

GEORGIA STATE UNIVERSITY (GSU) CHEM 1211K PRINCIPLES OF CHEMISTRY I TEST 1 PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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

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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. Which energy form is associated with the motion of atoms, molecules, and subatomic particles?
 - A. Potential energy
 - B. Kinetic energy
 - C. Thermal energy
 - D. Chemical energy
2. Chlorous acid is represented by which chemical formula in aqueous solution?
 - A. HClO_3
 - B. HCl
 - C. HClO
 - D. HClO_2 (aq)
3. How many grams are in 2 moles of $\text{Ca}_3(\text{PO}_4)_2$?
 - A. 620.36 g
 - B. 930.54 g
 - C. 465.18 g
 - D. 310.36 g
4. If an atom has 17 protons and a mass number of 35, how many neutrons does it have?
 - A. 18
 - B. 17
 - C. 19
 - D. 15
5. Which statement accurately describes Avogadro's number?
 - A. 6.022×10^{23} ; the number of particles in one mole of a substance
 - B. 9.109×10^{-31} ; mass of an electron
 - C. 1.6605×10^{-24} ; a unit conversion factor
 - D. 3.00×10^8 ; speed of light

6. What is the electron configuration for neutral aluminum in its ground state, and how many unpaired electrons does it have?
- A. $1s^2 2s^2 2p^6 3s^2 3p^1$; one unpaired electron.
 - B. $1s^2 2s^2 2p^6 3s^2 3p^2$; zero unpaired.
 - C. $1s^2 2s^2 2p^6 3s^2 3p^?$; two unpaired.
 - D. $1s^2 2s^2 2p^6 3s^2 3p^6$; three unpaired electrons.
7. How many inches are in 1 yard?
- A. 24
 - B. 30
 - C. 36
 - D. 40
8. Which statement is true regarding exact numbers and significant figures?
- A. Exact numbers have a finite number of significant figures.
 - B. Significant figures are the same as decimal places.
 - C. All measurements have unlimited significant figures.
 - D. Exact numbers have an unlimited number of significant figures.
9. Which subatomic particle carries a negative charge?
- A. Proton
 - B. Electron
 - C. Neutron
 - D. Positron
10. How many iron atoms are contained in 354 g of iron?
- A. 1.0×10^{23}
 - B. 6.02×10^{23}
 - C. 7.50×10^{24}
 - D. 3.82×10^{24}

Answers

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

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Explanations

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1. Which energy form is associated with the motion of atoms, molecules, and subatomic particles?

- A. Potential energy
- B. Kinetic energy**
- C. Thermal energy
- D. Chemical energy

Energy from movement is kinetic energy. It's the energy particles have because they are in motion—translating, rotating, and vibrating at the microscopic level. For a moving object, the kinetic energy is given by $KE = 1/2 mv^2$, and on a population level, the average kinetic energy of particles is related to temperature, which is why hotter substances have more vigorous particle motion. Potential energy comes from position (not motion), chemical energy from stored bonds, and thermal energy is the overall energy associated with microscopic motion and interactions in a system; the specific form tied to motion itself is kinetic energy.

2. Chlorous acid is represented by which chemical formula in aqueous solution?

- A. HClO_3
- B. HCl
- C. HClO
- D. $\text{HClO}_2(\text{aq})$**

Chlorous acid is the chlorine oxyacid with two oxygens around chlorine, so its formula is HClO_2 . In water it remains as $\text{HClO}_2(\text{aq})$, since the equation for the acid's dissociation would be $\text{HClO}_2 \rightarrow \text{H}^+ + \text{ClO}_2^-$, reflecting its identity as chlorous acid. This distinguishes it from the other oxyacids: hypochlorous acid has one oxygen (HClO), chloric acid has three oxygens (HClO_3), and hydrochloric acid has no oxygens (HCl). So the aqueous formula that represents chlorous acid is $\text{HClO}_2(\text{aq})$.

3. How many grams are in 2 moles of $\text{Ca}_3(\text{PO}_4)_2$?

- A. 620.36 g**
- B. 930.54 g
- C. 465.18 g
- D. 310.36 g

Mass in grams comes from multiplying moles by the molar mass. First, determine the molar mass of $\text{Ca}_3(\text{PO}_4)_2$ by summing all the atoms: calcium contributes $3 \times 40.08 = 120.24 \text{ g}$; each PO_4 unit is $30.97 + 4 \times 16.00 = 94.97 \text{ g}$, and there are two of them, giving $2 \times 94.97 = 189.94 \text{ g}$. Add them: $120.24 + 189.94 = 310.18 \text{ g}$ per mole. For 2 moles, multiply by 2: $2 \times 310.18 = 620.36 \text{ g}$. Therefore, about 620.36 grams.

