

University of Central Florida (UCF) CHM2046 Chemistry Fundamentals II Test 3 Practice Test (Sample)

Study Guide



Everything you need from our exam experts!

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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

- 1. In terms of temperature and pressure, when do gases behave ideally?**
 - A. At low temperatures and high pressures.**
 - B. At high temperatures and low pressures.**
 - C. At low temperatures and low pressures.**
 - D. At all temperatures and pressures.**
- 2. If the enthalpy change for a reaction is given as -50 kJ, what type of reaction is this?**
 - A. Endothermic reaction**
 - B. Exothermic reaction**
 - C. Equilibrium reaction**
 - D. Reversible reaction**
- 3. What does Avogadro's Law state about gases at the same temperature and pressure?**
 - A. They have different volumes**
 - B. They contain an equal number of moles**
 - C. They have different masses**
 - D. They behave differently under pressure**
- 4. In terms of solubility, what does "like dissolves like" refer to?**
 - A. Polar solvents dissolve polar solutes**
 - B. Nonpolar solvents dissolve polar solutes**
 - C. Only ionic solutes can dissolve in any solvent**
 - D. Hydrophobic substances dissolve in water**
- 5. What is the primary cause of alkaline earth metals' reactivity?**
 - A. Their high electronegativity**
 - B. Their low ionization energy**
 - C. Their large atomic size**
 - D. Their tendency to form covalent bonds**

- 6. What function does the salt bridge serve in an electrochemical cell?**
- A. To connect the two half-cells electrically**
 - B. To maintain concentration of reactants**
 - C. To allow the transfer of electrons**
 - D. To maintain electrical neutrality by allowing ionic flow**
- 7. How does molecularity differ from the order of a reaction?**
- A. Molecularity determines the activation energy**
 - B. Order relates to the overall rate, while molecularity is about individual steps**
 - C. Order is always a whole number, while molecularity can be fractional**
 - D. Molecularity depends on temperature, while order does not**
- 8. What does Gibbs free energy (G) measure?**
- A. The total energy change of a chemical reaction**
 - B. The maximum reversible work obtainable from a system at constant temperature and pressure**
 - C. The energy required to start a reaction**
 - D. The energy lost during a chemical reaction**
- 9. What does an ICE table help determine in a chemical reaction?**
- A. Final temperature**
 - B. Initial, Change, and Equilibrium concentrations**
 - C. Pressure changes**
 - D. Catalyst effect**
- 10. Which type of bond typically involves a complete transfer of electrons?**
- A. Covalent bond**
 - B. Ionic bond**
 - C. Hydrogen bond**
 - D. Metallic bond**

Answers

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

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Explanations

1. In terms of temperature and pressure, when do gases behave ideally?

A. At low temperatures and high pressures.

B. At high temperatures and low pressures.

C. At low temperatures and low pressures.

D. At all temperatures and pressures.

Gases behave ideally under conditions of high temperatures and low pressures. At high temperatures, the kinetic energy of gas molecules increases, which allows them to move more freely and minimizes interactions between particles. This is crucial because ideal gas behavior assumes that gas molecules do not attract or repel each other, which is more plausible at higher energies. Additionally, low pressures reduce the density of the gas, which means that the volume of the gas particles in relation to the empty space increases. Under such conditions, the assumptions of the ideal gas law—like negligible volume of gas particles and no intermolecular forces—are more likely to hold true. This combination effectively allows the gas molecules to behave like an ideal gas, where the behavior can be accurately described by the ideal gas law, $PV=nRT$. In contrast, low temperatures tend to slow down the molecules and may cause them to cluster together due to intermolecular forces, while high pressures compress the gas, making molecular volume significant and increasing the influence of these intermolecular forces. This is why gases do not behave ideally under those conditions.

2. If the enthalpy change for a reaction is given as -50 kJ, what type of reaction is this?

A. Endothermic reaction

B. Exothermic reaction

C. Equilibrium reaction

D. Reversible reaction

The enthalpy change of a reaction, indicated as -50 kJ, signifies that energy is released during the reaction. In thermodynamics, reactions that release heat to their surroundings are termed exothermic. When the enthalpy change is negative, it indicates that the products of the reaction have lower enthalpy compared to the reactants, demonstrating that energy has been released as a result of the reaction. In contrast, an endothermic reaction absorbs energy from the surroundings, resulting in a positive enthalpy change. Equilibrium and reversible reactions pertain to the dynamic state of reactants and products in a reaction but do not specifically indicate the heat exchange involved. Thus, given the negative enthalpy change of -50 kJ, the reaction identified here is definitively exothermic, as it reflects a release of energy, confirming the correctness of identifying it as an exothermic reaction.

