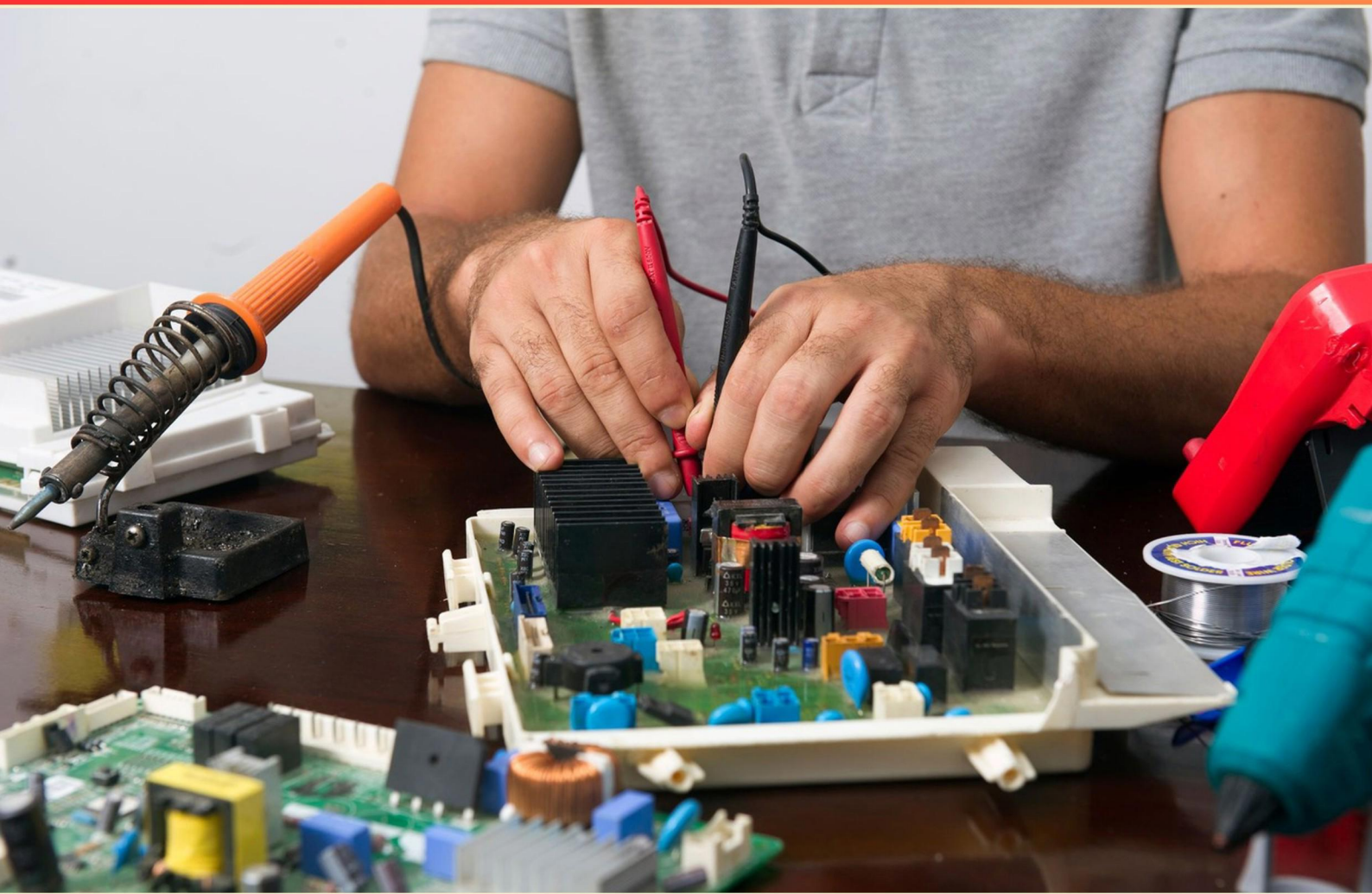


HVAC MATH PRACTICE TEST (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

VISIT US ONLINE FOR
THE FULL VERSION STUDY GUIDE

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Table of Contents

Copyright	1
Table of Contents	2
Introduction	3
How to Use This Guide	4
Questions	5
Answers	8
Explanations	10
Next Steps	15

