

Eddy Current Testing (ET) Level II 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. Why is analyzing phase and magnitude critical in Eddy Current Testing?**
 - A. It provides better visuals of the test results**
 - B. It helps differentiate material property variations from actual flaws**
 - C. It simplifies the use of the equipment**
 - D. It makes the process faster for operators**

- 2. In context to Eddy Current Testing, what does improved signal processing lead to?**
 - A. Lesser detection of material properties**
 - B. Reduction in the need for calibration**
 - C. Enhanced clarity in identifying defects**
 - D. Slower data analysis**

- 3. What role does the test frequency play in Eddy Current Testing?**
 - A. It determines the cost of the testing equipment**
 - B. It affects the depth of penetration of the test signal**
 - C. It influences the time required for testing**
 - D. It has no impact on testing outcomes**

- 4. What do the limit frequency equations and impedance diagrams for long solid rods and long thin-walled tubing show?**
 - A. Different**
 - B. Identical**
 - C. Similar**
 - D. Unrelated**

- 5. What is the significance of skin effect in eddy current testing?**
 - A. It determines the penetration depth of currents**
 - B. It increases the efficiency of the current**
 - C. It is irrelevant to test results**
 - D. It affects only non-metals**

- 6. What technique is used to increase sensitivity in Eddy Current Testing for surface defects?**
- A. Using a larger probe coil**
 - B. Choosing higher frequencies**
 - C. Adopting complex geometries in testing**
 - D. Applying a pulsed magnetic field**
- 7. In Eddy Current Testing, what does a phase shift typically indicate?**
- A. Fluctuations in temperature**
 - B. Changes in impedance related to defects**
 - C. Alterations in magnetic field strength**
 - D. Uniform material properties**
- 8. In modulation analysis testing, which of the following does not affect the test frequency applied to the test coil?**
- A. Discontinuities in the test specimen**
 - B. Dimension changes of the test specimen**
 - C. Chemical composition of the test specimen**
 - D. A filter in the test circuit**
- 9. The depth of eddy current penetration is primarily dependent on:**
- A. Test frequency**
 - B. Coil shape**
 - C. Magnetic permeability**
 - D. All of the above**
- 10. Which of the following is not a commonly used eddy current testing readout mechanism?**
- A. Signal generator**
 - B. Meter**
 - C. Cathode ray tube**
 - D. Strip chart recorder**

Answers

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

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Explanations

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1. Why is analyzing phase and magnitude critical in Eddy Current Testing?

- A. It provides better visuals of the test results
- B. It helps differentiate material property variations from actual flaws**
- C. It simplifies the use of the equipment
- D. It makes the process faster for operators

Analyzing phase and magnitude is critical in Eddy Current Testing because it plays a vital role in distinguishing variations in material properties from actual defects. The phase angle in Eddy Current Testing indicates the nature of the electromagnetic interaction between the eddy currents and the test material. This interaction can be affected by changes in the material's conductivity, permeability, and thickness, as well as by the presence of flaws such as cracks or corrosion. By examining both the phase and magnitude of the eddy current signal, inspectors can gain insights into not just the presence of defects but also how these defects may interact with the material itself. For instance, a change in phase could indicate a flaw, while alterations in magnitude might suggest variations in the material's properties. Understanding these differences allows for a more accurate assessment of the component being tested, ensuring that any repairs or interventions are based on precise information regarding the integrity of the material. This analytical approach enhances the detection capability of the testing process, contributing to more effective quality control and maintenance practices.

2. In context to Eddy Current Testing, what does improved signal processing lead to?

- A. Lesser detection of material properties
- B. Reduction in the need for calibration
- C. Enhanced clarity in identifying defects**
- D. Slower data analysis

Improved signal processing in Eddy Current Testing significantly enhances the clarity in identifying defects. This is achieved by more effectively filtering out noise and improving the resolution of the signals received from the inspected materials. By employing advanced algorithms and techniques, signal processing can distinguish between different types of signals more accurately, which leads to a clearer representation of any flaws present in the material. This heightened clarity is crucial for inspectors, as it allows for more precise identification and characterization of defects such as cracks, corrosion, or changes in material properties. Enhanced clarity directly contributes to the reliability of the testing results and facilitates better decision-making based on the analysis of the data collected during the Eddy Current Testing process.

