HVAC 403A Practice Exam (Sample)

Study Guide

Everything you need from our exam experts!

Table of Contents

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. Which of the following is a function of the switch located on the high-pressure side of an A/C system?

A. High pressure compressor cut out

B. Low ambient temp cut out

C. Evaporator fan speed control

D. Engine RPM limiter

2. What is the chemical makeup of HCFC refrigerants?

A. Chlorine based

B. Hydrogen/chlorine based

C. Hydrogen based

D. Fluorine based

3. Which statement is true about refrigerant oil categories?

A. PAG is not used with refrigerants

B. POE oils are never used with refrigerants

C. Mineral oil is a refrigerant oil category

D. Silicone oil is a refrigerant oil category

4. Refrigerant after the condenser and before the metering device is typically in what condition?

A. Hot

B. High pressure

C. Subcooled

D. Liquid

5. Which of the following statements describes when refrigerant oil must be replaced?

A. System has been open to atmosphere too long

B. System is saturated with moisture

C. Both A and B

D. Neither A nor B

6. Which statement describes the effect of increasing pressure on a liquid's boiling point?

A. It increases the boiling point

B. It decreases the boiling point

C. It has no effect

D. It causes boiling at any temperature

7. Which two refrigerant oils cannot be mixed?

A. PAG oil and mineral oil

B. Mineral oil and ester oil

C. PAG oil and POE oil

D. Ester oil and mineral oil

8. Latent heat of vaporization is the amount of heat required to change a liquid into a vapour.

A. The heat energy released during vapor condensation

B. The energy required to raise a solid to its melting point

C. The heat added during cooling of a gas

D. The amount of heat required to change a liquid into a vapour

9. What is the role of the compressor control valve?

A. Directs refrigerant into compressor to be compressed

B. Regulates refrigerant flow to evaporator

C. Senses pressure in suction line

D. Changes the stroke of the compressor piston

10. What does the sensing bulb on a TXV monitor?

A. Suction pressure

B. Discharge pressure

C. Outlet evaporator temperature

D. Ambient temperature

Answers

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

Explanations

1. Which of the following is a function of the switch located on the high-pressure side of an A/C system?

A. High pressure compressor cut out

B. Low ambient temp cut out

C. Evaporator fan speed control

D. Engine RPM limiter

The high-pressure side switch acts as a safety device that watches the refrigerant pressure after the condenser. If pressure climbs too high, it opens its contacts and stops the compressor (often by de-energizing the compressor clutch). This protects the compressor and the rest of the system from damage due to overpressure. That's why the correct description is the high-pressure compressor cut out. The other options don't fit because they describe functions unrelated to this safety switch: protecting the system from high pressure, controlling evaporator airflow or exterior conditions, or limiting engine speed.

2. What is the chemical makeup of HCFC refrigerants?

A. Chlorine based

B. Hydrogen/chlorine based

C. Hydrogen based

D. Fluorine based

HCFC refrigerants are hydrochlorofluorocarbons, molecules that include hydrogen and chlorine in their makeup, along with fluorine and carbon. That combination means the best description is that they are hydrogen/chlorine based. While fluorine and carbon are also parts of the molecules, the defining feature for identifying HCFCs is the presence of hydrogen together with chlorine. Saying they're chlorine-based or hydrogen-based alone would misrepresent their composition, and labeling them fluorine-based would ignore the hydrogen-chlorine relationship that characterizes HCFCs.

3. Which statement is true about refrigerant oil categories?

A. PAG is not used with refrigerants

B. POE oils are never used with refrigerants

C. Mineral oil is a refrigerant oil category

D. Silicone oil is a refrigerant oil category

Refrigerant oil categories depend on the base stock used to lubricate the compressor and their compatibility with the refrigerant. Mineral oil is a recognized category of refrigerant oil; it's the traditional lubricant used with older refrigerants and is still referenced as a refrigerant oil category. With newer refrigerants, other oils (like PAG and POE) are used because mineral oil doesn't always provide proper lubrication or compatibility with those refrigerants. The other statements are not correct because PAG and POE oils are indeed used with refrigerants in many systems, and silicone oil is not typically treated as a standard refrigerant oil category in this context.

4. Refrigerant after the condenser and before the metering device is typically in what condition?

A. Hot

B. High pressure

C. Subcooled

D. Liquid

The key idea is the state of the refrigerant as it leaves the condenser and precedes the metering device: it is a high-pressure subcooled liquid. The condenser removes heat from the refrigerant and turns it into a liquid at the condenser pressure, and then further cooling (subcooling) lowers its temperature below the saturation temperature for that pressure. This ensures the refrigerant stays in the liquid phase when entering the expansion device, preventing flash gas and improving system efficiency. While it is also liquid and at high pressure, the defining characteristic here is that it is subcooled, which is why this choice best describes the condition.

