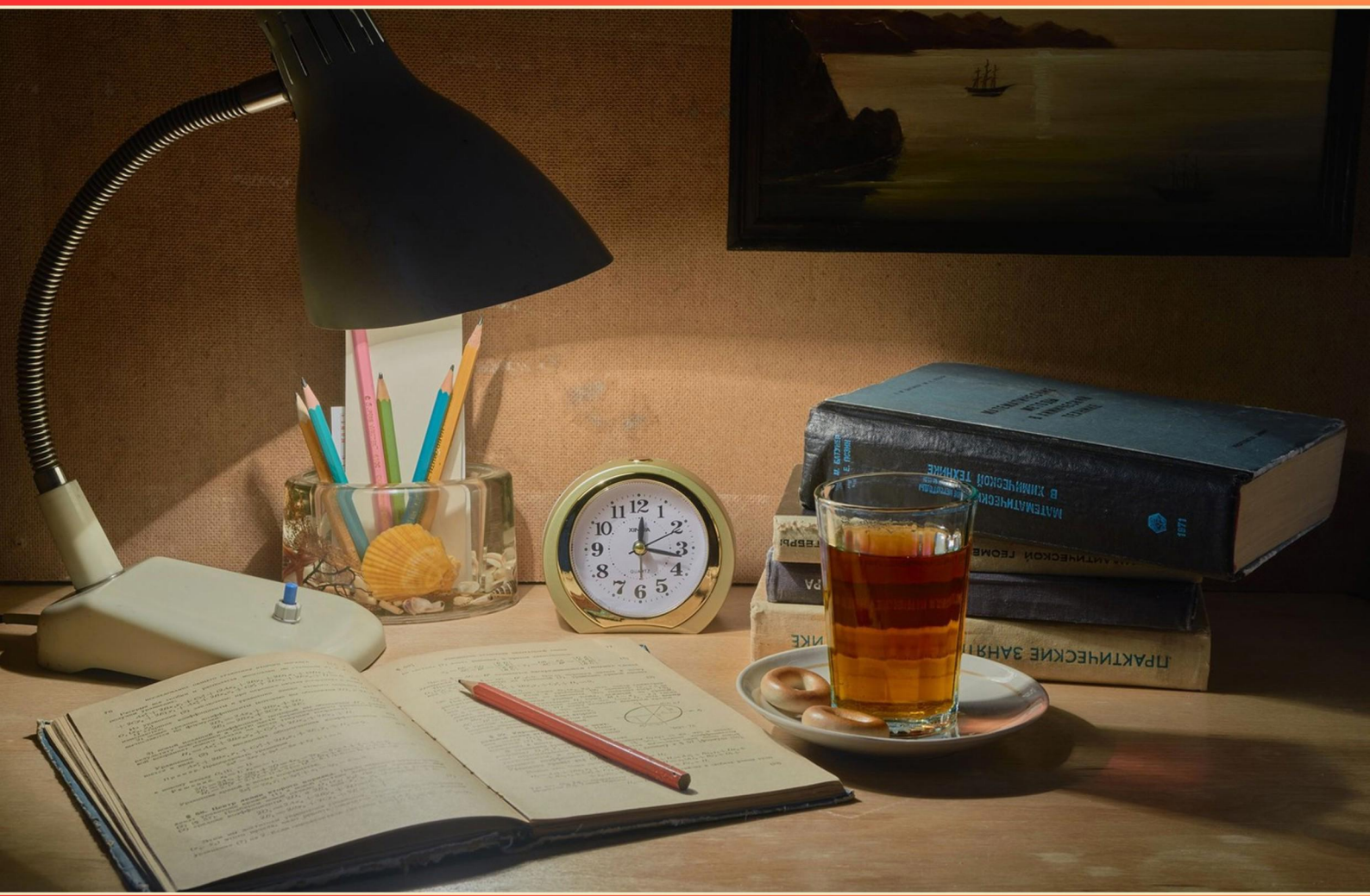
HESI A2 BIOLOGY PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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.

