

AAMC Biological and Biochemical Foundations of Living Systems (BB) Full-Length (FL) 2 Practice Test (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. What is the main function of ribosomes in a cell?**
 - A. DNA synthesis**
 - B. Protein synthesis**
 - C. Lipid synthesis**
 - D. Energy production**

- 2. During which process do cells generate ATP in the absence of oxygen?**
 - A. Aerobic respiration**
 - B. Anaerobic respiration**
 - C. Fermentation**
 - D. Cellular respiration**

- 3. What is the term for the observable traits of an organism?**
 - A. Genotype**
 - B. Phenotype**
 - C. Allele**
 - D. Diploid**

- 4. What are the two main types of nucleic acids?**
 - A. RNA and proteins**
 - B. DNA and RNA**
 - C. DNA and lipids**
 - D. Proteins and carbohydrates**

- 5. What describes the phenotype of an individual heterozygous for one $\Delta F508$ and one wild-type CFTR allele?**
 - A. More susceptible to typhoid fever than wild-type homozygotes and has CF**
 - B. More susceptible to typhoid fever than $\Delta F508$ homozygotes and does not have CF**
 - C. More resistant to typhoid fever than $\Delta F508$ homozygotes and has CF**
 - D. More resistant to typhoid fever than wild-type homozygotes and does not have CF**

- 6. What physiological process is primarily mediated by endosomes during viral infection?**
- A. Viral replication**
 - B. Endocytosis**
 - C. RNA synthesis**
 - D. Protein degradation**
- 7. Which process increases genetic diversity during meiosis?**
- A. Mutation**
 - B. Crossing over**
 - C. Binary fission**
 - D. Replication**
- 8. Which CFTR allele is associated with an increased susceptibility to cystic fibrosis in homozygotes?**
- A. G542X**
 - B. $\Delta F508$**
 - C. Both G542X and $\Delta F508$**
 - D. None of the above**
- 9. Which of the following statements about residue 109 can be concluded from the data?**
- A. It drastically increases binding affinity**
 - B. It has a minimal impact on binding affinity**
 - C. It completely inhibits binding**
 - D. It is not involved in any binding interactions**
- 10. Which of the following best describes a population in biological terms?**
- A. A group of organisms of the same species living in an area**
 - B. A group of different species interacting in a habitat**
 - C. A specific environment and its abiotic factors**
 - D. A group of cells carrying out similar functions**

Answers

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

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Explanations

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1. 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.

2. During which process do cells generate ATP in the absence of oxygen?

- A. Aerobic respiration
- B. Anaerobic respiration**
- C. Fermentation
- D. Cellular respiration

The process by which cells generate ATP in the absence of oxygen is anaerobic respiration. This refers to the metabolic pathways that occur when oxygen is not available but energy is still required by the cell. Anaerobic respiration can involve different types of reactions, such as the use of terminal electron acceptors other than oxygen, and it typically results in less energy production compared to aerobic respiration. In organisms like certain bacteria or yeast, anaerobic processes often lead to fermentation, which involves the partial breakdown of sugars to produce energy. Fermentation is a specific type of anaerobic respiration that leads to the production of byproducts like lactic acid (in muscle cells) or ethanol and carbon dioxide (in yeast). However, fermentation is one of the pathways under the broader category of anaerobic respiration. Cellular respiration generally refers to the process of converting biochemical energy from nutrients into ATP, which can occur both in the presence (aerobic respiration) and absence (anaerobic respiration) of oxygen. Therefore, while options like fermentation describe specific types of anaerobic processes, anaerobic respiration encompasses a wider range of activities, including fermentation itself. Thus, anaerobic respiration is appropriate for describing ATP synthesis in oxygen-deprived conditions, recognizing the various pathways it includes

3. What is the term for the observable traits of an organism?

- A. Genotype
- B. Phenotype**
- C. Allele
- D. Diploid

The term for the observable traits of an organism is phenotype. Phenotype refers to the physical expression of genetic information that is influenced by both the organism's genotype (the genetic makeup) and environmental factors. For example, if a plant has a genotype that allows for tall growth, the actual height of the plant that can be measured is its phenotype. This encompasses observable characteristics like height, color, and shape, as determined by the underlying genetic information and environmental interactions. Understanding phenotype is crucial in fields such as genetics and evolutionary biology, as it connects the genetic composition of an organism with its observable attributes.

4. What are the two main types of nucleic acids?

- A. RNA and proteins
- B. DNA and RNA**
- C. DNA and lipids
- D. Proteins and carbohydrates

The two main types of nucleic acids are DNA and RNA. Both DNA (deoxyribonucleic acid) and RNA (ribonucleic acid) play crucial roles in the storage, transmission, and expression of genetic information within biological systems. DNA serves as the long-term repository of genetic information, while RNA acts as a messenger and plays various roles in translating that information into proteins. DNA is composed of two strands forming a double helix, containing the bases adenine, thymine, cytosine, and guanine. In contrast, RNA is typically single-stranded and contains the bases adenine, uracil, cytosine, and guanine. This fundamental distinction in their structure and function is critical to their roles in cellular processes, including replication, transcription, and translation. The other choices contain components that do not include nucleic acids. Proteins are made from amino acids and are not classified as nucleic acids. Similarly, lipids and carbohydrates represent other classes of biomolecules with distinct functions. Thus, recognizing DNA and RNA as the two primary types of nucleic acids is essential for understanding genetics and biochemistry.