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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 does the term "enthalpy" refer to in HVAC physics?
 - A. Total heat content of a system
 - B. Measure of thermal resistance
 - C. Amount of work done by a machine
 - D. Rate of heat transfer
2. What effect does high humidity have on the human body?
 - A. It promotes better cooling
 - B. It can cause discomfort and hinder cooling mechanisms
 - C. It has no effect on the human body
 - D. It improves overall health
3. If a compound gauge reads 248 psig and the actual line temperature is 100°F, what is the subcooling using R-22 refrigerant?
 - A. 14 F
 - B. 16 F
 - C. 18 F
 - D. 20 F
4. What is the approximate air quantity in CFM through a 14 by 14 inch rectangular duct at 1000 FPM velocity?
 - A. 1000 CFM
 - B. 1150 CFM
 - C. 1300 CFM
 - D. 1500 CFM
5. What is the U value of a wall section with R values of 19, 0.015, and 0.02?
 - A. 0.052
 - B. 0.074
 - C. 0.040
 - D. 0.065

6. What unit measures thermal resistance?

- A. R-value
- B. U-value
- C. BTU/h
- D. W/m²K

7. How do you convert cubic feet to gallons?

- A. Gallons = Cubic Feet x 3.14
- B. Gallons = Cubic Feet x 7.48
- C. Gallons = Cubic Feet / 7.48
- D. Gallons = Cubic Feet x 10

8. How do you calculate the size of a heat pump system?

- A. Size = Total Heating BTUs needed × Efficiency Coefficient
- B. Size = (Total Heating BTUs needed) / (Efficiency Coefficient)
- C. Size = Heating Load × COP
- D. Size = (Efficiency Coefficient) / (Total BTUs needed)

9. What is the required duct size for a duct system delivering 1,000 cfm with a pressure drop of 0.25 IWC and a friction rate of 0.095 IWC/100?

- A. 10 inch diameter
- B. 12 inch diameter
- C. 14 inch diameter
- D. 16 inch diameter

10. What is the capacity of a 1 1/4 inch schedule 40 natural gas line with a length of 60 feet at 2 psi?

- A. 3,660 cfh
- B. 4,060 cfh
- C. 4,660 cfh
- D. 5,060 cfh

Answers

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

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Explanations

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1. What does the term "enthalpy" refer to in HVAC physics?

- A. Total heat content of a system
- B. Measure of thermal resistance
- C. Amount of work done by a machine
- D. Rate of heat transfer

The term "enthalpy" refers to the total heat content of a system, which is a key concept in HVAC physics. In essence, enthalpy integrates the internal energy of a system with the product of its pressure and volume, encapsulating all forms of energy contained within a substance. This includes the energy associated with thermal heat transfer and the energy stored in the system due to phase changes, such as from liquid to vapor. In HVAC applications, understanding enthalpy allows professionals to calculate and optimize energy transfer processes, such as heating and cooling within a building. It helps in designing systems that effectively manage energy consumption and thermal comfort. For example, during the refrigeration cycle, changes in enthalpy signify how much energy is absorbed or released by the refrigerant as it transitions between different states, which is critical for effective system performance.

2. What effect does high humidity have on the human body?

- A. It promotes better cooling
- B. It can cause discomfort and hinder cooling mechanisms
- C. It has no effect on the human body
- D. It improves overall health

High humidity significantly influences the body's thermal regulation and comfort levels. When humidity levels are high, the air contains a large amount of water vapor, which reduces the effectiveness of sweat evaporation. Sweating is one of the body's primary cooling mechanisms, as it helps dissipate heat. If sweat cannot evaporate efficiently due to high moisture in the air, the body feels hotter and more uncomfortable. This discomfort can lead to heat-related illnesses, as the body struggles to cool itself effectively. High humidity can also exacerbate feelings of fatigue, make breathing more laborious, and contribute to a general sense of unease. In contrast, lower humidity levels allow sweat to evaporate more readily, promoting better cooling and comfort for the individual.

3. If a compound gauge reads 248 psig and the actual line temperature is 100°F, what is the subcooling using R-22 refrigerant?

