CHEMISTRY AND SUSTAINABILITY CONCEPTS FOR STEM STUDENTS 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.

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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!

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Questions

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1. Which statement best distinguishes extrinsic properties from intrinsic properties?

A. Extrinsic properties change based on the amount of substance; intrinsic properties do not.

B. Intrinsic properties change based on the amount; extrinsic properties do not.

C. Extrinsic properties are inherent to the material and do not vary with amount.

D. Intrinsic properties depend on temperature.

2. What is the boiling point of water at standard atmospheric pressure (in degrees Celsius)?

A. 90 °C

B. 110 °C

C. 120 °C

D. 100 °C

3. What is the relationship between mass and weight?

A. Mass is equal to weight.

B. Mass is proportional to weight; as mass changes, weight changes at a constant rate.

C. Mass increases weight independently of gravity.

D. Mass and weight are unrelated.

4. What is the density of air at 20 °C?

A. 0.01 g/cm³

B. 0.0013 g/cm³

C. 0.0001 g/cm³

D. 0.1 g/cm³

5. Which statement correctly describes physical separation of a mixture?

A. The chemical identities of the components remain unchanged.

B. New substances are formed.

C. The components lose all properties.

D. The mixture becomes a pure substance.

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6. Density is an intrinsic property.

A. False

B. It depends

C. True

D. Not a property

7. Which statement correctly relates liters and cubic centimeters?

A. 1 liter equals 1000 cubic centimeters.

B. 1 liter equals 1 cubic centimeter.

C. 1 liter equals 1000 liters.

D. 1 liter equals 0.001 cubic meters.

8. Which event is a chemical change?

A. Melting ice

B. Dissolving sugar in water

C. Tearing paper

D. Burning wood to ash

9. What does certainty in measurement refer to?

A. The exactness of measurement only depends on instrument.

B. It is unrelated to accuracy.

C. The degree of confidence in the accuracy and precision of a measured value.

D. It is the time taken to measure.

10. Which statement about changing only one factor is supported by the material?

A. It guarantees new discoveries.

B. It helps identify gaps or errors in previous findings.

C. It makes research faster but less robust.

D. It is unnecessary if you have fresh data.

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Answers

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

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Explanations

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1. Which statement best distinguishes extrinsic properties from intrinsic properties?

A. Extrinsic properties change based on the amount of substance; intrinsic properties do not.

B. Intrinsic properties change based on the amount; extrinsic properties do not.

C. Extrinsic properties are inherent to the material and do not vary with amount.

D. Intrinsic properties depend on temperature.

The key idea here is how a property scales with how much material you have. Extrinsic properties depend on the amount of substance, so they change when you change the size of the sample. If you double the amount of material, extrinsic properties like mass, volume, or total energy also double. Intrinsic properties, on the other hand, do not change with sample size (assuming you compare under the same conditions); they stay the same whether you have a small or large piece of the substance. Examples include density (for a uniform material under the same conditions) and melting or boiling points, which are characteristic of the material itself. So the statement that extrinsic properties change based on the amount of substance, while intrinsic properties do not, best captures the distinction. The other options mix up this idea: intrinsic properties are not defined by changes with amount, so saying they change with amount is incorrect; extrinsic properties are not inherently non-variable with amount, so saying they do not vary with amount is incorrect; and while some properties depend on temperature, that dependence isn't the criterion used to separate intrinsic from extrinsic.

2. What is the boiling point of water at standard atmospheric pressure (in degrees Celsius)?

A. 90 °C

B. 110 °C

C. 120 °C

D. 100 °C

The main idea is the boiling point: the temperature at which a liquid's vapor pressure equals the surrounding pressure. At standard atmospheric pressure (about 1 atmosphere, 101.3 kPa), water's vapor pressure reaches that external pressure at roughly 100 °C, so it begins to form bubbles throughout the liquid and boil. That makes 100 °C the boiling point under these conditions. If the pressure were higher, water would boil at a higher temperature; if lower, at a lower temperature. The other temperatures would correspond to different pressures, not standard atmospheric pressure.

3. What is the relationship between mass and weight?

A. Mass is equal to weight.

B. Mass is proportional to weight; as mass changes, weight changes at a constant rate.

C. Mass increases weight independently of gravity.

D. Mass and weight are unrelated.

Weight is the gravitational force acting on a mass, while mass is the amount of matter in an object. The relationship between them is given by $W = m\,g$, where g is the gravitational acceleration. Since g is essentially constant near Earth's surface, weight changes in direct proportion to mass: doubling the mass doubles the weight. The rate of change of weight with respect to mass is g, a constant for a given location. If you were on a different planet or at a different altitude where gravity differs, the proportionality still holds, but the constant g would be different, so the same mass would weigh more or less accordingly. This is why mass is proportional to weight with a constant rate of change, rather than being equal or completely unrelated.

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4. What is the density of air at 20 °C?

