Arizona R-39/CR-39 Residential and Commercial Air Conditioning and Refrigeration HVAC Contractor Practice Exam (Sample)

Study Guide

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Questions

1. For steam and water piping, a hydrostatic pressure test should be maintained between which PSIG?

A. 30 - 50 PSIG

B. 50 - 100 PSIG

C. 100 - 150 PSIG

D. 150 - 200 PSIG

2. Which statement about PVC and EMT is correct?

A. PVC can hold more than EMT

B. PVC is more widely used than EMT

C. EMT is a thin-walled metal conduit

D. PVC is the preferred choice for high voltages

3. A hood exhaust must be provided in a room when what condition is met?

A. Surface temperatures are over 600°F

B. Surface temperatures are over 800°F and a single circuit has more than 6.6 lbs of refrigerant

C. Surface temperatures are over 700°F

D. Surface temperatures are over 900°F

4. Is using a wall cavity for a return in air conditioning systems acceptable?

A. True

B. False

5. What is the CFM calculation for a register with an area of 4.167 square feet and a velocity of 500 FPM?

A. 2083.5 CFM

B. 500 CFM

C. 1041.75 CFM

D. 1000 CFM

6. True or False: Units may be sized in accordance with ACCA Manual S?

A. True

B. False

C. Only for residential units

D. Only for commercial units

7. What is considered supply air in HVAC terminology?

A. Air returned to the system

B. Air being exhausted from a space

C. Air delivered to the occupied space

D. Air drawn from the outdoors

8. True or False: Units using R-22 need to be replaced as of 2020?

A. True

B. False

C. Only in specific states

D. Only for commercial units

9. What is the main benefit of using a heat recovery system in HVAC?

A. Reduced operational noise

B. Increasing airflow rates

C. Improved energy efficiency

D. Lower initial installation costs

10. What is an important consideration in sizing an air conditioning unit?

A. Only the size of the equipment itself

B. The color of the unit

C. The heat load of the space

D. Whether it is residential or commercial

Answers

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

Explanations

1. For steam and water piping, a hydrostatic pressure test should be maintained between which PSIG?

A. 30 - 50 PSIG

B. 50 - 100 PSIG

C. 100 - 150 PSIG

D. 150 - 200 PSIG

The appropriate range for a hydrostatic pressure test on steam and water piping is typically between 50 to 100 PSIG. This range is essential as it allows for the detection of leaks and ensures the integrity of the piping system under operational conditions. Maintaining pressure within this range helps to simulate the maximum pressures that the piping might encounter during normal operation, thereby assuring that the system can handle such conditions without risk of failure. This testing process is vital in ensuring safety and compliance with building codes and standards in HVAC installations. Utilizing a pressure test within this interval also minimizes the potential for damaging the piping, which could occur if pressures were set too high. The chosen range strikes a balance between thorough testing while minimizing the risk of over-pressurizing the system components.

2. Which statement about PVC and EMT is correct?

A. PVC can hold more than EMT

B. PVC is more widely used than EMT

C. EMT is a thin-walled metal conduit

D. PVC is the preferred choice for high voltages

The statement regarding EMT as a thin-walled metal conduit is accurate. EMT, or Electrical Metallic Tubing, is designed primarily for electrical raceway use and is fabricated from steel or aluminum. Its thin-wall construction makes it lightweight and easy to handle while still providing a substantial degree of protection for the electrical conductors it encases. This thin profile allows for cost-effective installation and is commonly used in a variety of electrical applications where physical protection is needed without significant weight or bulk. In contrast, while PVC (Polyvinyl Chloride) is known for its electrical insulation properties and resistance to moisture and chemical damage, its application differs fundamentally. PVC conduits are non-metallic and are generally preferred for specific situations, such as outdoor installations or areas exposed to corrosive environments. However, EMT is favored in many settings for its durability and mechanical strength, especially in commercial and industrial installations. This distinction enhances the understanding of conductor protection and the materials' respective advantages and limitations in electrical installations.

3. A hood exhaust must be provided in a room when what condition is met?

A. Surface temperatures are over 600°F

B. Surface temperatures are over 800°F and a single circuit has more than 6.6 lbs of refrigerant

C. Surface temperatures are over 700°F

D. Surface temperatures are over 900°F

The requirement for a hood exhaust in a room is primarily linked to safety considerations related to high surface temperatures and the presence of refrigerants. When surface temperatures exceed 800°F and a single circuit contains more than 6.6 lbs of refrigerant, it indicates a potential risk for overheating and refrigerant release, which can lead to hazardous conditions. The rationale for needing a hood exhaust under these specific circumstances is to ensure that any heat generated in the system is effectively ventilated, reducing the risk of fire or explosion. High refrigerant loads combined with elevated temperatures necessitate proper ventilation to safeguard both personnel and the environment. The specific parameters outlined in choice B provide a clear guideline for when exhaust systems are essential, aligning with safety standards that help prevent malfunction or accidents in HVAC operations. Therefore, this option best encapsulates the criteria for requiring a hood exhaust in a room.

4. Is using a wall cavity for a return in air conditioning systems acceptable?

A. True

B. False

Using a wall cavity for a return in air conditioning systems is acceptable in certain contexts. This practice can allow for efficient air circulation while utilizing space that might otherwise be wasted. A wall cavity can facilitate the return airflow needed to maintain balanced pressure and enhance the performance of the HVAC system, as long as it meets design and building code requirements. However, for this to be effective and appropriate, the cavity must be properly sized, sealed, and connected to ensure that it does not create additional noise or airflow issues. It's also essential for the cavity to be free from obstructions and contaminants that could affect air quality. Therefore, under the right conditions, using a wall cavity can be a practical and functional solution, justifying why it is marked as acceptable in this context.

