

FDNY OPERATING ENGINEER PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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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. Which type of compressor typically has the smallest displacement for a given operating condition?**
 - A. Centrifugal
 - B. Reciprocating
 - C. Rotary
 - D. Screw

- 2. What type of condenser utilizes swirls to enhance water circulation?**
 - A. Horizontal shell and tube condenser
 - B. Vertical shell and tube condenser
 - C. Shell and coil condenser
 - D. Evaporative condenser

- 3. When is a condenser most efficient at heat transfer?**
 - A. When the refrigerant is at low pressure
 - B. When the ambient temperature is high
 - C. When the condenser water is cooler
 - D. When the refrigerant vapor is superheated

- 4. What is the primary role of an evaporator in a refrigeration system?**
 - A. To increase the pressure of refrigerant
 - B. To absorb heat from the environment
 - C. To release heat to the atmosphere
 - D. To maintain constant humidity levels

- 5. What process is required to change water at 32 degrees F into ice at 32 degrees F?**
 - A. Latent heat of fusion
 - B. Latent heat of vaporization
 - C. Specific heat capacity
 - D. Convection cooling

- 6. What advantage do semi-hermetic compressors have compared to hermetic compressors?**
- A. They are less expensive
 - B. They are completely sealed
 - C. They allow for field servicing
 - D. They are more efficient
- 7. If ammonia has leaked into the brine, what color will Nessler's solution turn?**
- A. Green
 - B. Blue
 - C. Yellow
 - D. Red
- 8. In a reciprocating refrigeration system with an evaporative condenser, where should the muffler be installed?**
- A. Between the evaporator and TEV
 - B. Between the condenser and receiver
 - C. Between the compressor and condenser
 - D. Between the receiver and oil trap
- 9. What are the three methods of heat transfer?**
- A. Conduction, vaporization, and condensation
 - B. Convection, conduction, and sublimation
 - C. Radiation, conduction, and convection
 - D. Condensation, convection, and radiation
- 10. What is the state of the refrigerant as it enters and exits a condenser?**
- A. Low pressure gas in, high pressure liquid out
 - B. High pressure gas in, low pressure liquid out
 - C. High pressure gas in, high pressure liquid out
 - D. Low pressure gas in, low pressure liquid out

Answers

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

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Explanations

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1. Which type of compressor typically has the smallest displacement for a given operating condition?

- A. Centrifugal
- B. Reciprocating
- C. Rotary**
- D. Screw

The rotary compressor is known for having the smallest displacement for a given operating condition when compared to centrifugal, reciprocating, and screw compressors. This is largely due to its design and operational principles. Rotary compressors typically utilize a mechanism where two rotors move against each other within a tight tolerance, allowing them to compress the gas with minimal waste of volume. This compact design allows for efficient operation with smaller displacement, meaning they can perform effectively while occupying less space. In contrast, centrifugal compressors generally require a larger size because they rely on high-speed rotating impellers to generate pressure, making them less space-efficient for the same output compared to rotary designs. Reciprocating compressors involve pistons and cylinders, which take up more space and have more mechanical complexity leading to larger displacement for the same performance. Similarly, screw compressors, while efficient, also tend to be bulkier due to their design involving two intertwined helical rotors, further increasing their displacement relative to rotary compressors. Thus, the efficiency and compactness in displacement that rotary compressors provide for various operational conditions make them the ideal choice when a smaller displacement is desired.

2. What type of condenser utilizes swirls to enhance water circulation?

- A. Horizontal shell and tube condenser
- B. Vertical shell and tube condenser**
- C. Shell and coil condenser
- D. Evaporative condenser

The type of condenser that utilizes swirls to enhance water circulation is the vertical shell and tube condenser. In this design, the vertical arrangement of the tubes allows for a more effective gravitational flow of water, which helps in creating swirls or turbulent flow. This swirling action increases the efficiency of heat transfer by improving the mixing of water within the shell, leading to better heat exchange between the cooling water and the refrigerant or fluid being condensed. The vertical shell design is particularly advantageous because it reduces the likelihood of air binding and provides better drainage, thereby promoting consistent and effective cooling. The swirling motion generated in a vertical configuration helps to break up boundary layers that could otherwise inhibit heat transfer, enhancing overall performance. Other types, such as horizontal shell and tube condensers and evaporative condensers, do not prioritize swirl-induced circulation to the same extent. Horizontal designs often rely on natural flow which does not create the same level of turbulence. Shell and coil condensers utilize a different physical structure that is more compact but does not focus on swirling mechanisms in the same way as vertical shell and tube condensers.

