

EDDY CURRENT TESTING (ET) LEVEL I PRACTICE TEST (SAMPLE)

STUDY GUIDE



**SAMPLE STUDY GUIDE
WITH LIMITED QUESTIONS**

**VISIT US ONLINE FOR
THE FULL VERSION STUDY GUIDE**

<https://eddycurrenttestinglvl1.examzify.com>



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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. An eddy current test coil's combined opposition to the flow of current is called:**
 - A. Inductive reactance
 - B. Flux density
 - C. Impedance
 - D. Back voltage
- 2. In ET, what indicates a flaw in the material?**
 - A. A change in the impedance due to altered eddy currents.
 - B. A drop in thermal emissivity.
 - C. An increase in acoustic noise.
 - D. A change in the color of the surface.
- 3. As test material conductivity increases, what happens to the coil's inductive reactance?**
 - A. test coil inductive reactance increases
 - B. back voltage increases
 - C. test coil inductive reactance remains constant
 - D. test coil inductive reactance decreases
- 4. What is the consequence of poor probe handling in ET inspections?**
 - A. Poor probe handling has no effect on results.
 - B. It only affects the time required to complete a scan.
 - C. Poor probe handling leads to higher variability and less repeatable defect indications, reducing reliability.
 - D. It unexpectedly increases sensitivity.
- 5. Why is thorough documentation of test conditions important in ET?**
 - A. It ensures traceability, allows results to be reproduced, and supports proper interpretation given variations in material, surface condition, temperature, and lift-off.
 - B. It provides warranty and service contracts for equipment.
 - C. It reduces need for calibration tests.
 - D. It speeds up data collection.

- 6. A magnetic field around a coil may be viewed as a distribution of lines of flux around the coil. The number of lines per unit area is defined as:**
- A. Magnetic field strength
 - B. Magnetic flux
 - C. Magnetic permeability
 - D. Flux density
- 7. To detect very small surface discontinuities near the edge of features, which coil is typically preferred?**
- A. Encircling coil
 - B. Narrow coil
 - C. Coaxial coil
 - D. Surface coil
- 8. What is a key difference between surface-breaking and near-surface flaws in ET signals?**
- A. Surface-breaking flaws produce strong near-surface impedance changes with orientation dependence.
 - B. Surface-breaking flaws affect only deep signals.
 - C. Near-surface flaws always produce stronger impedance changes than surface-breaking.
 - D. Lift-off variations do not affect either type.
- 9. A coil's magnetic field may be viewed as a distribution of lines of flux around the coil. The number of lines in a unit area is defined as:**
- A. Magnetic Flux
 - B. Flux Density
 - C. Field Intensity
 - D. Inductance
- 10. How does material thickness interact with ET signal when a defect is near the surface?**
- A. If thickness exceeds skin depth, the near-surface defect is more easily detected
 - B. The thickness of material has no effect on near-surface defect detection
 - C. A thicker material always makes near-surface defects harder to detect
 - D. Near-surface detection is unaffected by frequency or probe type

Answers

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

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Explanations

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1. An eddy current test coil's combined opposition to the flow of current is called:

- A. Inductive reactance
- B. Flux density
- C. Impedance**
- D. Back voltage

In eddy current testing, the coil's response is governed by impedance—the total opposition to current flow in the coil. This combines both resistance (losses in the coil itself) and reactance (the inductive opposition that depends on frequency). The inductive part is important, but it's only part of the picture; the coil also has resistance, so the overall impedance is what actually changes when eddy currents are induced in the nearby material. When a conductive piece or a flaw alters the eddy currents, it changes how much current the coil "sees," shifting the impedance. That change in impedance is what testers monitor to detect defects or variations in material properties. Flux density describes the magnetic field itself, not how much the current is opposed to flowing, and back voltage is the induced emf from changing current—related concepts, but not the total opposition used for defect detection.

2. In ET, what indicates a flaw in the material?

- A. A change in the impedance due to altered eddy currents.**
- B. A drop in thermal emissivity.
- C. An increase in acoustic noise.
- D. A change in the color of the surface.

