

OHIO ASSESSMENT FOR EDUCATORS (OAE) INTEGRATED SCIENCE (024) PRACTICE EXAM (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 type of lava flow is typically produced by shield volcanoes?**
 - A. Pumice
 - B. Basaltic
 - C. Volcanic ash
 - D. Obsidian
- 2. Which operational variable does not affect gas pressure according to kinetic molecular theory?**
 - A. Volume of the gas
 - B. Temperature of the gas
 - C. Amount of gas present
 - D. Color of the gas
- 3. What happens during the oxidation process?**
 - A. Electrons are gained
 - B. Electrons are shared
 - C. Electrons are lost
 - D. Electrons are transferred
- 4. What type of biome is characterized as a grassland often with scattered trees, typically found in tropical and subtropical areas with seasonal rains?**
 - A. Tundra biome
 - B. Savannah biome
 - C. Desert biome
 - D. Taiga biome
- 5. What results from a temperature inversion known as subsidence inversion?**
 - A. Cool air rises, leading to cloud formation
 - B. Sinking air warms, creating stable conditions near the surface
 - C. Severe storms develop due to high moisture levels
 - D. Temperature drops uniformly throughout the atmosphere

6. What is the chemical formula for sulfate?

- A. SO_3^{2-}
- B. SO_4^{2-}
- C. SO_4^{3-}
- D. SO_2^{3-}

7. In the heat of combustion equation, what variable is represented by 'q'?

- A. The change in temperature
- B. The heat added or removed
- C. The total energy in a system
- D. The pressure applied

8. Which of the following statements is true about sodium?

- A. It is very stable in air
- B. It reacts violently with water
- C. It has a high melting point
- D. It is a gas at room temperature

9. Which of the following components is NOT part of a colloid?

- A. Dispersion medium
- B. Dispersed phase
- C. Solvent
- D. Stabilizer

10. What defines the 'electron shell' in atomic structure?

- A. A defined area where electrons exist.
- B. The weight of the electron.
- C. The size of the atom.
- D. The charge of the nucleus.

Answers

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

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Explanations

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1. What type of lava flow is typically produced by shield volcanoes?

- A. Pumice
- B. Basaltic**
- C. Volcanic ash
- D. Obsidian

Shield volcanoes are primarily characterized by their broad, gently sloping profiles and are predominantly built up by the eruption of low-viscosity lava that can flow over long distances. The type of lava that is typically produced by shield volcanoes is basaltic. Basaltic lava is high in iron and magnesium but low in silica, resulting in its low viscosity. This allows it to travel far from the eruption site, contributing to the formation of the wide, shield-like shape of these volcanoes. The fluidity of basaltic lava leads to relatively non-explosive eruptions, which is a key feature of shield volcanoes. Other types of lava, such as pumice, volcanic ash, and obsidian, are associated with different volcanic activities or types of volcanoes. Pumice forms from explosive eruptions that create gas-rich lava, while volcanic ash results from the fragmentation of volcanic material during eruptions. Obsidian is a volcanic glass that forms when lava cools very quickly, typically during explosive volcanic eruptions where the magma has a high silica content.

2. Which operational variable does not affect gas pressure according to kinetic molecular theory?

- A. Volume of the gas
- B. Temperature of the gas
- C. Amount of gas present
- D. Color of the gas**

According to kinetic molecular theory, gas pressure is influenced by variables that directly impact the movement and collision of gas particles. These include the volume of the gas, the temperature, and the amount of gas present, as each factor influences how frequently and forcefully gas particles collide with the walls of the container. The color of the gas, however, does not have any effect on its pressure. Color is a property associated with how light interacts with the gas and does not influence the kinetic energy or motion of gas molecules. Therefore, it is correct to state that the color of the gas is the operational variable that does not affect gas pressure, as it does not alter the behavior or interactions of the molecules in a way that would impact pressure.

3. What happens during the oxidation process?

- A. Electrons are gained
- B. Electrons are shared
- C. Electrons are lost**
- D. Electrons are transferred

During the oxidation process, electrons are lost from an atom or molecule. This occurs in a chemical reaction where the oxidation state of the substance increases as it loses electrons. When a substance undergoes oxidation, it typically involves the transfer of electrons to another substance, which is simultaneously reduced. In various contexts, such as in metabolic pathways or redox reactions, oxidation helps explain how energy is released or how substances interact with one another, making it fundamental in understanding chemical behavior. Understanding that the distinguishing feature of oxidation is electron loss is crucial to grasping broader concepts such as electrochemistry and reactions in biological systems. It connects to the half-reaction method, where oxidation and reduction processes are analyzed in terms of electron transfer, allowing for a clearer interpretation of various chemical reactions.

4. What type of biome is characterized as a grassland often with scattered trees, typically found in tropical and subtropical areas with seasonal rains?

- A. Tundra biome
- B. Savannah biome**
- C. Desert biome
- D. Taiga biome

The savannah biome is characterized by grasslands that typically feature scattered trees and is predominantly found in tropical and subtropical regions. This biome experiences seasonal rainfall, resulting in a distinct wet and dry season, which influences the types of vegetation and animal life present. The grasses are well adapted to survive periods of drought, while the scattered trees provide essential habitats and food sources for various species. In contrast to other biomes, the savannah's combination of grasses and scattered trees allows for a unique ecosystem that supports a wide variety of wildlife, including herbivores and their natural predators. The presence of fire is also important in savannahs, as it helps maintain the balance between grass and tree populations. The other biomes mentioned, such as tundra, desert, and taiga, do not share these specific characteristics. Tundra is known for its cold climate and minimal vegetation, deserts are characterized by very low rainfall and extreme temperatures, and taiga is a biome dominated by coniferous forests found in colder regions. Thus, the savannah stands out for its mixed landscape and climatic conditions, making it the correct answer for the characteristics described.