3. When is a condenser most efficient at heat transfer?

- A. When the refrigerant is at low pressure
- B. When the ambient temperature is high
- C. When the condenser water is cooler**
- D. When the refrigerant vapor is superheated

A condenser operates most efficiently at heat transfer when the condensing medium, such as condenser water, is cooler. This cooler water helps to maintain a greater temperature differential between the refrigerant and the surrounding environment, allowing heat to transfer more effectively from the refrigerant to the water. When the condenser water is cooler, it can absorb more heat from the refrigerant, which enhances the overall efficiency of the heat exchange process. As the temperature of the water decreases, it enables the refrigerant to condense more easily, thereby improving the condenser's performance. In contrast, if the refrigerant is at a low pressure, it may not condense properly, as lower pressure usually correlates with lower temperatures. When ambient temperatures are high, it reduces the temperature gradient necessary for efficient heat exchange, making heat transfer less effective. Lastly, having superheated refrigerant increases the temperature of the refrigerant further, which can also reduce efficient heat transfer since the refrigerant needs to be cooled down below its boiling point to condense effectively.

4. What is the primary role of an evaporator in a refrigeration system?

- A. To increase the pressure of refrigerant
- B. To absorb heat from the environment**
- C. To release heat to the atmosphere
- D. To maintain constant humidity levels

The primary role of an evaporator in a refrigeration system is to absorb heat from the environment. This process happens when the refrigerant inside the evaporator coil evaporates, turning from a liquid into a gas as it absorbs heat from the surrounding air or fluid. This heat absorption creates a cooling effect, which is fundamental to the refrigeration cycle. As the refrigerant absorbs heat, it effectively lowers the temperature of the area being cooled, whether it be inside a refrigerator, air conditioning system, or another type of refrigeration application. This process is crucial for maintaining the desired temperature within a refrigerated space. The other options relate to different functions or components within a refrigeration system. While increasing pressure or releasing heat may occur in other components like compressors or condensers, and while humidity control is an aspect of some HVAC systems, those functions do not pertain to the primary operation of the evaporator itself. Thus, understanding the evaporator's heat absorption role is key to grasping the overall operation of refrigeration systems.

5. What process is required to change water at 32 degrees F into ice at 32 degrees F?

- A. Latent heat of fusion**
- B. Latent heat of vaporization
- C. Specific heat capacity
- D. Convection cooling

To change water at 32 degrees Fahrenheit into ice at the same temperature, the concept of latent heat of fusion is crucial. Latent heat of fusion refers to the amount of thermal energy needed to change a substance from a liquid phase to a solid phase without changing its temperature. In this situation, water at 32 degrees F is at its freezing point. To convert this water into ice, energy must be removed from the water. By removing this energy, the molecules of water lose kinetic energy and begin to form a solid structure—ice—while remaining at a constant temperature of 32 degrees F during this phase change. The other concepts mentioned do not apply to this specific process. For instance, latent heat of vaporization pertains to the heat energy required to turn a liquid into a gas, which is not relevant here. Specific heat capacity relates to the amount of energy needed to change the temperature of a unit mass of a substance by one degree, which also does not involve a phase change. Convection cooling involves transferring heat through fluid motion, which is not the primary mechanism for changing water into ice at 32 degrees F. Thus, the correct process needed to accomplish the change from water to ice at the same temperature is the latent heat

6. What advantage do semi-hermetic compressors have compared to hermetic compressors?

- A. They are less expensive
- B. They are completely sealed
- C. They allow for field servicing**
- D. They are more efficient

Semi-hermetic compressors provide the advantage of allowing for field servicing, which is a significant factor for maintenance and repair. Unlike hermetic compressors that are completely sealed and require replacement if they fail, semi-hermetic models can be opened in the field for repairs. This capability not only reduces downtime but also can be more cost-effective in the long run as it allows technicians to address specific issues without needing to replace the entire unit. This flexibility in servicing means that components such as the motor or valves can be accessed and repaired or replaced as needed, minimizing the overall operational disruption. In large facilities or systems where prolonged downtime could lead to significant losses, this feature is especially valuable. While other options may have their own merits, they do not capture the unique benefit that semi-hermetic compressors offer concerning maintenance and serviceability.