4. If an atom has 17 protons and a mass number of 35, how many neutrons does it have?

- A. 18
- B. 17
- C. 19
- D. 15

Mass number is the total number of protons and neutrons in the nucleus. With 17 protons, the number of neutrons must be 35 minus 17, which equals 18. So the atom has 18 neutrons (chlorine-35). If it had 17 neutrons, the mass would be 34; 19 neutrons would make it 36; 15 neutrons would be 32. Only 18 neutrons give a mass of 35.

5. Which statement accurately describes Avogadro's number?

- A. 6.022×10^{23} ; the number of particles in one mole of a substance
- B. 9.109×10^{-31} ; mass of an electron
- C. 1.6605×10^{-24} ; a unit conversion factor
- D. 3.00×10^8 ; speed of light

Avogadro's number is the number of representative particles in one mole of any substance. Its value, 6.022×10^{23} , lets you convert between the macroscopic amount of material you can weigh (moles) and the actual particles present (atoms, molecules, or ions). So this statement captures that essential definition and the exact value used in mole-to-particle conversions. The other numbers shown are different physical constants: the electron's mass, the atomic mass unit in grams, and the speed of light. They're important in their own right but do not describe Avogadro's number.

6. What is the electron configuration for neutral aluminum in its ground state, and how many unpaired electrons does it have?

- A. $1s^2 2s^2 2p^6 3s^2 3p^1$; one unpaired electron.
- B. $1s^2 2s^2 2p^6 3s^2 3p^2$; zero unpaired.
- C. $1s^2 2s^2 2p^6 3s^2 3p^?$; two unpaired.
- D. $1s^2 2s^2 2p^6 3s^2 3p^6$; three unpaired electrons.

Aluminum has 13 electrons, so the arrangement fills the inner shells up to neon: $1s^2 2s^2 2p^6$. The remaining electrons occupy the 3s and 3p subshells, giving $3s^2 3p^1$. In the 3s subshell two electrons are paired, and in the 3p subshell there is a single electron that occupies one of the three degenerate 3p orbitals, leaving it unpaired. Therefore the full ground-state configuration is $1s^2 2s^2 2p^6 3s^2 3p^1$, and there is one unpaired electron. The other configurations don't match aluminum. For example, $1s^2 2s^2 2p^6 3s^2 3p^2$ would have 12 electrons total (like magnesium) and would place two electrons in 3p (which could be unpaired in two orbitals), not aluminum. A $3p^6$ ending would imply a noble-gas core (argon, 18 electrons), not aluminum.

7. How many inches are in 1 yard?

- A. 24
- B. 30
- C. 36**
- D. 40

The main idea is unit conversion between yard and inch. A yard is defined as three feet, and there are twelve inches in one foot. So, in inches, 1 yard = 3 feet $\times$ 12 inches per foot = 36 inches. That's why 36 inches is correct. The other numbers don't fit because they represent different lengths: 24 inches is two feet, 30 inches is two and a half feet, and 40 inches is three feet four inches.

8. Which statement is true regarding exact numbers and significant figures?

- A. Exact numbers have a finite number of significant figures.
- B. Significant figures are the same as decimal places.
- C. All measurements have unlimited significant figures.
- D. Exact numbers have an unlimited number of significant figures.**

Exact numbers come from counting or from definitions, so they are known with perfect precision. Because there's no measurement uncertainty, they carry an unlimited number of significant figures. In calculations, this means an exact quantity or a defined conversion factor doesn't limit how many significant figures you can carry—the precision is set by the measured quantities themselves. For example, the conversion 1 inch equals exactly 2.54 centimeters is defined and exact, so it has unlimited significant figures, while your measured value (like 5.00 inches) determines the final precision of the result. This is why the statement about exact numbers having an unlimited number of significant figures is true.

9. Which subatomic particle carries a negative charge?

- A. Proton
- B. Electron**
- C. Neutron
- D. Positron

The main idea is identifying which subatomic particle has a negative electric charge. Protons carry a positive charge, neutrons are electrically neutral, and a positron is the antimatter counterpart of the electron with a positive charge. The particle that carries the negative charge is the electron, which has a $-e$ elementary charge and a much smaller mass than protons or neutrons. This negative charge is what drives chemical bonding and electrical phenomena, and in atoms, electrons balance the positive charge of protons to yield neutral atoms.

10. How many iron atoms are contained in 354 g of iron?

- A. 1.0×10^{23}
- B. 6.02×10^{23}
- C. 7.50×10^{24}
- D. 3.82×10^{24}**

Use the mole concept: convert grams to moles using the molar mass of iron, then multiply by Avogadro's number to get atoms. Iron has a molar mass of about 55.85 g/mol. The amount in moles is $354 \text{ g} \div 55.85 \text{ g/mol} \approx 6.34 \text{ mol}$. Multiply by Avogadro's number ($6.022 \times 10^{23} \text{ atoms/mol}$) to get the number of atoms: $6.34 \times 6.022 \times 10^{23} \approx 3.82 \times 10^{24} \text{ atoms}$. So 354 g of iron contains about 3.82×10^{24} iron atoms.

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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://gsu-chem1211ktest1.examzify.com>

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

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