HESI A2 CHEMISTRY 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. The three forms of radiation include alpha, beta, and which other type?

A. Ultraviolet Radiation
B. X-ray Radiation
C. Gamma Radiation
D. Neutron Radiation

2. Which form of energy is measured in calories?

A. Mechanical Energy
B. Heat
C. Kinetic Energy
D. Potential Energy

3. What is the pH value of a neutral solution at 25°C?

A. 0
B. 4
C. 7
D. 14

4. What does the term "enthalpy" measure?

A. The mass of a substance involved in a reaction
B. The total energy of a thermodynamic system
C. The time duration of a chemical reaction
D. The change in pressure throughout a reaction

5. How is a solution best described?

A. A heterogeneous mixture of two or more substances
B. A homogeneous mixture of two or more substances
C. A combination of solids only
D. A pure substance with fixed composition

6. What is the term for a negatively charged ion?

A. Cation
B. Neutral ion
C. Anion
D. Isotope

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7. What is the pH of a neutral solution at 25°C?

A. 6

B. 7

C. 8

D. 9

8. What does an increase in reaction concentration generally cause?

A. It decreases the reaction rate

B. It may increase the reaction rate

C. It has no effect on the reaction rate

D. It reverses the reaction

9. Explain what a redox reaction is.

A. A reaction where heat is absorbed

B. A reaction involving the transfer of electrons between two species

C. A reaction focused on the exchange of protons

D. A reaction that does not involve any energy transfer

10. Which of the following is NOT a type of radioactive decay?

A. Alpha decay

B. Gamma decay

C. Delta decay

D. Beta decay

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Answers

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

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Explanations

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1. The three forms of radiation include alpha, beta, and which other type?

A. Ultraviolet Radiation

B. X-ray Radiation

C. Gamma Radiation

D. Neutron Radiation

The correct answer is gamma radiation, which is one of the three main types of radiation emitted during radioactive decay, along with alpha and beta radiation. Gamma radiation consists of high-energy photons, which are electromagnetic waves. These photons have no mass and no charge, allowing them to penetrate materials more effectively than either alpha or beta particles. Unlike alpha particles, which are clusters of two protons and two neutrons, and beta particles, which can be electrons or positrons emitted from a nucleus, gamma rays provide a form of energy without any associated particle mass. This ability to penetrate materials makes gamma radiation particularly significant in various fields, including medical imaging and radiation therapy, as well as in nuclear science and safety. Understanding the characteristics of gamma radiation, alongside alpha and beta radiation, is crucial because it helps in grasping the broader implications of radiation in both theoretical physics and practical applications such as radiation protection measures.

2. Which form of energy is measured in calories?

A. Mechanical Energy

B. Heat

C. Kinetic Energy

D. Potential Energy

The correct answer is heat, which is a form of energy that transfers between systems or objects with different temperatures. The calorie is a unit specifically defined to measure the amount of heat energy required to raise the temperature of one gram of water by one degree Celsius at a specified pressure. This makes it particularly useful in thermodynamics and chemistry, where heat transfer plays a crucial role in chemical reactions and processes. Heat energy is also significant in various biological and physical processes, impacting things such as metabolism in organisms. The other forms of energy—mechanical, kinetic, and potential—are measured using different units and pertain to different types of energy interactions. Mechanical energy encompasses both kinetic and potential energy, encapsulating the total energy a system can have due to its position or movement. Kinetic energy pertains specifically to the energy of motion, while potential energy refers to the stored energy based on the position of an object. Therefore, when it comes to the measurement of energy in terms of calories, heat is the specific form that corresponds directly to this unit of measurement.

3. What is the pH value of a neutral solution at 25°C?

A. 0

B. 4

C. 7

D. 14

A neutral solution at 25°C has a pH value of 7. This is a fundamental concept in chemistry that defines neutrality in terms of hydrogen ion concentration. At this temperature, pure water possesses equal concentrations of hydrogen ions (H^+) and hydroxide ions (OH^-), each being 1×10^{-7} moles per liter. The pH scale, which ranges from 0 to 14, quantifies the acidity or basicity of a solution. A pH of 7 indicates a balance where acidity and basicity are equal, hence denoting a neutral solution. Values below 7 indicate acidity (more H^+ ions), while values above 7 indicate basicity (more OH^- ions).

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4. What does the term "enthalpy" measure?

A. The mass of a substance involved in a reaction

B. The total energy of a thermodynamic system

C. The time duration of a chemical reaction

D. The change in pressure throughout a reaction

Enthalpy is a thermodynamic quantity that is used to measure the total energy of a system, which includes both the internal energy and the energy associated with the pressure and volume of the system. Specifically, it accounts for the energy required to create a system at a constant pressure and can be regarded as a measure of the heat content of a system. The concept of enthalpy is particularly important in the context of chemical reactions, as it allows chemists to understand and quantify the energy changes that occur during those reactions. When a chemical reaction takes place, the enthalpy change indicates whether the reaction is exothermic (releases heat) or endothermic (absorbs heat). In contrast, other choices do not accurately define enthalpy: - The mass of a substance involved in a reaction is a separate physical quantity and does not reflect energy content. - The time duration of a chemical reaction is related to kinetics, not thermodynamics, and does not involve the energy measures of the system. - The change in pressure throughout a reaction is an important variable in thermodynamics but does not solely describe enthalpy, as enthalpy is a more comprehensive measure that includes both pressure and volume effects. Thus, B is the correct

