

HVAC 403A PRACTICE EXAM (SAMPLE)

STUDY GUIDE



Prepare with structure. Pass with confidence



Copyright © 2026 by Examzify - A Kaluba Technologies Inc. product.

ALL RIGHTS RESERVED.

No part of this book may be reproduced or transferred in any form or by any means, graphic, electronic, or mechanical, including photocopying, recording, web distribution, taping, or by any information storage retrieval system, without the written permission of the author.

Notice: Examzify makes every reasonable effort to obtain accurate, complete, and timely information about this product from reliable sources.

SAMPLE

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

SAMPLE

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

SAMPLE

- 1. What is the impact of duct design and pressure losses on system energy usage, and how can you minimize them?**
 - A. Duct design has no impact on energy
 - B. Duct losses do not affect fan power
 - C. Higher losses increase fan power and energy use; minimize with proper sizing, smoother transitions, sealing, and minimizing bends
 - D. Only insulation affects energy use
- 2. Which safety interlock is designed to prevent HVAC operation if an access door is opened during service?**
 - A. Door interlocks prevent operation if an access door is opened.
 - B. Flame safety switches alone ensure safety.
 - C. Pressure sensors alone ensure safety.
 - D. Humidistats prevent operation when humidity is too high.
- 3. When liquid charging an A/C system on the low side, which rule should be followed?**
 - A. Charge refrigerant at 20 psi lower than ambient pressure
 - B. Charge refrigerant at ambient pressure
 - C. Charge refrigerant at 20 psi higher than ambient
 - D. Charge refrigerant based on compressor size
- 4. R134a will boil at what temperature at 28 psi?**
 - A. 0 degrees Fahrenheit
 - B. 32 degrees Fahrenheit
 - C. -10 degrees Fahrenheit
 - D. 212 degrees Fahrenheit
- 5. Which statement about R-134a's ODP is true?**
 - A. It has zero ozone depletion potential.
 - B. It has high ozone depletion potential.
 - C. ODP is not defined for refrigerants.
 - D. ODP is greater than 1.

- 6. HCFC refrigerants are based on which combination of elements?**
- A. Chlorine based
 - B. Hydrogen and chlorine based
 - C. Hydrogen based
 - D. Fluorine based
- 7. In an orifice-tube A/C system, where is the compressor located?**
- A. After accumulator before condenser
 - B. After condenser before evaporator
 - C. Before accumulator after receiver dryer
 - D. After evaporator before TXV
- 8. What determines the high side pressure on all A/C systems?**
- A. Compressor speed
 - B. Evaporator temperature
 - C. Ambient air temperature
 - D. Refrigerant charge
- 9. What is the purpose of setpoint scheduling and occupancy-based controls, and what are potential energy consequences of poor programming?**
- A. To align HVAC operation with occupancy; poor programming leads to wasted energy or poor IAQ
 - B. To maximize equipment wear and tear
 - C. To minimize energy use regardless of occupancy
 - D. To ensure equipment runs continuously at full power
- 10. Which energy value represents melting one pound of ice into water?**
- A. 144 BTUs
 - B. 10 BTUs
 - C. 970 BTUs
 - D. 60 BTUs

Answers

SAMPLE

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

SAMPLE

Explanations

SAMPLE

1. What is the impact of duct design and pressure losses on system energy usage, and how can you minimize them?

- A. Duct design has no impact on energy
- B. Duct losses do not affect fan power
- C. Higher losses increase fan power and energy use; minimize with proper sizing, smoother transitions, sealing, and minimizing bends**
- D. Only insulation affects energy use

When ductwork has friction and fittings that create pressure losses, the fan must generate extra pressure to push the same amount of air through the system. The power the system uses is tied to the pressure rise the fan provides times the airflow, adjusted for the fan's efficiency. So, higher losses mean the fan has to work harder, increasing energy consumption and operating costs. To keep energy use down, focus on duct design that minimizes those losses: size the ducts properly to keep air velocities in an efficient range, use smoother transitions and gradual bends to cut minor losses, seal all joints and leaks so air doesn't escape or cause the fan to push more air than intended, and minimize the number and sharpness of bends by using larger-radius turns. Also, smoother interior surfaces reduce friction losses. Insulation matters for reducing heat transfer and the total building energy needed to maintain temperature, but the direct impact on fan energy in this context comes from reducing duct pressure losses through good design and sealing.