In eddy current testing, a flaw is indicated by a change in impedance caused by the disruption of eddy currents. When AC current flows in the probe, it induces circular currents in the material; if there's a flaw like a crack or void, these currents are disturbed, which changes the distribution of the currents and the magnetic coupling to the probe. That disturbance shows up as a change in the impedance (and often the phase) read by the instrument, signaling a flaw. The other options don't fit ET: a drop in thermal emissivity relates to infrared thermography, increased acoustic noise points to ultrasonic or mechanical issues, and a surface color change isn't a reliable indicator of subsurface flaws in ET.

3. As test material conductivity increases, what happens to the coil's inductive reactance?

- A. test coil inductive reactance increases
- B. back voltage increases
- C. test coil inductive reactance remains constant
- D. test coil inductive reactance decreases**

In eddy current testing, the material's conductivity determines how strongly eddy currents are formed when the coil's field changes. These eddy currents produce a magnetic field that opposes the coil's field, reducing the net magnetic flux linked by the coil. With higher conductivity, the opposing field is stronger, so the effective inductance seen by the coil drops. Since inductive reactance at a given frequency is $X_L = \omega L$, a lower inductance means a smaller inductive reactance. So, as conductivity increases, the coil's inductive reactance decreases. The idea that back voltage would increase isn't consistent with the reduced inductance in this scenario.

4. What is the consequence of poor probe handling in ET inspections?

- A. Poor probe handling has no effect on results.
- B. It only affects the time required to complete a scan.
- C. Poor probe handling leads to higher variability and less repeatable defect indications, reducing reliability.**
- D. It unexpectedly increases sensitivity.

In ET, how you hold and position the probe matters as much as the flaw you're trying to detect. The coil's coupling to the material depends on lift-off (the distance between the probe and surface) and the probe's angle and pressure. If handling is inconsistent, lift-off and orientation wander as you scan, introducing artifacts and noise into the signals. That makes defect indications vary from pass to pass even for the same flaw, so measurements become less repeatable and the inspection's reliability declines. When you keep the probe position and alignment stable, signals are more consistent, calibration is meaningful, and real flaws stand out more clearly. Poor handling doesn't reliably increase sensitivity; it typically degrades signal stability and reliability.

5. Why is thorough documentation of test conditions important in ET?

- A. It ensures traceability, allows results to be reproduced, and supports proper interpretation given variations in material, surface condition, temperature, and lift-off.**
- B. It provides warranty and service contracts for equipment.
- C. It reduces need for calibration tests.
- D. It speeds up data collection.

In ET, the measured response depends on many variables such as material type, surface condition, temperature, and how far the probe is from the surface (lift-off). Recording all these test conditions creates traceability so you know exactly how the test was performed and with which setup. It also makes results reproducible—another inspector can recreate the same setup and expect similar results. Most importantly, it supports proper interpretation because changes in lift-off, temperature, or surface finish can modify the signal in ways that look like flaws if you don't know the conditions. By documenting these factors, you can distinguish real defects from measurement effects and compare results across parts, times, or audits. The other options don't address how results relate to the variable conditions that influence the ET signal.

6. A magnetic field around a coil may be viewed as a distribution of lines of flux around the coil. The number of lines per unit area is defined as:

- A. Magnetic field strength
- B. Magnetic flux
- C. Magnetic permeability
- D. Flux density**

Magnetic flux density is the density of field lines per unit area, and that is exactly what is being described. It tells you how many lines cross a given patch of area around the coil, so a higher density means more lines per square meter and a stronger local field. The relationship is that the total flux through a surface is $\Phi = \int B \cdot dA$, so the average lines-per-area is B , the flux density. The standard unit is the tesla, which equals one weber per square meter. Magnetic flux is the total number of lines through a surface, not per unit area, and magnetic permeability describes how a material responds to the field (relating B to H), not the density of lines.

