

API 571 CERTIFICATION (CORROSION & MATERIALS) PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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 effect does acidic media have on metals?**
 - A. It generally protects metals
 - B. It causes increased corrosion
 - C. It has no effect
 - D. It strengthens metals

- 2. Which materials are most resistant to Ammonium Bisulfide corrosion?**
 - A. Carbon Steel
 - B. Super Duplex
 - C. Alloy 400
 - D. Alloy 20

- 3. What is a common cause of atmospheric corrosion?**
 - A. High temperatures
 - B. Presence of moisture and pollutants
 - C. Electrical conductivity
 - D. Exposure to sunlight

- 4. What describes "uniform corrosion"?**
 - A. A localized form of corrosion
 - B. Corrosion that occurs evenly over a material's surface
 - C. Corrosion that only occurs under insulation
 - D. A rapidly fluctuating rate of corrosion

- 5. What type of stress corrosion cracking (SCC) is associated with carbon steel and low alloy steels?**
 - A. Chloride SCC
 - B. Carbonate SCC
 - C. Sulfide SCC
 - D. Hydrogen SCC

- 6. What is a primary construction consideration when dealing with hydrochloric acid corrosion?**
- A. Only nickel-based alloys
 - B. All common materials of construction
 - C. Specifically carbon steels
 - D. Only composite materials
- 7. What type of welding is a concern with corrosion in dissimilar metal welds?**
- A. Welding carbon steel to aluminum
 - B. Welding nickel alloys to 300 series stainless steel
 - C. Welding cast iron to carbon steel
 - D. Welding carbon steel to 300 series stainless steel
- 8. Ammonia Stress Corrosion Cracking is most severe in which type of alloys?**
- A. Copper-Zinc alloys
 - B. Aluminum alloys
 - C. Stainless steels
 - D. Carbon steels
- 9. Which material has improved resistance to brine corrosion?**
- A. Copper alloys
 - B. Carbon steels
 - C. Ni-Cr-Mo alloys
 - D. Lead alloys
- 10. How does the presence of moisture affect corrosion?**
- A. Moisture reduces corrosion
 - B. Moisture is necessary for corrosion to occur
 - C. Moisture creates a protective layer on metals
 - D. Moisture has no effect on corrosion

Answers

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

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Explanations

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1. What effect does acidic media have on metals?

- A. It generally protects metals
- B. It causes increased corrosion**
- C. It has no effect
- D. It strengthens metals

Acidic media has a significant impact on metals, primarily leading to increased corrosion. In an acidic environment, the concentration of hydrogen ions (H^+) is higher, which can react with metal surfaces. This reaction can accelerate the dissolution of the metal, resulting in a higher corrosion rate. Acids can strip protective oxide layers that may naturally form on some metals, rendering them more susceptible to further attack by the acid or other corrosive agents. For instance, metals like zinc, aluminum, and even iron will corrode more rapidly when exposed to acidic solutions. The presence of acids can facilitate the electrochemical reactions that contribute to corrosion, such as the anodic and cathodic processes occurring on a metal surface. In contrast, other options suggest that acidic media protects metals, has no effect, or strengthens them, which does not align with the known corrosion behaviors of metals in acidic environments.

2. Which materials are most resistant to Ammonium Bisulfide corrosion?

- A. Carbon Steel
- B. Super Duplex**
- C. Alloy 400
- D. Alloy 20

Super Duplex is highly resistant to Ammonium Bisulfide corrosion due to its unique microstructure, which comprises both austenitic and ferritic phases. This combination provides enhanced strength and improved resistance to localized corrosion, such as pitting and crevice corrosion, which can occur in the presence of aggressive environments like Ammonium Bisulfide. The alloy's high chromium and molybdenum content further contribute to its corrosion resistance, making it well-suited for handling environments that can be harsh and corrosive. Super Duplex materials are specifically designed for applications where traditional stainless steels might fail, thus offering a greater durability and longevity in challenging conditions. In contrast, the other materials listed may not provide the same level of protection against Ammonium Bisulfide. Carbon steel is particularly vulnerable to corrosion in acidic environments, and while Alloy 400 and Alloy 20 are resistant to many types of corrosion, they do not have the same resistance levels to Ammonium Bisulfide as Super Duplex does. Therefore, for applications exposed to this specific corrosive agent, Super Duplex emerges as the superior choice.

