

HVAC Star Practice Exam (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. How can you identify reverse operation with a scroll compressor?**
 - A. The compressor will not compress.**
 - B. The compressor will stop on motor overload.**
 - C. The compressor will overheat.**
 - D. The compressor will operate normally.**

- 2. Evaporators should never exceed a pressure drop of:**
 - A. 1 psig.**
 - B. 1.5 psig.**
 - C. 3 psig.**
 - D. 2 psig.**

- 3. Which thermometer is considered the most accurate?**
 - A. Glass stem thermometer**
 - B. Digital thermometer**
 - C. Infrared thermometer**
 - D. Mercury thermometer**

- 4. What are typical operating pressures for an R-410A system on the high side and low side under typical ambient conditions?**
 - A. High side 150-170 psi; low side 350-400 psi**
 - B. High side 250-300 psi; low side 90-110 psi**
 - C. High side 350-400+ psi; low side 150-170 psi**
 - D. High side 500-600 psi; low side 300-350 psi**

- 5. When a stuffing box shaft seal on a centrifugal pump leaks excessively, what maintenance action is recommended?**
 - A. Tighten packing gland and/or replace packing**
 - B. Replace the pump**
 - C. Rebuild the shaft seal**
 - D. Ignore the leak**

- 6. Which material is commonly used for a direct-drive pump coupling?**
- A. Stainless steel**
 - B. Brass**
 - C. Aluminum**
 - D. Ceramic**
- 7. State Ohm's law and calculate the resistance of a 24 V thermostat coil drawing 0.8 A.**
- A. $R = I / V = 0.033$ ohms**
 - B. $R = V \times I = 480$ ohms**
 - C. $R = V / I = 30$ ohms**
 - D. $R = V - I = 23$ ohms**
- 8. After applying lockout/tagout devices, what is the next critical verification step?**
- A. Test all controls for proper operation before starting**
 - B. Ensure PPE is properly worn for the task**
 - C. Discharge all stored energy sources**
 - D. Verify zero energy before work**
- 9. What is the purpose of a manifold gauge set in HVAC service, and what do the high and low sides represent?**
- A. It measures electrical current in the compressor circuit and indicates overload conditions**
 - B. It measures refrigerant pressures to diagnose charging and leaks; the high side corresponds to condenser pressure and the low side to evaporator pressure**
 - C. It measures airflow through the evaporator; high side is inlet air, low side is outlet air**
 - D. It calibrates thermostat setpoints for variable speed cooling**
- 10. The four main components of a refrigeration system are:**
- A. Compressor, condenser, evaporator, & metering device**
 - B. Compressor, receiver, condenser, evaporator**
 - C. Condenser, evaporator, condenser, metering device**
 - D. Compressor, evaporator, dryer, metering device**

Answers

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

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Explanations

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1. How can you identify reverse operation with a scroll compressor?

- A. The compressor will not compress.**
- B. The compressor will stop on motor overload.**
- C. The compressor will overheat.**
- D. The compressor will operate normally.**

When a scroll compressor spins in the wrong direction, the two scrolls don't seal properly to trap and pressurize refrigerant. That means the unit can turn, but it won't actually compress the gas, so there's no expected pressure rise to move heat. The most direct indicator of reverse operation is that the compressor will not compress. The other signs—like overheating, stopping on motor overload, or running normally—are not reliable indicators of reverse rotation and can occur for many other faults or operating conditions.

2. Evaporators should never exceed a pressure drop of:

- A. 1 psig.**
- B. 1.5 psig.**
- C. 3 psig.**
- D. 2 psig.**

When refrigerant boils inside the evaporator, the system's suction pressure is set by the pressure difference across the coil. Keeping that pressure drop small helps maintain a healthy suction pressure entering the compressor, ensures the refrigerant fully evaporates in the coil for effective heat transfer, and reduces the risk of abnormal compressor operation or oil return problems. The commonly accepted maximum for evaporator pressure drop is about 2 psig. Exceeding this limit means the outlet pressure falls too far below the inlet, hurting performance and increasing the chance of issues with suction stability and liquid refrigerant reaching the compressor. Therefore, the best answer is 2 psig.

3. Which thermometer is considered the most accurate?

- A. Glass stem thermometer**
- B. Digital thermometer**
- C. Infrared thermometer**
- D. Mercury thermometer**

Accuracy in temperature measurement comes from directly sensing a physical change with minimal interference. A glass stem thermometer does this by tracking the predictable expansion of the liquid inside a sealed glass column. As temperature changes, the liquid rises or falls in a way that corresponds to a calibrated scale, giving a direct and stable reading. There's little to drift over time because there are no electronic components or surface-dependent measurements to affect the result. Digital thermometers rely on electronic sensors, which can drift with battery life, sensor tolerance, and calibration differences, while infrared thermometers measure surface temperature and can be influenced by skin emissivity, distance, and ambient conditions. These factors can introduce small but notable errors. Because the glass stem (often mercury-in-glass) method uses a straightforward, well-established physical principle, it tends to provide the most accurate readings when used correctly.

4. What are typical operating pressures for an R-410A system on the high side and low side under typical ambient conditions?

