

MEDICAL CHEMISTRY PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

VISIT US ONLINE FOR
THE FULL VERSION STUDY GUIDE

<https://medicalchemistry.examzify.com>



Copyright © 2026 by Examzify - A Kaluba Technologies Inc. product.

ALL RIGHTS RESERVED.

No part of this book may be reproduced or transferred in any form or by any means, graphic, electronic, or mechanical, including photocopying, recording, web distribution, taping, or by any information storage retrieval system, without the written permission of the author.

Notice: Examzify makes every reasonable effort to obtain accurate, complete, and timely information about this product from reliable sources.

SAMPLE

Table of Contents

Copyright	1
Table of Contents	2
Introduction	3
How to Use This Guide	4
Questions	5
Answers	8
Explanations	10
Next Steps	15

SAMPLE

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

SAMPLE

1. Which option is NOT a structural isomer of C_4H_8 ?
- A. But-1-ene
 - B. Cyclobutane
 - C. But-2-ene
 - D. Isobutane
2. Which of the following is formed when an acid reacts with an alkali?
- A. Salt
 - B. Water
 - C. Salt and water
 - D. Gas
3. Charles' law describes the relationship between which two properties of a gas?
- A. Pressure and volume
 - B. Volume and temperature
 - C. Temperature and amount of gas
 - D. Density and temperature
4. RCH_2OH and $RR'R''COH$ are
- A. primary and tertiary alcohols, respectively
 - B. secondary and primary alcohols, respectively
 - C. primary and secondary alcohols, respectively
 - D. tertiary and secondary alcohols, respectively
5. RCH_2OH represents which class of alcohol?
- A. Primary
 - B. Secondary
 - C. Tertiary
 - D. Quaternary
6. Why do atoms form covalent bonds?
- A. Outer energy level shells become full
 - B. Outer energy level shells become empty
 - C. Inner shells become full
 - D. They form because atoms gain full charge

7. The reaction of an alcohol with a carboxylic acid to form an ester and water is called what?
- A. Esterification
 - B. Hydration
 - C. Dehydration
 - D. Hydrogenation
8. Calcium has an atomic number of 20. A stable calcium atom has an electronic configuration of:
- A. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^2$
 - B. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$
 - C. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$
 - D. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^3$
9. Which structural feature connects amino acids in a protein?
- A. Peptide bond
 - B. Glycosidic bond
 - C. Ester bond
 - D. Hydrogen bond
10. Which product results from the basic hydrolysis of an amide?
- A. A carboxylate salt and an amine
 - B. A carboxylate salt and water
 - C. A carboxylate salt and ammonia
 - D. An alcohol and an amine

Answers

SAMPLE

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

SAMPLE

Explanations

SAMPLE

1. Which option is NOT a structural isomer of C₄H₈?

- A. But-1-ene
- B. Cyclobutane
- C. But-2-ene
- D. Isobutane**

The concept tested is structural (constitutional) isomerism: molecules that share the same formula but differ in how the atoms are connected. For C₄H₈, there's one degree of unsaturation, so the molecule can be a straight-chain or branched alkene, or a cyclic structure, all with the same formula. But-1-ene fits as a straight-chain alkene with the double bond at the first carbon, giving C₄H₈. But-2-ene is also a straight-chain alkene, just with the double bond located between the second and third carbons, still C₄H₈. Cyclobutane provides a ring form of C₄H₈, maintaining the same carbon and hydrogen count but changing connectivity from a chain to a ring. Isobutane, however, is C₄H₁₀, a saturated alkane with two extra hydrogens, so it does not have the same molecular formula as C₄H₈ and cannot be a structural isomer of it.

2. Which of the following is formed when an acid reacts with an alkali?

- A. Salt
- B. Water
- C. Salt and water**
- D. Gas

Neutralization between an acid and an alkali yields salt and water. In solution, the hydrogen ions from the acid combine with the hydroxide ions from the alkali to form water, while the remaining ions form the salt. This is why the typical products are salt and water, not a gas or just salt or just water. For example, HCl reacting with NaOH gives NaCl (salt) and H₂O (water). Gas would only appear in reactions that produce a gas (like acid reacting with carbonate to release CO₂), not in a simple acid-alkali neutralization.

3. Charles' law describes the relationship between which two properties of a gas?

- A. Pressure and volume
- B. Volume and temperature**
- C. Temperature and amount of gas
- D. Density and temperature

Volume of a gas changes in direct proportion to its absolute temperature when the pressure is held constant. This is Charles' law: $V \propto T$ with T measured in Kelvin. As you heat the gas at fixed pressure, its molecules move more rapidly and push the container walls outward, so the volume expands; cooling slows them down and the volume contracts. Using Kelvin is essential because it keeps the relationship linear and avoids issues with negative temperatures. Other gas laws describe different scenarios—for example, keeping T constant links pressure and volume (Boyle's law), or keeping V constant links pressure and temperature (Gay-Lussac's law). So the relationship described by Charles' law is between volume and temperature.

