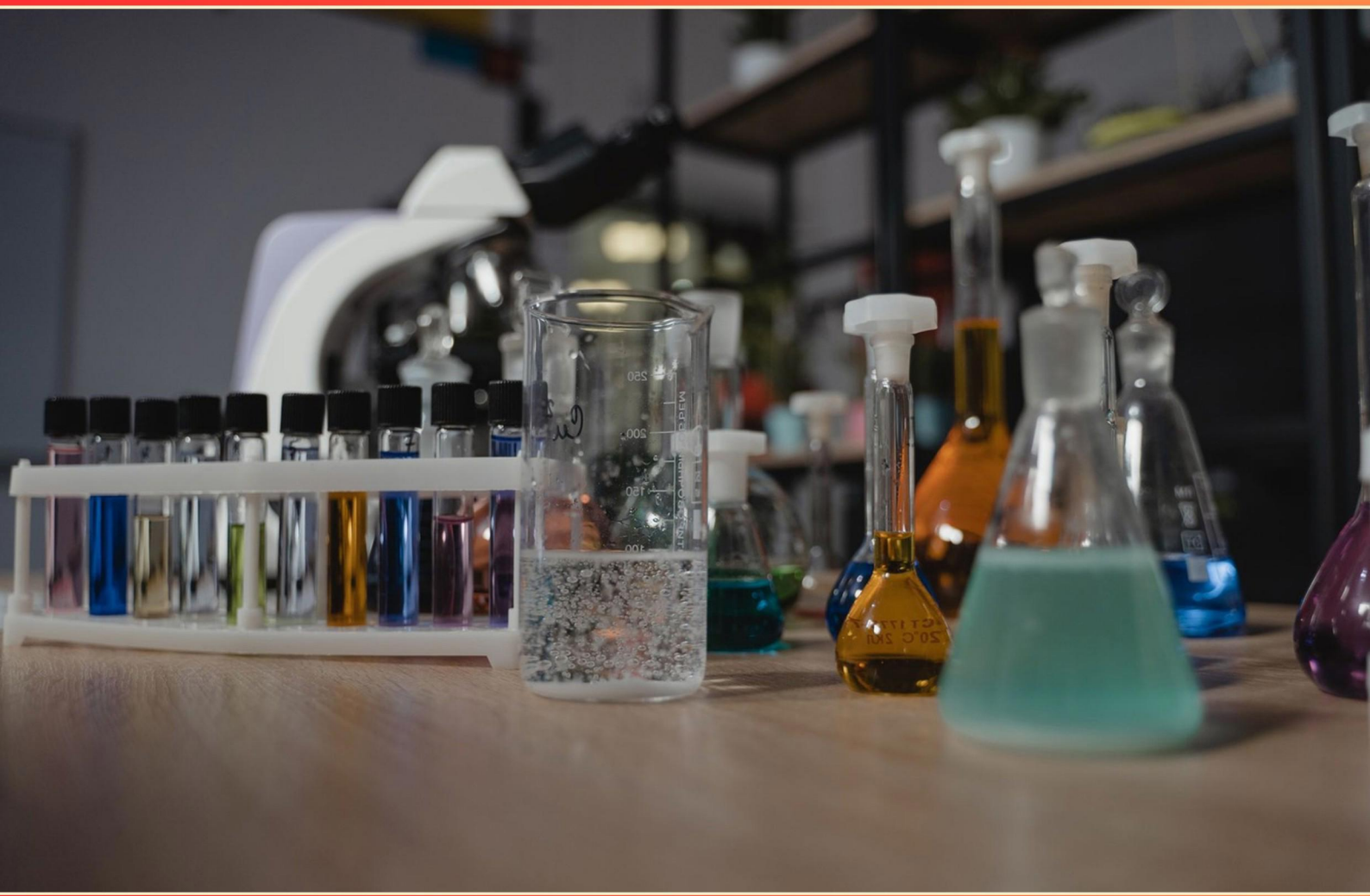
AAMC CHEMICAL AND PHYSICAL FOUNDATIONS OF BIOLOGICAL SYSTEMS (C/P) FULL-LENGTH (FL) 2 PRACTICE TEST (SAMPLE)

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.

