

HESI A2 CHEMISTRY PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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. In a chemical equation, what does the symbol (s) indicate?**
 - A. Liquid
 - B. Gas
 - C. Solid
 - D. Aqueous solution
- 2. What is the main purpose of chromatography?**
 - A. To enhance chemical reactions
 - B. To analyze gas emissions
 - C. To separate components of a mixture
 - D. To evaluate dye properties
- 3. What is the main characteristic of noble gases in terms of reactivity?**
 - A. Highly reactive
 - B. Very low reactivity
 - C. Moderately reactive
 - D. Radioactive
- 4. In a single replacement reaction, what is typically produced?**
 - A. A new element and a compound
 - B. Two elements
 - C. A single compound
 - D. Two compounds
- 5. What does a high pH level indicate about a solution?**
 - A. It is neutral
 - B. It is acidic
 - C. It is basic or alkaline
 - D. It is corrosive
- 6. What defines a precipitation reaction?**
 - A. A reaction that produces gas from liquid reactants
 - B. A reaction that produces an insoluble solid from soluble reactants
 - C. A reaction that absorbs heat
 - D. A reaction occurring in the absence of a solvent

7. Which of the following groups has a +3 charge?

- A. III
- B. IIIA
- C. IVA
- D. IB

8. In chemical reactions, what is the function of a catalyst?

- A. To lower the activation energy and speed up the reaction
- B. To increase the activation energy required
- C. To alter the products of the reaction
- D. To change the states of the reactants

9. What does "chemical synthesis" entail?

- A. The separation of compounds into individual elements
- B. The process of combining different elements or compounds to create a new substance
- C. The breakdown of complex molecules into simpler ones
- D. The analysis of chemical compounds

10. What is the role of a catalyst in a chemical reaction?

- A. A substance that decreases the rate of reaction
- B. A substance that provides energy to the reaction
- C. A substance that increases the rate of reaction without being consumed
- D. A substance that changes the direction of the reaction

Answers

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

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Explanations

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1. In a chemical equation, what does the symbol (s) indicate?

- A. Liquid
- B. Gas
- C. Solid**
- D. Aqueous solution

In a chemical equation, the symbol (s) denotes a solid state of a substance. This notation is used to indicate that the reactant or product exists in a solid form at the specified temperature and pressure during the reaction. Understanding this symbol is essential because it provides valuable information about the physical state of the chemicals involved in the reaction, which can influence various factors, including solubility, reactivity, and the overall dynamics of the reaction. For example, when metals or salts precipitate out of solution, they are represented with the (s) symbol, indicating that they have formed a solid product. This clarity helps chemists predict the outcomes of reactions and understand the nature of the substances they are working with.

2. What is the main purpose of chromatography?

- A. To enhance chemical reactions
- B. To analyze gas emissions
- C. To separate components of a mixture**
- D. To evaluate dye properties

The main purpose of chromatography is to separate components of a mixture. This versatile technique works by passing the mixture through a medium that causes different components to move at different rates, allowing them to be isolated from one another. In many applications, such as in chemical analysis, food testing, and forensic science, this separation is crucial for identifying and quantifying the individual substances present in a complex mixture. As the components travel through the medium, they can be detected and collected for further analysis, which is why chromatography is an essential tool in chemistry and many related fields. The other options, while related to chemical processes, do not accurately describe the primary function of chromatography. Enhancing chemical reactions pertains more to catalytic processes, analyzing gas emissions involves different analytical techniques such as spectroscopy, and evaluating dye properties might use chromatography as a tool alongside other methods but is not the main purpose of the technique itself.

3. What is the main characteristic of noble gases in terms of reactivity?

- A. Highly reactive
- B. Very low reactivity**
- C. Moderately reactive
- D. Radioactive

Noble gases are characterized by their very low reactivity, which is due to their full valence electron shells. In the periodic table, noble gases occupy Group 18 and include helium, neon, argon, krypton, xenon, and radon. These elements have eight electrons in their outermost shell (with the exception of helium, which has two), creating a stable electron configuration that does not tend to gain or lose electrons. This stability means that they do not typically form chemical bonds with other elements, making them mostly inert under standard conditions. The lack of reactivity is what allows noble gases to exist in nature as monatomic gases. They do not readily participate in reactions due to their complete valence electron shells, which contrasts sharply with other groups in the periodic table that are more reactive, such as alkali metals or halogens. Therefore, the characteristic of very low reactivity is a defining feature of noble gases and helps explain their unique behavior in chemical reactions.

4. In a single replacement reaction, what is typically produced?

A. A new element and a compound

B. Two elements

C. A single compound

D. Two compounds

In a single replacement reaction, one element replaces another element in a compound, resulting in the formation of a new element and a new compound. This reaction can be represented generally by the equation: $A + BC \rightarrow AC + B$. In this equation, element A displaces element B from compound BC, leading to the creation of a new compound AC and the release of element B as a separate entity. This characteristic is fundamental to single replacement reactions, distinguishing them from other types of reactions, such as synthesis or decomposition reactions. Consequently, the presence of both a new element and a compound is the hallmark of this reaction type, thus making the given answer the correct choice.