5. What describes the phenotype of an individual heterozygous for one $\Delta F508$ and one wild-type CFTR allele?
- A. More susceptible to typhoid fever than wild-type homozygotes and has CF
 - B. More susceptible to typhoid fever than $\Delta F508$ homozygotes and does not have CF
 - C. More resistant to typhoid fever than $\Delta F508$ homozygotes and has CF
 - D. More resistant to typhoid fever than wild-type homozygotes and does not have CF**

The phenotype of an individual heterozygous for one $\Delta F508$ and one wild-type CFTR allele is best described as more resistant to typhoid fever than wild-type homozygotes and does not have cystic fibrosis (CF). The $\Delta F508$ mutation in the CFTR gene is a common cause of cystic fibrosis, a genetic disorder that affects the respiratory and digestive systems due to the production of thick and sticky mucus. When an individual has one wild-type allele and one $\Delta F508$ allele, they typically do not exhibit the full spectrum of symptoms associated with cystic fibrosis. This is because the presence of the wild-type allele allows for some normal CFTR protein function, which helps maintain the balance of salt and water on epithelial surfaces. Furthermore, studies have suggested that individuals with the $\Delta F508$ mutation may have some degree of resistance to certain infectious diseases, like typhoid fever, due to the altered immune response. This is especially true when comparing these heterozygous individuals to those who are homozygous for the $\Delta F508$ mutation or those who possess the wild-type genotype. Hence, the presence of one functional wild-type CFTR allele allows for normal health concerning cystic fibrosis and offers an advantage in terms of disease resistance

6. What physiological process is primarily mediated by endosomes during viral infection?
- A. Viral replication
 - B. Endocytosis**
 - C. RNA synthesis
 - D. Protein degradation

Endosomes play a crucial role in the process of endocytosis, which is essential during viral infections. When a virus enters a host cell, it often does so by binding to specific receptors on the cell's surface. This interaction triggers the process of endocytosis, where the cell membrane engulfs the virus and forms an endosome that contains the viral particles. Once inside the endosome, the acidic environment can lead to changes in the viral envelope or the viral particle itself, triggering the release of the viral genome into the cytoplasm or enabling the virus to fuse with cellular membranes. This step is vital for the virus to effectively hijack the host's cellular machinery for replication and propagation. While viral replication, RNA synthesis, and protein degradation are important in the lifecycle of a virus, these processes occur after the endosome-mediated entry has taken place. Therefore, the primary role of endosomes in the context of viral infection is to facilitate the entry of the virus into the host cell through endocytosis.

7. 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.

8. Which CFTR allele is associated with an increased susceptibility to cystic fibrosis in homozygotes?

- A. G542X
- B. Δ F508**
- C. Both G542X and Δ F508
- D. None of the above

The choice of Δ F508 as the CFTR allele associated with an increased susceptibility to cystic fibrosis in homozygotes is based on its well-established role in the disease's pathogenesis. Δ F508 is a deletion mutation that removes a single phenylalanine residue at position 508 of the CFTR protein. This alteration leads to improper folding of the CFTR protein, resulting in its degradation before it reaches the cell surface. Individuals who are homozygous for this allele exhibit severe manifestations of cystic fibrosis due to the significant reduction in functional CFTR protein, which is crucial for chloride ion transport across epithelial membranes. In terms of disease severity, homozygosity for Δ F508 correlates strongly with the classic symptoms of cystic fibrosis, including respiratory and digestive complications. Although G542X is also a CFTR mutation, which introduces a premature stop codon and leads to nonfunctional CFTR protein, Δ F508 mutations are more common and recognized as presenting a greater risk when homozygous, hence highlighting its particular clinical relevance in cystic fibrosis cases.

9. Which of the following statements about residue 109 can be concluded from the data?

- A. It drastically increases binding affinity**
- B. It has a minimal impact on binding affinity**
- C. It completely inhibits binding**
- D. It is not involved in any binding interactions**

Residue 109 has been shown to have a minimal impact on binding affinity based on the provided data. This suggests that alterations to this specific residue do not significantly affect the overall interaction between the molecule in question and its target. Such a conclusion could stem from experimental evidence demonstrating that mutations at this position result in only slight changes in binding measurements, indicating that the residue may not play a critical role in stabilizing the complex. This is a common scenario in biochemical interactions, where certain residues may contribute to affinity but are not essential, allowing for the possibility that other residues may compensate for any changes made at residue 109. Understanding the nuances of binding interactions is crucial in biochemistry, as most proteins engage in a network of contacts, and not all residues contribute equally to the overall binding affinity.

10. Which of the following best describes a population in biological terms?

- A. A group of organisms of the same species living in an area**
- B. A group of different species interacting in a habitat**
- C. A specific environment and its abiotic factors**
- D. A group of cells carrying out similar functions**

A population in biological terms is defined as a group of organisms of the same species living in a specific area. This definition emphasizes the homogeneity of species within the population and the importance of spatial location, which allows for interaction and reproduction among individuals of that same species. Understanding populations is crucial in ecology and evolution, as it helps researchers study species dynamics, reproductive strategies, and the impact of environmental changes on biodiversity. The other choices describe different biological concepts. A group of different species interacting in a habitat outlines a community rather than a population. The specific environment along with its abiotic factors refers to an ecosystem, which encompasses interactions among living (biotic) and non-living (abiotic) components. Lastly, a group of cells carrying out similar functions describes a tissue in multicellular organisms, highlighting the organization of cells rather than organisms. This distinction is important in biological classifications and understanding the interrelations among various levels of biological organization.

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://aamcbbfl2.examzify.com>

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

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