3. What is a common cause of atmospheric corrosion?

- A. High temperatures
- B. Presence of moisture and pollutants**
- C. Electrical conductivity
- D. Exposure to sunlight

Atmospheric corrosion is commonly attributed to the presence of moisture and pollutants in the environment. When water vapor condenses on metal surfaces, it creates an electrolyte that can facilitate electrochemical reactions, leading to corrosion. Additionally, pollutants such as sulfur dioxide, nitrogen oxides, and chlorides can further accelerate the corrosion process by promoting the formation of corrosive compounds or by altering the pH of the environment. This combination of moisture and pollutants creates a conducive environment for corrosion to occur, making it a significant factor in atmospheric corrosion scenarios. High temperatures typically increase the rate of oxidation but are not the primary factor in atmospheric corrosion compared to moisture and pollutants. Electrical conductivity relates more to the properties of materials than the corrosion process itself. While sunlight can influence the temperature and may aid in drying surfaces, it is not a direct cause of atmospheric corrosion. Therefore, presence of moisture and pollutants stands out as the key contributor to this type of corrosion.

4. What describes "uniform corrosion"?

- A. A localized form of corrosion
- B. Corrosion that occurs evenly over a material's surface**
- C. Corrosion that only occurs under insulation
- D. A rapidly fluctuating rate of corrosion

Uniform corrosion refers to a type of corrosion that occurs evenly over the entire surface of a material. This means that all parts of the surface are affected equally, leading to a gradual thinning of the material rather than localized damage. This pattern of corrosion is often predictable and easier to assess, as it typically results from consistent exposure to corrosive environments, such as moisture, acids, or salts. In contrast to other forms of corrosion, such as pitting or crevice corrosion, which can create noticeable localized areas of damage and degradation, uniform corrosion tends to present a more uniform wear and tear effect across the material's surface. This makes it particularly important to monitor and manage, as the material can reach a critical thickness where structural integrity is compromised without any visible signs of localized failure. Recognizing the characteristics of uniform corrosion can help in implementing effective preventative measures and maintenance strategies in various industrial applications.

5. What type of stress corrosion cracking (SCC) is associated with carbon steel and low alloy steels?

- A. Chloride SCC
- B. Carbonate SCC**
- C. Sulfide SCC
- D. Hydrogen SCC

Carbonate stress corrosion cracking (SCC) is particularly relevant to carbon steel and low alloy steels primarily due to their susceptibility to certain environments, such as those containing bicarbonates or carbonate ions. In these scenarios, the presence of water along with carbonate species can lead to the formation of a localized environment that promotes SCC. For carbon and low alloy steels, the mechanism of SCC involves the electrochemical processes that occur when these materials are exposed to specific conditions, often involving stress, a corrosive environment, and a sufficient concentration of carbonates. Such cracking can lead to significant failures in structural integrity, making it crucial to understand the environments that can lead to this type of SCC, especially in industries such as oil and gas, where these materials are commonly utilized. Other forms of SCC, such as those associated with chloride, sulfide, or hydrogen environments, could affect various alloys differently but are less characteristic of carbon steel and low alloy steels specifically in the context of carbonate environments.

6. What is a primary construction consideration when dealing with hydrochloric acid corrosion?

- A. Only nickel-based alloys
- B. All common materials of construction**
- C. Specifically carbon steels
- D. Only composite materials

When addressing corrosion caused by hydrochloric acid, a primary construction consideration is the need to evaluate a wide variety of materials rather than limiting options to a specific type. Hydrochloric acid is known for its aggressive corrosive nature, which affects many common construction materials. While certain materials (such as nickel-based alloys) may offer superior resistance to hydrochloric acid, it is essential to consider all common materials of construction and their compatibility with the environment in which they will be used. Using a broader range of materials allows engineers and designers to make informed decisions that balance corrosion resistance, cost, and mechanical properties. Various factors such as temperature, concentration of the acid, and the presence of impurities can influence how different materials perform in such acidic environments. Therefore, a comprehensive assessment encourages the selection of the most appropriate material for the specific application involving hydrochloric acid, ensuring the integrity and longevity of the construction.

