

# Heating, Ventilation, and Air Conditioning (HVAC ) Electrical 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. What is the typical voltage range for residential HVAC systems?**
  - A. 100 to 120 volts**
  - B. 120 to 240 volts**
  - C. 220 to 260 volts**
  - D. 240 to 300 volts**
  
- 2. Which type of system is designed for energy efficiency by adjusting capacities?**
  - A. Single-stage systems**
  - B. Multi-stage systems**
  - C. Central systems**
  - D. Window units**
  
- 3. What is the significance of using R-410A refrigerant over R-22?**
  - A. R-410A is less expensive**
  - B. R-410A is more environmentally friendly and has better efficiency properties**
  - C. R-410A has a higher boiling point**
  - D. R-410A requires less maintenance**
  
- 4. What does the electric meter on a house measure?**
  - A. Voltage**
  - B. Current**
  - C. Wattage**
  - D. Resistance**
  
- 5. If 300 ohm resistors are wired in parallel, what is the total resistance?**
  - A. 150 ohms**
  - B. 300 ohms**
  - C. 100 ohms**
  - D. 200 ohms**

- 6. What is the approximate voltage to ground of a "high leg" on a three phase open Delta system?**
- A. 120 volts**
  - B. 208 volts**
  - C. 240 volts**
  - D. 480 volts**
- 7. What might cause short cycling of the compressor and condenser fan motors while the blower motor is not running?**
- A. A faulty compressor relay**
  - B. A faulty blower motor or blower relay**
  - C. A blocked return duct**
  - D. A low refrigerant level**
- 8. What voltage is found from terminal Y to the input side of the coil on line #11?**
- A. 24 volts**
  - B. 0 volts**
  - C. 120 volts**
  - D. 240 volts**
- 9. Which switch impacts the operation of the blower motor in AUTO mode?**
- A. The thermal expansion valve**
  - B. The high pressure switch**
  - C. The thermostat setting**
  - D. The relay control**
- 10. Transformers are rated according to which specification?**
- A. Voltage at the primary**
  - B. Current rating**
  - C. VA at the secondary**
  - D. Wattage output**

## Answers

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

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## **Explanations**

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**1. What is the typical voltage range for residential HVAC systems?**

- A. 100 to 120 volts
- B. 120 to 240 volts**
- C. 220 to 260 volts
- D. 240 to 300 volts

The typical voltage range for residential HVAC systems is indeed between 120 to 240 volts. This range is standard for most HVAC equipment found in homes, including air conditioning units, heat pumps, and furnaces. In many residential setups, smaller systems like air handlers and some types of heating systems may operate on 120 volts, which is commonly used for standard household electrical outlets. Larger equipment, such as central air conditioning units or high-efficiency furnaces, typically requires 240 volts to operate effectively. This allows the systems to function efficiently and handle the increased power demands necessary for heating and cooling large spaces. The choice of this voltage range enables compatibility with the existing electrical infrastructure in residential settings, ensuring safety and efficiency in operation. Additionally, the 120 to 240 volts supply is in line with standard electrical codes and practices for residential applications.

**2. Which type of system is designed for energy efficiency by adjusting capacities?**

- A. Single-stage systems
- B. Multi-stage systems**
- C. Central systems
- D. Window units

A multi-stage system is designed for energy efficiency by adjusting its operating capacities based on the current heating or cooling needs of a space. This system can operate at different levels, providing only the necessary amount of heating or cooling required at any given time, which reduces energy consumption and enhances comfort. In contrast, single-stage systems operate at one fixed capacity, leading to potential energy waste when the full capacity is more than is needed for the current demand. Central systems typically provide uniform temperature control across larger areas but may lack the fine-tuning capacity adjustments of multi-stage systems. Window units, while convenient for localized cooling, generally have a more limited capacity for efficient energy use compared to multi-stage systems, as they usually operate in a single-stage manner without modulation. Therefore, a multi-stage system is the preferred choice when prioritizing energy efficiency through capacity adjustments.