2. Which safety interlock is designed to prevent HVAC operation if an access door is opened during service?

- A. Door interlocks prevent operation if an access door is opened.**
- B. Flame safety switches alone ensure safety.
- C. Pressure sensors alone ensure safety.
- D. Humidistats prevent operation when humidity is too high.

When service doors are involved, the safety interlock specifically designed for this situation is a door interlock. Its function is to prevent the HVAC unit from running if a service access door is opened. This is typically achieved with a switch mounted on the door frame that is normally closed and opens when the door is opened. Opening the door interrupts the control circuit, causing the equipment to shut down and stay off until the door is closed and the circuit is reset. This protects technicians from moving parts, electrical hazards, and other dangers present inside the equipment. Flame safety switches are related to combustion and ensure fuel is only allowed if a flame is present; they're not about doors. Pressure sensors monitor refrigerant pressures to protect the system, but they don't prevent operation simply because a door is opened. Humidistats control humidity levels and don't function as safety interlocks tied to door access.

3. When liquid charging an A/C system on the low side, which rule should be followed?

- A. Charge refrigerant at 20 psi lower than ambient pressure**
- B. Charge refrigerant at ambient pressure
- C. Charge refrigerant at 20 psi higher than ambient
- D. Charge refrigerant based on compressor size

When charging through the low side, you use the suction-side pressure as a practical guide for how much refrigerant is in the system. The rule of thumb is to bring the charge in until the low-side pressure sits about 20 psi below the ambient (outside) pressure. This creates a safe, conservative headroom so the refrigerant can vaporize properly in the evaporator and the compressor isn't overwhelmed by liquid returning to it. It's a simple reference that works under typical conditions and with common refrigerants, helping avoid overcharging or undercharging. Charging at ambient pressure wouldn't provide that cushion and could push the system toward improper evaporator operation. Charging 20 psi above ambient would raise the suction pressure too high, risking poor cooling and added stress on the compressor. Relying on compressor size alone ignores real system variation and charge requirements. For accuracy, the exact charge should ultimately follow the manufacturer's specifications and weighing or pressure-temperature checks, but the 20 psi below ambient rule is a common practical guide for low-side charging.

4. R134a will boil at what temperature at 28 psi?

- A. 0 degrees Fahrenheit
- B. 32 degrees Fahrenheit**
- C. -10 degrees Fahrenheit
- D. 212 degrees Fahrenheit

R-134a boils at the saturation temperature for the system's pressure. In other words, the liquid-vapor equilibrium occurs at a specific temperature for a given pressure, and that's the temperature at which boiling will occur. At 28 psi gauge, the absolute pressure is about 43 psi. The R-134a saturation data show that around 43 psia the saturation temperature is near 0°C, which is 32°F. So, at 28 psi, R-134a will boil at roughly 32°F. A quick context: the normal boiling point of R-134a at 1 atm is about -26°C (-15°F), illustrating how increasing pressure raises the boiling temperature.

5. Which statement about R-134a's ODP is true?

- A. It has zero ozone depletion potential.**
- B. It has high ozone depletion potential.
- C. ODP is not defined for refrigerants.
- D. ODP is greater than 1.

ODP measures how much a substance can deplete the ozone layer, relative to a reference like CFC-11. Substances that contain chlorine or bromine drive ozone destruction in the stratosphere, while those that lack these halogens do not. R-134a is a hydrofluorocarbon with fluorine and hydrogen but no chlorine, so it does not catalytically destroy ozone. That means its ozone depletion potential is zero. So the statement describing zero ODP is the correct one. For context, while it doesn't deplete ozone, R-134a has a relatively high global warming potential, which is why alternatives with lower GWP are being pursued.