7. To detect very small surface discontinuities near the edge of features, which coil is typically preferred?

- A. Encircling coil
- B. Narrow coil**
- C. Coaxial coil
- D. Surface coil

Coil geometry in eddy current testing sets how localized the sensing is. To catch tiny surface flaws that sit right at or near the edge of a feature, you need a coil with a small cross-sectional area so the magnetic field and the resulting eddy currents are concentrated in a small, localized region. A narrow coil provides higher lateral resolution, meaning it probes a smaller area of the surface. That makes the impedance changes caused by a tiny defect near the edge more pronounced, instead of being averaged out over a larger area. In contrast, a larger or encircling coil spreads the field over a bigger region, which tends to wash out the signal from very small near-edge defects. A surface coil is very useful for near-surface flaws but doesn't offer the same tight localization along the edge as a narrow coil. A coaxial coil has its own field pattern that isn't as focused on edge-localized features. So, for detecting very small surface discontinuities near the edge, the narrow coil is the best choice because its localized field and eddy-current pattern maximize sensitivity to those small, edge-adjacent defects.

8. What is a key difference between surface-breaking and near-surface flaws in ET signals?

- A. Surface-breaking flaws produce strong near-surface impedance changes with orientation dependence.**
- B. Surface-breaking flaws affect only deep signals.
- C. Near-surface flaws always produce stronger impedance changes than surface-breaking.
- D. Lift-off variations do not affect either type.

In eddy current testing, impedance changes come from how eddy currents are disturbed by a flaw. Surface-breaking flaws intersect the surface, so they disrupt the current flow right where it's most concentrated. Because the way the currents wrap around and around the defect depends on the flaw's orientation relative to the probe, the impedance change is both strong near the surface and highly dependent on orientation. Lift-off variations can affect signals for both surface-breaking and near-surface flaws, but the defining difference described here is that surface-breaking flaws yield large near-surface impedance changes that vary with orientation. The other options misstate where the signal is strongest or how orientation and lift-off influence the response.

9. A coil's magnetic field may be viewed as a distribution of lines of flux around the coil. The number of lines in a unit area is defined as:

- A. Magnetic Flux
- B. Flux Density**
- C. Field Intensity
- D. Inductance

The main idea is how we describe how strong the magnetic field is in a specific area by looking at how crowded the field lines are there. The number of lines passing through a unit area is called magnetic flux density. It measures how many lines go through each square meter (or other area unit) and is a direct indicator of the local field strength. In practical terms, if the lines are packed tightly, the flux density is high and the magnetic field is strong; if they're spread out, the flux density is low and the field is weaker. Mathematically, for a uniform distribution, flux density equals the total flux divided by the area ($B = \Phi/A$), and its unit is the tesla (weber per square meter). Magnetic flux, by contrast, is the total number of lines passing through a surface, not per unit area. Field intensity describes the magnetizing force around the material and relates to flux density via $B = \mu H$, where μ is the permeability of the medium. Inductance is a property of a coil that links current and magnetic flux in a circuit, not a local line density measure.

10. How does material thickness interact with ET signal when a defect is near the surface?

- A. If thickness exceeds skin depth, the near-surface defect is more easily detected**
- B. The thickness of material has no effect on near-surface defect detection
- C. A thicker material always makes near-surface defects harder to detect
- D. Near-surface detection is unaffected by frequency or probe type

Eddy currents mainly flow in a shallow surface layer, with depth described by the skin depth $\delta = \sqrt{2/(\omega\mu\sigma)}$. When the metal is thicker than this depth, the current is concentrated near the surface where a defect lies, so disrupting that local current path causes a stronger change in the coil's impedance and makes the near-surface flaw easier to detect. If the material is thinner than or comparable to δ , the current can probe both surfaces, and the near-surface defect's effect can be diluted by interactions with the far surface, reducing sensitivity. Since δ depends on frequency and material properties, adjusting frequency or using different probes changes how thick a material needs to be to maximize near-surface defect detection. That's why the answer noting that a thickness exceeding skin depth improves detection of a near-surface defect is the best choice.

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://eddycurrenttestinglvl1.examzify.com>

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

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