3. What does Avogadro's Law state about gases at the same temperature and pressure?

- A. They have different volumes**
- B. They contain an equal number of moles**
- C. They have different masses**
- D. They behave differently under pressure**

Avogadro's Law states that under the same temperature and pressure conditions, equal volumes of gases contain an equal number of moles of molecules. This law emphasizes the relationship between the volume of a gas and the number of moles it contains when temperature and pressure are held constant. Since the law relates directly to the concept of moles, it indicates that regardless of the type of gas, if you have equal volumes, those volumes will contain an identical number of molecules (and thus moles) when conditions are standardized. This principle is crucial for understanding gas behavior and is foundational in stoichiometry and reaction calculations involving gases. In the context of the other options, while gases may differ in volumes, masses, and their behavior under pressure, Avogadro's Law specifically highlights the equality in the number of moles for equal volumes at a specified temperature and pressure. This makes the correlation of moles the key concept of Avogadro's Law.

4. In terms of solubility, what does "like dissolves like" refer to?

- A. Polar solvents dissolve polar solutes**
- B. Nonpolar solvents dissolve polar solutes**
- C. Only ionic solutes can dissolve in any solvent**
- D. Hydrophobic substances dissolve in water**

The phrase "like dissolves like" refers to the principle that polar solvents are most effective at dissolving polar solutes. This relationship exists because both polar solvents and polar solutes possess similar characteristics such as dipole moments and ionic interactions, allowing them to interact effectively on the molecular level. In a polar solvent, the molecules have a significant difference in electronegativity, leading to uneven distribution of charge, which facilitates the solvation process when polar solutes are introduced. This principle is foundational to understanding solubility in chemistry, as it emphasizes the importance of molecular interactions that dictate whether a substance will dissolve in a given solvent based on their polar or nonpolar nature.

5. What is the primary cause of alkaline earth metals' reactivity?

- A. Their high electronegativity**
- B. Their low ionization energy**
- C. Their large atomic size**
- D. Their tendency to form covalent bonds**

The reactivity of alkaline earth metals is primarily attributed to their low ionization energy. These elements, which include beryllium, magnesium, calcium, strontium, barium, and radium, have two electrons in their outermost shell. To achieve a stable electron configuration, they need to lose these two valence electrons. Low ionization energy means that less energy is required to remove these outer electrons, facilitating the metal's ability to readily react with other elements or compounds. Consequently, alkaline earth metals are more likely to participate in chemical reactions, often forming positive ions. This characteristic is particularly notable as the metallic character and reactivity of these elements increase down the group, corresponding with a decrease in ionization energy. In contrast, high electronegativity does not apply to alkaline earth metals as they are less electronegative than many other elements. Their large atomic size contributes to the lower ionization energy, but it is the low ionization energy itself that is the primary factor in their reactivity. Additionally, while alkaline earth metals can form covalent bonds, this is not their predominant mode of reactivity, as they typically engage in ionic bonding by losing electrons to achieve stability.

6. What function does the salt bridge serve in an electrochemical cell?

- A. To connect the two half-cells electrically**
- B. To maintain concentration of reactants**
- C. To allow the transfer of electrons**
- D. To maintain electrical neutrality by allowing ionic flow**

In an electrochemical cell, the salt bridge plays a crucial role in maintaining electrical neutrality by allowing ionic flow between the two half-cells. As a redox reaction occurs, electrons flow through an external circuit from the anode to the cathode, causing changes in charge. This buildup of positive or negative charge in the respective half-cells can impede the reaction. The salt bridge contains an electrolyte solution, typically a gel or a liquid that has ions present, which can migrate to balance the charge by compensating for the loss or gain of electrons. For instance, if electrons leave the anode half-cell, positive ions from the salt bridge will move toward the anode, while negative ions will move toward the cathode, thus maintaining the electrical neutrality of the overall system. This function is vital for the continuous operation of the electrochemical cell, enabling a sustained flow of electricity. This role of the salt bridge distinguishes it from the other options. Connecting the two half-cells electrically focuses on electron flow, while maintaining concentration of reactants refers more to the solution within the half-cells themselves rather than the balance of charges. Allowing the transfer of electrons primarily describes the external circuit rather than the role of the salt bridge. Therefore, the

