

AAMC BIOLOGICAL AND BIOCHEMICAL FOUNDATIONS OF LIVING SYSTEMS (BB) FULL-LENGTH (FL) 2 PRACTICE TEST (SAMPLE) STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

VISIT US ONLINE FOR
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 effect does DPC have on the hydrophobic amino acids in Protein X?**
 - A. DPC phosphorylates these amino acids.
 - B. DPC hydrolyzes these amino acids.
 - C. DPC exposes these amino acids.
 - D. DPC suppresses these amino acids.

- 2. Which component of the cell membrane is primarily responsible for its fluidity?**
 - A. Proteins
 - B. Carbohydrates
 - C. Cholesterol
 - D. Nucleic acids

- 3. What is a genetic drift?**
 - A. A systematic change in phenotype
 - B. A change in allele frequency due to random sampling in a population
 - C. Natural selection
 - D. Mutation in DNA sequence

- 4. What is the main function of ribosomes in a cell?**
 - A. DNA synthesis
 - B. Protein synthesis
 - C. Lipid synthesis
 - D. Energy production

- 5. Which process describes the movement of water across a selectively permeable membrane?**
 - A. Diffusion
 - B. Active transport
 - C. Osmosis
 - D. Facilitated diffusion

- 6. Which process increases genetic diversity during meiosis?**
- A. Mutation
 - B. Crossing over
 - C. Binary fission
 - D. Replication
- 7. What is the basic structural unit of proteins?**
- A. Nucleotide
 - B. Amino acid
 - C. Fatty acid
 - D. Monosaccharide
- 8. What is one of the implications of failing to maintain homeostasis?**
- A. No impact on organism health
 - B. Increased efficiency of biological processes
 - C. Development of diseases or disorders
 - D. Improved adaptation to environments
- 9. What was noted about the changes in binding affinity regarding residues 201 and 269?**
- A. They both increase binding affinity
 - B. They do not influence binding affinity
 - C. They drastically change binding affinity
 - D. They have minimal impact on binding affinity
- 10. What is the term for the genetic makeup of an organism?**
- A. Phenotype
 - B. Genotype
 - C. Chromotype
 - D. Karyotype

Answers

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

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Explanations

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1. What effect does DPC have on the hydrophobic amino acids in Protein X?

- A. DPC phosphorylates these amino acids.
- B. DPC hydrolyzes these amino acids.
- C. DPC exposes these amino acids.**
- D. DPC suppresses these amino acids.

The correct response indicates that DPC exposes the hydrophobic amino acids in Protein X. This is significant because hydrophobic amino acids generally tend to be buried within the protein's interior to avoid contact with the aqueous environment. When DPC, a denaturant or a disrupting agent, interacts with the protein, it can disrupt the native folding of the protein. This disruption leads to the exposure of hydrophobic regions, which were previously shielded from water. In biological systems, the exposure of hydrophobic amino acids can alter the stability and functionality of a protein. By uncovering these regions, DPC may promote interactions that would not normally occur in the properly folded state of the protein, potentially leading to aggregation or changes in activity. Exploring the other options: Phosphorylation typically involves adding a phosphate group to an amino acid, which primarily occurs on specific side chains such as serine, threonine, and tyrosine, rather than affecting hydrophobicity directly. Hydrolysis refers to the breaking of chemical bonds due to the reaction with water, which does not specifically pertain to the exposure of hydrophobic amino acids. Lastly, suppressing the amino acids would imply reducing their visibility or effects, which contradicts the action of DPC in

2. Which component of the cell membrane is primarily responsible for its fluidity?

- A. Proteins
- B. Carbohydrates
- C. Cholesterol**
- D. Nucleic acids

The component of the cell membrane primarily responsible for its fluidity is cholesterol. Cholesterol is interspersed among the phospholipid layers in the membrane and plays a critical role in maintaining the proper balance of fluidity and rigidity. At higher temperatures, cholesterol prevents the phospholipid fatty acid chains from becoming too fluid, while at lower temperatures, it helps to maintain membrane fluidity by preventing the fatty acids from packing too closely together. This ability of cholesterol to stabilize membrane fluidity is essential for various membrane functions, including the movement of proteins and lipids within the membrane, which is crucial for cellular processes such as signaling and transport. Other components, such as proteins and carbohydrates, serve different functions within the membrane. While proteins are increasingly recognized for their role in signaling, transport, and structural support, and carbohydrates are important for cell recognition and communication, neither directly contributes to the fluidity of the membrane to the extent that cholesterol does. Nucleic acids, which include DNA and RNA, are not involved in the structure or fluidity of the cell membrane, as they primarily function in genetic information storage and transfer.

