phase, the cell grows and prepares itself for DNA synthesis; in the S phase, the DNA is replicated; the G2 phase allows the cell to prepare for mitosis by further growing and ensuring all components are ready for division. Mitosis then results in the physical separation of the duplicated chromosomes and the formation of two new cells. This cycle is tightly regulated to prevent issues such as uncontrolled cell growth, which can lead to cancerous developments. While other options involve essential biological processes—such as storing genetic information, synthesizing proteins, and producing ATP for energy—these do not encapsulate the primary function of the cell cycle, which is specifically oriented towards the progression of cell growth and division.

5. Which cellular structure is known as the powerhouse of the cell?

- A. Nucleus
- B. Mitochondrion**
- C. Cytoplasm
- D. Ribosome

The mitochondrion is referred to as the powerhouse of the cell because it is the organelle responsible for producing adenosine triphosphate (ATP), the primary energy carrier in cells. Mitochondria generate ATP through the processes of cellular respiration, where they convert nutrients and oxygen into energy. This energy is crucial for powering various cellular functions and processes. Mitochondria are unique in that they contain their own DNA and are capable of replicating independently within the cell, which supports their role in energy metabolism. This energy production is essential for maintaining the cell's activities and overall homeostasis.

6. What essential role do telomeres serve in eukaryotic cells?

- A. Regulate gene expression
- B. Protect chromosome ends**
- C. Facilitate transcription
- D. Assist in DNA replication

Telomeres serve an essential role in protecting chromosome ends. They are repetitive nucleotide sequences located at the ends of linear chromosomes in eukaryotic cells. This protection is vital because, during DNA replication, the enzymes that duplicate DNA are unable to completely replicate the very end of the chromosomes. As a result, without telomeres, important genetic information could be lost at the ends of chromosomes with each cell division. Telomeres act as a buffer zone, preventing the loss of essential coding DNA from the chromosomes, thereby maintaining genomic stability and integrity. Additionally, they help prevent the chromosomes from fusing with each other, which could lead to chromosomal abnormalities and potentially result in diseases like cancer. While regulation of gene expression, facilitation of transcription, and assistance in DNA replication are important processes in cellular function, they do not specifically relate to the protective function that telomeres provide at the ends of eukaryotic chromosomes. This makes the protective role of telomeres distinctly vital for cell longevity and stability.

7. Which biological macromolecule is considered the main energy fuel source?

- A. Proteins
- B. Fats
- C. Nucleic acids

D. Carbohydrates

Carbohydrates are considered the main energy fuel source for the body because they are the most readily available form of energy for metabolism. When consumed, carbohydrates are broken down into glucose, which enters cellular respiration to produce ATP, the energy currency of cells. This energy is essential for various physiological processes and activities. Carbohydrates can be found in simple forms, such as sugars (like glucose and fructose), and complex forms, such as starches and fibers. The body prioritizes carbohydrates as its primary energy source due to their ability to provide quick and easily accessible energy. While fats are also an important energy source, they are primarily utilized during periods of prolonged energy expenditure and require more time to be metabolized. Proteins, on the other hand, primarily serve structural and functional roles rather than energy; they are used for energy mainly in cases of prolonged fasting or intense exercise. Nucleic acids are crucial for genetic information storage and transfer and are not used for energy purposes. Thus, carbohydrates play a crucial role in providing immediate energy, making them the main fuel source for biological processes.

8. Which type of RNA brings amino acids to the ribosome during protein synthesis?

- A. Messenger RNA (mRNA)
- B. Ribosomal RNA (rRNA)
- C. Transfer RNA (tRNA)**
- D. Small nuclear RNA (snRNA)

Transfer RNA (tRNA) is the molecule responsible for bringing amino acids to the ribosome during the process of protein synthesis. Each tRNA molecule is specific to one amino acid and has a corresponding anticodon that pairs with the codon on the messenger RNA (mRNA) template. This ensures that the correct amino acid is added to the growing polypeptide chain in the sequence dictated by the mRNA. The role of tRNA is essential for translating the genetic code carried by mRNA into a functional protein. While mRNA serves as the template that carries the genetic information from DNA to the ribosome, and ribosomal RNA (rRNA) is a structural component of the ribosome itself, it is tRNA that directly delivers the amino acids needed for protein assembly. Small nuclear RNA (snRNA) has different functions primarily related to RNA processing and does not play a role in protein synthesis in the same way that tRNA does.

9. What type of epithelium is associated with absorption and secretion processes, often ciliated?

- A. Pseudostratified epithelium**
- B. Simple cuboidal epithelium
- C. Stratified squamous epithelium
- D. Transitional epithelium

The type of epithelium associated with absorption and secretion processes and often ciliated is pseudostratified epithelium. This specialized tissue appears to have multiple layers due to the varying heights of the cells, but every cell is connected to the basement membrane, making it a single layer of cells. In particular, pseudostratified ciliated columnar epithelium is commonly found in the respiratory tract, where the cilia help to move mucus out of the airways, thereby aiding in secretion and protection. This type of epithelium is well-suited for its role as it not only facilitates the movement of substances through the respiratory system but also plays a part in absorption. Other types of epithelium mentioned serve different functions. For example, simple cuboidal epithelium is primarily involved in secretion and absorption but does not typically exhibit cilia. Stratified squamous epithelium provides protection against abrasion and is found in areas like the skin and oral cavity. Transitional epithelium is specialized for stretching and is found in the urinary bladder, not primarily associated with absorption or secretion.

10. What does autocrine action in hormones refer to?

- A. Hormones that act on nearby cells
- B. Hormones that act on the same cell that produced them**
- C. Hormones that travel through the bloodstream
- D. Hormones that are secreted into ducts

Autocrine action refers to a type of hormonal signaling where hormones are released by a specific cell and then bind to receptors on that same cell, influencing its own activity. This mechanism allows the cell to regulate its functions in response to changes in its environment, without the need for the hormone to affect other cells. This is in contrast to paracrine signaling, where hormones act on nearby cells, or endocrine signaling, where hormones travel through the bloodstream to reach distant target cells. In the context of cellular communication, autocrine signaling plays a critical role in various physiological processes, such as growth and immune responses, by enabling cells to respond dynamically to their own signaling molecules.

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://hesia2biology.examzify.com>

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

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