7. How does molecularity differ from the order of a reaction?

- A. Molecularity determines the activation energy
- B. Order relates to the overall rate, while molecularity is about individual steps**
- C. Order is always a whole number, while molecularity can be fractional
- D. Molecularity depends on temperature, while order does not

The correct answer highlights a fundamental distinction between molecularity and the order of a reaction. Molecularity refers to the number of reactant molecules involved in a single elementary step of a reaction mechanism. It specifically describes the reaction at the molecular level and indicates how many molecules collide to result in a particular reaction. On the other hand, the order of a reaction reflects the relationship between the concentration of reactants and the rate of the overall reaction. It is determined experimentally and can involve the sum of the powers of the concentration terms in the rate law associated with the reaction, which may not correspond directly to the number of molecules in any single step. This distinction is significant because molecularity pertains solely to elementary reactions (which are the indivisible steps in the reaction mechanism), while the order considers the entire reaction as observed in the experimental data, which could involve multiple steps or catalytic processes. Thus, while molecularity is about individual steps in a reaction mechanism, the order provides insight into how concentrations of reactants influence the rate across all steps involved in the reaction.

8. What does Gibbs free energy (G) measure?

- A. The total energy change of a chemical reaction
- B. The maximum reversible work obtainable from a system at constant temperature and pressure**
- C. The energy required to start a reaction
- D. The energy lost during a chemical reaction

Gibbs free energy (G) is a key concept in thermodynamics that quantifies the maximum reversible work that can be performed by a system at constant temperature and pressure. This is significant because it helps determine the spontaneity of a reaction. When considering a chemical reaction, if the change in Gibbs free energy (ΔG) is negative, the process can occur spontaneously, meaning it can proceed without the input of extra energy. Conversely, if ΔG is positive, the reaction is non-spontaneous under those conditions and would require energy input to proceed. This relationship between Gibbs free energy and the capability to do work is vital in various applications, including chemical reaction engineering and biochemistry. The other options do not accurately reflect the scope of Gibbs free energy. For instance, while total energy change refers to the overall energy change during a reaction, it does not specifically address the conditions of constant temperature and pressure or the reversibility of work. Similarly, activation energy focuses on the energy required to initiate a reaction, not the thermodynamic feasibility after it has started. Finally, the energy lost during a chemical reaction may not fully encapsulate the concept of Gibbs free energy, as it is not just a measure of energy loss but also reflects system capability at

9. What does an ICE table help determine in a chemical reaction?

A. Final temperature

B. Initial, Change, and Equilibrium concentrations

C. Pressure changes

D. Catalyst effect

The correct choice identifies that an ICE table, which stands for Initial, Change, and Equilibrium concentrations, is a tool used to analyze changes in concentration of reactants and products during a chemical reaction at equilibrium. In a chemical reaction, particularly for reversible reactions, the ICE table organizes important information about the concentrations of reactants and products at three key points: the initial concentrations before the reaction starts, the changes in those concentrations as the reaction progresses, and the final equilibrium concentrations once the reaction has reached a state where the forward and reverse reactions occur at the same rate. Using an ICE table allows chemists to systematically account for how the concentrations of substances change throughout the reaction, making it easier to calculate the equilibrium concentrations based on the stoichiometry of the reaction and the initial amounts present. It is essential in understanding the relationship between reactants and products and predicting the outcome of the reaction under specific conditions. This framework is particularly useful in conjunction with the equilibrium constant expression, which relates the concentrations of reactants and products at equilibrium. Understanding these changes is key to mastering concepts in chemical equilibrium.

10. Which type of bond typically involves a complete transfer of electrons?

A. Covalent bond

B. Ionic bond

C. Hydrogen bond

D. Metallic bond

An ionic bond is characterized by the complete transfer of electrons from one atom to another. This typically occurs between metals and nonmetals, where the metal, having a low electronegativity, loses one or more electrons, becoming a positively charged cation. In contrast, the nonmetal, possessing a higher electronegativity, gains those electrons, forming a negatively charged anion. The resulting electrostatic attraction between these oppositely charged ions constitutes the ionic bond. This bond is distinct from covalent bonds, where electrons are shared between atoms, and hydrogen bonds, which are weak interactions involving hydrogen atoms bonded to electronegative elements. Metallic bonds, on the other hand, are characterized by a 'sea of electrons' that are shared among many metal atoms, but do not involve a complete transfer of electrons as seen in ionic bonding.

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://ucf-chm2046-test3.examzify.com>

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