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

1. A glass rod charged with +3.2 x 10^-9 C has how many electrons removed?

A. 5.1 x 10^11 protons

B. 5.1 x 10^11 electrons

C. 2.0 x 10^10 protons

D. 2.0 x 10^10 electrons

2. What characterizes saturated fats?

A. They contain multiple double bonds between carbon atoms.

B. They are liquids at room temperature.

C. They contain no double bonds between carbon atoms.

D. They are high in unsaturated fatty acids.

3. What significant contribution did Robert Hooke make to biology?

A. He discovered the nucleus.

B. He coined the term "cell."

C. He developed the theory of evolution.

D. He invented the microscope.

4. Which gas law relates pressure, volume, and temperature of a gas?

A. Boyle's Law

B. Charles's Law

C. Ideal gas law (PV=nRT)

D. Avogadro's Law

5. What is the main difference between saturated and unsaturated fatty acids?

A. Saturated fatty acids contain double bonds

B. Unsaturated fatty acids contain double bonds

C. Both are identical in structure

D. Saturated fatty acids have more hydrogen atoms

6. In chemistry, what type of reaction is defined by the loss of electrons?

A. Reduction reaction

B. Oxidation reaction

C. Hydrolysis reaction

D. Decomposition reaction

7. Which component exhibits an electronic excited state closer in energy to the ground state, a peptide bond or an aromatic side chain?

A. An aromatic side chain; the absorbed photon energy is higher

B. An aromatic side chain; the absorbed photon energy is lower

C. A peptide bond; the absorbed photon energy is higher

D. A peptide bond; the absorbed photon energy is lower

8. Which single bond present in nitroglycerin is the least polar?

A. C-H

B. C-O

C. C-C

D. O-N

9. What is the effect of increasing temperature on the rate of a chemical reaction?

A. It decreases the reaction rate.

B. It has no effect on the reaction rate.

C. It generally increases the reaction rate.

D. It causes the reaction to stop.

10. Which property of water is mainly responsible for its high specific heat?

A. Hydrogen bonding among molecules

B. Ionic interactions in solution

C. Distribution of electrons

D. Temperature stability alone

Answers

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

Explanations

1. A glass rod charged with +3.2 x 10^-9 C has how many electrons removed?

A. 5.1 x 10^11 protons

B. 5.1 x 10^11 electrons

C. 2.0 x 10^10 protons

D. 2.0 x 10^10 electrons

To understand how many electrons were removed from the glass rod charged with +3.2 x 10^-9 C, we need to relate the amount of charge to the charge of a single electron. The elementary charge, which is the charge of an electron, is approximately -1.6 x 10^-19 C. When electrons are removed from an object, it becomes positively charged. In this case, the glass rod has a positive charge of +3.2 x 10^-9 C. To find out how many electrons were removed, we need to divide the total charge of the rod by the charge of one electron. The mathematical representation of this would be: Number of electrons removed = Total charge / Charge of one electron = (3.2 x 10^-9 C) / (1.6 x 10^-19 C/electron). Calculating this gives us: Number of electrons removed = (3.2 x 10^-9) / (1.6 x 10^-19) = 2.0 x 10^10 electrons. Thus, the glass rod had approximately 2.0 x 10^10 electrons removed to achieve a charge of +3.2 x 10^-9 C

2. What characterizes saturated fats?

A. They contain multiple double bonds between carbon atoms.

B. They are liquids at room temperature.

C. They contain no double bonds between carbon atoms.

D. They are high in unsaturated fatty acids.

Saturated fats are characterized by the absence of double bonds between their carbon atoms. This means that all carbon atoms in the fatty acid chains are fully saturated with hydrogen atoms. As a result, saturated fats typically have a straight structure that allows them to pack closely together, which is why they tend to be solid at room temperature. In contrast to saturated fats, unsaturated fats contain one or more double bonds which introduce kinks in the fatty acid chains, preventing them from packing tightly. This structural difference often results in unsaturated fats being liquid at room temperature. Therefore, the defining characteristic of saturated fats is that they do not have any double bonds, making them distinct from other types of fats.