- A. 14 F
- B. 16 F
- C. 18 F
- D. 20 F

To determine the subcooling using R-22 refrigerant based on a compound gauge reading and the actual line temperature, you will first need to convert the pressure measured in psig to a corresponding saturation temperature for R-22. A compound gauge reading of 248 psig indicates a pressure that is measured above atmospheric pressure. To find the saturation temperature for R-22 at this pressure, you can refer to refrigerant pressure-temperature charts specific to R-22. The saturation temperature associated with 248 psig is approximately 84°F. Subcooling is calculated by taking the saturation temperature and subtracting the current liquid refrigerant temperature from it. Here, you take the saturation temperature of 84°F and subtract the actual line temperature of 100°F. However, to correctly calculate subcooling, you need to recognize that subcooling is only relevant when the refrigerant is a liquid; thus, if the temperature of the line is above the saturation temperature, we would expect to see a negative value. Subcooling can also be represented in terms of absolute temperature, ensuring you analyze the refrigerant behavior correctly. In this case, if you calculate subcooling and reach a resulting value of 16°F, this signifies

4. What is the approximate air quantity in CFM through a 14 by 14 inch rectangular duct at 1000 FPM velocity?

- A. 1000 CFM
- B. 1150 CFM
- C. 1300 CFM**
- D. 1500 CFM

To determine the air quantity in cubic feet per minute (CFM) through a rectangular duct, we use the formula: $\text{CFM} = \text{Area (sq. ft.)} \times \text{Velocity (FPM)}$ First, we calculate the area of the duct. Given the dimensions of the duct are 14 inches by 14 inches, we convert these measurements to feet. Since there are 12 inches in a foot, the dimensions in feet are: $\text{Width} = \frac{14}{12} \text{ ft} = 1.167 \text{ ft}$ $\text{Height} = \frac{14}{12} \text{ ft} = 1.167 \text{ ft}$ The area of the duct is: $\text{Area} = \text{Width} \times \text{Height} = 1.167 \text{ ft} \times 1.167 \text{ ft} \approx 1.36 \text{ sq. ft}$ Next, we can calculate the CFM by multiplying the area by the velocity: $\text{CFM} = 1.36 \text{ sq. ft} \times 1000 \text{ FPM} = 1360 \text{ CFM}$

5. What is the U value of a wall section with R values of 19, 0.015, and 0.02?

- A. 0.052**
- B. 0.074
- C. 0.040
- D. 0.065

To find the U value of a wall section, you first need to understand the relationship between U value and R value. The U value, which measures the rate of heat transfer through a building element, is the reciprocal of the total R value of that element. The walls' R values given are 19, 0.015, and 0.02. To calculate the total R value, you simply add these values together: $\text{Total R value} = 19 + 0.015 + 0.02 = 19.035$ Now, the U value is the reciprocal of the total R value, calculated by: $\text{U value} = 1 / \text{Total R value}$ $\text{U value} = 1 / 19.035 \approx 0.0525$ When rounded, this U value is approximately 0.052, which correlates with the choice provided. Therefore, this choice is accurate due to the mathematical relationships established in thermal conductivity principles in building construction. Understanding that higher R values yield lower U values is essential, as it reflects better insulation and energy efficiency within a structure.

6. What unit measures thermal resistance?

- A. R-value**
- B. U-value
- C. BTU/h
- D. W/m²K

The unit that measures thermal resistance is the R-value. R-value quantifies the effectiveness of insulation materials in resisting heat flow. The higher the R-value, the more effective the insulation is at providing resistance against heat transfer. This is particularly important in HVAC applications, where maintaining temperature control in buildings significantly impacts energy efficiency and comfort levels. The R-value is crucial when determining how well a building will retain heat in the winter or stay cool in the summer. It plays a key role in selecting appropriate insulation materials, as proper insulation can lead to reduced energy consumption for heating and cooling systems, ultimately resulting in lower utility costs and improved indoor air quality. While other values such as U-value, BTU/h, and W/m²K measure different aspects of thermal performance and heat transfer, they do not represent thermal resistance directly like the R-value does. U-value, for example, measures the rate of heat transfer and is the inverse of R-value, which shows how much heat is retained by an insulating material. Understanding these distinctions helps in recognizing how to optimize energy efficiency in HVAC systems.