7. If ammonia has leaked into the brine, what color will Nessler's solution turn?

- A. Green
- B. Blue
- C. Yellow**
- D. Red

Nessler's solution is a chemical reagent used specifically for detecting ammonia. When ammonia is present, Nessler's solution reacts to form a colored complex that indicates the presence of ammonium ions. The color change of Nessler's solution in this case is a characteristic yellow hue that signifies the presence of ammonia. The reaction involves the formation of a yellow-colored compound, which is due to the formation of a diazonium compound from the reaction between Nessler's reagent and ammonia. This color change is a vital indicator in water quality testing, particularly in chlorinated water systems where ammonia presence needs to be monitored. Understanding this context about Nessler's solution highlights its importance in environmental monitoring and safety, as well as its role in identifying potential hazards due to ammonia leaks. The other color options would not represent a correct reaction to ammonia in Nessler's solution, as they do not align with the established chemistry of the reagent.

8. In a reciprocating refrigeration system with an evaporative condenser, where should the muffler be installed?

- A. Between the evaporator and TEV
- B. Between the condenser and receiver
- C. Between the compressor and condenser**
- D. Between the receiver and oil trap

In a reciprocating refrigeration system, the placement of the muffler is essential for the effective operation and longevity of the system. The correct installation point for the muffler is between the compressor and the condenser. This location is crucial because the muffler helps to minimize the noise created by the pulsating flow of refrigerant that is discharged from the compressor. By placing the muffler here, it reduces sound waves and vibrations resulting from compression cycles, providing a quieter operation. Moreover, it helps in smoothing out the flow of refrigerant, minimizing pressure fluctuations that could adversely affect system performance and efficiency. Installing the muffler at this point also ensures that any potential liquid refrigerant returns to the compressor in a stratified manner. This can help in preventing liquid slugging, which can damage the compressor and decrease the system's efficiency. The other placement options do not provide the same benefits in terms of noise reduction and preventing compressor damage, making the chosen location between the compressor and condenser optimal for overall system health and performance.

9. What are the three methods of heat transfer?

- A. Conduction, vaporization, and condensation
- B. Convection, conduction, and sublimation
- C. Radiation, conduction, and convection**
- D. Condensation, convection, and radiation

The three methods of heat transfer are conduction, convection, and radiation. Conduction is the transfer of heat through a solid material, where energy is transferred through direct contact between molecules. This method is efficient in solids, particularly metals, due to their closely packed molecules, which facilitate rapid energy transfer. Convection involves the movement of heat through fluids (liquids and gases) by the actual movement of the fluid itself. As a fluid is heated, it becomes less dense and rises, while cooler, denser fluid sinks. This creates a convection current that effectively distributes thermal energy. Radiation is the transfer of heat in the form of electromagnetic waves, such as infrared radiation. This method does not require a medium, allowing heat to be transferred through the vacuum of space, exemplified by the warmth of the sun reaching Earth. The other options include terms such as vaporization, sublimation, and condensation, which relate to phase changes of matter but do not represent fundamental methods of heat transfer in the same way conduction, convection, and radiation do.

10. What is the state of the refrigerant as it enters and exits a condenser?

- A. Low pressure gas in, high pressure liquid out
- B. High pressure gas in, low pressure liquid out
- C. High pressure gas in, high pressure liquid out**
- D. Low pressure gas in, low pressure liquid out

In a refrigeration cycle, the condenser plays a critical role in the heat exchange process. As refrigerant enters the condenser, it is in a gaseous form and typically under high pressure. This is a result of it having just exited the compressor, where its temperature and pressure were elevated. When the high-pressure gas passes through the condenser, heat is removed from the refrigerant, usually through a cooling medium like air or water. During this heat exchange, the refrigerant condenses into a liquid state. By the time it exits the condenser, the refrigerant is now in a high-pressure liquid state. This transition is crucial as it ensures that the refrigerant is prepared for the next stage of the refrigeration cycle, where it will expand and enter the evaporator. Thus, the correct description of the state of the refrigerant as it enters and exits the condenser is indeed high pressure gas in and high pressure liquid out. Understanding this process is fundamental for operating engineers, as it underlines the principles of thermodynamics applied in refrigeration systems.

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:

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

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