

HVAC Math 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

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- 1. What is the relationship between duct size and airflow efficiency?**
 - A. Larger ducts always improve efficiency**
 - B. Smaller ducts always reduce efficiency**
 - C. Proper sizing is important for optimal efficiency**
 - D. Duct sizing has no effect on efficiency**

- 2. How do you calculate the heat load in BTUs for a space?**
 - A. Heat Load = (Area × Ceiling Height × R-value × Temperature Difference) / 1.5**
 - B. Heat Load = (Area × Ceiling Height × R-value × Temperature Difference) / 1.1**
 - C. Heat Load = Area × Ceiling Height × Temperature Difference**
 - D. Heat Load = Area × R-value × Temperature Difference**

- 3. What is the primary purpose of airflow measurement in HVAC systems?**
 - A. To enhance aesthetic appeal**
 - B. To evaluate energy efficiency**
 - C. To ensure comfort levels within the space**
 - D. To fulfill building code requirements**

- 4. How is the energy efficiency ratio (EER) calculated?**
 - A. EER = Power consumption (W) ÷ Cooling capacity (BTU/hr)**
 - B. EER = Cooling capacity (BTU/hr) ÷ Power consumption (W)**
 - C. EER = (Cooling capacity × Efficiency) / (Power required)**
 - D. EER = Total Cooling Load / Operating Hours**

- 5. How do you calculate the tons of air conditioning needed for a room?**
 - A. Tons = (BTU/hr) ÷ 12,000**
 - B. Tons = (BTU/hr) × 12,000**
 - C. Tons = (BTU/hr) ÷ 1,200**
 - D. Tons = (BTU/hr) + 12,000**

6. Using the formula for CFM, if a duct measures 40 inches by 22 inches and the air velocity is 1,500 fpm, what is the CFM?
- A. 8,000 CFM
 - B. 9,167 CFM
 - C. 10,500 CFM
 - D. 11,000 CFM
7. Using the psychrometric chart, what would be the approximate dry bulb temperature in degrees F with a humidity ratio of 79 grains per # dry air and a wet bulb temperature of 68 degrees F?
- A. 75 degrees F
 - B. 80 degrees F
 - C. 85 degrees F
 - D. 90 degrees F
8. What does the acronym CFM stand for in HVAC calculations?
- A. Cubic Feet per Minute
 - B. Cubic Feet per Meter
 - C. Computed Flow Measurement
 - D. Constant Flow Management
9. What is the total airflow in CFM if the air velocity is 500 fpm and the duct area is 1.38 square feet?
- A. 500 CFM
 - B. 620 CFM
 - C. 690 CFM
 - D. 740 CFM
10. For a duct measuring 10 inches by 20 inches, what is the area in square feet?
- A. 1.25 square feet
 - B. 1.38 square feet
 - C. 2.5 square feet
 - D. 3 square feet

Answers

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

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Explanations

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1. What is the relationship between duct size and airflow efficiency?

- A. Larger ducts always improve efficiency**
- B. Smaller ducts always reduce efficiency**
- C. Proper sizing is important for optimal efficiency**
- D. Duct sizing has no effect on efficiency**

The relationship between duct size and airflow efficiency is critical in HVAC systems. Proper sizing is essential for achieving optimal efficiency because ducts that are too small can restrict airflow, leading to increased pressure drops. This restriction can cause the system to work harder, reducing overall efficiency and increasing operational costs. Conversely, ducts that are too large can result in lower air velocity, which might lead to issues such as uneven airflow and insufficient air distribution throughout the space. Efficient airflow optimizes energy use and maintains consistent temperatures across various areas in a building. Therefore, ensuring that ducts are neither too large nor too small but sized appropriately according to the system's requirements and the space they serve is key to maintaining energy efficiency and comfort. This careful consideration of duct sizing helps balance the system's pressure, volume, and temperature, contributing positively to overall performance and efficiency.

2. How do you calculate the heat load in BTUs for a space?

- A. Heat Load = (Area × Ceiling Height × R-value × Temperature Difference) / 1.5**
- B. Heat Load = (Area × Ceiling Height × R-value × Temperature Difference) / 1.1**
- C. Heat Load = Area × Ceiling Height × Temperature Difference**
- D. Heat Load = Area × R-value × Temperature Difference**

The heat load in BTUs for a space is calculated by taking into account the three key factors: the area of the space, the temperature difference between the inside and outside, and the R-value, which represents the insulation's effectiveness. The fundamental formula involved in this calculation includes these elements to ensure an accurate assessment of how much heat energy is required to maintain a comfortable environment. In option B, the formula incorporates the area, ceiling height, R-value, and temperature difference, and divides by a specific constant (in this case, 1.1). This constant helps to adjust and scale the resulting value to ensure it accurately reflects real-world conditions and the efficiency of heat transfer in typical HVAC applications. By including a constant in the calculation, this option recognizes that there are additional factors in play that must be considered. It ensures the resulting heat load calculation is realistic for the parameters typical in HVAC scenarios, leading to a more optimal sizing of heating or cooling systems. The other choices either omit necessary components, use incorrect multipliers, or don't reflect the true complexity of heat transfer dynamics in a space. Thus, by using this specific formula, one can more effectively determine the actual heat load needed to maintain appropriate thermal comfort levels within the space being analyzed.