6. HCFC refrigerants are based on which combination of elements?

- A. Chlorine based
- B. Hydrogen and chlorine based**
- C. Hydrogen based
- D. Fluorine based

HCFC stands for hydrochlorofluorocarbons, so their molecules include hydrogen along with chlorine, carbon, and fluorine. The defining aspect that sets them apart from pure chlorine- or fluorine-based compounds is the presence of hydrogen, which differentiates HCFCs from CFCs (no hydrogen) and from strictly fluorine- or chlorine-based groups. Among the options, hydrogen and chlorine based best captures the core composition, even though fluorine and carbon are also part of the molecule.

7. In an orifice-tube A/C system, where is the compressor located?

- A. After accumulator before condenser**
- B. After condenser before evaporator
- C. Before accumulator after receiver dryer
- D. After evaporator before TXV

Compressors in vapor compression systems must receive only vapor, not liquid. The accumulator sits on the low pressure suction line and collects any liquid that might return from the evaporator, preventing liquid slugging and protecting the compressor. From the accumulator, refrigerant gas is drawn into the compressor, then discharged to the condenser. After compression, the high pressure gas goes to the condenser and then to the metering device and evaporator, completing the cycle. In an orifice tube setup, this arrangement places the compressor after the accumulator and before the condenser, which is why this location is correct.

8. What determines the high side pressure on all A/C systems?

- A. Compressor speed
- B. Evaporator temperature
- C. Ambient air temperature**
- D. Refrigerant charge

Ambient air temperature around the condenser sets the high-side pressure. The condenser must reject heat from the refrigerant to the surrounding air, and the pressure on the high side corresponds to the condensation temperature needed to do that heat transfer. When the outside air is warmer, the condenser can't reject heat as efficiently, so the refrigerant condenses at a higher temperature and pressure, raising the high-side pressure. In cooler air, condensation occurs at a lower temperature and pressure, lowering the high side. While compressor speed and refrigerant charge can cause shifts under certain conditions, the surrounding air temperature is the primary factor determining high-side pressure in typical operation.

9. What is the purpose of setpoint scheduling and occupancy-based controls, and what are potential energy consequences of poor programming?

A. To align HVAC operation with occupancy; poor programming leads to wasted energy or poor IAQ

B. To maximize equipment wear and tear

C. To minimize energy use regardless of occupancy

D. To ensure equipment runs continuously at full power

Setpoint scheduling and occupancy-based controls aim to match HVAC operation to how the space is actually used. By scheduling, you set lower energy use during unoccupied times (cooler or warmer setpoints, reduced ventilation) and then adjust for occupancy when people are present. Occupancy-based controls use sensors to dial conditioning and ventilation up or down based on whether people are in the space. When programmed correctly, this reduces energy use while keeping comfort and air quality acceptable. If programming is off, you end up conditioning spaces that aren't in use, wasting energy. Conversely, you can still spend more energy later trying to regain comfort after a poorly planned setback. Poor occupancy sensing or incorrect ventilation settings can also lead to stale air or inadequate IAQ, which is another form of energy penalty because it may trigger compensating operations.

10. Which energy value represents melting one pound of ice into water?

A. 144 BTUs

B. 10 BTUs

C. 970 BTUs

D. 60 BTUs

Melting ice into water at 0°C requires latent heat of fusion—the energy used to change a substance from solid to liquid without raising its temperature. For ice, this value is about 333.55 kJ/kg, which converts to roughly 144 BTU per pound. So melting one pound of ice uses about 144 BTUs of energy. The other numbers don't fit because they correspond to different processes: a much smaller amount would not overcome the molecular bonds to melt, and a value around 970 BTU is the latent heat of vaporization (energy to turn water into steam), not melting.

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://hvac403a.examzify.com>

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

SAMPLE