Electricity and Magnetism 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

1. What are the possible charges on a particle?

A. Only Positive

B. Positive, negative or neutral

C. Neutral Only

D. Only Negative

2. Aurora Borealis is formed in which region of Earth's atmosphere?

A. Ionosphere

B. Troposphere

C. Stratosphere

D. Exosphere

3. What is electricity?

A. Photons

B. Moving electrons

C. Protons Moving

D. Electrons at Rest

4. Which component is essential for creating a magnetic field in devices like electric motors when current passes through it?

A. Solenoid

B. Galvonometer

C. Transformer

D. Generator

5. How do you increase the strength of an electromagnet?

A. Increase the number of batteries

B. Increase the number of coils wrapped around

C. Decrease the current

D. Use a weaker iron core

6. Which statement is true about like charges?

- **A. Like charges Repel**
- **B. Like charges Attract**
- **C. Like charges Are Neutral**
- **D. Like charges Cancel Each Other**

7. What term describes the region around a magnet where magnetic forces are felt?

- **A. Magnetic field**
- **B. Magnetic pole**
- **C. Magnetization**
- **D. Magnetic flux**

8. What direction do electrons move in a battery?

- **A. From positive terminal to negative terminal**
- **B. From negative terminal to positive terminal**
- **C. In a circle around the circuit**
- **D. From anode to cathode**

9. A circuit that contains more than one path for current flow is called a

- **A. Series circuit**
- **B. Parallel circuit**
- **C. Battery**
- **D. Switch**

10. How does a fuse protect us from circuit overload?

- **A. When the electric current becomes too much, the little piece of metal in the fuse melts which opens the circuit.**
- **B. It stores excess charge**
- **C. It converts AC to DC**
- **D. It increases resistance of circuit**

Answers

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

Explanations

1. What are the possible charges on a particle?

A. Only Positive

B. Positive, negative or neutral

C. Neutral Only

D. Only Negative

Charges come in three signs: positive, negative, or zero. This reflects whether a particle has more protons than electrons, more electrons than protons, or an equal number of each. Protons carry a positive charge, electrons carry a negative charge, and neutrons have no net charge. When atoms or molecules gain or lose electrons, they become charged ions with a net positive or negative charge; if they keep the same number of protons and electrons, they are neutral. Since a particle can have any of these three states, the possible charges are positive, negative, or neutral.

2. Aurora Borealis is formed in which region of Earth's atmosphere?

A. Ionosphere

B. Troposphere

C. Stratosphere

D. Exosphere

Charged particles from the solar wind are funneled along Earth’s magnetic field into the polar upper atmosphere, where they collide with gas molecules. These collisions excite the atoms and ions, and as they return to lower energy states, they emit light, creating the aurora. This glow occurs in the upper atmosphere within the ionosphere, at altitudes of roughly 80 to a few hundred kilometers. The lower layers (troposphere and stratosphere) are too deep and dense, and the outer exosphere is too diffuse to produce this effect.

3. What is electricity?

A. Photons

B. Moving electrons

C. Protons Moving

D. Electrons at Rest

Electricity is the flow of electric charges. In most everyday conductors, those moving charges are electrons, and when a voltage pushes them to drift through a circuit, they create an electric current that can power devices. Photons are the quanta of light and are related to electromagnetic radiation, not the steady charge flow in a wire. Moving protons would be relevant in some plasmas or solutions, but in solid conductors the current mostly comes from electrons, not the nuclei. Electrons at rest don’t produce current because current is defined as the rate at which charge moves; without motion, there’s no current to carry energy.

4. Which component is essential for creating a magnetic field in devices like electric motors when current passes through it?

A. Solenoid

B. Galvonometer

C. Transformer

D. Generator

When you want a magnetic field produced by electric current, the essential element is a coil of wire—the solenoid. Passing current through many turns creates and concentrates a magnetic field inside the coil, and the field strength scales with the current and the number of turns. In electric motors, these windings form electromagnets that interact with permanent magnets or other coils to produce torque and rotation. The other options involve coils or magnetic effects but in different roles. A galvanometer uses a current-carrying coil to sense current by its torque in a magnetic field, not primarily to generate the motor's driving field. A transformer relies on magnetic flux to transfer energy between windings, which is about energy coupling rather than creating the motor's drive field. A generator is a device that produces electricity, not the coil arrangement used to create the motor's magnetic field for motion.

