

# CIE Chemistry Advanced Subsidiary (AS) Level 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

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- 1. What is the key feature of metallic bonding?**
  - A. Delocalised electrons surround positively charged metal ions**
  - B. Delocalised electrons surround negatively charged metal ions**
  - C. Localised electron pairs**
  - D. Hydrogen bonding network**
- 2. What is the typical oxidation number of fluorine in compounds?**
  - A. 0**
  - B. +1**
  - C. +2**
  - D. -1**
- 3. Which statement about hydrolysis is true?**
  - A. It uses water to break bonds in a polymer**
  - B. It produces water when breaking bonds**
  - C. It makes polymers from monomers**
  - D. It never occurs under mild conditions**
- 4. Standard states are defined as:**
  - A. The most stable form of an element at 1 atm and 298 K**
  - B. The gaseous state of the element at 1 atm**
  - C. The reactive state of the element at 25°C**
  - D. The state of the element when dissolved in water**
- 5. Substitution reactions typically yield**
  - A. A single product is formed**
  - B. No reaction occurs**
  - C. Two products are formed**
  - D. Only a polymer is formed**
- 6. In peroxides, oxygen has oxidation number**
  - A. -1**
  - B. -2**
  - C. 0**
  - D. +2**

- 7. What is true about collisions between gas particles in the kinetic theory?**
- A. Collisions between gas particles are inelastic, leading to a loss of kinetic energy.**
  - B. Collisions are elastic, meaning kinetic energy is conserved.**
  - C. Gas particles do not collide.**
  - D. Collisions cause permanent deformation of particles.**
- 8. Which statement describes the standard enthalpy change of solution when dissolving to form an infinitely dilute solution?**
- A. The enthalpy change when one mole of solute is dissolved in solvent to form an infinitely dilute solution under standard conditions.**
  - B. The enthalpy change when one mole of solute is dissolved in solvent to form a concentrated solution.**
  - C. The enthalpy change when solute is dissolved to form a saturated solution.**
  - D. The enthalpy change when one mole of solute is formed from solvent.**
- 9. In aqueous acid or enzyme-catalyzed reactions, hydrolysis of a polymer proceeds by adding a molecule of which substance?**
- A. Water**
  - B. Oxygen**
  - C. Nitrogen**
  - D. Methane**
- 10. Which substance is an example of a giant molecular structure?**
- A. Silicon dioxide**
  - B. Sodium chloride**
  - C. Nitrogen gas**
  - D. Methane**

## Answers

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

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## **Explanations**

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### 1. What is the key feature of metallic bonding?

- A. Delocalised electrons surround positively charged metal ions**
- B. Delocalised electrons surround negatively charged metal ions
- C. Localised electron pairs
- D. Hydrogen bonding network

Metallic bonding comes from a lattice of positive metal ions embedded in a sea of delocalised electrons that move freely around them. These electrons aren't bound to any one ion, so they can flow and hold the ions together by electrostatic attraction. This description—delocalised electrons surrounding positively charged metal ions—best captures the essence of metallic bonding and explains why metals conduct electricity and are malleable. The other ideas don't fit: there aren't fixed negatively charged ions attracting electrons in a metal lattice, electron pairs aren't localized as in covalent bonds, and hydrogen bonding doesn't occur in metals.

### 2. What is the typical oxidation number of fluorine in compounds?

- A. 0
- B. +1
- C. +2
- D. -1**

Fluorine is the most electronegative element, so in almost all compounds it attracts the bonding electrons toward itself. Using the usual rule for oxidation numbers—that electrons in bonds are assigned to the more electronegative atom—fluorine ends up with an oxidation state of -1 in compounds. The only time its oxidation number is not -1 is when fluorine exists as the element F<sub>2</sub>, where there are no bonds to other elements and the oxidation state is 0. Since there's no situation where fluorine becomes positive in typical compounds, -1 is the standard oxidation number for fluorine in compounds.

### 3. Which statement about hydrolysis is true?

- A. It uses water to break bonds in a polymer**
- B. It produces water when breaking bonds
- C. It makes polymers from monomers
- D. It never occurs under mild conditions

Hydrolysis is the reaction where water is used to break bonds in a larger molecule. In a polymer, a water molecule donates a hydrogen to one part and an hydroxyl group to the other, splitting the linkage and yielding smaller units or monomers. So the statement that hydrolysis uses water to break bonds in a polymer is the best description. Hydrolysis does not produce water; it consumes it. That's the opposite of what dehydration synthesis (polymerization) does, which forms water as bonds are created. Also, hydrolysis can occur under mild conditions, especially with catalysts like acids, bases, or enzymes, so saying it never happens under mild conditions isn't accurate.

#### 4. Standard states are defined as:

- A. The most stable form of an element at 1 atm and 298 K**
- B. The gaseous state of the element at 1 atm**
- C. The reactive state of the element at 25°C**
- D. The state of the element when dissolved in water**

The standard state is the most thermodynamically stable form of an element or compound under standard conditions, defined at 1 atmosphere pressure and 298 K. It doesn't have to be a gas—the stable form can be solid, liquid, or gas depending on the element. For example, carbon's standard state is graphite (solid), oxygen's is O<sub>2</sub> (gas), hydrogen's is H<sub>2</sub> (gas), and mercury's is liquid at room temperature. This definition provides a consistent reference for thermodynamic data like enthalpies of formation. The other descriptions mix in ideas about reactivity, being dissolved in water, or always being gaseous, which aren't how standard states are defined.

