

AAMC CHEMICAL AND PHYSICAL FOUNDATIONS OF BIOLOGICAL SYSTEMS (C/P) FULL-LENGTH (FL) 3 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 defines a covalent bond?**
 - A. A bond formed by the transfer of electrons between atoms
 - B. A bond formed by the sharing of electrons between two atoms
 - C. A bond that occurs between ions of opposite charges
 - D. A bond that is generally weaker than hydrogen bonds
- 2. What is the significance of the molar mass of glucose being 180 g/mol?**
 - A. It determines the volume of blood needed for a test.
 - B. It helps convert moles of glucose to grams.
 - C. It indicates the temperature of the glucose solution.
 - D. It allows for concentration calculations in solutions.
- 3. Which statement describes the behavior of proteins at a pH above their isoelectric point (pI)?**
 - A. They will be positively charged.
 - B. They will be negatively charged.
 - C. They will have no charge.
 - D. They will precipitate out of solution.
- 4. Which major product forms if the aldol condensation does not undergo a dehydration reaction?**
 - A. Enal
 - B. Aldol
 - C. Carboxylic Acid
 - D. Ketone
- 5. The enzyme in a blood glucose meter is classified as what type of enzyme?**
 - A. A transferase
 - B. An isomerase
 - C. An oxidoreductase
 - D. A hydrolase

6. Which category best describes the amino acids studied, with the exception of N6-trimethyllysine?
- A. Acidic and hydrophobic
 - B. Basic and hydrophilic
 - C. Neutral and hydrophilic
 - D. Neutral and hydrophobic
7. What is the equation for calculating power in terms of work and time?
- A. $P = W/t$
 - B. $P = F \times v$
 - C. $P = W/v$
 - D. $P = F/t$
8. What adverse effect does UV radiation have due to its high energy?
- A. Increased growth of microorganisms
 - B. Destruction of DNA integrity
 - C. Enhancement of cellular respiration
 - D. Reduction of cellular metabolism
9. Which aspect of ultrasound waves does not change when entering different media?
- A. Amplitude
 - B. Speed of sound
 - C. Frequency
 - D. Wavelength
10. For the plasma used to sterilize a wound, what is the corresponding temperature range?
- A. 393-423 K
 - B. 363-373 K
 - C. 303-313 K
 - D. 273-283 K

Answers

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

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Explanations

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1. What defines a covalent bond?

- A. A bond formed by the transfer of electrons between atoms
- B. A bond formed by the sharing of electrons between two atoms**
- C. A bond that occurs between ions of opposite charges
- D. A bond that is generally weaker than hydrogen bonds

A covalent bond is defined by the sharing of electrons between two atoms. This type of bond typically occurs when two nonmetals come together and share their valence electrons to achieve greater stability, often resulting in each atom reaching a full outer electron shell, commonly referred to as the octet rule. In covalent bonding, the shared electrons allow each atom to benefit from the electron configuration of the other, thus allowing both to achieve a more stable, lower-energy state. This stands in contrast to ionic bonds, where electrons are transferred from one atom to another, creating charged particles (ions) that are held together by electrostatic forces. Covalent bonds can vary in strength and may involve the sharing of one or more electron pairs, leading to single, double, or triple bonds depending on how many pairs are shared. Understanding this distinction is crucial for grasping the fundamental concepts of chemical bonding and how different types of bonds influence the properties and behaviors of molecules.

2. What is the significance of the molar mass of glucose being 180 g/mol?

- A. It determines the volume of blood needed for a test.
- B. It helps convert moles of glucose to grams.**
- C. It indicates the temperature of the glucose solution.
- D. It allows for concentration calculations in solutions.

The molar mass of glucose, which is 180 g/mol, is significant primarily because it enables the conversion of moles of glucose to grams. This means that when you know the number of moles of glucose present in a sample, you can easily calculate its mass in grams by using the molar mass as a conversion factor. For instance, if you have 2 moles of glucose, the mass can be determined by multiplying 2 moles by 180 grams/mole, resulting in 360 grams of glucose. This conversion is essential in various biological and chemical contexts, where precise measurements of substances are necessary for reactions, solution preparations, and understanding metabolic processes. While the molar mass is important for calculations involving concentration in solutions, the specific function of converting moles to grams is why this option stands out as the most relevant answer.