### 3. What is the significance of using R-410A refrigerant over R-22?

- A. R-410A is less expensive
- B. R-410A is more environmentally friendly and has better efficiency properties**
- C. R-410A has a higher boiling point
- D. R-410A requires less maintenance

R-410A is recognized for being more environmentally friendly and having superior efficiency properties compared to R-22. This transition is crucial in the context of environmental regulations aimed at reducing ozone depletion. R-22, a hydrochlorofluorocarbon (HCFC), contributes to ozone layer depletion and has been phased out in many regions under the Montreal Protocol due to its high ozone-depleting potential. In contrast, R-410A is composed of hydrofluorocarbons (HFCs), which do not deplete the ozone layer, making them a more sustainable choice. Additionally, R-410A operates at higher pressures than R-22, which allows systems using this refrigerant to be designed for greater efficiency. This efficiency translates into better cooling performance and energy savings, contributing to reduced greenhouse gas emissions when used across a broader scale. The other options do not align with the key advantages of R-410A. For instance, while R-410A may sometimes be perceived as more expensive, its long-term efficiency gains often offset initial costs. Additionally, the boiling point of R-410A is not inherently higher than that of R-22 in a way that affects its performance in traditional applications. Lastly, while proper maintenance is always

### 4. What does the electric meter on a house measure?

- A. Voltage
- B. Current
- C. Wattage**
- D. Resistance

The electric meter on a house measures wattage, which is a key indicator of the electrical energy usage over time. Wattage is calculated as the product of voltage and current, and the electric meter tracks the total electrical power consumed by the household. This measurement is critical for billing purposes since utility companies charge customers based on their total energy consumption in kilowatt-hours (kWh), which are derived from the wattage readings of the meter. Understanding wattage is essential for household energy management as it directly impacts electricity costs and efficiency. Homeowners can use the wattage measurement to identify high-energy-consuming appliances and make informed decisions about their energy usage.

5. If 300 ohm resistors are wired in parallel, what is the total resistance?
- A. 150 ohms
  - B. 300 ohms
  - C. 100 ohms**
  - D. 200 ohms

When resistors are connected in parallel, the total or equivalent resistance can be calculated using the formula:  $\frac{1}{R_{total}} = \frac{1}{R_1} + \frac{1}{R_2} + \dots + \frac{1}{R_n}$  In this case, if we consider two resistors of 300 ohms wired in parallel, the calculation would be:  $\frac{1}{R_{total}} = \frac{1}{300} + \frac{1}{300} = \frac{2}{300}$  This simplifies to:  $R_{total} = \frac{300}{2} = 150$  ohms. So, for two 300 ohm resistors in parallel, the total resistance is 150 ohms, which corresponds to the first option. The resulting value demonstrates how parallel resistors lower the overall resistance compared to the individual resistors, as the current has multiple pathways to flow through. This calculation can also be extended to more resistors in multiple configurations, but the key aspect within this instance is recognizing the parallel configuration leads to a total resistance that is always less than the

6. What is the approximate voltage to ground of a "high leg" on a three phase open Delta system?
- A. 120 volts
  - B. 208 volts**
  - C. 240 volts
  - D. 480 volts

In a three-phase open Delta system, the "high leg" refers to one of the phases that has a voltage to ground that is typically higher than the others. In this system, the line-to-line voltage is 240 volts, and the line-to-neutral voltage for the high leg is approximately 208 volts. This is derived from the relationship between the line-to-line voltage and the line-to-neutral voltage in a three-phase system, where the latter can be calculated by dividing the line-to-line voltage by the square root of three (approximately 1.732). Thus, for a 240-volt line-to-line measurement, the voltage to ground (line-to-neutral) for the high leg comes out to be about 240 volts divided by 1.732, which equals approximately 138 volts (the lower legs are around 120 volts). However, in practical applications, the high leg is designated due to its designation in the service, typically associated with 208 volts in commercial setups. This allows equipment designed for 208/120 volt systems to operate correctly. This understanding of the voltage to ground in a high-leg configuration is crucial for recognizing the specific wiring setups in three-phase systems, especially for troubleshooting and ensuring compatibility with equipment designed for