3. What is the primary purpose of airflow measurement in HVAC systems?

- A. To enhance aesthetic appeal
- B. To evaluate energy efficiency
- C. To ensure comfort levels within the space**
- D. To fulfill building code requirements

The primary purpose of airflow measurement in HVAC systems is to ensure comfort levels within the space. Proper airflow is crucial for maintaining a consistent and comfortable indoor environment. It directly impacts temperature regulation, humidity control, and the overall air quality that occupants experience. When airflow is measured effectively, it allows HVAC professionals to adjust the system to deliver the right amount of heated or cooled air, ensuring that all areas of a building receive adequate circulation. While energy efficiency and building code requirements are important considerations in the design and operation of HVAC systems, the immediate goal of measuring airflow is directly related to occupant comfort. Aesthetics, on the other hand, do not pertain to the functional aspects of airflow measurement, making comfort the standout focus of this practice.

4. How is the energy efficiency ratio (EER) calculated?

- A. $EER = \text{Power consumption (W)} \div \text{Cooling capacity (BTU/hr)}$
- B. $EER = \text{Cooling capacity (BTU/hr)} \div \text{Power consumption (W)}$**
- C. $EER = (\text{Cooling capacity} \times \text{Efficiency}) / (\text{Power required})$
- D. $EER = \text{Total Cooling Load} / \text{Operating Hours}$

The energy efficiency ratio (EER) is an important metric used to measure the efficiency of cooling systems, such as air conditioning units. The correct calculation of EER is determined by dividing the cooling capacity of the unit, measured in British Thermal Units per hour (BTU/hr), by the power consumption of the unit, measured in watts (W). This ratio provides a direct insight into how much cooling is being produced for each watt of electricity consumed. Choosing this particular formula highlights how effectively a cooling system converts electrical power into cooling output. A higher EER indicates a more efficient system, meaning it can provide more cooling with less energy consumption. Understanding this relationship is crucial for HVAC professionals when evaluating and recommending equipment based on energy efficiency standards. In other options, while they involve components related to energy consumption, they do not correctly present the relationship defining EER as typically required in the industry. The focus on deriving the ratio by dividing cooling output by energy input captures the essence of energy efficiency in air conditioning systems accurately.

5. How do you calculate the tons of air conditioning needed for a room?

- A. **Tons = (BTU/hr) ÷ 12,000**
- B. Tons = (BTU/hr) × 12,000
- C. Tons = (BTU/hr) ÷ 1,200
- D. Tons = (BTU/hr) + 12,000

To determine the tons of air conditioning required for a room, the correct formula is based on the relationship between BTU (British Thermal Units) and tons. One ton of air conditioning is equivalent to the ability to remove 12,000 BTUs of heat per hour. Therefore, to find the number of tons needed, you divide the total BTUs per hour by 12,000. Using the formula $\text{Tons} = (\text{BTU/hr}) \div 12,000$ allows you to convert BTUs to tons effectively, which is necessary for calculating the capacity of an air conditioning system suitable for the space. This calculation is crucial in HVAC design to ensure the system can adequately cool the specified area. Thus, by applying the correct conversion factor of 12,000, you can accurately ascertain the cooling requirements of any given room.

6. Using the formula for CFM, if a duct measures 40 inches by 22 inches and the air velocity is 1,500 fpm, what is the CFM?

- A. 8,000 CFM
- B. **9,167 CFM**
- C. 10,500 CFM
- D. 11,000 CFM

To determine the CFM (Cubic Feet per Minute) in this scenario, you can use the formula: $[\text{CFM} = \text{Area (sq ft)} \times \text{Velocity (fpm)}]$ First, you need to calculate the area of the duct in square feet. The duct dimensions are given in inches, so you should first convert these dimensions to feet: - Width: 40 inches = $(\frac{40}{12}) = \frac{10}{3}$ feet - Height: 22 inches = $(\frac{22}{12}) = \frac{11}{6}$ feet Now, you can calculate the area: $[\text{Area} = \text{Width} \times \text{Height} = \left(\frac{10}{3}\right) \times \left(\frac{11}{6}\right) = \frac{110}{18} \text{ sq ft} = \frac{55}{9} \text{ sq ft} \approx 6.11 \text{ sq ft}]$ With the area calculated, you can now use the velocity provided, which

7. Using the psychrometric chart, what would be the approximate dry bulb temperature in degrees F with a humidity ratio of 79 grains per # dry air and a wet bulb temperature of 68 degrees F?