7. What type of welding is a concern with corrosion in dissimilar metal welds?

- A. Welding carbon steel to aluminum
- B. Welding nickel alloys to 300 series stainless steel
- C. Welding cast iron to carbon steel
- D. Welding carbon steel to 300 series stainless steel**

Welding carbon steel to 300 series stainless steel is indeed a significant concern when it comes to corrosion in dissimilar metal welds. This is primarily due to the differences in their electrochemical properties, which can lead to galvanic corrosion. When two dissimilar metals are in contact in the presence of an electrolyte, the more anodic metal (in this case, carbon steel) can corrode faster than it would on its own, while the more cathodic metal (300 series stainless steel) is protected. The difference in thermal expansion and the potential for microstructural changes due to the heat of welding can also exacerbate the situation. Carbon steel and stainless steel have different coefficients of thermal expansion, which can lead to thermal stresses and potential cracks at the weld interface. In environments where moisture or corrosive elements are present, these factors can severely compromise the integrity of the weld. Understanding the corrosion mechanisms at play in dissimilar metal welds is crucial for material selection and welding processes to ensure longevity and performance in various applications.

8. Ammonia Stress Corrosion Cracking is most severe in which type of alloys?

- A. Copper-Zinc alloys**
- B. Aluminum alloys
- C. Stainless steels
- D. Carbon steels

Ammonia Stress Corrosion Cracking (ASCC) is particularly severe in Copper-Zinc alloys, often referred to as brass. This susceptibility is primarily due to the presence of zinc in the alloy, which can lead to significant stress corrosion cracking when exposed to ammonia. The mechanism involves the interaction of the ammonia with the copper matrix and the zinc, resulting in the formation of microstructural features that make these alloys particularly vulnerable to cracking under stress. Copper-Zinc alloys exhibit a combination of high strength and ductility, which can be compromised in the presence of ammonia, especially in environments containing moisture. The presence of ammonia disrupts the protective oxide layers and aggravates localized corrosion processes. This phenomenon poses a notable risk in applications where these alloys are exposed to ammonia, leading to cracking and potential failure. Other materials such as stainless steels, carbon steels, and aluminum alloys have varying degrees of resistance to stress corrosion cracking in ammonia environments, often due to their different chemical compositions and microstructures. Therefore, it is critical for engineers and material selection experts to recognize the high susceptibility of Copper-Zinc alloys to ASCC to prevent potential failures in relevant applications.

9. Which material has improved resistance to brine corrosion?

- A. Copper alloys
- B. Carbon steels
- C. Ni-Cr-Mo alloys**
- D. Lead alloys

The choice of Ni-Cr-Mo alloys reflects a material that has enhanced resistance to brine corrosion due to its specific composition and microstructural properties. Nickel, chromium, and molybdenum all contribute to the corrosion resistance of the alloy. Nickel increases toughness and resistance to pitting, while chromium enhances oxidation resistance and overall corrosion resistance. Molybdenum is particularly effective in preventing localized corrosion, such as pitting and crevice corrosion, which are common concerns in brine environments where chloride ions are present. Brine, which is a high concentration of salt solution, can cause significant corrosion risks to many materials. However, Ni-Cr-Mo alloys are specifically designed to withstand such aggressive environments, making them a suitable choice for applications exposed to brine. Their resilience is essential in industries such as marine environments, oil and gas production, and chemical processing, where brine is prevalent. In contrast, other materials like copper alloys, carbon steels, and lead alloys do not offer the same level of resistance to brine corrosion. Copper alloys may perform adequately in certain situations but can suffer from corrosion in saline environments. Carbon steels are generally prone to corrosion without appropriate protective measures, especially in chloride-rich environments. Lead alloys can have

10. How does the presence of moisture affect corrosion?

- A. Moisture reduces corrosion
- B. Moisture is necessary for corrosion to occur**
- C. Moisture creates a protective layer on metals
- D. Moisture has no effect on corrosion

Moisture plays a crucial role in the corrosion process, as it serves as an electrolyte, facilitating the movement of ions which is essential for electrochemical reactions. When moisture is present, it creates an environment where cathodic and anodic reactions can occur more readily on the surface of metals. This leads to increased corrosion rates, especially in the presence of aggressive ions such as chloride from saltwater or pollutants. Without moisture, many forms of corrosion, particularly those that involve electrolytic processes (like galvanic or pitting corrosion), would be significantly inhibited or even prevented. Therefore, moisture is not merely a contributing factor; it is often a fundamental requirement for corrosion to progress. Understanding this relationship is key to implementing strategies to mitigate corrosion in various industrial settings, especially in environments that are prone to high humidity or water exposure.

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:

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

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