3. What significant contribution did Robert Hooke make to biology?

A. He discovered the nucleus.

B. He coined the term "cell."

C. He developed the theory of evolution.

D. He invented the microscope.

Robert Hooke made a landmark contribution to biology by coining the term "cell." In his 1665 work titled "Micrographia," he detailed his observations of cork cells under a microscope. Hooke noticed that the structure of the cork resembled small, hollow compartments, which he referred to as "cells" based on the Latin word "cella," meaning small room. This terminology laid the foundation for cell theory, which states that the cell is the basic unit of life. The other contributions mentioned, while significant in their own right, do not pertain to Hooke. The discovery of the nucleus is attributed to other scientists who studied plant and animal cells later. The theory of evolution was primarily developed by Charles Darwin and Alfred Russel Wallace in the 19th century. The invention of the microscope cannot be credited to a single individual but rather evolved through contributions from various inventors, although Hooke did enhance its use in biology. Thus, Hooke's naming of the "cell" represents a pivotal moment in the history of biology.

4. Which gas law relates pressure, volume, and temperature of a gas?

A. Boyle's Law

B. Charles's Law

C. Ideal gas law (PV=nRT)

D. Avogadro's Law

The relationship between pressure, volume, and temperature of a gas is best described by the ideal gas law, represented as \(PV = nRT\), where \(P\) is pressure, \(V\) is volume, \(n\) is the number of moles of the gas, \(R\) is the ideal gas constant, and \(T\) is the temperature in Kelvin. This law encompasses the principles of other gas laws, such as Boyle's Law, which states that pressure and volume are inversely related at a constant temperature, and Charles's Law, which states that volume is directly proportional to temperature at constant pressure. The ideal gas law allows for a comprehensive understanding of the gas's behavior under varying conditions of pressure, volume, temperature, and amount of substance, integrating these key variables into a single equation. It provides a more complete picture than the other laws, which address only specific aspects of the gas's behavior. Avogadro's Law specifically relates the volume of a gas to its amount (number of moles) at constant temperature and pressure but does not encompass how temperature and pressure influence volume on their own, nor does it connect all three parameters in a unified framework like the ideal gas law does.

5. What is the main difference between saturated and unsaturated fatty acids?

A. Saturated fatty acids contain double bonds

B. Unsaturated fatty acids contain double bonds

C. Both are identical in structure

D. Saturated fatty acids have more hydrogen atoms

The distinction between saturated and unsaturated fatty acids primarily revolves around the presence of double bonds in their carbon chains. Unsaturated fatty acids are characterized by having one or more double bonds between the carbon atoms. These double bonds introduce kinks in the fatty acid chain, preventing the molecules from packing closely together, which impacts their physical state at room temperature — unsaturated fatty acids are typically liquid (like oils), while saturated fatty acids, lacking double bonds, have straight chains that allow them to pack tightly, leading to a solid state (like butter). Furthermore, this structural difference plays a crucial role in their functions in biological systems, influencing membrane fluidity and metabolic pathways. The presence of double bonds in unsaturated fatty acids contributes to the fluidity of cellular membranes, which is vital for proper cell function. In contrast, the straight chains of saturated fatty acids can lead to a more rigid structure in lipids. Therefore, understanding this key structural difference — that unsaturated fatty acids contain double bonds — is essential for grasping the biochemical properties and implications of these fatty acids in biological systems.

6. In chemistry, what type of reaction is defined by the loss of electrons?

A. Reduction reaction

B. Oxidation reaction

C. Hydrolysis reaction

D. Decomposition reaction

The type of reaction defined by the loss of electrons is an oxidation reaction. In the context of redox (reduction-oxidation) reactions, oxidation specifically refers to the process where an atom, ion, or molecule loses electrons. This can result in an increase in oxidation state. The classic example of oxidation can be observed in the reaction of metals with oxygen, where the metal is oxidized as it loses electrons. In contrast, a reduction reaction involves the gain of electrons, leading to a decrease in oxidation state. Hydrolysis reactions involve the breaking down of compounds by reaction with water, while decomposition reactions refer to the breakdown of a single compound into two or more products. Therefore, the key feature of an oxidation reaction is the loss of electrons, distinguishing it clearly from the other types of reactions listed.

7. Which component exhibits an electronic excited state closer in energy to the ground state, a peptide bond or an aromatic side chain?

