

ALEKS Placement Chemistry Practice Exam (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 the context of chemical nomenclature, what does the suffix "-ide" signify?
 - A. An ionic compound with oxygen
 - B. A compound containing a specific element
 - C. An acidic compound with hydrogen
 - D. A molecular compound with a simplified formula
2. Avogadro's number is approximately how many particles in one mole?
 - A. 3.011×10^{23}
 - B. 6.022×10^{23}
 - C. 9.109×10^{31}
 - D. 1.602×10^{19}
3. What is the basic unit of matter?
 - A. Molecule
 - B. Atom
 - C. Element
 - D. Compound
4. What is the process called when a solid turns directly into a vapor?
 - A. Freezing
 - B. Sublimation
 - C. Condensation
 - D. Deposition
5. What state of matter is often described as having a definite shape and volume?
 - A. Liquid
 - B. Gas
 - C. Solid
 - D. Bose-Einstein Condensate

6. What is the charge of the hydroxide ion?
- A. $\text{H}(-)$
 - B. $\text{OH}(-)$
 - C. $\text{OH}(2-)$
 - D. $\text{O}(-)$
7. Which term describes elements that exhibit properties of both metals and nonmetals?
- A. Metalloids
 - B. Nonmetals
 - C. Metals
 - D. Diatomic molecules
8. What is the chemical formula for arsenate?
- A. $\text{AsO}_3(3-)$
 - B. $\text{AsO}_4(3-)$
 - C. $\text{BO}_3(3-)$
 - D. H_2O
9. Which ion is represented by the formula $\text{SO}_3(2-)$?
- A. Sulfite
 - B. Sulfate
 - C. Thiosulfate
 - D. Nitrate
10. Which statement accurately reflects the composition of an atomic nucleus?
- A. It contains only protons
 - B. It contains only neutrons
 - C. It contains protons and electrons
 - D. It contains protons and neutrons

Answers

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

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Explanations

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1. In the context of chemical nomenclature, what does the suffix "-ide" signify?

- A. An ionic compound with oxygen**
- B. A compound containing a specific element**
- C. An acidic compound with hydrogen**
- D. A molecular compound with a simplified formula**

The suffix "-ide" is commonly used in chemical nomenclature to indicate that a compound contains a specific element, typically in its simplest or base form. For example, when naming compounds, such as sodium chloride (NaCl), the "chloride" part signifies that the compound includes chlorine in its anion form, while the "sodium" represents the cation. The "-ide" suffix is applied to the anion, which reflects the name of the element. This naming convention helps differentiate between compounds containing various elements or groups, and also distinguishes between different oxidation states or types of compounds. For instance, "oxide" suggests the presence of oxygen, but it specifically refers to compounds where oxygen is in a reduced form. Therefore, while other suffixes or prefixes can denote different characteristics about the composition or structure of compounds, "-ide" firmly indicates the presence of a specific elemental component.

2. Avogadro's number is approximately how many particles in one mole?

- A. 3.011×10^{23}**
- B. 6.022×10^{23}**
- C. 9.109×10^{31}**
- D. 1.602×10^{19}**

Avogadro's number, which is approximately 6.022×10^{23} , represents the quantity of particles (atoms, molecules, ions, or other entities) in one mole of a substance. This foundational concept in chemistry establishes a link between the macroscopic scale of substances and the microscopic scale of individual particles. The significance of this number lies in its use for converting between the number of moles and the number of individual particles in a sample. This value comes into play in stoichiometry and is essential for calculations involving chemical reactions, where understanding the number of entities participating is crucial. By using Avogadro's number, chemists can precisely determine concentrations, yields, and other properties of substances in a chemical reaction. The familiarity with this number enables chemists to work effectively with amounts of chemicals in moles and relate these amounts to their physical properties.

3. What is the basic unit of matter?

- A. Molecule
- B. Atom**
- C. Element
- D. Compound

The basic unit of matter is an atom. Atoms are the fundamental building blocks of all substances in the universe. Each atom consists of a nucleus made of protons and neutrons, surrounded by electrons that orbit the nucleus. This structure enables atoms to participate in chemical reactions and form different substances. While molecules, elements, and compounds are all significant in the study of matter, they are constructed from atoms. A molecule is formed when two or more atoms bond together, either of the same element or different elements. An element is a pure substance that consists entirely of one type of atom, while a compound is made up of two or more different types of atoms chemically bonded together. Hence, the atom is the most fundamental unit, as it can exist independently and form the basis for all other forms of matter.

4. What is the process called when a solid turns directly into a vapor?

- A. Freezing
- B. Sublimation**
- C. Condensation
- D. Deposition

The process in which a solid turns directly into a vapor is known as sublimation. During sublimation, solid particles gain enough energy to overcome their intermolecular forces and escape into the gas phase without first becoming a liquid. This transition typically occurs under specific conditions of temperature and pressure. A common example of sublimation is dry ice (solid carbon dioxide) which, when exposed to room temperature, changes directly into carbon dioxide gas without melting into a liquid. Understanding sublimation is crucial in various scientific applications, such as in freeze-drying processes, where moisture is removed from food products by sublimating ice. In summary, sublimation describes a direct transition from solid to gas, distinguishing it from other phase changes that involve liquid states.