3. What is a genetic drift?

- A. A systematic change in phenotype
- B. A change in allele frequency due to random sampling in a population**
- C. Natural selection
- D. Mutation in DNA sequence

Genetic drift refers to a change in allele frequencies within a population due to random sampling effects, particularly in small populations. This phenomenon occurs by chance rather than by selection pressures and can lead to significant changes over time, such as the loss of genetic variation or the fixation of alleles, regardless of their adaptive value. Unlike natural selection, which relates to an organism's ability to survive and reproduce based on advantageous traits, genetic drift is random and does not necessarily favor any particular trait. In a population, if a few individuals randomly contribute disproportionately to the next generation's gene pool, their alleles will be overrepresented relative to others. This random fluctuation can lead to differing allele frequencies in different populations, contributing to evolutionary divergence. The other answer choices involve different concepts in genetics and evolution. A systematic change in phenotype pertains to non-random processes such as selection, while natural selection is an adaptive process driven by environmental pressures. Mutation refers to changes at the DNA level, which introduce new genetic variations but do not inherently involve the random changes in allele frequencies characteristic of genetic drift.

4. What is the main function of ribosomes in a cell?

- A. DNA synthesis
- B. Protein synthesis**
- C. Lipid synthesis
- D. Energy production

Ribosomes play a crucial role in the process of protein synthesis, which is essential for various cellular functions. They are the molecular machines in cells that facilitate the translation of messenger RNA (mRNA) into polypeptide chains, ultimately leading to the formation of proteins. During protein synthesis, ribosomes read the sequence of nucleotides in the mRNA and assemble amino acids in the correct order, as specified by that sequence. This process occurs in two main stages: initiation, where the ribosome binds to the mRNA; and elongation, where amino acids are added one by one to construct the growing polypeptide chain. Ribosomes can be found either floating freely in the cytosol or bound to the endoplasmic reticulum, known as rough ER, where they synthesize proteins destined for secretion or for use in the cell membrane. Their ability to synthesize proteins is fundamental to cellular structure and function, impacting everything from enzymatic activity to cell signaling and immune responses. By understanding the primary role of ribosomes in protein synthesis, one can appreciate their importance in cellular biology and the overall functioning of living organisms.

5. Which process describes the movement of water across a selectively permeable membrane?

- A. Diffusion
- B. Active transport
- C. Osmosis**
- D. Facilitated diffusion

The movement of water across a selectively permeable membrane is specifically described by the process known as osmosis. Osmosis is a type of passive transport that involves the movement of water molecules from an area of lower solute concentration to an area of higher solute concentration. This occurs to equalize solute concentrations on both sides of the membrane, facilitating the balance of water and solutes across cellular structures. Unlike simple diffusion, which involves the movement of any type of solute, osmosis is solely focused on water. This distinction is crucial because it highlights that osmosis is driven by the concentration gradient of water itself, rather than the solutes. While facilitated diffusion refers to the process of moving larger or polar molecules across a membrane through specific channel proteins, and active transport involves energy input to move substances against their concentration gradient, osmosis does not require energy and is specific to the movement of water. Overall, when examining the transport of water through a selectively permeable membrane, osmosis accurately defines the process based on its principles of movement in response to solute concentration differences.