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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!

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Questions

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1. Why are sister chromatids important during cell division?

A. They participate in metabolic functions
B. They ensure genetic material is equally divided
C. They increase cell size before division
D. They determine cell type

2. What process occurs when an enzyme's active site is altered?

A. Enzyme inhibition
B. Denaturation
C. Substrate binding
D. Allosteric regulation

3. How do enzymes affect the activation energy of a biochemical reaction?

A. They increase the activation energy
B. They lower the activation energy
C. They have no effect on activation energy
D. They eliminate activation energy

4. Which of the following structures is absent in worms?

A. Eyes and ears
B. Skin and muscles
C. Nerves and blood vessels
D. Lungs and heart

5. Which of the following actions is NOT a function of hormones?

A. Regulating metabolism
B. Promoting muscle growth
C. Feeding on blood
D. Communicating between cells

6. What is the primary result of Meiosis I and II through cytokinesis?

A. Two diploid daughter cells
B. Four diploid daughter cells
C. Four haploid daughter cells
D. Two haploid daughter cells

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7. What is the function of chromosomes in a cell?

A. They contain all the RNA material necessary for protein synthesis

B. They store all the energy required for cellular processes

C. They contain all the DNA material necessary for replication and cell function

D. They help in the digestion of cellular nutrients

8. Which cellular structure is involved in the translation of genetic information?

A. Mitochondria

B. Nucleus

C. Ribosomes

D. Golgi apparatus

9. What are alleles?

A. Different types of chromosomes

B. Alternative versions for a gene

C. Types of nucleic acids

D. Building blocks of proteins

10. Which term describes the single cell formed when a sperm cell fertilizes an egg cell?

A. Zygote

B. Embryo

C. Gamete

D. Blastocyst

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Answers

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

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Explanations

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1. Why are sister chromatids important during cell division?

A. They participate in metabolic functions

B. They ensure genetic material is equally divided

C. They increase cell size before division

D. They determine cell type

Sister chromatids are crucial during cell division because they ensure that genetic material is equally divided between the two resulting daughter cells. Each chromosome is duplicated during the S phase of the cell cycle, resulting in two identical copies called sister chromatids that are connected at a region known as the centromere. During mitosis, specifically in the anaphase stage, the sister chromatids are pulled apart by spindle fibers and moved to opposite ends of the cell. This separation is essential for maintaining the correct number of chromosomes in each daughter cell, thereby preserving the genetic integrity of the cells. If sister chromatids do not separate properly, it can lead to aneuploidy, which is an abnormal number of chromosomes in a cell and can result in various genetic disorders or diseases like cancer. The other options do not accurately describe the function of sister chromatids; they are not involved in metabolic functions, do not affect cell size directly before division, nor do they determine cell type, which is generally governed by the expression of specific genes rather than the presence of sister chromatids.

2. What process occurs when an enzyme's active site is altered?

A. Enzyme inhibition

B. Denaturation

C. Substrate binding

D. Allosteric regulation

Denaturation refers to the structural alteration of an enzyme's active site, which can occur due to various factors such as changes in temperature, pH, or exposure to certain chemicals. When denaturation happens, the enzyme loses its natural structure and, consequently, its functional capacity. This is critical because the active site, which is the region of the enzyme where substrate molecules bind, must maintain its specific shape to facilitate the chemical reactions it catalyzes. If the active site is altered through denaturation, the enzyme can no longer effectively bind to its substrate, thereby inhibiting its catalytic activity. In contrast, enzyme inhibition refers to a process that reduces or halts enzyme activity without permanently altering the enzyme's structure. Substrate binding is the initial step where substrate molecules attach to the active site, while allosteric regulation involves the binding of regulatory molecules at sites other than the active site, which can either enhance or inhibit enzyme activity without changing the enzyme's primary structure. These processes do not inherently involve the direct alteration of the active site in the same way that denaturation does.

