

# NATE Air Conditioning Service Certification 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

- 1. Supply ducts running through unconditioned spaces should be insulated and have what?**
  - A. Equal friction**
  - B. Excessive air velocity**
  - C. A vapor barrier**
  - D. A transition backing**
- 2. What component is used to reduce sound transmission and prevent water leaks on a rooftop air conditioner installation?**
  - A. Silicone caulk**
  - B. Roof flashing**
  - C. Curb gasket**
  - D. Roofing tar**
- 3. 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**
- 4. What can low airflow through an EVAP coil result in?**
  - A. Increased system efficiency**
  - B. Higher energy costs**
  - C. Freezing of the coil**
  - D. Reduced cooling capacity**
- 5. What can occur if a refrigerant line is improperly insulated?**
  - A. Increased energy efficiency**
  - B. Frost build-up and reduced performance**
  - C. Higher cooling capacity**
  - D. Enhanced safety**

- 6. What do the initials "S.E.E.R." represent?**
- A. Summer Energy Efficiency Rating**
  - B. Seasonal Energy Efficiency Ratio**
  - C. Supplementary Energy Efficiency Rating**
  - D. Summer Energy Efficiency Ratio**
- 7. Which type of compressor is known for its high efficiency and effectiveness in varying load conditions?**
- A. Scroll compressor**
  - B. Reciprocating compressor**
  - C. Screw compressor**
  - D. Centrifugal compressor**
- 8. What does moderate resistance on a "bellyband" crankcase heater indicate during a service check-up?**
- A. The crankcase heater will operate**
  - B. Line voltage is insufficient.**
  - C. Supply wires are oversized.**
  - D. Duct heaters are operating properly.**
- 9. If the technician believes that a hermetic compressor has a permanently open internal overload protector, when should the technician test the compressor?**
- A. Cool**
  - B. Bypassed**
  - C. Hot**
  - D. Running**
- 10. What component is responsible for compressing the refrigerant in an air conditioning system?**
- A. The evaporator**
  - B. The compressor**
  - C. The condenser**
  - D. The expansion valve**



## **Answers**

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

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## **Explanations**

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**1. Supply ducts running through unconditioned spaces should be insulated and have what?**

- A. Equal friction**
- B. Excessive air velocity**
- C. A vapor barrier**
- D. A transition backing**

Insulating supply ducts that run through unconditioned spaces is essential for maintaining energy efficiency and comfort within a building. In addition to insulation, the presence of a vapor barrier is crucial because it prevents moisture infiltration from the unconditioned space into the ducts. Moisture can lead to mold growth, reduced air quality, and damage to the ductwork and surrounding areas. The vapor barrier acts as a protective layer that limits the potential for condensation to form on the ducts due to temperature differences between the conditioned air inside the ducts and the colder, unconditioned air surrounding them. Proper use of a vapor barrier helps ensure that the conditioned air remains at the desired temperature and that the insulation remains effective. Other options, while they play roles in air distribution and efficiency, do not address the moisture control needed for ducts located in unconditioned spaces. For example, excessive air velocity can lead to increased noise and energy loss, while transition backing and equal friction methods focus more on the airflow dynamics rather than the insulation and moisture concerns associated with unconditioned spaces.

**2. What component is used to reduce sound transmission and prevent water leaks on a rooftop air conditioner installation?**

- A. Silicone caulk**
- B. Roof flashing**
- C. Curb gasket**
- D. Roofing tar**

The curb gasket is specifically designed to reduce sound transmission and prevent water leaks in rooftop air conditioner installations. It serves as a seal between the rooftop unit and the curb, which is the surface that the air conditioner sits on. By providing a flexible and durable barrier, the curb gasket effectively minimizes vibrations and sound that can travel through the structure, ensuring a quieter operation of the HVAC system. Additionally, the curb gasket plays a crucial role in moisture management. It prevents water from infiltrating the interior of the building by sealing any gaps that could allow rain water or snow melt to enter. This is particularly important on rooftops where water pooling can occur, and where a reliable seal is essential to protect the building and its contents from water damage. In contrast, the other options serve different purposes. Silicone caulk is great for sealing gaps and joints, but it is not specifically designed for sound attenuation or the unique challenges presented by rooftop installations. Roof flashing is used to direct water away from critical areas, but it doesn't provide the same level of soundproofing or sealing as a curb gasket. Roofing tar is often used for sealing and waterproofing, but again, it does not provide acoustic dampening properties. Thus, the curb gasket is the most suitable choice for

### 3. 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.

### 4. What can low airflow through an EVAP coil result in?

- A. Increased system efficiency
- B. Higher energy costs
- C. Freezing of the coil**
- D. Reduced cooling capacity

Low airflow through an evaporator coil can cause the coil to freeze. This occurs because the evaporator coil relies on a specific amount of airflow to function properly. When airflow is decreased, the refrigerant within the coil may not get adequately warmed by the passing air, leading to a situation where the temperature of the coil drops significantly. Moisture in the air can then condense on the coil and freeze, creating ice build-up. This ice not only limits heat exchange efficiency but can also lead to further complications and damage to the system if not addressed. Thus, the consequence of low airflow is directly linked to the formation of ice on the coil, showcasing the importance of maintaining proper airflow for effective operation of air conditioning systems.

