

NATE AIR CONDITIONING SERVICE CERTIFICATION PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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THE FULL VERSION STUDY GUIDE**

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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 a common cause of ice build-up on the evaporator coil?**
 - A. High ambient temperatures
 - B. Low refrigerant levels or poor airflow
 - C. Dirty condenser coils
 - D. Excess humidity
- 2. What is the primary purpose of the evaporator in an air conditioning system?**
 - A. To expel heat from the refrigerant
 - B. To absorb heat from the indoor air
 - C. To compress refrigerant vapor
 - D. To filter air pollutants
- 3. A compressor with proper voltage and a hard start relay and capacitor draws lock rotor amps on startup. What is the most likely problem?**
 - A. The unit is overcharged.
 - B. The potential relay is open.
 - C. The start and run windings are open.
 - D. The pressure difference on the compressor is too great.
- 4. What could an unusual noise from the air conditioning unit indicate?**
 - A. Normal operation
 - B. Water leak
 - C. Potential mechanical failure
 - D. Energy efficiency
- 5. What is the typical operating pressure range for R-410A in a residential air conditioning system?**
 - A. 50 to 100 psi on the high side
 - B. 200 to 300 psi on the high side
 - C. 150 to 250 psi on the low side
 - D. 300 to 400 psi on the low side

- 6. What refrigerant is being phased out due to environmental concerns?**
- A. R-410A
 - B. R-32
 - C. R-22
 - D. R-134A
- 7. What are the symptoms of a failing expansion valve?**
- A. Constant noise from the unit
 - B. Fluctuating cooling performance and possible icing on the evaporator coil
 - C. Increased energy bills
 - D. Refrigerant leak detected
- 8. In HVAC systems, what is the purpose of a TXV (Thermal Expansion Valve)?**
- A. To regulate airflow through ducts.
 - B. To control refrigerant flow to the evaporator.
 - C. To manage compressor pressure.
 - D. To provide heating during winter.
- 9. What happens to the cooling capacity of an air conditioning system due to return air leakage in a hot attic?**
- A. It remains the same
 - B. It decreases
 - C. It increases
 - D. It fluctuates
- 10. What effect does high humidity have on the operation of an air conditioning system?**
- A. It increases energy efficiency
 - B. It reduces system noise
 - C. It reduces the system's cooling efficiency and comfort levels
 - D. It enhances air quality

Answers

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

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Explanations

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1. What is a common cause of ice build-up on the evaporator coil?

- A. High ambient temperatures
- B. Low refrigerant levels or poor airflow**
- C. Dirty condenser coils
- D. Excess humidity

Low refrigerant levels or poor airflow is indeed a common cause of ice build-up on the evaporator coil. When the refrigerant level is low, there may not be enough refrigerant circulating through the system to absorb heat effectively. This leads to a drop in the temperature of the evaporator coil below freezing, causing moisture in the air to condense and freeze on the coil. Similarly, poor airflow can contribute to this issue as well. If there are obstructions such as dirty air filters, blocked ducts, or malfunctioning fans, the airflow over the evaporator coil is restricted. When there is insufficient air passing over the coil, the heat exchange process is compromised, leading to lower temperatures and potential icing. Understanding these factors is critical for diagnosing and preventing issues related to ice build-up on evaporator coils, which can impact system efficiency and performance.

2. What is the primary purpose of the evaporator in an air conditioning system?

- A. To expel heat from the refrigerant
- B. To absorb heat from the indoor air**
- C. To compress refrigerant vapor
- D. To filter air pollutants

The primary purpose of the evaporator in an air conditioning system is to absorb heat from the indoor air. In the process of cooling, the evaporator coil uses a refrigerant that evaporates at low pressure and temperature. As indoor air passes over the evaporator coil, the refrigerant inside the coil absorbs heat from the air, causing the refrigerant to evaporate into a gas. This heat absorption results in a drop in air temperature, thereby cooling the indoor environment. This fundamental role of the evaporator is essential in achieving the intended temperature control and comfort in air conditioning systems.

3. A compressor with proper voltage and a hard start relay and capacitor draws lock rotor amps on startup. What is the most likely problem?

- A. The unit is overcharged.
- B. The potential relay is open.**
- C. The start and run windings are open.
- D. The pressure difference on the compressor is too great.

