NEIEP MAGNETISM AND ELECTROMAGNETISM (355) (SAMPLE)

STUDY GUIDE

SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

Table of Contents

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

1. In an ideal transformer, how are input and output powers related?

A. P_in = P_out (Vp Ip = Vs Is in ideal)

B. Vs/Vp = Ns/Np

C. Is/Ip = Ns/Np

D. Vp/Ip = Vs/Is

2. In an ideal transformer, how are primary and secondary currents related to the turns ratio?

A. Is/Ip = Np/Ns

B. Is/Ip = Ns/Np

C. Is/Ip = (Np/Ns)^2

D. Is/Ip independent of turns

3. Which protective device opens the circuit by melting when current exceeds its rating?

A. Circuit breaker

B. Relay

C. Transformer

D. Fuse

4. Does flux density increase or decrease as the distance from a magnet increases?

A. Increases

B. Decreases

C. Remains the same

D. Oscillates

5. What does a circuit breaker do when current flow exceeds its rated level?

A. Opens the circuit.

B. Short circuits the load.

C. Increases the current flow.

D. Remains closed until manually reset.

6. What is the unit of inductive reactance X_L?

A. Henry
B. Ohms
C. Tesla
D. Weber

7. What is the effect of increasing load on transformer regulation?

A. Increases voltage drop and worsens regulation.
B. Improves regulation.
C. No effect.
D. Always improves efficiency.

8. Magnetic field strength is directly proportional to what?

A. Voltage
B. Resistance
C. Current flow
D. Capacitance

9. If current flow increases, what happens to the magnetic field?

A. It decreases.
B. It increases.
C. It remains unchanged.
D. It oscillates unpredictably.

10. Which statement best describes the path of magnetic lines of force relative to poles?

A. They connect opposite poles, forming loops.
B. They connect identical poles.
C. They do not connect poles at all.
D. They only exist inside the magnet.

Answers

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

Explanations

1. In an ideal transformer, how are input and output powers related?

A. P_in = P_out (Vp Ip = Vs Is in ideal)

B. Vs/Vp = Ns/Np

C. Is/Ip = Ns/Np

D. Vp/Ip = Vs/Is

In an ideal transformer, power is conserved—there are no losses in the windings or core. That means the input power equals the output power: P_in = P_out. Since power is the product of voltage and current, this becomes Vp Ip = Vs Is. This direct equality captures the energy transfer happening inside an ideal transformer. The voltage ratio Vs/Vp = Ns/Np is another fundamental relation that describes how voltages relate to turns. From that and the power balance, you'd get the current ratio Is/Ip = Np/Ns, which shows currents are inversely related to the turns. The statement Vp/Ip = Vs/Is would imply equal input and output impedances, which isn't generally true for different turns and loads. So the clean, universally valid way to state the power relationship is that input power equals output power.

2. In an ideal transformer, how are primary and secondary currents related to the turns ratio?

A. Is/Ip = Np/Ns

B. Is/Ip = Ns/Np

C. Is/Ip = (Np/Ns)^2

D. Is/Ip independent of turns

In an ideal transformer, power must be conserved: Vp Ip = Vs Is, and the voltages relate to turns as Vp/Vs = Np/Ns. Combine these two relations: Is/Ip = Vp/Vs = Np/Ns. So the secondary-to-primary current ratio equals the turns ratio, meaning Is/Ip = Np/Ns. This also matches the intuitive idea that increasing voltage on the secondary (more turns) comes with a proportional decrease in current, and vice versa, to keep power the same. For example, if Np is twice Ns, the secondary current is twice the primary current, since Is/Ip = Np/Ns = 2.

3. Which protective device opens the circuit by melting when current exceeds its rating?

A. Circuit breaker

B. Relay

C. Transformer

D. Fuse

The key idea is overcurrent protection that sacrifices a part of itself to stop the current. A fuse uses a thin metal element that carries the circuit current. When the current exceeds its rating, the element heats up due to I^2R losses and melts, opening the circuit. This makes fuses single-use devices that must be replaced after they operate. Circuit breakers perform protection by tripping a switch—often via a bimetal thermal mechanism or a magnetic trip—so they interrupt the circuit without melting anything. They are resettable after the fault is cleared. Relays are control devices that open or close contacts in response to a signal, not primarily protective devices that melt to interrupt current. Transformers, on the other hand, are energy-transfer devices and do not function as protective elements that open circuits by melting.