5. What results from a temperature inversion known as subsidence inversion?

- A. Cool air rises, leading to cloud formation
- B. Sinking air warms, creating stable conditions near the surface**
- C. Severe storms develop due to high moisture levels
- D. Temperature drops uniformly throughout the atmosphere

In a subsidence inversion, a layer of cooler air is trapped near the surface by a layer of warmer air above it. This occurs when air sinks and compresses, causing it to warm. The warming of the sinking air creates stable atmospheric conditions, preventing vertical mixing of air layers. As a result, the cooler air near the surface remains stagnant, which can lead to the buildup of pollutants and fog, but also contributes to a stable atmosphere where weather changes are minimized. The process is significant in meteorology because it can lead to prolonged calm weather and higher air quality issues when pollutants accumulate in the trapped air.

6. What is the chemical formula for sulfate?

- A. SO_3^{2-}
- B. SO_4^{2-}**
- C. SO_4^{3-}
- D. SO_2^{3-}

The chemical formula for sulfate is correctly represented as SO_4^{2-} . Sulfate is an anion that consists of one sulfur atom covalently bonded to four oxygen atoms. The "2-" indicates that the ion carries a charge of negative two, which is important for balancing chemical equations and understanding its behavior in reactions. This specific formulation, SO_4^{2-} , reflects the common oxidation state of sulfur in this anion, where it is in the +6 oxidation state. This is a significant aspect of its chemical identity, as it participates in various chemical processes, such as precipitation reactions and the formation of salts with different cations. Recognizing the characteristics of sulfate, including its charge and molecular composition, is crucial for students studying integrated science, as it plays a vital role in both inorganic and environmental chemistry.

7. In the heat of combustion equation, what variable is represented by 'q'?

- A. The change in temperature
- B. The heat added or removed**
- C. The total energy in a system
- D. The pressure applied

In the context of the heat of combustion equation, 'q' represents the heat added or removed from a system during a chemical reaction, specifically a combustion reaction. This variable quantifies the energy change that occurs when a substance combusts, typically measured in joules or calories. Combustion reactions release energy in the form of heat when fuels react with oxygen, leading to a temperature increase in their surroundings. Thus, 'q' accounts for the total amount of heat energy involved in this process, reflecting either the energy released (exothermic reaction) or absorbed in other contexts. This is essential for understanding thermodynamics and energy transfer in chemical processes. The other potential variables listed do not accurately represent what 'q' signifies in this scenario. The change in temperature relates to the result of an energy change, not the energy itself, while total energy in a system encompasses all forms of energy and does not specifically denote heat transfer. Pressure is a separate parameter that can affect reactions but does not define the heat energy change directly.

8. Which of the following statements is true about sodium?

- A. It is very stable in air
- B. It reacts violently with water**
- C. It has a high melting point
- D. It is a gas at room temperature

Sodium is known for its highly reactive nature, especially with water. When sodium comes into contact with water, it reacts vigorously, producing hydrogen gas and sodium hydroxide. This reaction can generate enough heat to ignite the hydrogen gas, leading to an explosive outcome. This characteristic is a significant aspect of sodium's behavior, establishing it as an alkali metal that does not exist freely in nature but is found in various compounds instead. The other statements are not accurate representations of sodium's properties. For instance, sodium is not stable in air; it can oxidize quickly, forming sodium oxide. Additionally, sodium has a relatively low melting point compared to metals, melting at about 98 degrees Celsius, so it does not qualify as having a high melting point. Finally, sodium is a solid at room temperature, not a gas. Understanding these characteristics helps to clarify why sodium's reactivity with water stands out.

9. Which of the following components is NOT part of a colloid?

- A. Dispersion medium
- B. Dispersed phase
- C. Solvent**
- D. Stabilizer

In a colloid, the key components include the dispersion medium and the dispersed phase. The dispersion medium is the substance that makes up the bulk of the mixture, while the dispersed phase consists of particles that are distributed throughout the medium. Colloids are characterized by the size of the dispersed particles and their ability to remain suspended within the medium without settling. A solvent is generally a component of a solution, where it dissolves a solute, leading to a homogeneous mixture at the molecular level. While colloids do involve a dispersion medium, which can sometimes be a solvent, the specific term "solvent" does not accurately describe a distinct part of a colloid. Therefore, it is appropriate to identify "solvent" as not being a traditional component of a colloid. Stabilizers play an important role in colloids, as they prevent the particles in the dispersed phase from aggregating or settling out of the dispersion.

10. What defines the 'electron shell' in atomic structure?

A. A defined area where electrons exist.

B. The weight of the electron.

C. The size of the atom.

D. The charge of the nucleus.

The concept of the 'electron shell' is fundamentally tied to the arrangement of electrons around the nucleus of an atom. An electron shell corresponds to a defined region in which electrons can commonly be found. This term reflects how electrons occupy specific energies and locations based on quantum mechanics, with each shell representing different energy levels. In more technical terms, electron shells are categorized by principal quantum numbers, which indicate the energy level of electrons within that shell. Each shell can hold a specific number of electrons and is layered around the nucleus, much like the layers of an onion. As you move outward from the nucleus, the energy of the electrons generally increases, and the distance from the nucleus becomes greater, representing higher electron shells. Understanding this concept is crucial for explaining chemical behavior, such as bonding and reactivity, as the arrangement of electrons in shells dictates how atoms interact with one another. This understanding of electron shells is foundational in fields such as chemistry and physics. The other choices do not accurately capture the definition of an electron shell. For instance, the weight of the electron pertains to its mass, but not to the concept of an electron shell itself. The size of an atom is influenced by the arrangement of its electron shells, but it does not define what an electron

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://oae-integratedscience-024.examzify.com>

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

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