3. What role does the test frequency play in Eddy Current Testing?

- A. It determines the cost of the testing equipment
- B. It affects the depth of penetration of the test signal**
- C. It influences the time required for testing
- D. It has no impact on testing outcomes

The test frequency in Eddy Current Testing significantly influences the depth of penetration of the test signal into the material being examined. Higher frequencies result in shallower penetration, while lower frequencies allow the Eddy current to penetrate deeper. This phenomenon occurs because higher frequency magnetic fields induce more rapid oscillations, which confine the Eddy currents closer to the surface of the conductive material. Consequently, selecting the appropriate test frequency is crucial for detecting specific types of flaws or for evaluating the condition of material at various depths. The depth of penetration is essential when assessing the integrity of components, especially when defects might be located just beneath the surface or at varying depths. By adjusting the frequency, technicians can tailor the test to effectively identify these defects based on their position relative to the surface. This adaptability is key in applications where different materials and thicknesses are involved. While other aspects like cost of equipment, testing time, or potential impacts on outcomes are relevant, they do not hold the same fundamental connection to the physics of Eddy current behavior as the penetration depth does. Thus, understanding the relationship between test frequency and depth of penetration is essential for effective and accurate Eddy Current Testing.

4. What do the limit frequency equations and impedance diagrams for long solid rods and long thin-walled tubing show?

- A. Different**
- B. Identical
- C. Similar
- D. Unrelated

The limit frequency equations and impedance diagrams for long solid rods and long thin-walled tubing are indeed different due to the distinct physical and electromagnetic characteristics of these geometries. In Eddy Current Testing, the interaction between the eddy currents induced in a conductor and the material's shape and permeability plays a crucial role in determining the response of the system. For long solid rods, the eddy currents are typically distributed throughout the entire volume of the material, which influences the depth of penetration and the way the impedance responds to variations in frequency. In contrast, long thin-walled tubing presents a different scenario, where the eddy currents primarily flow in the wall of the tube. This discrepancy in how eddy currents behave causes variations in the limit frequency equations, which define the range of frequencies that can be effectively used for testing each type of geometry. Moreover, the impedance diagrams for these structures will demonstrate different characteristics reflecting the distinct ways that the eddy currents are induced and interact with defects or material properties. Therefore, choosing the option that depicts these differences is pivotal in understanding the application and effectiveness of Eddy Current Testing techniques for various material forms.

5. What is the significance of skin effect in eddy current testing?

- A. It determines the penetration depth of currents**
- B. It increases the efficiency of the current**
- C. It is irrelevant to test results**
- D. It affects only non-metals**

The significance of skin effect in eddy current testing lies in its role in determining the penetration depth of currents within conductive materials. Skin effect refers to the phenomenon whereby an alternating current (AC) tends to flow near the surface of a conductor rather than uniformly throughout its entirety. This effect is particularly pronounced at higher frequencies, where the depth at which the current penetrates into the material decreases. In eddy current testing, this means that the sensitivity and effectiveness of the test are closely tied to the frequency of the alternating current being used. Higher frequencies lead to a shallower penetration depth, which is useful for detecting surface or near-surface defects. Conversely, lower frequencies allow the currents to penetrate deeper, which can be advantageous when inspecting thicker materials. Therefore, understanding and utilizing the skin effect enables practitioners to tailor their testing approach based on the specific requirements of the inspection, making it a crucial factor in evaluating test results and material integrity.

6. What technique is used to increase sensitivity in Eddy Current Testing for surface defects?

- A. Using a larger probe coil**
- B. Choosing higher frequencies**
- C. Adopting complex geometries in testing**
- D. Applying a pulsed magnetic field**

Choosing higher frequencies is a technique used to increase sensitivity in Eddy Current Testing for surface defects because higher frequencies generate eddy currents that penetrate less deep into the material. This is advantageous for detecting surface-breaking defects since it allows the testing system to be more responsive to changes in the electromagnetic field caused by flaws closer to the surface. Eddy current testing operates on the principle that the eddy currents induced in a conductive material will change in response to any discontinuities. When a higher frequency is applied, the induced currents are limited to a smaller depth, enhancing the system's ability to detect small, shallow defects. This increased sensitivity is particularly useful for applications where surface integrity is critical, such as in aerospace or automotive components where surface cracks can lead to catastrophic failures. While using a larger probe coil or adopting complex geometries may have their benefits in certain contexts, they don't inherently increase sensitivity to surface defects like higher frequencies do. Similarly, applying a pulsed magnetic field is not typical in conventional Eddy Current Testing, which relies on continuous waveforms to induce eddy currents in the material.