#### 5. Substitution reactions typically yield

- A. A single product is formed**
- B. No reaction occurs**
- C. Two products are formed**
- D. Only a polymer is formed**

Substitution reactions involve replacing a leaving group with a nucleophile. As this replacement happens, the leaving group leaves to form its own product (usually an ion). The nucleophile then attaches to the substrate to give the substituted molecule. So, after the reaction there are two products: the new substituted compound and the leaving group in its ionic form. This applies to both S<sub>N</sub>1 and S<sub>N</sub>2 mechanisms, though the steps differ. It's not just one product, nor is it a no-reaction situation, and polymer formation isn't the typical outcome for simple substitution.

#### 6. In peroxides, oxygen has oxidation number

- A. -1**
- B. -2**
- C. 0**
- D. +2**

Oxygen in peroxides has an oxidation state of -1. This comes from the presence of an O-O bond. Take hydrogen peroxide, H<sub>2</sub>O<sub>2</sub>: each hydrogen is almost always +1, giving a total of +2 from hydrogen. The molecule is neutral, so the two oxygens together must contribute -2. Since the two oxygens are equivalent, they share that -2 equally, giving -1 on each oxygen. The same idea applies to the peroxide ion O<sub>2</sub><sup>2-</sup>, where the overall -2 charge is distributed between the two oxygens, again resulting in -1 per oxygen. This is different from a normal oxide, where oxygen is typically -2 because there isn't an O-O bond to share that extra negative charge.

**7. What is true about collisions between gas particles in the kinetic theory?**

- A. Collisions between gas particles are inelastic, leading to a loss of kinetic energy.**
- B. Collisions are elastic, meaning kinetic energy is conserved.**
- C. Gas particles do not collide.**
- D. Collisions cause permanent deformation of particles.**

In the kinetic theory of gases, particles move quickly and mostly interact only during brief collisions. These collisions are treated as elastic, so the total kinetic energy of the colliding particles is the same before and after the collision, even though energy can be shuffled between particles. This means momentum is conserved and there's no net loss of translational kinetic energy during a collision. That's why the average kinetic energy of particles is linked to temperature, through the idea that temperature reflects the average translational kinetic energy in the system. The idea that collisions are inelastic would imply some kinetic energy is lost as heat, sound, or deformation, which isn't assumed in the basic kinetic theory. Saying there are no collisions is incorrect, since collisions are exactly how momentum and energy are redistributed. And permanent deformation would also indicate energy loss and dissipation, not what the model describes for idealized gas particles.

**8. Which statement describes the standard enthalpy change of solution when dissolving to form an infinitely dilute solution?**

- A. The enthalpy change when one mole of solute is dissolved in solvent to form an infinitely dilute solution under standard conditions.**
- B. The enthalpy change when one mole of solute is dissolved in solvent to form a concentrated solution.**
- C. The enthalpy change when solute is dissolved to form a saturated solution.**
- D. The enthalpy change when one mole of solute is formed from solvent.**

The standard enthalpy change of solution is the energy change when one mole of solute dissolves in a solvent to form a solution that is infinitely dilute, measured under standard conditions. This means the amount of solute is so small that solute-solute interactions are negligible and only solute-solvent interactions contribute to the enthalpy change. That exact description—one mole dissolving to give an infinitely dilute solution under standard conditions—is why this option is correct. The other scenarios refer to dissolving to form a concentrated or saturated solution, or to processes like forming a compound from solvent, which do not define the standard enthalpy of solution.

**9. In aqueous acid or enzyme-catalyzed reactions, hydrolysis of a polymer proceeds by adding a molecule of which substance?**

- A. Water**
- B. Oxygen**
- C. Nitrogen**
- D. Methane**

Hydrolysis is the breaking of bonds by adding water. In aqueous acid or enzyme-catalyzed hydrolysis, a water molecule attacks the bond in the polymer, leading to its cleavage and forming two smaller molecules. Water donates a hydrogen to one fragment and a hydroxyl group to the other, effectively splitting the polymer. The other substances listed (oxygen, nitrogen, methane) don't participate as the adding reactant in hydrolysis under these conditions; they're associated with other types of reactions, not the water-driven bond-breaking that defines hydrolysis.

**10. Which substance is an example of a giant molecular structure?**

- A. Silicon dioxide**
- B. Sodium chloride**
- C. Nitrogen gas**
- D. Methane**

A giant molecular structure is a solid where atoms are linked by a continuous network of covalent bonds throughout the material, forming a 3D lattice. Silicon dioxide does this: each silicon atom is covalently bonded to four oxygen atoms, and these bonds extend in all directions to create a single, continuous framework. This gives it properties like a very high melting point and great hardness, and it doesn't conduct electricity because there are no free charged particles. The other options don't form such a covalent network. Nitrogen gas is made of individual N<sub>2</sub> molecules with strong bonds between two atoms, but these molecules do not connect into a network. Methane consists of discrete CH<sub>4</sub> molecules held together by weak intermolecular forces, not a continuous network. Sodium chloride is an ionic lattice held together by electrostatic forces between ions, not covalent bonds. Hence, silicon dioxide best represents a giant molecular (covalent network) structure.

## 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](mailto: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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