

TEXAS A&M UNIVERSITY (TAMU) CHEM107 GENERAL CHEMISTRY FOR ENGINEERING STUDENTS EXAM 2 PRACTICE (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. What is the magnitude of attractive or repulsive forces between gas molecules?**
 - A. Strong
 - B. Weak
 - C. Significant
 - D. Negligible
- 2. What happens during the process of dilution?**
 - A. The amount of solute decreases
 - B. The amount of solute remains constant, but concentration decreases
 - C. The total volume decreases
 - D. The solute becomes more concentrated
- 3. What does the term "enthalpy" refer to?**
 - A. A number that indicates reaction rates
 - B. The total heat content of a system
 - C. A measure of disorder in a system
 - D. A graphical representation of state changes
- 4. What does the wavelength inverse equation primarily relate to?**
 - A. The heat of a reaction
 - B. The energy of chemical bonds
 - C. The energy levels of electrons
 - D. The difference in energy between two orbitals
- 5. Which type of ion is associated with the smallest ionization energy?**
 - A. Cation
 - B. Anion
 - C. Neutral atom
 - D. Molecule

6. What does VSEPR theory predict?

- A. The melting points of various compounds
- B. The three-dimensional arrangement of atoms in a molecule based on electron pair repulsion
- C. The reaction rates of chemical interactions
- D. The types of intermolecular forces present in a substance

7. How does the speed of red light compare to the speed of green light?

- A. Red light is faster than green light
- B. Green light is faster than red light
- C. All light travels at the same speed
- D. Neither have a speed

8. As you move left to right across a period in the periodic table, which property generally increases?

- A. Atomic Radius
- B. Ionization Energy
- C. Metallic Character
- D. Density

9. What is the purpose of a phase diagram?

- A. To show temperature changes during a reaction
- B. A graphical representation showing the phase behavior of a substance at different temperatures and pressures
- C. To indicate the rate of a chemical reaction
- D. To visualize the order of reactants

10. What is the wavelength of green light?

- A. 390 nm
- B. 450 nm
- C. 680 nm
- D. 700 nm

Answers

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

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Explanations

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1. What is the magnitude of attractive or repulsive forces between gas molecules?

- A. Strong
- B. Weak
- C. Significant
- D. Negligible**

Gas molecules experience negligible attractive or repulsive forces in relation to each other. This characteristic is a fundamental principle in the kinetic molecular theory of gases, which states that the distance between gas particles is significantly greater than their sizes, allowing them to act independently. In a gas, particles move freely and occupy a large volume, which means that any intermolecular forces are minimal compared to the energy of the particles moving within the gas. The kinetic energy of gas molecules is much higher than any potential energy resulting from intermolecular interactions. Hence, under typical conditions, the forces between gas molecules can be treated as negligible, allowing for the ideal gas behavior where gas laws apply. In contrast, stronger forces are observed in liquids and solids due to closer packing of molecules, which significantly influences their properties. Therefore, in the context of gases, the interactions between molecules do not play a crucial role, affirming that the appropriate description of these forces is negligible.

2. What happens during the process of dilution?

- A. The amount of solute decreases
- B. The amount of solute remains constant, but concentration decreases**
- C. The total volume decreases
- D. The solute becomes more concentrated

During the process of dilution, the volume of the solution increases by adding more solvent, such as water, to the solution. While the total volume of the solution increases, the amount of solute—the substance being dissolved—does not change. Consequently, the concentration of the solute decreases because concentration is defined as the amount of solute per unit volume of solution. When you dilute a solution, you're spreading the same amount of solute over a larger volume, which leads to a lower concentration. This concept is integral in various applications, particularly in chemistry, where precise concentrations are critical for reactions and calculations. Thus, the correct answer highlights that while the amount of solute remains constant, the concentration decreases due to the increase in total solution volume.

3. What does the term "enthalpy" refer to?

- A. A number that indicates reaction rates
- B. The total heat content of a system**
- C. A measure of disorder in a system
- D. A graphical representation of state changes

Enthalpy is a thermodynamic property that corresponds to the total heat content of a system at constant pressure. It is a measure of the energy that can be absorbed or released during a chemical reaction or a physical process. Enthalpy takes into account both the internal energy of the system and the product of its pressure and volume, providing a comprehensive view of the energy changes involved. Understanding enthalpy is essential for analyzing heat transfer in chemical reactions and phase changes. For instance, when reagents undergo a chemical reaction, the change in enthalpy, known as the enthalpy of reaction, can indicate whether the reaction is exothermic (releases heat) or endothermic (absorbs heat). The other options do not accurately describe enthalpy. A number indicative of reaction rates relates to kinetics, the measure of disorder pertains to entropy, and a graphical representation of state changes involves phase diagrams or heating curves, none of which defines enthalpy itself.

4. What does the wavelength inverse equation primarily relate to?

- A. The heat of a reaction
- B. The energy of chemical bonds
- C. The energy levels of electrons**
- D. The difference in energy between two orbitals

The wavelength inverse equation primarily relates to the energy levels of electrons. This equation, often presented as $\frac{1}{\lambda} = R \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right)$, is used in the context of electronic transitions in atoms, particularly hydrogen. In this formula, λ represents the wavelength of the emitted or absorbed light during an electron transition between energy levels characterized by quantum numbers n_1 and n_2 . When an electron moves from a higher energy level to a lower energy level, a photon is emitted, and the energy of that photon corresponds to the difference between the two energy levels. Since energy and wavelength are inversely related through the equation $E = \frac{hc}{\lambda}$, where h is Planck's constant and c is the speed of light, the wavelength can be indirectly used to determine the energy associated with these transitions. Thus, this relationship highlights how electrons transition between quantized energy states in an atom, emphasizing electronic structure and behavior significantly defined by quantum mechanics. This concept is a cornerstone of understanding various phenomena

