

Refrigeration and Air Conditioning Mechanics (313A) Advanced 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

- 1. If a rooftop unit has relays and contractors chattering, where should troubleshooting begin?**
 - A. At the compressor unit**
 - B. On the secondary side of the transformer**
 - C. In the thermostat connections**
 - D. At the ductwork connection**
- 2. How can you identify if a freeze stat has tripped on an air handler?**
 - A. The outdoor dampers will be fully closed with the fan off**
 - B. The indoor temperature will drop significantly**
 - C. The humidity levels will increase**
 - D. The compressor will shut down**
- 3. What is the purpose of a muffler in a refrigeration system?**
 - A. To increase pressure**
 - B. To reduce noise**
 - C. To enhance heat exchange**
 - D. To optimize airflow**
- 4. Which of the following are the basic elements of a control system?**
 - A. Controller, feedback, actuator**
 - B. Controller, controlled device, source of energy**
 - C. Controller, transmitter, receiver**
 - D. Controller, sensor, output device**
- 5. What is the relationship between the defrost heater and the termination solenoid?**
 - A. The heater remains on when the solenoid is energized**
 - B. The heater turns off when the solenoid is energized**
 - C. Both components are independent of each other**
 - D. The heater only functions when the solenoid is off**

- 6. Which pressure controls the operation of an internally equalized TXV?**
- A. The difference between the gas at the evaporator inlet and the temperature of the gas at the evaporator outlet**
 - B. The temperature of the gas at the compressor outlet**
 - C. The pressure at the condenser outlet**
 - D. The pressure at the evaporator outlet**
- 7. What is the effect of a higher pressure in a refrigeration system?**
- A. Decreased refrigerant flow**
 - B. Increased compressor load**
 - C. Lower cooling capacity**
 - D. Optimal energy efficiency**
- 8. When mixing acid and water, always:**
- A. Mix equal volumes**
 - B. Pour acid into water**
 - C. Pour water into acid**
 - D. Use an acid-resistant container**
- 9. What is the typical air velocity range through comfort cooling evaporators?**
- A. 100-200 fpm**
 - B. 300-500 fpm**
 - C. 600-800 fpm**
 - D. 900-1200 fpm**
- 10. What is one potential reason for an electric motor to overheat?**
- A. Lack of lubrication**
 - B. Excessive load**
 - C. Any of the answers apply**
 - D. Improper voltage supply**

Answers

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

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Explanations

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1. If a rooftop unit has relays and contractors chattering, where should troubleshooting begin?

- A. At the compressor unit**
- B. On the secondary side of the transformer**
- C. In the thermostat connections**
- D. At the ductwork connection**

Troubleshooting relays and contactors that are chattering in a rooftop unit should ideally begin on the secondary side of the transformer. This is because a chattering symptom typically indicates an issue with power supply inconsistencies or low voltage. The transformer steps down the line voltage to a lower voltage suitable for control circuits, and problems in this area such as insufficient voltage can directly lead to chattering. By inspecting the secondary side of the transformer, one can determine if the voltage is stable and sufficient to properly operate the control devices. If the voltage is inadequate, it may cause the relays and contactors to rapidly engage and disengage, resulting in the chattering noise. This step is crucial before investigating other components like the compressor, thermostat connections, or ductwork, as these areas may not be the source of the issue if the primary power supply is unstable.

2. How can you identify if a freeze stat has tripped on an air handler?

- A. The outdoor dampers will be fully closed with the fan off**
- B. The indoor temperature will drop significantly**
- C. The humidity levels will increase**
- D. The compressor will shut down**

Identifying if a freeze stat has tripped on an air handler involves understanding its function. A freeze stat is designed to prevent freezing conditions in the air handler by shutting down the system when the temperature drops to a certain point. When the freeze stat trips, it generally responds by sending a signal to close the outdoor dampers to prevent additional cold air from entering the system and further lowering the temperature inside the air handler. This action typically occurs while the fan is off, as the system seeks to halt the progression of freezing. Thus, if you notice that the outdoor dampers are fully closed and the fan is not operating, it indicates that the freeze stat has activated to prevent potential damage to the system due to low temperatures. The other choices do not directly indicate a freeze stat trip: the temperature drop implies the issue but is not a definitive sign of activation; as for humidity levels rising or the compressor shutting down, these can occur for various reasons not strictly related to a freeze stat tripping.