When a compressor draws lock rotor amps at startup, it indicates that the compressor is not able to start properly and is stuck in the locked rotor condition. In this particular scenario, if the voltage is correct and a hard start relay and capacitor have been installed, the most likely issue is that the potential relay is open. The potential relay is responsible for disconnecting the start winding once the compressor reaches a certain speed, allowing it to then run on the run winding. If this relay fails to close (i.e., it remains open when it shouldn't), the start winding does not receive the necessary current to help the compressor start, causing the compressor to draw excessive current and potentially preventing it from starting altogether. In contrast, options like the unit being overcharged or having an open winding would lead to different symptoms. Overcharging typically causes high pressure issues, while an open winding would not allow the compressor to draw current at all. A pressure difference that is too great can result from other issues but would not necessarily lead to the specific symptoms indicated by the lock rotor amps being drawn. Therefore, the condition of the open potential relay aligns perfectly with the symptoms observed in the question.

4. What could an unusual noise from the air conditioning unit indicate?

- A. Normal operation
- B. Water leak
- C. Potential mechanical failure**
- D. Energy efficiency

An unusual noise coming from an air conditioning unit often serves as a warning sign of potential mechanical failure. Air conditioning systems are designed to operate quietly, and any irregular sounds may indicate that components such as the compressor, fan, or motor are not functioning as intended. For instance, grinding noises might suggest that parts are rubbing together, while hissing sounds could be indicative of refrigerant leaks. Such noises can lead to more significant issues if not addressed promptly, including complete system failure. Normal operation does not typically involve any strange or loud sounds; consistent operation should be relatively silent. While a water leak can indeed produce noises, it usually has additional indicators, such as visible water pooling or moisture. Energy efficiency is generally reflected in the operational performance and not in the sounds emitted from the unit. Thus, when users hear unusual noises, it is crucial to investigate further to determine the underlying cause, as it often relates to mechanical integrity.

5. What is the typical operating pressure range for R-410A in a residential air conditioning system?

- A. 50 to 100 psi on the high side
- B. 200 to 300 psi on the high side**
- C. 150 to 250 psi on the low side
- D. 300 to 400 psi on the low side

The typical operating pressure range for R-410A in a residential air conditioning system on the high side is indeed between 200 to 300 psi. This higher pressure is a characteristic of R-410A, which is a hydrofluorocarbon (HFC) refrigerant that operates at a greater pressure compared to older refrigerants like R-22. In a properly functioning residential air conditioning system using R-410A, the high side pressure reflects the compressed refrigerant's pressures as it circulates through the system. These pressures ensure that the refrigerant can adequately release heat to the surrounding atmosphere while efficiently cooling the indoor air. Understanding the operational pressures is crucial for technicians because it allows for the diagnosis of system performance. If pressures deviate significantly from the normal operating range, it may indicate issues such as overcharging, air in the system, or refrigerant leaks. Understanding these ideal pressure ranges is essential for maintaining system efficiency and performance. The other pressure ranges listed either pertain to the low side of the system or reflect pressures that are atypical for R-410A, demonstrating an understanding of refrigerant pressure dynamics specific to R-410A.

6. What refrigerant is being phased out due to environmental concerns?

- A. R-410A
- B. R-32
- C. R-22**
- D. R-134A

The refrigerant being phased out due to environmental concerns is R-22. This compound, which is a hydrochlorofluorocarbon (HCFC), has been identified as contributing to ozone layer depletion and has a high global warming potential compared to newer alternatives. The phase-out process began in the late 2000s as part of international agreements, such as the Montreal Protocol, aimed at reducing substances that deplete the ozone layer. In 2010, the production of R-22 was significantly limited, and by 2020, it was banned for use in most new equipment. Consequently, stakeholders in the HVAC industry are encouraged to transition to more environmentally friendly refrigerants, such as R-410A or R-32, which have a lower potential for ozone depletion and global warming. Understanding the environmental impact of refrigerants like R-22 is crucial for technicians and engineers in order to comply with regulatory standards and to promote sustainable practices in HVAC systems.