7. In Eddy Current Testing, what does a phase shift typically indicate?

- A. Fluctuations in temperature**
- B. Changes in impedance related to defects**
- C. Alterations in magnetic field strength**
- D. Uniform material properties**

In Eddy Current Testing, a phase shift is a significant indicator of changes in impedance related to defects within the material being tested. When eddy currents are induced in a conductor, they generate a magnetic field that interacts with the material properties. If a defect, such as a crack, corrosion, or other discontinuity, is present, it affects the distribution of eddy currents and consequently modifies the impedance. As defects alter the path and density of the induced currents, the relationship between the voltage and the current (which is known as the phase angle) changes. This phase shift is directly correlated with the type and extent of the defect, allowing inspectors to characterize the nature of the flaw and assess its impact on the material's integrity. Understanding this relationship is crucial for accurately interpreting test results and determining the condition of the material, which is why a phase shift is primarily associated with changes in impedance due to defects.

8. In modulation analysis testing, which of the following does not affect the test frequency applied to the test coil?

- A. Discontinuities in the test specimen**
- B. Dimension changes of the test specimen**
- C. Chemical composition of the test specimen**
- D. A filter in the test circuit**

In modulation analysis testing, the test frequency applied to the test coil is not influenced by a filter in the test circuit. Filters are used to manage signals within the circuit, such as removing noise or unwanted frequencies, but they do not alter the frequency that is initially applied to the test coil for the test itself. On the other hand, discontinuities in the test specimen, dimension changes of the specimen, and the chemical composition of the specimen all play significant roles in how eddy currents respond within the material and can impact the effective frequency of the test because they affect the material's properties. For instance, changes in dimensions might alter the skin effect, affecting how eddy currents behave, and variations in chemical composition could lead to differences in conductivity or permeability, further influencing how the test frequency interacts with the material. Thus, only a filter's role is limited to processing the signal rather than affecting the fundamental test frequency applied.

9. The depth of eddy current penetration is primarily dependent on:

- A. Test frequency**
- B. Coil shape**
- C. Magnetic permeability**
- D. All of the above**

The depth of eddy current penetration is primarily influenced by test frequency because higher frequencies result in shallower penetration of the eddy currents, while lower frequencies allow for deeper penetration. This relationship arises from the skin effect, which is the tendency of alternating current (AC) to distribute itself within a conductor such that the current density is highest near the surface and decreases exponentially with depth. While factors like coil shape and magnetic permeability do influence the testing results and the distribution of eddy currents, they do not primarily determine the penetration depth. Coil shape affects the field distribution and sensitivity, and magnetic permeability impacts how the currents flow in different materials, but the frequency is the most direct and critical parameter governing how deeply eddy currents can penetrate the material being tested. Thus, emphasizing test frequency as the key driver aligns properly with the principles of eddy current testing in this context.

10. Which of the following is not a commonly used eddy current testing readout mechanism?

- A. Signal generator**
- B. Meter**
- C. Cathode ray tube**
- D. Strip chart recorder**

The correct answer identifies a component not traditionally associated with eddy current testing readout mechanisms. In eddy current testing, it is crucial to translate the detected signals into a readable format for analysis, and commonly used devices for this purpose provide immediate visual feedback or recorded data. A signal generator is employed to create electromagnetic waves but is not a readout mechanism. It serves an important role in generating the current necessary to set up the conditions for the eddy currents in the test object. The readout mechanisms, on the other hand, are designed to display the results of the testing process. Devices such as meters are often used to directly quantify the response, providing a clear and immediate understanding of the material integrity. Cathode ray tubes, while somewhat outdated now, historically served to visualize the oscillations acquired during eddy current testing. Strip chart recorders were utilized to provide a continuous record of the data over time, making them valuable for ongoing assessments. In summary, the distinguishing factor is that a signal generator is essential for initiating the testing but is not a mechanism that presents or interprets the results or findings from the test, which is the role of the other listed devices.

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://eddycurrenttestinglvl2.examzify.com>

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

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