5. What state of matter is often described as having a definite shape and volume?

A. Liquid

B. Gas

C. Solid

D. Bose-Einstein Condensate

The state of matter that is characterized by having a definite shape and volume is solid. Solids have closely packed particles that vibrate in place, which gives them a fixed structure. This arrangement of particles allows solids to maintain their shape and volume under normal conditions. In contrast, liquids have a definite volume but take the shape of their container, while gases have neither a definite shape nor a definite volume, expanding to fill the entire space available. Bose-Einstein condensates represent a state of matter that occurs at extremely low temperatures where particles behave collectively in a unique quantum state, but they do not fit the description of having a definite shape and volume in the same way that solids do. Therefore, the characteristics of solids align perfectly with the definitions provided in the question, making it the correct answer.

6. What is the charge of the hydroxide ion?

A. H(-)

B. OH(-)

C. OH(2-)

D. O(-)

The charge of the hydroxide ion is represented as OH(-). This indicates that the hydroxide ion consists of one oxygen atom and one hydrogen atom, with a total net charge of negative one. The negative charge arises because the hydroxide ion has gained an extra electron, resulting in a charge of -1. In the context of chemical behavior, the hydroxide ion is commonly encountered in acid-base chemistry, where it acts as a base by accepting protons (H⁺ ions). This understanding is crucial as it helps in predicting the behavior of hydroxide in chemical reactions, such as neutralization reactions with acids. The other charge representations do not accurately reflect the correct charge of the hydroxide ion. For instance, a hydrogen atom represented with a negative charge (H(-)) does not correspond to the structure of hydroxide, and the representation OH(2-) would imply a hydroxide ion with a charge of -2, which is not possible for this ion. Similarly, O(-) would indicate a negatively charged oxygen atom but does not incorporate the hydrogen atom that forms hydroxide. Therefore, the correct representation is OH(-), confirming that it is precisely the hydroxide ion.

7. Which term describes elements that exhibit properties of both metals and nonmetals?

A. Metalloids

B. Nonmetals

C. Metals

D. Diatomic molecules

The term that describes elements exhibiting properties of both metals and nonmetals is metalloids. Metalloids typically have a mixture of characteristics from both categories, making them versatile in their physical and chemical properties. For instance, they often have metallic luster like metals but can be brittle like nonmetals. Additionally, metalloids can conduct electricity better than nonmetals but not as well as metals, making them useful in semiconductors and other applications. This distinct classification helps in understanding the behavior of these elements in various chemical reactions and their role in different materials, especially in technology and manufacturing.

8. What is the chemical formula for arsenate?

A. $\text{AsO}_3(3-)$

B. $\text{AsO}_4(3-)$

C. $\text{BO}_3(3-)$

D. H_2O

The chemical formula for arsenate is represented as $\text{AsO}_4(3-)$. This indicates that arsenate consists of one arsenic atom (As) bonded to four oxygen atoms (O), and the entire ion carries a negative charge of three. This is characteristic of the arsenate ion, which is an anion commonly encountered in various chemical contexts, particularly in biochemistry and environmental chemistry. In terms of its structure, the four oxygen atoms are typically arranged around the arsenic atom in a tetrahedral geometry. The negative three charge suggests that this ion can combine with positively charged ions to form various compounds, such as salts. The other choices provided do not correspond to arsenate. For example, $\text{AsO}_3(3-)$ denotes arsenite, not arsenate. The formula $\text{BO}_3(3-)$ represents borate, while H_2O is simply water, neither of which relate to arsenate. Understanding the distinction between these similar sounding compounds is crucial in chemistry, especially when discussing anions and their reactivity.

9. Which ion is represented by the formula SO_3^{2-} ?

- A. Sulfite**
- B. Sulfate**
- C. Thiosulfate**
- D. Nitrate**

The ion represented by the formula SO_3^{2-} is sulfite. This is because the "SO" indicates that it contains sulfur (S) and oxygen (O) atoms, and the (2-) indicates that this ion has a charge of negative two. The sulfite ion specifically consists of one sulfur atom bonded to three oxygen atoms and carries a -2 charge, which fits the given formula perfectly. Sulfate, which is indicated by the formula SO_4^{2-} , contains one sulfur atom and four oxygen atoms and also carries a -2 charge, but it is distinct from sulfite due to the one additional oxygen atom. Thiosulfate, represented by the formula $\text{S}_2\text{O}_3^{2-}$, contains a different structure entirely, incorporating two sulfur atoms. Nitrate, on the other hand, is represented by the formula NO_3^- , indicating it is composed of nitrogen and oxygen, bearing a different count and configuration of atoms than what is found in sulfite. Therefore, the identification of SO_3^{2-} as sulfite aligns correctly with its chemical composition and charge.

10. Which statement accurately reflects the composition of an atomic nucleus?

- A. It contains only protons**
- B. It contains only neutrons**
- C. It contains protons and electrons**
- D. It contains protons and neutrons**

The atomic nucleus is made up of protons and neutrons, collectively known as nucleons. Protons carry a positive charge, which contributes to the overall positive charge of the nucleus, while neutrons are neutral particles that provide stability to the nucleus. The presence of both types of particles allows the nucleus to maintain its structure, as neutrons help to mitigate the repulsive forces between the positively charged protons. Meanwhile, electrons are not part of the nucleus; they exist in orbitals around the nucleus, forming the outer region of an atom known as the electron cloud. Therefore, the options that mention only protons, only neutrons, or including electrons do not accurately represent the true composition of an atomic nucleus. Thus, the choice stating that the nucleus contains protons and neutrons captures the essential components accurately.

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://aleksplacementchem.examzify.com>

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