4. Does flux density increase or decrease as the distance from a magnet increases?

A. Increases

B. Decreases

C. Remains the same

D. Oscillates

Flux density measures how strong the magnetic field is at a point. The magnet's field lines are crowded near the poles and spread out as you move away. Because the field is produced by a finite source, its strength diminishes with distance—roughly as the distance to the third power in the far field for a dipole. That means doubling how far you are from the magnet reduces the flux density by about eight times, and the general trend is a weaker field the farther you go. It doesn't stay the same, increase, or oscillate with static distance. So the flux density decreases as distance from the magnet increases.

5. What does a circuit breaker do when current flow exceeds its rated level?

A. Opens the circuit.

B. Short circuits the load.

C. Increases the current flow.

D. Remains closed until manually reset.

When current runs beyond what a breaker is designed to carry, the protective mechanism inside it trips and opens the electrical contacts. That action breaks the circuit and stops the flow of current, preventing overheating, insulation damage, or a fire. The triggering is typically thermal (a bimetal strip heated by excess current) or magnetic (a strong magnetic field from a short or surge pulls the contacts apart). After tripping, the circuit is opened and power must be reset to restore it. This explains why opening the circuit is the correct behavior, not shorting the load, not increasing current, and not staying closed during an overcurrent condition.

6. What is the unit of inductive reactance X_L?

A. Henry

B. Ohms

C. Tesla

D. Weber

Inductive reactance X_L is the opposition to AC current caused by an inductor, and in AC circuits it behaves like a resistance. Its magnitude is $X_L = \omega L$ (or $2\pi fL$), so its unit must be the same as impedance. Since impedance is measured in ohms, X_L carries the ohm unit. A quick check: L is in henries, ω is in radians per second, and 1 H = 1 V·s/A. Multiplying gives (V·s/A)·(1/s) = V/A, which is an ohm. The other units correspond to inductance (henry), magnetic flux density (tesla), and magnetic flux (weber), not reactance. So the unit of inductive reactance is Ohms.

7. What is the effect of increasing load on transformer regulation?

A. Increases voltage drop and worsens regulation.

B. Improves regulation.

C. No effect.

D. Always improves efficiency.

Increasing load makes the current through the windings larger, and the transformer has internal impedance from winding resistance and leakage reactance. The voltage drop across this impedance grows with current ($V_{drop} \approx I \cdot Z$). So the secondary voltage under full load falls further from the no-load voltage as load increases. Regulation is defined as the difference between the no-load and full-load secondary voltages at the same applied voltage, usually expressed as a percentage. With heavier load, the full-load voltage drops more, the difference widens, and the regulation becomes worse. Light load gives a small drop and small regulation, while heavy load produces a larger drop and larger regulation. The idea that regulation would improve with load ignores the I·Z drop, and statements about efficiency describe a different aspect of transformer operation.

8. Magnetic field strength is directly proportional to what?

A. Voltage

B. Resistance

C. Current flow

D. Capacitance

Magnetic field strength is determined by how much current is flowing that produces it. According to Ampere's law, the field around a conductor grows in direct proportion to the current, so for a straight wire B I, and for a coil B NI. That means the field is set by the amount of charge moving, not by the voltage itself. Voltage can push more current through a circuit only if the resistance allows it (V = IR), so higher voltage with the same resistance leads to a stronger field indirectly through a larger current. Conversely, higher resistance lowers current and weakens the field. Capacitance doesn't set the steady magnetic field from a DC current; it relates to storing charge and affects transient behavior, not the direct, steady relationship. So the magnetic field strength is directly proportional to the current flow.

9. If current flow increases, what happens to the magnetic field?

A. It decreases.

B. It increases.

C. It remains unchanged.

D. It oscillates unpredictably.

The magnetic field strength produced by an electric current grows with how much current is flowing. Moving charges create the field, and its magnitude is proportional to the current. For a long straight wire, the field at a given distance is $B = \mu_0 I / (2\pi r)$; for a coil or solenoid, B is proportional to I as well. So when current increases, the magnetic field becomes stronger (double the current gives roughly double the field at the same location). The direction follows the right-hand rule, but the question is about strength, so the correct idea is that the magnetic field increases with current. The other options—decreasing, staying the same, or oscillating unpredictably—do not align with this straightforward proportional relationship for steady current.

10. Which statement best describes the path of magnetic lines of force relative to poles?

A. They connect opposite poles, forming loops.

B. They connect identical poles.

C. They do not connect poles at all.

D. They only exist inside the magnet.

Magnetic lines of force always form closed loops. They originate at the north pole and terminate at the south pole, outside the magnet. Inside the magnet the direction reverses, going from south back to north, so the entire path forms a loop that connects opposite poles. This is why the statement describing lines connecting opposite poles and forming loops is the best description. They don't connect identical poles, and they exist both inside and outside magnets.

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://neiep355.examzify.com

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