

MindTap AC/DC Practice Test (Sample)

Study Guide



Everything you need from our exam experts!

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Table of Contents

Copyright	1
Table of Contents	2
Introduction	3
How to Use This Guide	4
Questions	5
Answers	8
Explanations	10
Next Steps	15

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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. In a parallel circuit, the total current equals the sum of the currents through all branches.
 - A. Voltage across branches
 - B. Current through the source
 - C. Sum of currents through all branches
 - D. Power dissipated in the branches

2. What is the impedance of two impedances in series?
 - A. $Z_1 + Z_2$
 - B. $1/(Z_1 + Z_2)$
 - C. $Z_1 Z_2$
 - D. $(Z_1 Z_2)/(Z_1+Z_2)$

3. Voltage drop across a resistor in a circuit can be calculated using Ohm's law.
 - A. It cannot be calculated
 - B. Only in DC circuits
 - C. Only for capacitors
 - D. Voltage drop across a resistor can be calculated using Ohm's law

4. Which statement best describes the relationship between Thevenin and Norton equivalents?
 - A. They are alternate representations that yield the same terminal behavior for linear networks.
 - B. They are mutually exclusive; you must choose one.
 - C. Thevenin uses a current source in parallel with a resistor.
 - D. They apply only to AC circuits.

5. Emf is synonymous with wattage according to the material.
 - A. True
 - B. Sometimes
 - C. False
 - D. Never

6. The nonconductive covering around a wire is the conductor.
- A. False
 - B. True
 - C. Insulation
 - D. Sheathing
7. How do series and parallel resistor networks differ in their equivalent resistance?
- A. Series: $R_{eq} = \sum R$; current is the same through all; Parallel: $1/R_{eq} = \sum (1/R_i)$; voltage is the same across all.
 - B. Series: $R_{eq} = \text{product of } R$; parallel: $1/R_{eq} = \sum (1/R_i)$; current is different through each.
 - C. Series: $R_{eq} = 1 / \sum (1/R_i)$; parallel: $R_{eq} = \sum R_i$; voltage varies across components.
 - D. Series: $R_{eq} = \sum R$; current varies; Parallel: $R_{eq} = \sum R_i$; voltage varies.
8. What term describes a circuit that contains both series and parallel elements?
- A. Series circuit
 - B. Parallel circuit
 - C. Combination circuit
 - D. Hybrid circuit
9. A wire-wound resistor is made by winding a piece of resistive wire around a ceramic core.
- A. False
 - B. True
 - C. Cannot be determined
 - D. Not applicable
10. A can be connected directly across the power source because it has a very high resistance connected in series with the meter movement.
- A. Ammeter
 - B. Voltmeter
 - C. Ohmmeter
 - D. Wattmeter

Answers

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

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Explanations

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1. In a parallel circuit, the total current equals the sum of the currents through all branches.

A. Voltage across branches

B. Current through the source

C. Sum of currents through all branches

D. Power dissipated in the branches

In a parallel circuit, currents split at the junction where the branches diverge, but charge is conserved. The current coming from the source is distributed into the branches, and the currents in those branches add together to equal that source current. That additive behavior is why the total current is the sum of the branch currents. The reason this is the best description is that it directly expresses how current flows in parallel: each branch carries its own current, and those branch currents combine to form the total from the source. The voltage across each branch is the same, but that alone doesn't describe how the currents relate. The power dissipated in the branches isn't about summing currents, and while the current through the source matches the total in a simple circuit, the explicit statement about summing branch currents best captures the relationship.

2. What is the impedance of two impedances in series?

A. $Z_1 + Z_2$

B. $1/(Z_1 + Z_2)$

C. $Z_1 Z_2$

D. $(Z_1 Z_2)/(Z_1 + Z_2)$

In series, impedances add because the same current flows through both elements. Impedance relates voltage and current by $V = IZ$, so the total voltage is $V_{\text{total}} = V_1 + V_2 = I Z_1 + I Z_2 = I(Z_1 + Z_2)$. That makes the total impedance seen by the source $Z_{\text{total}} = Z_1 + Z_2$. This holds for any type of impedance, real or complex. If the impedances were in parallel instead, the total would be $(Z_1 Z_2)/(Z_1 + Z_2)$.

3. Voltage drop across a resistor in a circuit can be calculated using Ohm's law.

A. It cannot be calculated

B. Only in DC circuits

C. Only for capacitors

D. Voltage drop across a resistor can be calculated using Ohm's law

The main idea here is that Ohm's law directly links voltage, current, and resistance for a resistor: $V = I \times R$. Whatever current flows through a resistor and the value of its resistance, the voltage drop across the resistor is simply the product of those two. This holds whether the circuit is DC or AC, as long as the resistor behaves ideally (constant resistance). In DC, you get a steady drop; in AC, the instantaneous relationship is $v(t) = i(t) \times R$, and the RMS magnitudes satisfy $V_{\text{rms}} = I_{\text{rms}} \times R$ because the voltage and current remain in phase for a resistor. So the voltage drop across a resistor can be calculated using Ohm's law. For example, if a 10 Ω resistor has 0.5 A flowing through it, the voltage drop is 5 V. The other statements aren't correct because Ohm's law applies to resistors in both DC and AC contexts (not limited to DC), and it's specific to resistors (not only capacitors).

4. Which statement best describes the relationship between Thevenin and Norton equivalents?

- A. They are alternate representations that yield the same terminal behavior for linear networks.**
- B. They are mutually exclusive; you must choose one.
- C. Thevenin uses a current source in parallel with a resistor.
- D. They apply only to AC circuits.