3. Which statement describes the behavior of proteins at a pH above their isoelectric point (pI)?

- A. They will be positively charged.
- B. They will be negatively charged.**
- C. They will have no charge.
- D. They will precipitate out of solution.

At a pH above their isoelectric point (pI), proteins behave in a specific way due to the ionization of their side chains and the overall charge balance. The isoelectric point represents the pH at which a protein has no net charge because the positive and negative charges are balanced. When the pH is raised above the pI, the environment becomes less favorable for protonation of the acidic groups of the amino acids, and those groups lose protons (H⁺). As a result, more acidic side chains are negatively charged at this higher pH. Conversely, the basic side chains that might accept protons are already in a less favorable state for further protonation. Consequently, the overall charge of the protein becomes negative at pH levels above the pI. This negatively charged state leads to a range of behaviors pertaining to solubility and interactions with other molecules but is most simply defined in terms of charge. Therefore, at a pH above their isoelectric point, proteins will generally be negatively charged. This concept is critical in understanding protein behavior in biochemical reactions and separation techniques, like electrophoresis, where the charge influences migratory behavior in an electric field.

4. Which major product forms if the aldol condensation does not undergo a dehydration reaction?

- A. Enal
- B. Aldol**
- C. Carboxylic Acid
- D. Ketone

In an aldol condensation reaction, two carbonyl compounds (typically aldehydes or ketones) undergo a nucleophilic addition to form a β -hydroxy carbonyl compound, known as an aldol. If the reaction proceeds but does not undergo the dehydration step, the major product will be this aldol, which contains both a hydroxyl (–OH) group and a carbonyl (C=O) group at different positions in the molecule. The aldol product is characterized by its ability to further dehydrate to form an enal or α,β -unsaturated carbonyl compound if dehydration is allowed. However, since the question specifies that dehydration does not occur, the direct outcome of the reaction is simply the aldol itself. Therefore, identifying the reaction condition that retains the hydroxyl and carbonyl functionalities confirms the aldol as the major product. The other options refer to products that would arise from further reactions or different reaction conditions: an enal would form if dehydration occurred, a carboxylic acid could be derived from further oxidation of an aldol or where the condensation leads to overreaction, and a ketone may arise from using a ketone as a reactant or as an independent reaction. Nonetheless, under the

5. The enzyme in a blood glucose meter is classified as what type of enzyme?

- A. A transferase
- B. An isomerase
- C. An oxidoreductase**
- D. A hydrolase

The enzyme in a blood glucose meter is classified as an oxidoreductase because it plays a crucial role in the oxidation-reduction reactions that occur during the measurement of glucose levels in blood. Specifically, this enzyme catalyzes the oxidation of glucose to gluconolactone, during which glucose is oxidized and NAD⁺ is reduced to NADH. Oxidoreductases are key enzymes in metabolic pathways, facilitating electron transfer between substrates and helping to drive biological processes. In the context of blood glucose meters, the enzymatic reaction is designed to produce an electrical signal proportional to the concentration of glucose, enabling accurate measurement. Other enzyme classifications, like transferases, which transfer functional groups between molecules, isomerases, which catalyze structural rearrangements within a molecule, and hydrolases, which catalyze hydrolytic cleavage where bonds are broken by the addition of water, do not apply to the function of the enzyme used in blood glucose measurement. Consequently, understanding the specific function and mechanism of oxidoreductases is vital for interpreting the operation of blood glucose meters.

6. Which category best describes the amino acids studied, with the exception of N6-trimethyllysine?

- A. Acidic and hydrophobic
- B. Basic and hydrophilic**
- C. Neutral and hydrophilic
- D. Neutral and hydrophobic

The classification of amino acids can be understood based on their side chains, which determine their chemical properties. In this case, when referring to the amino acids studied, most of them are characterized as basic, meaning they possess side chains that can accept protons and are positively charged at physiological pH. Basic amino acids typically include lysine, arginine, and histidine, all of which contribute to a hydrophilic nature due to their ability to interact favorably with water and other polar molecules. N6-trimethyllysine, while derived from lysine, has additional methyl groups attached. This modification confers unique properties, but since the question asks for a category that includes all the studied amino acids except for N6-trimethyllysine, the remaining amino acids remain predominantly basic and hydrophilic. Thus, the correct categorization of these amino acids is as basic and hydrophilic, reflecting their ability to engage in strong interactions with aqueous environments, such as forming hydrogen bonds.