3. What is the purpose of a muffler in a refrigeration system?

- A. To increase pressure
- B. To reduce noise**
- C. To enhance heat exchange
- D. To optimize airflow

The purpose of a muffler in a refrigeration system is to reduce noise. Within any refrigeration system, components such as compressors can generate significant sound during operation. A muffler is strategically placed in the system to dampen this noise, enabling a quieter environment. This is particularly important in residential and commercial applications where excessive noise can be disruptive to patients, customers, or residents. The design of a muffler allows for sound waves to dissipate, often using baffles or chambers that slow down and redirect the sound energy. This results in a more pleasant operational sound level without affecting the system's efficiency or functionality. In contrast, while enhancing heat exchange, optimizing airflow, or increasing pressure involve critical aspects of a refrigeration system, they are not roles served by a muffler. These functions are typically managed by other components such as evaporators, condensers, or compressors, respectively, which are designed specifically for thermal management and fluid dynamics within the system.

4. Which of the following are the basic elements of a control system?

- A. Controller, feedback, actuator
- B. Controller, controlled device, source of energy**
- C. Controller, transmitter, receiver
- D. Controller, sensor, output device

The basic elements of a control system include a controller, a controlled device, and a source of energy. The controller is responsible for regulating the operation of the controlled device, which is the component that needs to be controlled, such as a furnace, air conditioning unit, or refrigeration system. The source of energy provides the necessary power for the controlled device to operate. In any control system, the controller processes information from various inputs (like sensor data) and makes decisions to maintain the desired state or performance of the controlled device. The controlled device, receiving instructions from the controller, performs the necessary actions to achieve the desired outcome, and the source of energy enables this process by supplying the energy needed for operation. Therefore, the combination of these three elements—controller, controlled device, and source of energy—forms a complete basic control system, allowing effective regulation and functionality in HVAC and refrigeration applications.

5. What is the relationship between the defrost heater and the termination solenoid?

- A. The heater remains on when the solenoid is energized**
- B. The heater turns off when the solenoid is energized**
- C. Both components are independent of each other**
- D. The heater only functions when the solenoid is off**

The relationship between the defrost heater and the termination solenoid is significant in the operation of refrigeration systems that feature a defrost cycle, such as those found in refrigerators and heat pumps. When the defrost cycle is activated, the defrost heater is energized to melt any accumulated frost or ice from the evaporator coils. The termination solenoid plays a crucial role in controlling this process. When the solenoid is energized, it indicates that the defrost cycle has completed or that the temperature has risen sufficiently to ensure that the frost has melted. In this state, the heater is designed to turn off to prevent overheating and to conserve energy, ensuring that the system functions efficiently without excessive heat buildup. This interaction ensures that the system operates effectively and responds appropriately to the conditions within the evaporator, thus maintaining optimal performance. The mechanism behind this is fundamental to the operation of refrigeration systems, where controlling the defrost cycle is essential for maintaining efficiency and preventing damage from ice buildup.

6. Which pressure controls the operation of an internally equalized TXV?

- A. The difference between the gas at the evaporator inlet and the temperature of the gas at the evaporator outlet**
- B. The temperature of the gas at the compressor outlet**
- C. The pressure at the condenser outlet**
- D. The pressure at the evaporator outlet**

An internally equalized thermostatic expansion valve (TXV) operates by modulating the flow of refrigerant into the evaporator based on the pressure difference created by the refrigerant's saturation vapor temperature at both the inlet and outlet of the evaporator. This pressure difference is directly influenced by the vapor pressure readings taken at the inlet and outlet of the evaporator. The TXV uses this information to maintain the desired superheat, ensuring that the refrigerant is efficiently evaporated and preventing liquid refrigerant from returning to the compressor. By measuring the pressure of the refrigerant gas at the evaporator outlet (where the temperature is directly correlated to its latent heat of vaporization) against the pressure of the refrigerant gas entering the evaporator, the TXV can adjust how much refrigerant enters the evaporator. This mechanism is crucial for maintaining system efficiency and preventing compressor damage.