**5. What can occur if a refrigerant line is improperly insulated?**

- A. Increased energy efficiency**
- B. Frost build-up and reduced performance**
- C. Higher cooling capacity**
- D. Enhanced safety**

Improper insulation of a refrigerant line can lead to frost build-up and reduced performance. When a refrigerant line is not adequately insulated, it can allow heat transfer between the refrigerant and the surrounding air. This heat transfer can cause the refrigerant to absorb heat and result in condensation on the outside of the line, which subsequently freezes when temperatures are low enough. This accumulation of frost around the line can restrict airflow and impede the system's ability to cool effectively, leading to decreased performance and efficiency. The performance of the air conditioning system depends on a consistent refrigerant flow and temperature. When frost forms on the refrigerant lines, it can create blockages and reduce the overall efficiency of the system, showing how critical proper insulation is in maintaining optimal operational conditions. Ensuring that refrigerant lines are well insulated helps maintain low temperatures inside the line, preventing condensation and frost formation, which in turn supports effective cooling performance.

**6. What do the initials "S.E.E.R." represent?**

- A. Summer Energy Efficiency Rating**
- B. Seasonal Energy Efficiency Ratio**
- C. Supplementary Energy Efficiency Rating**
- D. Summer Energy Efficiency Ratio**

The initials "S.E.E.R." stand for Seasonal Energy Efficiency Ratio. This metric is essential in assessing the efficiency of air conditioning and heat pump systems. It calculates the cooling output during a typical cooling season divided by the total electric energy input during that same season. The focus on "seasonal" indicates that this measure takes into account the varying conditions that may affect performance over time, leading to a more accurate representation of how efficiently a cooling system operates throughout its intended seasonal use. Understanding the S.E.E.R. value is crucial for both consumers and HVAC professionals, as it helps compare the energy efficiency of different units. A higher S.E.E.R. rating signifies better energy efficiency, which can lead to lower operational costs and a reduced environmental impact due to lower energy consumption. This is particularly significant as energy efficiency ratings directly impact utility expenses and are often central to discussions regarding energy policies and environmental responsibility in the HVAC industry.

**7. Which type of compressor is known for its high efficiency and effectiveness in varying load conditions?**

- A. Scroll compressor**
- B. Reciprocating compressor**
- C. Screw compressor**
- D. Centrifugal compressor**

The scroll compressor is known for its high efficiency and effectiveness in varying load conditions due to its unique design and operating principles. This type of compressor utilizes two spiral-shaped scrolls, one fixed and the other orbiting around the fixed scroll, to compress the refrigerant. This design allows for continuous compression without having to rely on valves, which reduces mechanical loss and improves overall efficiency. Scroll compressors also operate quietly and are capable of handling a wide range of load conditions effectively. They can modulate their output based on the cooling demand, which makes them particularly suitable for applications requiring variable tonnage, such as residential air conditioning systems. Their efficient operation results in lower energy consumption compared to other compressor types, especially in applications where load conditions fluctuate frequently. In contrast, other compressor types, such as reciprocating or centrifugal compressors, may not offer the same level of efficiency in variable load conditions, largely due to their operational characteristics and mechanical designs. For example, reciprocating compressors often have a fixed displacement and can struggle with efficiency when loads vary significantly. Centrifugal compressors are typically better suited for constant load applications and may not perform as well when load demands fluctuate.

**8. What does moderate resistance on a "bellyband" crankcase heater indicate during a service check-up?**

- A. The crankcase heater will operate**
- B. Line voltage is insufficient.**
- C. Supply wires are oversized.**
- D. Duct heaters are operating properly.**

Moderate resistance on a "bellyband" crankcase heater suggests that the heater will operate effectively. A crankcase heater is designed to warm the compressor oil, preventing it from becoming too viscous and ensuring proper lubrication when the system starts. Moderate resistance indicates that the heating element is intact and capable of generating heat, which is essential for the proper functioning of the compressor during startup, especially in colder conditions. This level of resistance typically falls within the manufacturer's specifications for normal operation. If the resistance were too low or too high, it could indicate an issue with the heater that would require further investigation. Therefore, moderate resistance confirms the heater is functional and is a good sign that it will perform as intended when powered on.

**9. If the technician believes that a hermetic compressor has a permanently open internal overload protector, when should the technician test the compressor?**

**A. Cool**

**B. Bypassed**

**C. Hot**

**D. Running**

Testing a hermetic compressor when it is cool is ideal because this state allows for the evaluation of the compressor's internal components without the influence of additional heat that may affect its operation. A cool compressor will not be in a state of thermal expansion as seen when the unit is running, making it easier to measure electrical resistance and conductivity without confounding factors that may indicate a functioning or compromised compressor. In this scenario, if the internal overload protector is believed to be permanently open, cooling the compressor stabilizes it at a baseline temperature. This provides a clearer indication of whether the compressor can energize and operate correctly under normal conditions, without the pressure and heat that occur during operation. Testing a compressor while it is bypassed or while it is running would introduce other complications that could confuse the results of the test. Running conditions can lead to erroneous readings due to fluctuating pressures and temperatures, while a bypassed compressor may not represent normal operational conditions, leading to misleading conclusions about its functionality.

**10. What component is responsible for compressing the refrigerant in an air conditioning system?**

**A. The evaporator**

**B. The compressor**

**C. The condenser**

**D. The expansion valve**

In an air conditioning system, the compressor plays a critical role in the refrigeration cycle by compressing the refrigerant. This component takes in low-pressure refrigerant vapor from the evaporator and compresses it, converting it into high-pressure vapor. The process of compression raises the temperature and pressure, allowing the refrigerant to circulate through the system efficiently. Once the refrigerant is compressed, it moves to the condenser where it will release heat and condense into a liquid state. The compressor is essential for maintaining the flow of refrigerant throughout the system and ensuring effective heat exchange. By increasing the pressure of the refrigerant, the compressor enables it to absorb and release heat at different stages of the refrigeration cycle, contributing to the cooling effect that air conditioning systems provide.



## 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://nateacservice.examzify.com>**

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