5. Which type of ion is associated with the smallest ionization energy?

- A. Cation
- B. Anion**
- C. Neutral atom
- D. Molecule

The correct answer is an anion. Ionization energy refers to the energy required to remove an electron from an atom or ion in its gaseous state. When we consider anions, which are negatively charged species formed when atoms gain electrons, the effect of electron-electron repulsion within the ion is greater due to the additional electron(s). This makes it easier to remove an electron compared to cations or neutral atoms, which typically have fewer electrons and, in the case of cations, have a net positive charge due to the loss of electrons. Neutral atoms have a higher ionization energy compared to anions because they have a balanced number of protons and electrons, leading to a more stable electron configuration. Cations, formed by losing electrons, generally hold their remaining electrons more tightly due to the increased effective nuclear charge perceived by the remaining electrons, resulting in higher ionization energies. In summary, an anion's additional electron(s) lead to stronger repulsive forces that lower the energy required to remove an electron compared to cations and neutral atoms, making it associated with the smallest ionization energy.

6. What does VSEPR theory predict?

- A. The melting points of various compounds
- B. The three-dimensional arrangement of atoms in a molecule based on electron pair repulsion**
- C. The reaction rates of chemical interactions
- D. The types of intermolecular forces present in a substance

VSEPR theory, or Valence Shell Electron Pair Repulsion theory, predicts the three-dimensional arrangement of atoms in a molecule by considering how the electron pairs surrounding a central atom repel each other. According to this theory, electron pairs, whether they are bonding pairs or lone pairs, will position themselves in ways that minimize repulsion, thereby creating specific geometrical shapes around the central atom. For example, if a central atom has four pairs of electrons (including both bonding and lone pairs), VSEPR theory predicts that these pairs will adopt a tetrahedral arrangement to maximize the distance between them. This allows chemists to infer the molecular shape, which is important for understanding the chemical behavior and properties of substances. The correct answer focuses on the molecular geometry aspect predicted by VSEPR, which is crucial for predicting various physical and chemical properties of molecules, whereas the other options refer to unrelated concepts, such as melting points, reaction rates, and intermolecular forces.

7. How does the speed of red light compare to the speed of green light?

- A. Red light is faster than green light
- B. Green light is faster than red light
- C. All light travels at the same speed**
- D. Neither have a speed

All light, regardless of its color, travels at the same speed in a vacuum. This speed is commonly known as the speed of light, denoted by the symbol " c ," which is approximately (3.00×10^8) meters per second. The distinction between different colors of light, such as red and green, arises from their wavelengths and frequencies, not their speeds. While light can behave differently when it passes through various mediums (like glass or water), causing refraction and changes in speed, in a vacuum, all electromagnetic radiation, including red and green light, propagates at this uniform speed. This principle is fundamental in the study of optics and is integral to understanding light and color in the context of physics and engineering.

8. As you move left to right across a period in the periodic table, which property generally increases?

- A. Atomic Radius
- B. Ionization Energy**
- C. Metallic Character
- D. Density

As you move left to right across a period in the periodic table, ionization energy generally increases. This phenomenon occurs due to the increasing positive charge of the nucleus as protons are added to the atomic structure while the electrons are added to the same principal energy level. As a result, the effective nuclear charge experienced by the outermost electrons increases. This heightened attraction between the nucleus and these outer electrons means that more energy is required to remove an electron, thus raising the ionization energy. In addition to this, the addition of protons increases the nuclear charge without significantly increasing the shielding effect because the added electrons are entering the same energy level. Consequently, the electrostatic attraction between the nucleus and the valence electrons becomes stronger, leading to a higher ionization energy. This trend is a critical aspect of understanding periodic trends, as ionization energy influences chemical reactivity and bonding behavior in elements.

9. What is the purpose of a phase diagram?

- A. To show temperature changes during a reaction
- B. A graphical representation showing the phase behavior of a substance at different temperatures and pressures**
- C. To indicate the rate of a chemical reaction
- D. To visualize the order of reactants

A phase diagram serves as a graphical representation that illustrates how a substance behaves in different phases—solid, liquid, and gas—under varying temperature and pressure conditions. This diagram provides crucial insights into the conditions required for each phase to exist and indicates the boundaries between phases, known as phase transitions. For example, it can show when a substance will melt, boil, or undergo sublimation, thus revealing the relationship between temperature and pressure for a given substance. Understanding phase diagrams is essential not only in chemistry but also in fields such as material science and engineering, as it helps predict how materials will behave under different environmental conditions. This allows engineers and scientists to make informed decisions when selecting materials for specific applications based on their phase behavior.

10. What is the wavelength of green light?

- A. 390 nm
- B. 450 nm**
- C. 680 nm
- D. 700 nm

The wavelength of green light typically ranges from approximately 495 nm to 570 nm. The answer given as 450 nm corresponds more closely to blue light, which falls on the shorter wavelength side of the visible spectrum. Green light, being situated in the middle range of the visible spectrum, is best represented by values around 520 nm. It is essential to understand the organization of the visible spectrum, where blue light has shorter wavelengths (around 450 nm), and red light has longer wavelengths (up to 700 nm). When identifying the wavelength of green light, one should be aware that it does not correspond to the values provided in the options above. Instead, the designated range for green would likely be around 520 nm, which is not listed in the given options. Therefore, the most accurate representation of green light would not be among the choices provided, indicating a possible misalignment in the understanding of the wavelength ranges for colors in the visible spectrum.

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://tamu-chem107exam2.examzify.com>

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

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