7. What are the symptoms of a failing expansion valve?

- A. Constant noise from the unit
- B. Fluctuating cooling performance and possible icing on the evaporator coil**
- C. Increased energy bills
- D. Refrigerant leak detected

The symptoms of a failing expansion valve commonly include fluctuating cooling performance and possible icing on the evaporator coil. The expansion valve's primary role is to regulate the flow of refrigerant into the evaporator coil to ensure proper cooling. When it begins to fail, it can either allow too much or too little refrigerant to pass through. This inconsistency leads to fluctuations in temperature, causing the cooling performance to vary significantly. Moreover, when there is too much refrigerant due to a failure in the valve's ability to modulate flow, the evaporator coil can become too cold, resulting in a buildup of ice. Icing occurs because the excess refrigerant cools the coil beyond its intended operating temperature, causing moisture in the air to freeze on the surface. This phenomenon disrupts the heat exchange process, exacerbating the cooling performance issues. In contrast, while constant noise can indicate various issues within the unit, and increased energy bills could stem from many factors unrelated to just the expansion valve, and a refrigerant leak is a separate concern that would manifest in distinct symptoms. Thus, understanding how the expansion valve functions and the effects of its failure is crucial for diagnosing related issues in an air conditioning system.

8. In HVAC systems, what is the purpose of a TXV (Thermal Expansion Valve)?

- A. To regulate airflow through ducts.
- B. To control refrigerant flow to the evaporator.**
- C. To manage compressor pressure.
- D. To provide heating during winter.

The purpose of a Thermal Expansion Valve (TXV) in HVAC systems is to control the flow of refrigerant to the evaporator. The TXV regulates the amount of refrigerant that enters the evaporator based on the cooling demand of the system. It adjusts the flow in response to changes in temperature and pressure, ensuring that the evaporator is neither flooded with too much refrigerant nor starved of refrigerant. This regulation is critical for maximizing the efficiency of the cooling process and maintaining proper temperature control within the system. By precisely monitoring the pressures and temperatures within the evaporator, the TXV helps optimize the heat exchange process, allowing the refrigerant to absorb maximum heat from the indoor air. This leads to effective cooling while also preventing issues such as compressor damage or inefficient system performance. Understanding the function of the TXV is essential for anyone working with HVAC systems, as it plays a vital role in their operation and efficiency.

9. What happens to the cooling capacity of an air conditioning system due to return air leakage in a hot attic?

- A. It remains the same
- B. It decreases**
- C. It increases
- D. It fluctuates

When considering the impact of return air leakage in a hot attic on the cooling capacity of an air conditioning system, it is important to understand the dynamics of air circulation and temperature. In this scenario, if there is leakage of return air, especially in a hot attic, warmer air from the attic can infiltrate the return air ducts. This means that the air being returned to the system for cooling purposes is not only warmer than the ideal return air temperature, but it is also reducing the overall efficiency of the air conditioning unit. As the system attempts to cool this warmer return air, it must work harder to achieve the desired temperature. This excess workload can lead to a decrease in the system's effective cooling capacity because the air conditioning system is not only compensating for the heat gain from leakage but may also struggle to meet the cooling demands of the living space. Consequently, the cooling capacity of the air conditioning system is diminished, making it less effective in providing the desired temperature in the conditioned space. Thus, return air leakage leads to a decrease in performance and efficiency, affirming that the cooling capacity of an air conditioning system decreases due to this leakage in a hot attic.

10. What effect does high humidity have on the operation of an air conditioning system?

- A. It increases energy efficiency
- B. It reduces system noise
- C. It reduces the system's cooling efficiency and comfort levels**
- D. It enhances air quality

High humidity can significantly impact the performance of an air conditioning system, and one of its main effects is reducing the system's cooling efficiency and comfort levels. When the humidity level is high, the air conditioning unit must work harder to remove excess moisture from the air. This additional load can lead to several issues. Firstly, the air conditioning system's evaporator coil is responsible for absorbing heat and moisture from the indoor air. In high humidity conditions, the system's ability to remove heat is compromised as it spends more time dealing with moisture. Consequently, while the air may be cooled, it may still feel uncomfortable due to the lingering humidity, leading to a perceived reduction in cooling comfort. Moreover, air conditioning systems are designed to operate within a specific range of temperature and humidity levels. When humidity is elevated, it can cause the system to cycle on more frequently in an effort to maintain the desired indoor climate, ultimately leading to increased energy consumption and strain on the equipment. Therefore, the correct answer highlights the adverse effects of high humidity on both the cooling efficiency of the system and the overall comfort of the indoor environment. Understanding this relationship is crucial for HVAC technicians when assessing system performance and advising on conditions that can impede effective cooling.

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://nateacservice.examzify.com>

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

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