7. What is the equation for calculating power in terms of work and time?

- A. $P = W/t$**
- B. $P = F \times v$
- C. $P = W/v$
- D. $P = F/t$

The equation for calculating power in terms of work and time is given by the formula $P = W/t$. In this equation, P represents power, W stands for work done, and t is the time over which the work is performed. This relationship shows that power is the rate at which work is done; in other words, it measures how quickly energy is transferred or converted from one form to another. When work is done over a specific period, dividing the total amount of work (measured in joules) by the time taken (measured in seconds) gives the power output in watts. This formula is foundational in physics and is used in various contexts, from mechanics to electrical systems, where rate of energy transfer is a significant factor. The other options may incorporate related concepts, but they do not represent the correct formula for power in the context of work and time. For example, the equation $P = F \times v$ relates power to force and velocity, which is a different perspective involving the linear motion of an object. Thus, understanding $P = W/t$ is essential for calculating power accurately in terms of work and time spent.

8. What adverse effect does UV radiation have due to its high energy?

- A. Increased growth of microorganisms
- B. Destruction of DNA integrity**
- C. Enhancement of cellular respiration
- D. Reduction of cellular metabolism

UV radiation is characterized by its high-energy photons, which can have significant effects on biological molecules. One of the primary adversities associated with UV radiation is its ability to disrupt the integrity of DNA. When UV light is absorbed by the DNA in cells, it can lead to the formation of pyrimidine dimers, such as thymine dimers. These dimers create covalent bonds between adjacent thymine bases on the same DNA strand, resulting in distortions in the DNA structure. This distortion can interfere with DNA replication and transcription, leading to mutations if not properly repaired by cellular mechanisms. A high rate of mutations can ultimately contribute to various cellular dysfunctions and increase the risk of cancer, particularly skin cancer, as a result of structural changes in the genetic material. In contrast, the other choices involve outcomes that are not directly linked to the effects of UV radiation. For example, while microorganisms may thrive under certain conditions, the high energy from UV radiation typically acts as a disinfectant, killing or inhibiting the growth of these organisms rather than promoting their growth. Moreover, UV radiation does not enhance cellular respiration or reduce cellular metabolism; instead, it primarily causes damage at the molecular level. Thus, the significant adverse effect of UV radiation is indeed the

9. Which aspect of ultrasound waves does not change when entering different media?

- A. Amplitude
- B. Speed of sound
- C. Frequency**
- D. Wavelength

In the context of ultrasound waves, the frequency of the wave remains constant when transitioning between different media. Frequency is determined by the source of the sound and does not change as the wave travels through different materials. This is a fundamental principle of wave behavior; while the speed of sound and wavelength can change depending on the medium (due to factors such as density and elasticity), the frequency produced by the ultrasound source stays the same. When sound enters a new medium, the speed of sound can vary significantly depending on the properties of that medium, such as its density and bulk modulus. Similarly, the wavelength is affected by the change in speed; since wave speed and wavelength are related through the equation $v = f \cdot \lambda$ (where v is speed, f is frequency, and λ is wavelength), a change in speed will result in a change in wavelength if the frequency remains constant. For example, if ultrasound waves move from air (where sound travels slower) into a denser medium like water or tissue, the speed of sound increases, which then results in a shorter wavelength, while the frequency remains tied to the original source. Thus, the aspect of ultrasound waves that remains unchanged while entering

10. For the plasma used to sterilize a wound, what is the corresponding temperature range?

- A. 393-423 K
- B. 363-373 K
- C. 303-313 K**
- D. 273-283 K

The temperature range for plasma used in sterilization is closely associated with the requirement to maintain the efficacy of the sterilization process while avoiding damage to surrounding tissues. Plasma sterilization typically operates at relatively low temperatures compared to traditional heat sterilization methods. The temperature range given in the selected answer, 303-313 K, translates to approximately 30-40 degrees Celsius, a suitable range for effective sterilization without causing thermal injury to the body tissues. This range allows for the generation of reactive species necessary for killing bacteria while being safe for use on living tissues. In contrast, the other temperature ranges provided either exceed the necessary conditions for sterilization or fall below the thermal activation range required for effective treatment, making them unsuitable for plasma sterilization.

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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