- A. High side 150-170 psi; low side 350-400 psi**
- B. High side 250-300 psi; low side 90-110 psi**
- C. High side 350-400+ psi; low side 150-170 psi**
- D. High side 500-600 psi; low side 300-350 psi**

R-410A systems run at higher pressures than older refrigerants, and the pressures on each side reflect the temperatures at which the refrigerant is condensing and evaporating. Under typical outdoor conditions with normal airflow and load, the high side (condensing) pressure is around 350-400+ psi, while the low side (suction) pressure sits around 150-170 psi. These values come from the need to condense the refrigerant at the ambient temperature and to evaporate it at the indoor coil temperature. If you saw readings as low as 150-170 psi on the high side, or 90-110 psi on the low side, that would suggest something unusual is affecting the system (like undercharge or a restriction). Very high readings, such as 500-600 psi on the high side or 300-350 psi on the low side, also indicate abnormal conditions or extreme ambient temperatures.

5. When a stuffing box shaft seal on a centrifugal pump leaks excessively, what maintenance action is recommended?

- A. Tighten packing gland and/or replace packing**
- B. Replace the pump**
- C. Rebuild the shaft seal**
- D. Ignore the leak**

When a stuffing box shaft seal leaks, the seal is provided by packing around the shaft that is compressed by the packing gland. The appropriate maintenance action is to tighten the packing gland gradually to increase compression and reduce leakage; if the packing is worn or damaged, replace the packing. This directly addresses the way a stuffing box seals and how leakage is controlled. Replacing the pump or rebuilding a shaft seal isn't the correct fix here, since a stuffing box uses packing rather than a mechanical shaft seal, and ignoring the leak isn't acceptable.

6. Which material is commonly used for a direct-drive pump coupling?

- A. Stainless steel**
- B. Brass**
- C. Aluminum**
- D. Ceramic**

Direct-drive pump couplings need a material that can transmit torque reliably while tolerating small misalignments and absorbing some vibration in a fluid environment. Brass fits well because it's a copper-zinc alloy that machines to precise tolerances with good wear resistance and damping properties, and it resists corrosion in many pump fluids. It's also cost-effective for the sizes typically used in direct-drive applications. Other materials don't fit as well: stainless steel is strong and corrosion-resistant but harder to machine and more costly, aluminum is lighter but not as durable for torsional loads, and ceramic is brittle and unsuitable for components that must handle shocks and misalignment.

7. State Ohm's law and calculate the resistance of a 24 V thermostat coil drawing 0.8 A.

- A. $R = I / V = 0.033$ ohms
- B. $R = V \times I = 480$ ohms
- C. $R = V / I = 30$ ohms**
- D. $R = V - I = 23$ ohms

Ohm's law shows how voltage, current, and resistance relate: $V = I \times R$. From that, resistance is $R = V / I$. Plugging in 24 V and 0.8 A gives $24 \div 0.8 = 30$ ohms. The other forms aren't valid for resistance: $R = I / V$ would give a tiny number (0.033 ohms) and isn't the correct rearrangement; $V \times I$ equals power (in watts), not resistance; and $V - I$ has no meaningful unit or interpretation for resistance. So the coil's resistance is 30 ohms.

8. After applying lockout/tagout devices, what is the next critical verification step?

- A. Test all controls for proper operation before starting
- B. Ensure PPE is properly worn for the task
- C. Discharge all stored energy sources
- D. Verify zero energy before work**

Verifying zero energy after lockout/tagout confirms that every energy source has been isolated and that no residual or stored energy could move or re-energize the equipment. This is the crucial step that ensures the machine will stay completely inactive while workers perform maintenance, protecting them from unexpected startups or energy releases from electrical, hydraulic, pneumatic, or mechanical sources. Testing the controls after lockout could re-energize the equipment, which defeats the purpose of the lockout. PPE is essential for safety, but it doesn't verify that the equipment is safely de-energized. Discharging stored energy is part of the process, but the specific verification step is to confirm there is zero energy present before work begins.

9. What is the purpose of a manifold gauge set in HVAC service, and what do the high and low sides represent?
- A. It measures electrical current in the compressor circuit and indicates overload conditions
 - B. It measures refrigerant pressures to diagnose charging and leaks; the high side corresponds to condenser pressure and the low side to evaporator pressure**
 - C. It measures airflow through the evaporator; high side is inlet air, low side is outlet air
 - D. It calibrates thermostat setpoints for variable speed cooling

The main idea is that a manifold gauge set is used to measure refrigerant pressures inside an HVAC system, helping you diagnose charging needs and leaks. The high-pressure side reads the pressure on the condenser side of the cycle, after the compressor, where the refrigerant is hot and under high pressure. The low-pressure side reads the pressure on the evaporator side, where the refrigerant is cooler and under low pressure. By comparing these readings to what's expected for the current operating condition, you can determine if the system is undercharged, overcharged, or has other issues such as a restriction. This tool isn't used to measure electrical current, airflow, or to calibrate thermostats.

10. The four main components of a refrigeration system are:
- A. Compressor, condenser, evaporator, & metering device**
 - B. Compressor, receiver, condenser, evaporator
 - C. Condenser, evaporator, condenser, metering device
 - D. Compressor, evaporator, dryer, metering device

In a vapor-compression refrigeration cycle, four components drive the essential heat-transfer loop: the compressor, condenser, metering device, and evaporator. The compressor takes in low-pressure refrigerant vapor and compresses it into a high-pressure, high-temperature gas, providing the energy to move refrigerant through the system. The hot gas then releases its heat to the surroundings in the condenser and becomes a high-pressure liquid. The metering device then throttles or restricts this liquid, dropping its pressure so it can enter the evaporator as a low-pressure, cool fluid. Inside the evaporator, the refrigerant absorbs heat from the space being cooled and boils back into a low-pressure gas, ready to return to the compressor. Additional parts like a receiver or a dryer may exist in real systems, but they are not part of the basic four components that define the cycle.

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://hvacstar.examzify.com>

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

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