4. RCH_2OH and $\text{RR}'\text{R}''\text{COH}$ are

- A. primary and tertiary alcohols, respectively
- B. secondary and primary alcohols, respectively
- C. primary and secondary alcohols, respectively
- D. tertiary and secondary alcohols, respectively

The concept being tested is how to classify alcohols by the degree of substitution at the carbon bearing the hydroxyl group. In alcohols, the carbon attached to OH determines whether it's primary, secondary, or tertiary: primary means the OH-bearing carbon is bonded to one other carbon, secondary to two, and tertiary to three. For RCH_2OH , the carbon with the OH is a CH_2 group attached to one carbon (R) and two hydrogens. That makes it a primary alcohol. For $\text{RR}'\text{R}''\text{COH}$, the carbon bearing the OH is connected to three carbon groups (R, R', and R''), which makes it a tertiary alcohol. So the pairing is primary and tertiary alcohols, respectively. For reference, ethanol is a classic primary example, while tert-butanol is a classic tertiary example.

5. RCH_2OH represents which class of alcohol?

- A. Primary
- B. Secondary
- C. Tertiary
- D. Quaternary

Alcohols are classified by how many carbon groups are attached to the carbon that bears the hydroxyl group. In RCH_2OH , the carbon with the OH is a CH_2 group, bonded to one carbon-containing R group and to two hydrogens. That means there is only one carbon attached to the carbon bearing the OH, which makes it a primary alcohol. If the OH-bearing carbon were attached to two carbons, it would be secondary; attached to three carbons would be tertiary. A quaternary carbon cannot bear an OH group because it lacks hydrogens. So RCH_2OH is a primary alcohol.

6. Why do atoms form covalent bonds?

- A. Outer energy level shells become full
- B. Outer energy level shells become empty
- C. Inner shells become full
- D. They form because atoms gain full charge

Atoms form covalent bonds because they want a full outer electron shell, which is more stable and lower in energy. They accomplish this by sharing electrons, so each atom can count those shared electrons toward filling its valence shell. For most elements this means achieving eight valence electrons (the octet rule), while hydrogen needs only two. This shared-electron approach explains why nonmetals bond with each other rather than transferring electrons. The idea that outer shells become full captures this stability-driven drive. Other possibilities—outer shells emptying, inner shells filling, or gaining full charge—don't describe covalent bonding and, in fact, transferring electrons tends to lead to ionic bonds rather than covalent sharing.

7. The reaction of an alcohol with a carboxylic acid to form an ester and water is called what?

- A. Esterification
- B. Hydration
- C. Dehydration
- D. Hydrogenation

This question tests esterification, the condensation reaction where an alcohol and a carboxylic acid combine to form an ester and water. In acid-catalyzed esterification, the carbonyl carbon of the carboxylic acid is activated and attacked by the alcohol's oxygen, creating a tetrahedral intermediate. Through a series of proton transfers, water is eliminated and the remaining acyl-oxygen bond rearranges to give the ester, with the acid catalyst regenerated. This process is often referred to as Fischer esterification when a strong acid drives the reaction, and the equilibrium can be shifted by using excess alcohol or removing water. Hydration would involve adding water to a molecule, which is not the reaction here. Dehydration is a broader term for removing water, whereas the specific transformation of an alcohol and a carboxylic acid into an ester with water production is called esterification. Hydrogenation is the addition of hydrogen to multiple bonds and is unrelated.

8. Calcium has an atomic number of 20. A stable calcium atom has an electronic configuration of:

- A. $1s^2 2s^2 2p^6 3s^2 3p^6 3d^2$
- B. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$
- C. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$
- D. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^3$

Calcium has 20 electrons in its neutral state, so the ground-state arrangement follows the Aufbau principle: fill the lowest-energy orbitals first, with two electrons occupying the outermost 4s orbital. The full configuration is $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$. This matches the option that shows $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$, since the two outer electrons reside in 4s. The 4s shell is the outermost for calcium, and 3d would not be involved in calcium's ground state until later elements; options that place electrons in 3d or miscount the outer-shell electrons ($4s^1$ or $4s^3$) do not represent neutral calcium.

9. Which structural feature connects amino acids in a protein?

- A. Peptide bond
- B. Glycosidic bond
- C. Ester bond
- D. Hydrogen bond

The linking of amino acids in a protein is accomplished by a peptide bond, a covalent amide linkage formed when the carboxyl group of one amino acid reacts with the amino group of the next, releasing water. This creates the protein's backbone and a repeating sequence of N-C-C units. The bond has partial double-bond character from resonance, making it planar and restricting rotation, which helps the chain adopt specific shapes necessary for folding into secondary and tertiary structures. Hydrogen bonds stabilize those folded structures but do not covalently connect amino acids in the chain. Glycosidic bonds join sugar molecules, and ester bonds link acids to alcohols, not the amino acids in a peptide chain.

10. Which product results from the basic hydrolysis of an amide?

A. A carboxylate salt and an amine

B. A carboxylate salt and water

C. A carboxylate salt and ammonia

D. An alcohol and an amine

Basic hydrolysis of an amide, or saponification, gives a carboxylate salt and an amine. In base, hydroxide attacks the carbonyl carbon of the amide, kicking out the nitrogen-containing fragment as an amine. The carboxyl group is deprotonated in the basic medium, so it ends up as the carboxylate ion, which then pairs with a metal cation (like Na⁺) to form a carboxylate salt. The nitrogen fragment leaves as an amine (for a simple formamide this would be ammonia, but in general it's the amine corresponding to the original amide). That's why the correct product is a carboxylate salt and an amine.

SAMPLE

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://medicalchemistry.examzify.com>

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

SAMPLE