A. 0.01 g/cm³

B. 0.0013 g/cm³

C. 0.0001 g/cm³

D. 0.1 g/cm³

Air isn't very dense because gases have relatively large spaces between molecules; at room temperature and pressure, its density is about 1.2 kilograms per cubic meter. That converts to roughly 0.0012 g per cubic centimeter. The calculation uses the ideal gas relation ρ = PM/RT: with P ≈ 1 atm, M ≈ 29 g/mol for air, T ≈ 298 K, you get ρ ≈ (1 × 29) / (0.0821 × 298) ≈ 1.19 g/L, which is 0.00119 g/cm^3. The closest option is 0.0013 g/cm^3, reflecting this typical room-temperature density. In familiar terms, that's about 1.2 g of air per liter.

5. Which statement correctly describes physical separation of a mixture?

A. The chemical identities of the components remain unchanged.

B. New substances are formed.

C. The components lose all properties.

D. The mixture becomes a pure substance.

The chemical identities remain unchanged during physical separation. This process uses differences in physical properties—like solubility, boiling point, or particle size—to separate components without breaking or forming chemical bonds. Because no chemical reactions occur, no new substances are produced and the original substances retain their characteristic properties. While you can sometimes end up with pure components after separation, the method itself is about isolating existing substances, not converting them into something new.

6. Density is an intrinsic property.

A. False

B. It depends

C. True

D. Not a property

Density is an intensive property: it describes the material itself, not how much material you have. For a given substance at a fixed temperature and pressure, the density stays the same whether you take a tiny drop or a large mass, because density is mass per unit volume and both mass and volume scale together. The catch is that density does depend on temperature and pressure, so it can change if those conditions change. But at a defined set of conditions, density is inherent to the material, making the statement true.

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7. Which statement correctly relates liters and cubic centimeters?

A. 1 liter equals 1000 cubic centimeters.

B. 1 liter equals 1 cubic centimeter.

C. 1 liter equals 1000 liters.

D. 1 liter equals 0.001 cubic meters.

Volumes can be expressed in liters or cubic centimeters, and these units are directly related: 1 liter equals 1000 cubic centimeters. This direct link makes the statement that ties liters to cubic centimeters the correct one, because it uses the same volume concept in two units that are interchangeable for common measurements. A liter is defined as the volume of a cube that is 10 cm on each side, which is 1000 cm^3, and since 1 cm^3 equals 1 mL, that also means 1 L equals 1000 mL. The other options mix up the units or connect liters to cubic meters, which isn't the focus when relating liters to cubic centimeters.

8. Which event is a chemical change?

A. Melting ice

B. Dissolving sugar in water

C. Tearing paper

D. Burning wood to ash

Chemical changes involve breaking and forming bonds to create substances with new composition and properties. Burning wood to ash does just that: the wood reacts with oxygen in a combustion process, turning into carbon dioxide, water vapor, and solid ash, with energy released. The original materials are transformed into new substances, and this change is typically irreversible under ordinary conditions. Melting ice changes only the state from solid to liquid; the substance remains water, so no new chemical species form. Dissolving sugar in water is a physical process where sugar and water intermingle, but their chemical identities don't change. Tearing paper is also physical, simply breaking it into pieces without altering its chemical composition. So, burning wood to ash is the event that shows a chemical change.

9. What does certainty in measurement refer to?

A. The exactness of measurement only depends on instrument.

B. It is unrelated to accuracy.

C. The degree of confidence in the accuracy and precision of a measured value.

D. It is the time taken to measure.

Certainty in measurement is about how much confidence you have in both the accuracy (how close you are to the true value) and the precision (how reproducible the measurement is) of a result. In practice, you don't get an exact value; you get a value plus an uncertainty that reflects all sources of error—instrument limitations, the measurement method, how the measurement is taken, and environmental factors. Repeating measurements and properly calibrating instruments reduce random and systematic errors, increasing certainty. So certainty isn't only about the instrument or about time; it's about the overall trustworthiness of the reported value, expressed as the range within which the true value is expected to lie.

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10. Which statement about changing only one factor is supported by the material?

A. It guarantees new discoveries.

B. It helps identify gaps or errors in previous findings.

C. It makes research faster but less robust.

D. It is unnecessary if you have fresh data.

Isolating a single variable lets you attribute observed effects to that variable, which makes it possible to check the validity and completeness of previous findings. When you change only one factor and keep everything else the same, any change in the outcome can be traced to that factor alone. If the new results diverge from what earlier studies suggested, it points to gaps or possible errors in those findings, prompting a closer look at assumptions, methods, or conditions used before. This approach also helps test the reproducibility and robustness of conclusions by showing whether prior results hold up under a controlled, isolated test. The other statements aren't supported because simply changing one factor does not guarantee new discoveries, and it doesn't inherently make research faster at the cost of robustness. Even with fresh data, isolating a single variable remains a sound way to probe cause-and-effect and reveal any previously unnoticed limitations.

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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://chemsustainabilityforstemstudents.examzify.com

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

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