5. How do you increase the strength of an electromagnet?

A. Increase the number of batteries

B. Increase the number of coils wrapped around

C. Decrease the current

D. Use a weaker iron core

The strength of an electromagnet comes from how many ampere-turns you have and how well the core concentrates the magnetic flux. Each loop around the core adds one turn, so wrapping more coils increases the total turns N. If the current I stays the same, the product NI—the ampere-turns—rises, which strengthens the magnetic field inside and around the coil. In a practical sense, increasing the number of turns directly boosts the magnetic flux density, especially when the core is made of high-permeability material that guides the field. Decreasing the current or using a weaker iron core would weaken the magnet, while simply adding batteries could increase current but is less direct and depends on the circuit.

6. Which statement is true about like charges?

A. Like charges Repel

B. Like charges Attract

C. Like charges Are Neutral

D. Like charges Cancel Each Other

Like charges repel each other. The electrostatic force between two charges follows Coulomb's law, F = k q1 q2 / r^2, and it acts along the line joining the charges. When the charges have the same sign, q1 q2 is positive, so the force on each charge points away from the other charge, pushing them apart. This is why like charges push apart, while opposite charges attract. The ideas that like charges are neutral or that they cancel each other aren't consistent with this behavior.

7. What term describes the region around a magnet where magnetic forces are felt?

A. Magnetic field

B. Magnetic pole

C. Magnetization

D. Magnetic flux

The region around a magnet where its influence can act on other magnets or moving charges is the magnetic field. A field is a way to describe how strong the magnet's effect is and in what direction it tends to push or rotate magnetic objects, even when there is no physical contact. You can think of it as the space where the magnet can do work on a test magnet or compass needle—the field tells you how the force would be oriented and how strong it would be at each point. The field is usually denoted by B and is measured in teslas; field lines emerge from the magnet's north pole and loop around to enter the south pole, continuing inside the magnet from south back to north. The other terms aren't describing the region of influence. A magnetic pole refers to the ends where the field emerges; magnetization describes the internal alignment of magnetic moments within a material, not the surrounding space. Magnetic flux is a measure of how much field passes through a surface, not the region itself.

8. What direction do electrons move in a battery?

A. From positive terminal to negative terminal

B. From negative terminal to positive terminal

C. In a circle around the circuit

D. From anode to cathode

Electrons move from the negative terminal to the positive terminal through the external circuit. Since electrons are negative, they're repelled by the negative terminal and drawn toward the positive terminal, so the actual electron flow is opposite the conventional current direction (which goes from positive to negative). The notion of flow from positive to negative describes current, not electron motion. The idea of circulating around the circuit isn't how charge travels in a simple battery circuit. Saying electrons move from anode to cathode aligns with the electrode labeling in a discharging cell, but the clearest way to state it is from the negative terminal to the positive terminal.

9. A circuit that contains more than one path for current flow is called a

A. Series circuit

B. Parallel circuit

C. Battery

D. Switch

Having more than one path for current flow means the circuit is parallel. In a parallel arrangement, the components are connected across the same two nodes, so current can divide among the different branches. The voltage across each branch is the same as the source, while the total current is the sum of the currents in all branches. If one path is opened or a component fails in one branch, the other branches still carry current, so parts of the circuit remain powered. This contrasts with a series circuit, where there is only one path for current and the same current flows through every component; removing one element breaks the current in the whole loop.

10. How does a fuse protect us from circuit overload?

A. When the electric current becomes too much, the little piece of metal in the fuse melts which opens the circuit.

B. It stores excess charge

C. It converts AC to DC

D. It increases resistance of circuit

The main idea is that a fuse protects by becoming a sacrificial weak link that melts when current is too high. Inside the fuse is a thin piece of metal designed to heat up quickly when the current exceeds its rating. Electrical power turns into heat as P = I^2R, so excess current raises the temperature until the metal link melts and breaks the circuit. Once broken, the current stops, preventing wires from overheating or starting a fire. In normal operation the current is below the fuse's rating, so the metal link has only a small resistance and carries the current without issue. It's not storing charge, so it won't protect by storing energy. It doesn't convert AC to DC, which is what a rectifier does. It also isn't a device that purposefully increases resistance to limit current; it merely opens the circuit once a fault causes overheating.

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://electricitymagnetism.examzify.com

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