A. An aromatic side chain; the absorbed photon energy is higher

B. An aromatic side chain; the absorbed photon energy is lower

C. A peptide bond; the absorbed photon energy is higher

D. A peptide bond; the absorbed photon energy is lower

The correct answer indicates that an aromatic side chain exhibits an electronic excited state closer in energy to its ground state, with the energy of the absorbed photon being lower. Aromatic side chains, such as phenylalanine, tyrosine, and tryptophan, have delocalized π electrons due to their conjugated systems. This delocalization results in electronic transitions that typically require lower energy (longer wavelength) photons to promote an electron from the ground state to an excited state. Since the energy gap between the ground and the excited state is smaller compared to other bonds in different molecular structures, the energies of the absorbed photons are lower. In contrast, peptide bonds, which are formed between amino acids, primarily involve less delocalization of electrons and have higher energy transitions. The electronic transitions associated with peptide bonds usually require higher energy photons because they involve σ to σ transitions, which are generally higher in energy than the π to π* transitions found in aromatic systems. Therefore, since the aromatic side chains can be excited with lower energy photons and have excited states closer to the ground state, the choice indicating that the energy of absorbed photons for an aromatic side chain is lower is accurate.*

8. Which single bond present in nitroglycerin is the least polar?

A. C-H

B. C-O

C. C-C

D. O-N

The least polar single bond in nitroglycerin is indeed the bond between carbon and carbon (C-C). To understand why this is correct, it's essential to consider the electronegativities of the atoms involved. Carbon is a non-metal with an electronegativity of about 2.5 on the Pauling scale, and it shares similar electronegativity with another carbon atom significantly; therefore, the C-C bond is considered nonpolar under normal circumstances, as both atoms exert equal pull on the shared electrons. In contrast, the other bonds involve either oxygen or nitrogen, which are more electronegative than carbon. For instance, C-O bonds are polar because oxygen has a higher electronegativity (3.5) compared to carbon, resulting in a significant difference in electronegativity and, consequently, a dipole moment. Similarly, O-N and C-H bonds also exhibit polarity due to the differences in electronegativity between the atoms involved. Thus, the C-C bond stands out as the least polar bond in nitroglycerin because it involves two identical atoms with equal sharing of electrons, leading to no partial charges or dipole moments.

9. What is the effect of increasing temperature on the rate of a chemical reaction?

A. It decreases the reaction rate.

B. It has no effect on the reaction rate.

C. It generally increases the reaction rate.

D. It causes the reaction to stop.

Increasing temperature generally increases the rate of a chemical reaction due to several factors related to molecular behavior. As temperature rises, the kinetic energy of molecules increases, leading to more frequent and energetic collisions between reactant molecules. This increase in energy enhances the likelihood that collisions will surpass the activation energy threshold—the minimum energy required for a reaction to occur—resulting in a greater probability of successful reactions. Moreover, higher temperatures can also lead to an increase in the number of reactive collisions by promoting the breakdown of bonds and other forms of molecular interactions. The increased movement of molecules allows them to encounter one another more often and with sufficient energy to facilitate breaking and forming chemical bonds. Therefore, the overall effect of increasing temperature on a chemical reaction is a general increase in reaction rate, making the selected answer accurate in the context of basic thermodynamics and chemical kinetics.

10. Which property of water is mainly responsible for its high specific heat?

A. Hydrogen bonding among molecules

B. Ionic interactions in solution

C. Distribution of electrons

D. Temperature stability alone

The high specific heat of water is primarily due to hydrogen bonding among its molecules. Water molecules exhibit a unique polarity, resulting in a partial positive charge on the hydrogen atoms and a partial negative charge on the oxygen atom. This polarity allows water molecules to form extensive hydrogen bonds with one another. When heat is applied to water, a significant amount of energy is required to break these hydrogen bonds before the temperature of the water can increase. This means that water can absorb a lot of heat energy while only experiencing a small increase in temperature, which characterizes high specific heat. As a result, water is very effective at stabilizing temperature changes in the environment and within living organisms, making it an essential component for life. In contrast, ionic interactions in solution, the distribution of electrons, or the concept of temperature stability alone do not adequately explain the high specific heat of water. While other interactions and properties can play a role in water's behavior, it is specifically the hydrogen bonds that account for its ability to absorb and retain large amounts of heat.

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://aamccpfl2.examzify.com

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