7. What might cause short cycling of the compressor and condenser fan motors while the blower motor is not running?
- A. A faulty compressor relay
  - B. A faulty blower motor or blower relay**
  - C. A blocked return duct
  - D. A low refrigerant level

Short cycling of the compressor and condenser fan motors can occur due to several reasons, but one key cause is related to issues with the blower motor or blower relay. When the blower motor is not functioning, it fails to circulate air properly across the evaporator coil. This lack of airflow can lead to the coil freezing, which, when it thaws, can cause the compressor to shut off prematurely to prevent damage. In this situation, the compressor and condenser fan motors may start and stop frequently (short cycling) due to the system attempting to maintain the desired temperature without adequate airflow from the blower motor. The relay, responsible for sending power to the blower motor, could also fail, resulting in the blower motor not operating despite the call for cooling. While other options may present issues in an HVAC system, they do not directly relate to the scenario of short cycling primarily caused by inadequate airflow produced by the blower motor. This makes the relationship between the blower motor (or its relay) and the short cycling phenomenon a significant factor in HVAC performance.

8. What voltage is found from terminal Y to the input side of the coil on line #11?
- A. 24 volts
  - B. 0 volts**
  - C. 120 volts
  - D. 240 volts

In the context of HVAC systems, when measuring voltage from terminal Y (which typically connects to the cooling system's contactor) to the input side of the coil on line #11 (often associated with a relay or contactor in the control circuit), a reading of 0 volts would indicate that there is no voltage present at that specific measurement point while the system is inactive or the thermostat is not calling for cooling. When the thermostat is not demanding cooling, the Y terminal will not have voltage applied to it, meaning the input side of the coil on line #11 also won't be energized. Therefore, a reading of 0 volts is expected. This outcome can signify that the control circuit is open, and no action is being taken by the compressor or the fan motor since there isn't an active call for cooling. It illustrates that the electrical path is not complete or that there is no power being supplied at that moment from the cooling circuit. Thus, a measurement of 0 volts reflects the expected state of the control circuit when it isn't demanding operation.

**9. Which switch impacts the operation of the blower motor in AUTO mode?**

- A. The thermal expansion valve**
- B. The high pressure switch**
- C. The thermostat setting**
- D. The relay control**

The thermostat setting plays a crucial role in determining how and when the blower motor operates in AUTO mode. When the thermostat is set to a desired temperature, it monitors the ambient temperature of the space. If the temperature rises above or falls below this setpoint, the thermostat signals the HVAC system to either heat or cool the area. In AUTO mode, the blower motor will operate when needed, based on the signals received from the thermostat to either distribute warm or cool air as per the set temperature. In this context, other components like the thermal expansion valve, high pressure switch, and relay control have their specific functions. The thermal expansion valve regulates the flow of refrigerant in the system, while the high pressure switch monitors system pressure and can protect against issues like refrigerant flooding. The relay control is essential for connecting electrical circuitry, but it does not dictate the operating conditions of the blower motor. Therefore, the thermostat setting is the key factor influencing the blower motor's operation in AUTO mode.

**10. Transformers are rated according to which specification?**

- A. Voltage at the primary**
- B. Current rating**
- C. VA at the secondary**
- D. Wattage output**

Transformers are primarily rated in volt-amperes (VA) at the secondary side because this measurement represents the capacity of the transformer to handle electrical load without overheating and while maintaining efficiency. The VA rating indicates both the voltage and current that a transformer can handle simultaneously, which is crucial for understanding how much power can be safely drawn from the secondary side of the transformer. While the voltage at the primary side is important for installation and connecting to the power supply, the VA rating is a more comprehensive measure of a transformer's performance and capability. The current rating, while relevant, does not provide a complete picture of the transformer's performance across varying voltage levels. Wattage output, similar to being linked with load calculations, is less commonly used for transformer rating since it can fluctuate depending on the power factor of the load. Therefore, the VA rating is the most appropriate and standardized specification for transformer ratings.

## 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](mailto:hello@examzify.com).**

**Or visit your dedicated course page for more study tools and resources:**

**<https://hvac-electrical.examzify.com>**

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

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