5. What is the CFM calculation for a register with an area of 4.167 square feet and a velocity of 500 FPM?

A. 2083.5 CFM

B. 500 CFM

C. 1041.75 CFM

D. 1000 CFM

To determine the CFM (Cubic Feet per Minute) for a register, you'll apply the formula: CFM = Area (in square feet) × Velocity (in feet per minute) In this scenario, the area of the register is given as 4.167 square feet, and the velocity is 500 feet per minute (FPM). Plugging these values into the formula: CFM = 4.167 sq ft × 500 FPM = 2083.5 CFM This calculation shows that at a velocity of 500 FPM, a register with an area of 4.167 square feet can deliver 2083.5 cubic feet of air per minute. Understanding this calculation is crucial for HVAC professionals, as it helps ensure proper air distribution for both residential and commercial systems. Correctly calculating the CFM is essential for maintaining energy efficiency and comfort levels within a space.

6. True or False: Units may be sized in accordance with ACCA Manual S?

A. True

B. False

C. Only for residential units

D. Only for commercial units

The statement that units may be sized in accordance with ACCA Manual S is true. ACCA Manual S is a widely accepted guideline used for the selection and sizing of residential and light commercial air conditioning systems. It provides detailed procedures for determining the appropriate equipment size based on various factors such as building structure, insulation, windows, and local climate conditions. Using Manual S ensures that the selected equipment will operate efficiently and effectively, allowing for optimal performance and comfort in the space being conditioned. Additionally, it helps to prevent issues related to oversizing or undersizing HVAC units, which can lead to inadequate heating or cooling, increased energy costs, and shortened equipment lifespans. The relevance of this manual is not limited to only residential or commercial applications, but it is applicable across various HVAC installations, making it a foundational resource for HVAC professionals.

7. What is considered supply air in HVAC terminology?

A. Air returned to the system

B. Air being exhausted from a space

C. Air delivered to the occupied space

D. Air drawn from the outdoors

In HVAC terminology, supply air refers specifically to the air that is delivered to the occupied space after being conditioned by the system. This air is typically cooled or heated, depending on the requirements of the space, and is essential for maintaining comfort and air quality. When a system operates, it draws in air from the environment, conditions it—through cooling, heating, humidification, or dehumidification—and then circulates that air back into the areas where people are present, such as residences or commercial buildings. This process ensures that occupants are provided with a comfortable environment. The other options present different aspects of airflow within an HVAC system: air returned to the system refers to the air that exits the occupied space and is sent back to be reconditioned; air being exhausted from a space indicates the removal of stale air; and air drawn from outdoors is used for ventilation purposes. However, none of these options directly describe supply air itself, making the identification of supply air as the conditioned air delivered to the space clear and appropriate.

8. True or False: Units using R-22 need to be replaced as of 2020?

A. True

B. False

C. Only in specific states

D. Only for commercial units

Although R-22, also known as HCFC-22, has been phased out due to its ozone-depleting properties, the statement that units using R-22 need to be replaced as of 2020 is not entirely accurate. The production and import of R-22 were banned starting in 2020, which means that while new units cannot be manufactured using R-22, existing units that utilize this refrigerant can still operate as long as they are properly maintained and can obtain reclaimed R-22 for repairs. Furthermore, many older systems still in operation can continue to use R-22 until they become inoperative, at which point replacements may be necessary. It's also important to note that in some areas or among certain users, there may be additional regulations or incentives that encourage replacement of R-22 systems with more environmentally-friendly alternatives. In summary, while there are restrictions on new production, existing units do not have to be replaced immediately, making the statement false.

9. What is the main benefit of using a heat recovery system in HVAC?

A. Reduced operational noise

B. Increasing airflow rates

C. Improved energy efficiency

D. Lower initial installation costs

The main advantage of utilizing a heat recovery system in HVAC is its ability to enhance energy efficiency. A heat recovery system captures waste heat generated from various processes or equipment and repurposes it for heating or preheating purposes within the HVAC system. This process significantly reduces the overall energy consumption required to achieve desired temperature levels, leading to lower energy bills and a reduced carbon footprint. By reclaiming energy that would otherwise be lost, heat recovery systems contribute to achieving higher system efficiency ratings. Such efficiency improvements can lead to reduced operational costs over time, making them not only beneficial for the environment but also economically advantageous for consumers. The other options touch on aspects of HVAC performance but do not directly address the primary purpose and benefit of heat recovery systems. While reducing operational noise and increasing airflow rates may be desirable in certain contexts, they are not the main objectives served by implementing heat recovery technology. Additionally, although initial installation costs can be a consideration, a focus on energy efficiency and long-term savings typically outweighs these upfront investments.

10. What is an important consideration in sizing an air conditioning unit?

A. Only the size of the equipment itself

B. The color of the unit

C. The heat load of the space

D. Whether it is residential or commercial

When sizing an air conditioning unit, the heat load of the space is a critical consideration. Heat load refers to the total amount of heat energy that must be removed from a space to maintain a comfortable indoor environment. This involves assessing various factors such as the dimensions of the space, the number of windows, insulation quality, occupancy levels, and the presence of heat-generating appliances. By calculating the heat load, HVAC professionals can determine the appropriate capacity of the air conditioning unit needed to efficiently cool the area without overworking the system or causing humidity problems. This consideration ensures optimal comfort and energy efficiency, helping to prevent the potential for equipment failure or increased energy costs. Other factors, like whether the unit is intended for residential or commercial use, while important, are secondary when it comes to the actual sizing process. The size of the equipment itself is inherently related to its capacity, but the proper sizing is fundamentally rooted in understanding the specific heat load of the space it is intended to serve. The color of the unit has no effect on its cooling performance or capacity, making it irrelevant to the sizing considerations.