5. Which of the following statements describes when refrigerant oil must be replaced?

A. System has been open to atmosphere too long

B. System is saturated with moisture

C. Both A and B

D. Neither A nor B

The key idea is that refrigerant oil must be replaced whenever it has become contaminated by air or moisture, because those contaminants degrade lubrication and promote chemical problems in the system. If the system has been open to the atmosphere too long, air and moisture can enter the oil, causing oxidation and contamination. If the system is already saturated with moisture, the moisture content is high enough to cause acid formation and oil degradation. In either case, the oil's effectiveness as a lubricant and its ability to protect components are compromised, so replacement is required. Since both conditions describe contamination that necessitates changing the oil, the correct conclusion is that both are reasons to replace the refrigerant oil.

6. Which statement describes the effect of increasing pressure on a liquid's boiling point?

A. It increases the boiling point

B. It decreases the boiling point

C. It has no effect

D. It causes boiling at any temperature

Boiling happens when a liquid's vapor pressure matches the surrounding pressure. When you increase the surrounding pressure, the atmosphere is harder for molecules to escape into the vapor phase, so you have to heat the liquid to a higher temperature to reach the same vapor pressure. That's why the boiling point rises as pressure increases. For example, water boils at 100°C at 1 atm, but in a high-pressure environment it must get hotter before it boils. Lowering pressure does the opposite, making boiling occur at a lower temperature. The statement that increasing pressure raises the boiling point accurately describes this relationship.

7. Which two refrigerant oils cannot be mixed?

A. PAG oil and mineral oil

B. Mineral oil and ester oil

C. PAG oil and POE oil

D. Ester oil and mineral oil

Oil compatibility in refrigeration systems is crucial because different oil types don't always blend together. Polyalkylene glycol (PAG) oil is polar, while mineral oil is nonpolar. These fundamental differences make PAG and mineral oil immiscible, so if they are mixed they separate into distinct layers rather than forming a uniform oil blend. That separation means oil won't circulate properly, lubrication becomes inconsistent, and bearing wear or compressor damage can occur. Sludge and poor oil film formation can also result, further endangering the compressor. When servicing, if PAG ends up mixed with mineral oil, the system should be flushed and the oil replaced to restore proper lubrication. The other pairings do not pose the same immediate, universal incompatibility as PAG with mineral oil, which is why this combination is the best answer.

8. Latent heat of vaporization is the amount of heat required to change a liquid into a vapour.

A. The heat energy released during vapor condensation

B. The energy required to raise a solid to its melting point

C. The heat added during cooling of a gas

D. The amount of heat required to change a liquid into a vapour

Latent heat of vaporization is the amount of heat required to change a liquid into a vapour. This energy is needed to overcome the intermolecular forces holding the liquid together, allowing molecules to break free into the gas phase. Temperature stays constant during this phase change at the boiling point because all the added heat goes into changing the phase, not warming the substance. The other ideas describe different processes: heat released during condensation is the reverse process, heating a solid to its melting point is sensible heat used to raise temperature until melting, and cooling a gas involves removing heat, also sensible rather than latent energy. So the statement that matches the concept is the amount of heat required to change a liquid into a vapour.

9. What is the role of the compressor control valve?

A. Directs refrigerant into compressor to be compressed

B. Regulates refrigerant flow to evaporator

C. Senses pressure in suction line

D. Changes the stroke of the compressor piston

The function being tested is how the compressor receives refrigerant to be compressed. The compressor control valve directs the low-pressure refrigerant from the evaporator into the compressor so it can be squeezed to a higher pressure. It acts as the intake control, opening during the suction phase to admit gas and closing during compression to prevent backflow, ensuring the refrigerant moves in the correct direction through the compressor. This role is distinct from metering refrigerant to the evaporator (that's the job of the metering device), from sensing suction pressure (which is handled by sensors), and from changing the compressor's stroke or displacement.

10. What does the sensing bulb on a TXV monitor?

A. Suction pressure

B. Discharge pressure

C. Outlet evaporator temperature

D. Ambient temperature

The sensing bulb on a TXV monitors the temperature of the refrigerant as it leaves the evaporator. Placed on the suction line at the evaporator outlet, the bulb senses the outlet temperature (which reflects the evaporator's superheat). A temperature change in the bulb changes the pressure inside the bulb and through the capillary to the valve's diaphragm. When the evaporator outlet gets hotter (higher superheat), the bulb pressure rises and the valve tightens to reduce refrigerant flow; when it gets cooler, the bulb pressure falls and the valve opens more to increase flow. This feedback keeps the evaporator outlet at the desired superheat, preventing liquid refrigerant from reaching the compressor and promoting efficient heat transfer. It isn't measuring discharge pressure, ambient temperature, or suction pressure directly.

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!