6. Which process increases genetic diversity during meiosis?

- A. Mutation
- B. Crossing over**
- C. Binary fission
- D. Replication

Crossing over is the process that significantly increases genetic diversity during meiosis. It occurs during prophase I of meiosis when homologous chromosomes pair up and exchange segments of their genetic material. This exchange of genetic information results in new combinations of alleles on each chromosome, creating gametes that are genetically distinct from one another. As a result, when these gametes fuse during fertilization, they create offspring with unique combinations of genes, contributing to the overall genetic diversity of a population. The other processes mentioned do not have the same impact on genetic diversity during meiosis: mutation introduces new variations but is not part of the meiotic process itself, binary fission is an asexual reproduction method in prokaryotes that does not involve meiosis, and replication refers to DNA duplication prior to cell division, which does not alter genetic diversity.

7. What is the basic structural unit of proteins?

- A. Nucleotide
- B. Amino acid**
- C. Fatty acid
- D. Monosaccharide

The basic structural unit of proteins is the amino acid. Amino acids are organic compounds that consist of a central carbon atom bonded to a carboxyl group, an amino group, a hydrogen atom, and a distinctive side chain (R group) that varies among different amino acids. These side chains are what give each amino acid its unique properties. Proteins are made up of long chains of amino acids linked together by peptide bonds, which are formed through a condensation reaction where the carboxyl group of one amino acid reacts with the amino group of another, releasing a molecule of water. This sequence and arrangement of amino acids in a protein determine its structure and function, making amino acids the fundamental building blocks of all proteins. In contrast to other options, nucleotides are the building blocks of nucleic acids like DNA and RNA, fatty acids are components of lipids, and monosaccharides are the simplest form of carbohydrates. Each of these has distinct roles in biological processes, but they do not constitute the structural units for proteins.

8. What is one of the implications of failing to maintain homeostasis?

- A. No impact on organism health
- B. Increased efficiency of biological processes
- C. Development of diseases or disorders**
- D. Improved adaptation to environments

Homeostasis refers to the mechanisms that maintain stable internal conditions in an organism despite changes in the external environment. When an organism fails to maintain homeostasis, it can lead to a disruption in these stable conditions, which can profoundly affect health. The development of diseases or disorders is a direct consequence of this failure. For instance, imbalances in body temperature, pH levels, or the concentrations of various substances can lead to physiological dysfunctions. An example is diabetes, which arises when the body cannot regulate blood glucose levels effectively, resulting in a variety of health complications. In contrast, the other options do not accurately reflect the ramifications of failing to maintain homeostasis. No impact on organism health contradicts the essential role of homeostasis in maintaining health. Increased efficiency of biological processes and improved adaptation to environments suggest positive outcomes, which are not what typically arises from homeostatic failures. These situations highlight the critical need for organisms to maintain homeostasis to ensure their survival and overall health.

9. What was noted about the changes in binding affinity regarding residues 201 and 269?

- A. They both increase binding affinity
- B. They do not influence binding affinity
- C. They drastically change binding affinity**
- D. They have minimal impact on binding affinity

The correct response indicates that residues 201 and 269 drastically change the binding affinity of the molecule in question. This suggests that alterations in these specific residues, possibly through mutation or modification, have a significant impact on the way the molecule interacts with its binding partner. High binding affinity often results from precise interactions between amino acid side chains and the target, meaning that even small changes in the structure of these residues can greatly influence how well the molecule fits or binds to its target. This could include changes in charge, hydrophobic effects, or steric hindrance, all leading to notable shifts in the binding strength. When discussing binding affinity, it is essential to recognize that some residues have a more dominant role than others, and those that drastically change affinity are likely situated at critical positions within the binding site. Understanding the structure-function relationship of proteins underscores why changes at residues 201 and 269 are so impactful in this context.

10. What is the term for the genetic makeup of an organism?

- A. Phenotype
- B. Genotype**
- C. Chromotype
- D. Karyotype

The correct answer is associated with the term "genotype," which refers to the specific genetic constitution of an organism—the unique set of genes inherited from its parents. This genetic makeup determines various traits and characteristics, influencing how the organism develops and functions. In contrast, the "phenotype" represents the observable characteristics or traits of an organism, which result from the interaction of its genotype with the environment. "Chromotype" is not a standard term in genetics, so it does not adequately describe any known genetic concept. Lastly, "karyotype" refers to the number and appearance of chromosomes in the nucleus of a cell, used to assess chromosomal abnormalities but does not encapsulate the entire genetic makeup as the genotype does.

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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