5. What does a high pH level indicate about a solution?

A. It is neutral

B. It is acidic

C. It is basic or alkaline

D. It is corrosive

A high pH level indicates that a solution is basic or alkaline. The pH scale ranges from 0 to 14, where 7 is considered neutral. When a solution has a pH greater than 7, it means that the concentration of hydroxide ions (OH^-) exceeds that of hydrogen ions (H^+), resulting in a basic solution. In practical terms, high pH values are commonly associated with common substances like baking soda or certain household cleaners, which can feel slippery and have properties that neutralize acids. This understanding is crucial in various chemical applications and reactions where maintaining a specific pH is important, such as in biological systems or chemical manufacturing processes. While the concept of corrosivity relates to how damaging a substance can be to materials or living tissue, it is not a direct indication of pH. Thus, corrosive substances can be either acidic or basic, but a high pH alone simply indicates that the solution is basic or alkaline.

6. What defines a precipitation reaction?

A. A reaction that produces gas from liquid reactants

B. A reaction that produces an insoluble solid from soluble reactants

C. A reaction that absorbs heat

D. A reaction occurring in the absence of a solvent

A precipitation reaction is specifically characterized by the formation of an insoluble solid from soluble reactants when they are mixed together. In such a reaction, two ionic compounds in solution react to form a new compound that, due to its low solubility in the solvent (typically water), precipitates out of the solution as a solid. This solid is known as the precipitate. The key here is the interaction between the ions in solution that leads to the formation of this insoluble solid, which distinguishes it from other types of reactions. In contrast, producing gas is a characteristic of certain types of reactions, such as gas evolution reactions, and does not relate to the formation of a precipitate. Heat absorption pertains to endothermic reactions, which are defined by their temperature changes and energy exchanges, rather than precipitation. A reaction occurring in the absence of a solvent is not relevant, as precipitation reactions generally occur in solutions where solvent is present to facilitate the mixing of reactants.

7. Which of the following groups has a +3 charge?

- A. III
- B. IIIA**
- C. IVA
- D. IB

The group that has a +3 charge is the group known as IIIA, also referred to as Group 13 in the periodic table. Elements in this group typically have three valence electrons, and when they form compounds, they usually lose these three electrons to achieve a full outer shell, resulting in a +3 oxidation state. For instance, aluminum, which is a member of Group IIIA, commonly exists in the +3 oxidation state when it forms compounds, such as aluminum oxide (Al_2O_3). This characteristic of readily losing three electrons to obtain stability is what defines the +3 charge for this group. The other groups listed do not typically exhibit a +3 charge. Group III, for instance, contains a range of elements with varying oxidation states, but it does not specifically designate a +3 charge as a hallmark. Group IVA contains elements that can have multiple oxidation states but is more commonly associated with +4 or -4 charges. Group IB, associated with transition metals like copper and gold, also tends to vary widely in their oxidation states, with no predominant +3 characteristic. Thus, IIIA is the correct identification of the group that predominantly shows a +3 charge.

8. In chemical reactions, what is the function of a catalyst?

- A. To lower the activation energy and speed up the reaction**
- B. To increase the activation energy required
- C. To alter the products of the reaction
- D. To change the states of the reactants

The function of a catalyst in chemical reactions is to lower the activation energy required for the reaction to proceed, thereby increasing the rate at which the reaction occurs. By reducing the activation energy barrier, a catalyst allows more reactant molecules to have enough energy to collide successfully and form products. This facilitates a quicker conversion from reactants to products without being consumed in the process, meaning it can be used repeatedly in multiple reaction cycles. Catalysts do not change the overall energy of the reaction or the products formed; they simply provide an alternative pathway that requires less energy, leading to faster reaction rates. This makes catalysts essential in many industrial processes and biological systems, such as enzymes in metabolic pathways.

9. What does "chemical synthesis" entail?

- A. The separation of compounds into individual elements
- B. The process of combining different elements or compounds to create a new substance**
- C. The breakdown of complex molecules into simpler ones
- D. The analysis of chemical compounds

Chemical synthesis refers to the process of combining various elements or compounds to create new substances. This involves chemical reactions where reactants are transformed into products through bond formation and rearrangement. This process is fundamental in chemistry as it allows for the creation of a vast array of materials, from pharmaceuticals to industrial chemicals. In the context of this question, the correct choice accurately describes the core concept of chemical synthesis. It emphasizes the combining of elements or compounds, highlighting the transformational aspect of creating something new. In contrast, the other options refer to different chemical processes. For example, the separation of compounds involves breaking bonds to isolate elements from their compounds, while the breakdown of complex molecules into simpler ones describes a process known as decomposition. Additionally, the analysis of chemical compounds focuses on examining and understanding the properties and components of substances rather than creating new ones. Understanding these distinctions is essential in grasping the broader concepts within the field of chemistry.

10. What is the role of a catalyst in a chemical reaction?

- A. A substance that decreases the rate of reaction
- B. A substance that provides energy to the reaction
- C. A substance that increases the rate of reaction without being consumed**
- D. A substance that changes the direction of the reaction

A catalyst plays a crucial role in chemical reactions by increasing the rate of the reaction without being consumed in the process. It achieves this by providing an alternative pathway for the reaction with a lower activation energy. This means that more reactant molecules can acquire the necessary energy to undergo the reaction, leading to an increased rate of reaction. In the presence of a catalyst, the energy barrier that reactants must overcome to form products is reduced, allowing the reaction to occur more readily and efficiently. Importantly, once the reaction is complete, the catalyst remains unchanged and can be reused for subsequent reactions. This characteristic makes catalysts vital in various industrial processes and biological systems, such as enzymes in metabolic pathways. The roles of other substances mentioned in the options differ significantly from that of a catalyst. A substance that decreases the rate of the reaction would act as an inhibitor, while one that provides energy would typically refer to an external energy source rather than a catalyst. Additionally, changing the direction of the reaction pertains to factors that influence equilibrium, not the function of a catalyst.

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://hesia2chemistry.examzify.com>

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

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