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3. How do enzymes affect the activation energy of a biochemical reaction?

A. They increase the activation energy

B. They lower the activation energy

C. They have no effect on activation energy

D. They eliminate activation energy

Enzymes are biological catalysts that play a crucial role in accelerating biochemical reactions by lowering the activation energy required for the reaction to occur. Activation energy is the minimum energy needed for reactants to undergo a chemical transformation. By providing an alternative reaction pathway that requires less energy, enzymes facilitate the conversion of substrates into products more efficiently and at a faster rate. The way enzymes achieve this is through their unique three-dimensional structures that provide specific binding sites for substrates. When substrates bind to the active site of an enzyme, the enzyme undergoes a conformational change, stabilizing the transition state of the reaction. This stabilization reduces the energy barrier that must be overcome for the reaction to proceed. Consequently, with the activation energy lowered, more molecules have sufficient energy to react, thus increasing the rate of the reaction. In contrast, the other choices are inaccurate because enzymes do not increase or eliminate activation energy, nor do they remain indifferent to its effects. Rather, they are essential in making reactions more prompt and energetically accessible, which is fundamentally important for sustaining life processes.

4. Which of the following structures is absent in worms?

A. Eyes and ears

B. Skin and muscles

C. Nerves and blood vessels

D. Lungs and heart

Worms, particularly terrestrial ones like earthworms, do not possess eyes and ears as found in many other animals. Instead, they have light-sensitive cells that allow them to detect changes in light, which helps them navigate their environment. Their sensory perception is primarily based on touch and chemical signals rather than vision or sound. This adaptation suits their burrowing lifestyle, where they mainly interact with soil rather than needing formal eyes or ears for communication or navigation. In contrast, other structures mentioned, such as skin and muscles, are essential for the worm's movement and bodily functions. Worms have a layer of skin that acts as a protective barrier and contains muscles that help facilitate their locomotion through the soil. The presence of nerves and blood vessels is crucial for their physiological processes, enabling them to respond to stimuli and transport nutrients. Lastly, while worms do not have lungs or a heart as mammals do, they use their skin for gas exchange and have a simplified circulatory system that pumps blood through vessels, indicating that having lungs and a heart is indeed absent in worms.

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5. Which of the following actions is NOT a function of hormones?

A. Regulating metabolism

B. Promoting muscle growth

C. Feeding on blood

D. Communicating between cells

Hormones are signaling molecules that are crucial for various physiological processes in the body. While they perform numerous roles, one of their primary functions is to facilitate communication between different cells, allowing for coordination of various bodily functions. Hormones travel through the bloodstream to target organs and tissues, influencing various processes such as growth, metabolism, and homeostasis. Regulating metabolism is an important function of hormones, as they help control the energy utilization and storage in the body. For instance, insulin plays a vital role in glucose metabolism, while thyroid hormones are significant in regulating basal metabolic rate. Promoting muscle growth is also a function of certain hormones, particularly anabolic hormones like testosterone and growth hormone, which are involved in the stimulation of muscle protein synthesis and tissue development. On the other hand, the action of "feeding on blood" does not correlate with any hormonal function. This phrase might suggest a behavior characteristic of certain animals, such as vampires or parasites, but it is not related to how hormones operate within biological systems. Hormones do not consume blood nor engage in any direct physical action like feeding. Thus, identifying "feeding on blood" as not being a function of hormones aligns with the understanding of what hormones are and what they do in the body.