7. What is the effect of a higher pressure in a refrigeration system?

- A. Decreased refrigerant flow**
- B. Increased compressor load**
- C. Lower cooling capacity**
- D. Optimal energy efficiency**

A higher pressure in a refrigeration system primarily leads to an increased compressor load. This is because the compressor must work harder to compress the refrigerant gas at elevated pressures, which increases the energy consumed by the compressor to maintain the desired cooling effect. When the pressure in the system rises, the compressor has to overcome a greater resistance to move the refrigerant through the system, thereby increasing its workload. This relationship is crucial in understanding system operation. As the pressure rises, the thermodynamic properties of the refrigerant change, typically resulting in higher discharge temperatures and potential inefficiencies in the system if not properly managed. Additionally, consistently high pressures can lead to wear and tear on the compressor, reducing its lifespan and efficiency if not addressed. Understanding the implications of increased pressure in the system is vital for maintaining optimal performance and energy use in refrigeration systems.

8. When mixing acid and water, always:

- A. Mix equal volumes**
- B. Pour acid into water**
- C. Pour water into acid**
- D. Use an acid-resistant container**

When mixing acid and water, the correct practice is to pour acid into water. This method is important for safety reasons. When concentrated acid is added to water, it dissipates its heat into a larger volume of liquid, which helps to prevent splattering or violent reactions. This is critical because adding water to a concentrated acid can lead to an exothermic reaction that generates heat, potentially causing the acid to splash back or produce dangerous fumes. In contrast, if water is poured into acid, the water can quickly turn into steam, and the rapid generation of steam can cause the mixture to foam or erupt violently. This is why storing acids in acid-resistant containers is also necessary but does not replace the correct procedure for mixing. Mixing equal volumes of acid and water may seem practical but does not address the safety issues associated with adding water to acid. Therefore, the practice of always pouring acid into water ensures that the mixing is done safely and minimizes the risk of accidents.

9. What is the typical air velocity range through comfort cooling evaporators?

- A. 100-200 fpm**
- B. 300-500 fpm**
- C. 600-800 fpm**
- D. 900-1200 fpm**

The typical air velocity range through comfort cooling evaporators is indeed in the range of 300 to 500 feet per minute (fpm). This range is established to ensure optimal heat exchange efficiency while maintaining a comfortable environment for occupants. At air velocities within this range, the evaporator can effectively absorb heat from the air, allowing for effective cooling while minimizing noise levels. Higher velocities can lead to increased noise and reduced comfort, as air movement becomes more noticeable and can create drafts, making a space feel less pleasant. Additionally, velocities that are too low can result in inadequate heat transfer, leading to inefficient cooling performance. Overall, maintaining an air velocity within the 300-500 fpm range strikes a balance between effective cooling, efficiency, and comfort, which is crucial in both residential and commercial air conditioning systems.

10. What is one potential reason for an electric motor to overheat?

- A. Lack of lubrication**
- B. Excessive load**
- C. Any of the answers apply**
- D. Improper voltage supply**

The selection indicating that any of the answers apply highlights the fact that there are multiple potential causes for an electric motor to overheat, each contributing to the overall issue in distinct ways. Lack of lubrication can lead to increased friction within the motor. As the components rub against each other without adequate lubrication, the friction generates heat, raising the motor's temperature. This excess heat can eventually lead to motor failure if not addressed. Excessive load is another contributing factor. If a motor is required to drive a load that exceeds its rated capacity, it will work harder than designed, causing it to draw more current and generate additional heat. Prolonged operation under these conditions can result in overheating and potential burnout. Improper voltage supply also plays a significant role in overheating. If the voltage supplied to the motor is either too high or too low, the motor will not operate efficiently. A lower voltage may cause the motor to draw more current to maintain the desired output, while higher voltage may lead to increased internal losses, both scenarios contributing to overheating. By recognizing that any of these situations can independently or collectively cause a motor to overheat, it becomes clear that a comprehensive understanding of proper motor maintenance, load calculations, and voltage requirements is essential in preventing these issues.

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://313advanced.examzify.com>

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