5. How is a solution best described?

A. A heterogeneous mixture of two or more substances

B. A homogeneous mixture of two or more substances

C. A combination of solids only

D. A pure substance with fixed composition

A solution is best described as a homogeneous mixture of two or more substances because it consists of a solute that is uniformly dissolved in a solvent. In a homogeneous mixture, the individual components are not distinguishable and exist in a single phase. This means that when you take a sample from any part of the solution, it will have the same composition throughout. For example, when table salt (the solute) is dissolved in water (the solvent), the resulting saltwater solution appears uniform; the salt ions are distributed evenly throughout the water. This property of solutions is key in many applications, including pharmacology, cooking, and chemical engineering, where consistent concentrations are vital. In contrast, a heterogeneous mixture contains visibly different substances or phases that remain separate, such as sand mixed with sugar or oil mixed with water, where differences between the components can be seen and detected. A combination of solids only would not adequately describe solutions, as they can include liquids and gases as well as solids. Lastly, a pure substance with a fixed composition refers to substances like distilled water or pure salt, which are not mixtures but rather single entities with consistent properties.

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6. What is the term for a negatively charged ion?

A. Cation

B. Neutral ion

C. Anion

D. Isotope

The term for a negatively charged ion is "anion." This designation arises from the way ions are formed and classified based on their electrical charge. Atoms can gain or lose electrons to form ions: when an atom gains one or more electrons, it acquires a negative charge because electrons carry a negative charge. As a result, the atom becomes an anion. In contrast, cations are positively charged ions formed when an atom loses electrons. Neutral ions would imply a balance of protons and electrons, resulting in no overall charge. Isotopes refer to variations of a particular element that have the same number of protons but different numbers of neutrons, which does not relate directly to charge. Therefore, the correct understanding of a negatively charged ion is anchored in the concept of anions and their properties.

7. What is the pH of a neutral solution at 25°C?

A. 6

B. 7

C. 8

D. 9

In a neutral solution at 25°C, the concentration of hydrogen ions (H) and hydroxide ions (OH) is equal, which defines neutrality. The pH scale measures the concentration of hydrogen ions on a logarithmic scale, where a pH of 7 is specifically designated as neutral. At this pH level, the concentration of H is 1 x 10 moles per liter. This means that a neutral solution does not favor either acidic or basic qualities, and all pure water at this temperature maintains a pH of 7. Therefore, the statement that a neutral solution has a pH of 7 is accurate and reflects the standard definition used in chemistry for neutral aqueous solutions. The other options suggest pH values that indicate either acidic (below 7) or basic (above 7) solutions, which would not be the case for a neutral solution at this temperature.

8. What does an increase in reaction concentration generally cause?

A. It decreases the reaction rate

B. It may increase the reaction rate

C. It has no effect on the reaction rate

D. It reverses the reaction

An increase in reaction concentration typically leads to more reactant particles being present in a given volume. This higher density of reactants increases the likelihood of collisions between molecules, which is essential for chemical reactions to occur. The more frequent the collisions, the faster the reaction rate, assuming that other conditions, like temperature and pressure, remain constant. For example, in a gas-phase reaction, increasing the concentration of a reactant means more molecules are available to collide with one another, thus facilitating a quicker reaction. This phenomenon can often be explained using collision theory, which posits that reacting particles must collide with sufficient energy and correct orientation for a successful reaction to occur. In contrast, other options suggest scenarios that either diminish the reaction rate or have no impact, which do not align with the principles of kinetics related to concentration. Consequently, increasing the reaction concentration is primarily associated with an increased reaction rate, making it the correct conclusion in this context.

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9. Explain what a redox reaction is.

A. A reaction where heat is absorbed

B. A reaction involving the transfer of electrons between two species

C. A reaction focused on the exchange of protons

D. A reaction that does not involve any energy transfer

A redox reaction, short for reduction-oxidation reaction, is characterized by the transfer of electrons between two species. In these reactions, one species undergoes oxidation, losing electrons, while another species is reduced, gaining those electrons. This transfer of electrons is fundamental to many chemical and biological processes, as it allows for changes in oxidation states and the formation of new compounds. The core concept behind redox reactions is that they inherently involve changes in the electrical charge of the involved elements. For example, in the combustion of hydrocarbons, carbon is oxidized to carbon dioxide, while oxygen is reduced, illustrating this electron transfer process clearly. Understanding redox reactions is crucial for comprehending various chemical reactions, including those occurring in batteries, metabolic pathways, and corrosion.

10. Which of the following is NOT a type of radioactive decay?

A. Alpha decay

B. Gamma decay

C. Delta decay

D. Beta decay

The correct answer identifies "Delta decay" as not being a recognized type of radioactive decay. Radioactive decay occurs when an unstable atomic nucleus loses energy by emitting radiation. The most common types of radioactive decay include alpha decay, beta decay, and gamma decay. Alpha decay involves the emission of an alpha particle, which consists of two protons and two neutrons, leading to a decrease in the atomic number of the original atom. Beta decay involves the transformation of a neutron into a proton (or vice versa), resulting in the emission of beta particles which can be electrons or positrons. Gamma decay is the release of gamma radiation, which is high-energy electromagnetic radiation, typically occurring after other types of decay in order to rid the nucleus of excess energy without changing its atomic number or mass. Since "Delta decay" is not classified under any of these established types of radioactive decay processes, it is the correct choice in response to the question.

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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:

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

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