The important idea is that Thevenin and Norton are two interchangeable ways to model a two-terminal linear network so that the terminals behave the same for any load. A Thevenin representation uses a voltage source in series with a resistor, while a Norton representation uses a current source in parallel with a resistor. They are equivalent because they produce the same I-V relationship at the terminals, so any load sees the same voltage and current regardless of which form you use. You can convert between them with $V_{th} = I_n \times R_{th}$ (and $I_n = V_{th} / R_{th}$). For example, a Thevenin model with 12 V and 5 Ω corresponds to a Norton model of 2.4 A in parallel with 5 Ω , and the load current for any R_L will be the same in either representation. This equivalence holds for linear networks and lets you choose the form that makes analysis easiest.

5. Emf is synonymous with wattage according to the material.

- A. True
- B. Sometimes
- C. False**
- D. Never

Emf represents electromotive force, a potential energy per unit charge that a source can provide, measured in volts. Wattage, or power, is the rate at which energy is transferred and is calculated as voltage times current ($P = V \times I$), measured in watts. These are different ideas: emf is about the energy available to push charges, while wattage is about how much energy is actually being used or delivered per unit time given a current. Because current and any internal resistance of the source affect the actual energy flow, emf does not equal wattage. So the statement is false.

6. The nonconductive covering around a wire is the conductor.

- A. False**
- B. True
- C. Insulation
- D. Sheathing

In electrical wiring, the metal inside the wire is the conductor—the material that carries current. The nonconductive covering around it serves as insulation to keep the current from escaping and to protect people from shock. Because the covering is not the part that conducts electricity, the statement is false. If you were asked to name the covering, insulation is the correct term (with outer layers sometimes called sheathing or a jacket).

7. How do series and parallel resistor networks differ in their equivalent resistance?

A. Series: $R_{eq} = \sum R$; current is the same through all; Parallel: $1/R_{eq} = \sum (1/R_i)$; voltage is the same across all.

B. Series: $R_{eq} = \text{product of } R$; parallel: $1/R_{eq} = \sum (1/R_i)$; current is different through each.

C. Series: $R_{eq} = 1 / \sum (1/R_i)$; parallel: $R_{eq} = \sum R_i$; voltage varies across components.

D. Series: $R_{eq} = \sum R$; current varies; Parallel: $R_{eq} = \sum R_i$; voltage varies.

When resistors are in series, they behave like one longer resistor: the total resistance is simply the sum of each resistor, and the same current flows through every component because there's only one path for the current. When resistors are in parallel, the voltage across each branch is the same (since all branches are connected to the same two nodes), the currents in the branches add up to the total, and the equivalent resistance is found from the reciprocal rule: $1/R_{eq} = \sum(1/R_i)$. For two resistors in parallel, that gives $R_{eq} = (R1 \cdot R2)/(R1 + R2)$. This combination of ideas is why the description states series resistances add and current stays the same, while for parallel the reciprocal sum rule applies and the voltage is the same across all branches. Other statements mix up these relationships (like claiming the series resistance multiplies, or the parallel resistance simply adds, or that voltage varies across parallel branches), which doesn't match how series and parallel networks actually behave.

8. What term describes a circuit that contains both series and parallel elements?

A. Series circuit

B. Parallel circuit

C. Combination circuit

D. Hybrid circuit

When a circuit includes sections where components share the same current (series) and sections where components share the same voltage (parallel), it's described as a combination circuit. This label captures the mixed nature of the connections, unlike purely series or purely parallel setups. To analyze, reduce the circuit step by step: identify a group in series and replace it with its equivalent resistance, then find a parallel group and reduce that, and continue until you end up with a single equivalent resistance. For example, a resistor in series with two resistors that are in parallel can be simplified by first finding the parallel pair's equivalent resistance, then adding the series resistor. This approach applies to any circuit that blends both connection types, which is precisely what a combination circuit describes.

9. A wire-wound resistor is made by winding a piece of resistive wire around a ceramic core.

A. False

B. True

C. Cannot be determined

D. Not applicable

The fact being tested is how a wire-wound resistor is constructed. A wire-wound resistor uses a length of resistive wire—such as nichrome—wrapped around or wound on a ceramic core (a former). The ceramic core provides a strong, insulating support and good heat resistance, allowing the winding to stay intact and the device to handle power without overheating. The resistance comes from the total length and properties of the resistive wire, so winding more turns increases resistance while maintaining a compact package. This method is a classic, reliable way to achieve high wattage ratings and precise resistance values, which is why describing a wire-wound resistor as made by winding resistive wire around a ceramic core is accurate.

10. A ___ can be connected directly across the power source because it has a very high resistance connected in series with the meter movement.

A. Ammeter

B. Voltmeter

C. Ohmmeter

D. Wattmeter

Voltmeter is designed to draw as little current as possible from the circuit. It uses a very high input resistance (a large series resistance with the meter's movement) so that when it's connected directly across a power source, it hardly loads the circuit. Because only a tiny current flows through the meter, the voltage across the source is measured with little disturbance to the circuit's operation. This is why a voltmeter is connected in parallel across the element whose voltage you want to know. In contrast, an ammeter has very low resistance and is placed in series to measure current, an ohmmeter injects current to measure resistance, and a wattmeter combines both voltage and current measurements to determine power.

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://mindtapacdc.examzify.com>

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

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