- A. 75 degrees F**
- B. 80 degrees F**
- C. 85 degrees F**
- D. 90 degrees F**

To determine the dry bulb temperature given a humidity ratio of 79 grains per pound of dry air and a wet bulb temperature of 68 degrees Fahrenheit, one would typically refer to the psychrometric chart, which visually represents the relationships among various properties of moist air. In this scenario, the wet bulb temperature is a crucial point of reference. It reflects the lowest temperature that can be attained by evaporating water into the air at constant pressure. At 68 degrees Fahrenheit wet bulb temperature and a humidity ratio of 79 grains per pound, there's a specific range of possible dry bulb temperatures. Using the psychrometric chart, you can locate the line for a wet bulb temperature of 68 degrees. From there, you track horizontally until you intersect the line representing a humidity ratio of 79 grains per pound of dry air. The intersection point gives an approximate dry bulb temperature. The temperature of 80 degrees Fahrenheit aligns with this relationship well. It is also consistent with the moisture content indicated by the humidity ratio, as higher humidity ratios correspond to higher moisture levels in the air, which generally correlate to elevated dry bulb temperatures when the wet bulb is known. Thus, based on the properties and relationships indicated in the psychrometric chart, 80 degrees Fahrenheit

8. What does the acronym CFM stand for in HVAC calculations?

- A. Cubic Feet per Minute**
- B. Cubic Feet per Meter**
- C. Computed Flow Measurement**
- D. Constant Flow Management**

The acronym CFM stands for Cubic Feet per Minute, which is a critical unit of measurement used in HVAC calculations. This value represents the volume of air that is moved or circulated each minute and is essential for determining the airflow within heating, ventilation, and air conditioning systems. Understanding CFM is crucial for HVAC professionals as it helps in sizing ducts, selecting fans, and ensuring that systems operate efficiently to maintain the desired indoor air quality and comfort levels. In essence, measuring airflow in CFM allows HVAC technicians to design systems that are capable of delivering the necessary ventilation and climate control needed for various environments, ensuring optimal performance and energy efficiency.

9. What is the total airflow in CFM if the air velocity is 500 fpm and the duct area is 1.38 square feet?

- A. 500 CFM
- B. 620 CFM
- C. 690 CFM**
- D. 740 CFM

To find the total airflow in cubic feet per minute (CFM), you can use the formula: $\text{CFM} = \text{Velocity (fpm)} \times \text{Area (sq ft)}$ In this case, the air velocity is 500 feet per minute (fpm), and the duct area is 1.38 square feet. Using the formula: $\text{CFM} = 500 \text{ fpm} \times 1.38 \text{ sq ft}$ Calculating this gives: $\text{CFM} = 500 \times 1.38 = 690$ Thus, the total airflow is 690 CFM. This calculation shows how air velocity and duct area work together to determine the total flow of air. Understanding the relationship between air velocity and duct area is essential in HVAC design, as it helps determine the efficiency of air distribution in a system. In this scenario, using the provided values in the formula correctly leads to the identification of the airflow rate, reinforcing the importance of accurate measurements in HVAC applications.

10. For a duct measuring 10 inches by 20 inches, what is the area in square feet?

- A. 1.25 square feet
- B. 1.38 square feet**
- C. 2.5 square feet
- D. 3 square feet

To calculate the area of a duct measuring 10 inches by 20 inches, you need to first convert the dimensions from inches to feet. There are 12 inches in a foot, so: - The width of 10 inches is equivalent to $10 \div 12 = 0.833$ feet. - The height of 20 inches is equivalent to $20 \div 12 = 1.667$ feet. Next, you can find the area of the duct in square feet by multiplying the width by the height: $\text{Area} = \text{Width} \times \text{Height} = 0.833 \text{ feet} \times 1.667 \text{ feet}$. The product of these two numbers gives: $\text{Area} = 1.388$ square feet. Rounding this to two decimal places gives 1.38 square feet, which corresponds to the correct option. This calculation demonstrates how to convert measurements and find the area, which is a crucial skill in HVAC applications where precise duct sizes are necessary for efficient airflow and system performance.

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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