6. What is the primary result of Meiosis I and II through cytokinesis?

A. Two diploid daughter cells

B. Four diploid daughter cells

C. Four haploid daughter cells

D. Two haploid daughter cells

Meiosis consists of two rounds of cell division: Meiosis I and Meiosis II, culminating in cytokinesis. The primary result of these processes is the formation of four haploid daughter cells. During Meiosis I, homologous chromosomes are separated into two different daughter cells. This reduction division reduces the chromosome number from diploid (two sets of chromosomes) to haploid (one set). Following Meiosis I, cytokinesis occurs, resulting in two haploid cells. Then, during Meiosis II, similar to mitosis, the two haploid cells undergo a second round of division where the sister chromatids of each chromosome are separated. This again concludes with cytokinesis, producing a total of four haploid daughter cells. Therefore, the correct choice reflects that the end result of meiosis and subsequent cytokinesis is indeed four haploid daughter cells, which have half the chromosome number of the original cell. This outcome is essential for sexual reproduction, allowing for genetic diversity when gametes (sperm and egg) combine during fertilization.

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7. What is the function of chromosomes in a cell?

A. They contain all the RNA material necessary for protein synthesis

B. They store all the energy required for cellular processes

C. They contain all the DNA material necessary for replication and cell function

D. They help in the digestion of cellular nutrients

The function of chromosomes within a cell is to contain all the DNA material necessary for replication and proper cell function. Chromosomes are structures made of DNA wrapped around proteins, which play a critical role in organizing and condensing the DNA during cell division. This organization ensures that genetic information is accurately replicated and distributed to daughter cells during mitosis and meiosis. The presence of DNA in chromosomes is essential for carrying the instructions needed for the synthesis of proteins, which in turn govern a wide range of cellular activities. This genetic material is what determines an organism's traits and is vital for processes such as growth, development, and reproduction. In contrast, the other provided options do not accurately represent the primary role of chromosomes. While RNA is involved in protein synthesis, chromosomes specifically house the DNA that codes for this RNA, not the RNA itself. Energy storage in cells is primarily handled by molecules like ATP and various energy reserves, rather than chromosomes. Lastly, digestion of nutrients involves cellular organelles such as lysosomes, not chromosomal structures. Thus, understanding the pivotal role of chromosomes in storing DNA helps clarify their essential function within the cell.

8. Which cellular structure is involved in the translation of genetic information?

A. Mitochondria

B. Nucleus

C. Ribosomes

D. Golgi apparatus

The ribosomes are the cellular structures involved in the translation of genetic information. They play a crucial role in protein synthesis by interpreting the mRNA (messenger RNA) sequence transcribed from DNA. During this process, ribosomes read the sequence of codons in the mRNA and match each codon with the corresponding amino acid, allowing for the construction of polypeptide chains that eventually fold into functional proteins. Ribosomes can be found floating freely in the cytoplasm or attached to the endoplasmic reticulum, contributing to the production of proteins either for use within the cell or for export outside the cell. Their fundamental role in converting genetic code into functional proteins is essential for the maintenance and operation of living organisms. In contrast, while mitochondria are involved in energy production, the nucleus houses the genetic material and is responsible for transcription rather than translation. The Golgi apparatus is primarily involved in modifying, sorting, and packaging proteins produced by ribosomes for secretion or for use within the cell.

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9. 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.

10. Which term describes the single cell formed when a sperm cell fertilizes an egg cell?

A. Zygote

B. Embryo

C. Gamete

D. Blastocyst

The term that describes the single cell formed when a sperm cell fertilizes an egg cell is "zygote." This is the initial cell created by the union of a male gamete (sperm) and a female gamete (egg), marking the start of a new organism's development. The zygote contains a full set of chromosomes, half contributed by the sperm and half by the egg, making it diploid (having two sets of chromosomes). As the zygote undergoes division and development, it will eventually form an embryo, but the embryo is a later stage in development after the zygote has started to divide. Meanwhile, "gametes" refer to the reproductive cells themselves—the sperm and the egg—prior to fertilization. A "blastocyst" is a later structure that develops from the zygote after multiple cell divisions and is involved in implantation into the uterine wall. Each term represents distinct stages or types of cells in the reproductive and developmental process.

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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:

https://hesia2biology.examzify.com

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

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