7. How do you convert cubic feet to gallons?

- A. Gallons = Cubic Feet x 3.14
- B. Gallons = Cubic Feet x 7.48**
- C. Gallons = Cubic Feet / 7.48
- D. Gallons = Cubic Feet x 10

To convert cubic feet to gallons, the correct calculation involves multiplying the cubic feet by a specific conversion factor. In this case, the conversion factor from cubic feet to gallons is approximately 7.48. This means that for every cubic foot of volume, there are 7.48 gallons. Understanding this conversion is essential in practical applications, especially in HVAC settings where fluid capacities need to be calculated accurately. For instance, when determining the amount of water needed for a system, or during calculations involving storage tanks, knowing how to convert these measurements ensures efficiency and correctness in operations. When you multiply cubic feet by 7.48, you are effectively translating the volume from one measurement system (cubic feet, typically used for larger spaces) to another (gallons, commonly used for liquids). This conversion is critical because different applications may require specific measurements based on the fluid's volume.

8. How do you calculate the size of a heat pump system?

- A. Size = Total Heating BTUs needed × Efficiency Coefficient
- B. Size = (Total Heating BTUs needed) / (Efficiency Coefficient)**
- C. Size = Heating Load × COP
- D. Size = (Efficiency Coefficient) / (Total BTUs needed)

To calculate the size of a heat pump system, the correct approach involves dividing the total heating BTUs needed by the efficiency coefficient of the system. This is because the efficiency coefficient, typically expressed as the Coefficient of Performance (COP), indicates how effectively the system converts energy input into heating output. In practical terms, if you need a certain number of BTUs to sufficiently heat a space, the efficiency of your heat pump will determine how much energy the system actually consumes to produce those BTUs. By dividing the total heating requirements by the efficiency, you can determine the necessary capacity of the heat pump system required to achieve the desired heating effect. This calculation ensures that the system is neither under-sized, which would lead to inadequate heating, nor over-sized, which could lead to inefficiencies and increased costs. Understanding this relationship between BTUs needed and the efficiency allows for proper design and sizing of HVAC systems.

9. What is the required duct size for a duct system delivering 1,000 cfm with a pressure drop of 0.25 IWC and a friction rate of 0.095 IWC/100?

- A. 10 inch diameter
- B. 12 inch diameter
- C. 14 inch diameter**
- D. 16 inch diameter

To determine the required duct size for a system delivering 1,000 cubic feet per minute (cfm) of air with a specified pressure drop and friction rate, we can use the duct sizing formulas and principles of air flow dynamics in HVAC systems. The friction loss in the duct is calculated based on the duct size, airflow, and the friction rate. In this scenario, we have an airflow of 1,000 cfm and we need to achieve a maximum pressure drop of 0.25 inches of water column (IWC). The friction rate is given as 0.095 IWC per 100 feet of duct. First, using the formula for calculating the required duct diameter, we can derive the size based on the airflow and the allowed pressure drop. This often involves estimating the velocity of air in the duct, as well as the cross-sectional area, to reach a point where the cumulative pressure loss matches the desired pressure drop. In practical terms, the diameter of duct that allows 1,000 cfm of airflow while maintaining the friction loss at the specified rate leads us to the selection of a 14-inch diameter duct. This size effectively balances the airflow and friction loss to maintain the required 0.25 IWC pressure drop

10. What is the capacity of a 1 1/4 inch schedule 40 natural gas line with a length of 60 feet at 2 psi?

- A. 3,660 cfh
- B. 4,060 cfh
- C. 4,660 cfh**
- D. 5,060 cfh

To determine the capacity of a 1 1/4 inch schedule 40 natural gas line, we utilize tables and formulas that account for the line's dimensions, the length of the pipe, and the pressure drop across the system. A 1 1/4 inch schedule 40 pipe has an inner diameter that allows for a specific volume of gas to flow through it based on pressure and length. In this scenario, with a pressure of 2 psi and a length of 60 feet, one can refer to gas flow capacity tables for natural gas piping that outline the cubic feet per hour (cfh) that different sizes of pipe can carry under various conditions. The calculations consider not only the pipe diameter and length but also the pressure, which allows gas to flow effectively without significant loss. The value of 4,660 cfh represents the maximum flow capacity for this specific configuration. It indicates that at a pressure of 2 psi and for a 60-foot run, the line can efficiently deliver this amount of natural gas to the intended appliances or systems. Therefore, option C reflects the accurate calculation based on standardized methodologies used in the HVAC industry for sizing gas lines. This capacity is essential when sizing piping systems for natural gas to ensure that

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://hvacmath.examzify.com>

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

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