HVAC Journeyman Practice Exam (Sample)

Study Guide

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Questions

1. **Factory-made air ducts should not be used for vertical risers serving more than how many stories?**

   A. 1 story

   B. 2 stories

   C. 3 stories

   D. Occupancy

2. **When installing an evaporative cooler, openings in exterior walls shall be what size compared to the duct?**

   A. 1 inch larger than the duct

   B. 3 inches larger than the duct

   C. flashed in an approved manner

   D. the same size as the duct

3. **The minimum size of the foundation opening for a floor furnace according to regulations is?**

   A. 20'' x 20''

   B. 24'' x 18''

   C. 24'' x 24''

   D. None of the above

4. **Every evaporative cooler supported on an aboveground platform must be elevated from the ground by at least how many inches?**

   A. 12 inches

   B. 18 inches

   C. 24 inches

   D. 30 inches

5. **At what intervals must metal ducts be securely fastened in place?**

   A. 3 foot intervals

   B. 6 foot intervals

   C. 10 foot intervals

   D. At each change of direction

6. What condition must be fulfilled after installing a cooling coil in the duct system?

- **A. Air pressure should be in a specific range**
- **B. The furnace must be operational for tests**
- **C. Ensure compliance with local building codes**
- **D. The air should first pass through the cooling coil**

7. Which type of operated damper should not be placed in any equipment vent connector?

- **A. Automatically operated**
- **B. Manually operated**
- **C. Gear operated**
- **D. Air operated**

8. What defines an explosive atmosphere in terms of airflow ducts?

- **A. Temperatures below freezing**
- **B. Presence of certain vapors and fumes**
- **C. High humidity levels**
- **D. Low air pressure**

9. Unlisted units heaters must have clearances to combustible material of at least how many inches?

- **A. 6 inches**
- **B. 12 inches**
- **C. 18 inches**
- **D. 24 inches**

10. Modifications made to the supporting framework of buildings due to the installation of an evaporative cooler must comply with which code?

- **A. Mechanical**
- **B. ASME**
- **C. Fire**
- **D. Building**

Answers

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

Explanations

1. Factory-made air ducts should not be used for vertical risers serving more than how many stories?

A. 1 story

B. 2 stories

C. 3 stories

D. Occupancy

Factory-made air ducts are designed under specific manufacturing and testing standards, primarily to handle horizontal runs and ventilation requirements. When it comes to vertical risers, particularly in multi-story buildings, the implications for airflow, structural integrity, and fire safety become significantly more complex. Using factory-made ducts for vertical risers that serve up to two stories is typically acceptable, as this configuration is manageable regarding pressure drops and potential vibrations. However, extending these ducts to more than two stories poses risks. The weight of the ductwork, alongside the potential for condensation and increased pressure differential, can lead to installation challenges and system inefficiencies. Additionally, from a fire safety perspective, vertical ducts in high-rise applications need to endure greater scrutiny to prevent smoke and fire spread. Thus, the limit on the use of factory-made air ducts for vertical risers is generally set at two stories to ensure that the system operates safely and efficiently while adhering to industry standards. This reflects a balanced consideration of functional requirements and safety regulations in HVAC design and installation.

2. When installing an evaporative cooler, openings in exterior walls shall be what size compared to the duct?

A. 1 inch larger than the duct

B. 3 inches larger than the duct

C. flashed in an approved manner

D. the same size as the duct

When installing an evaporative cooler, the guidelines recommend that openings in exterior walls should be 1 inch larger than the duct size. This allowance is essential for ensuring proper airflow and accommodating any variations in the ductwork during installation. A slightly larger opening helps to avoid obstruction, allowing for efficient air movement, which is crucial for the cooler's performance. By having this additional space, it also facilitates easier installation and adjustment of the duct if needed, without compromising the seal or connection between the duct and the wall. Proper sealing around the duct is essential to prevent air leaks, maximize the system's efficiency, and promote adequate cooling within the space being served. The other considerations, such as having the openings flashed in an approved manner or matching the size exactly to the duct, may address other aspects of installation but do not specifically promote the necessary airflow and installation flexibility as effectively as providing a 1-inch larger opening. This practice helps ensure that the evaporative cooler operates efficiently and effectively throughout its use.

3. The minimum size of the foundation opening for a floor furnace according to regulations is?

A. 20'' x 20''

B. 24'' x 18''

C. 24'' x 24''

D. None of the above

The minimum size of the foundation opening for a floor furnace is 24 inches by 24 inches. This standard is established to ensure adequate airflow and proper functionality of the furnace, allowing it to operate efficiently while maintaining safety guidelines. A foundation opening of this size provides sufficient space for the furnace to draw in air, which is crucial for combustion and heating efficiency. Additionally, a properly sized opening helps avoid issues such as overheating or inadequate exhaust gas flow, which can occur if the opening is too small. Meeting this dimension also aligns with building codes and safety regulations designed to protect both the equipment and the occupants of the space. The other potential sizes provided do not meet the regulatory requirements, as they are either smaller than necessary, preventing optimal airflow and potentially compromising safety and efficiency.

4. Every evaporative cooler supported on an aboveground platform must be elevated from the ground by at least how many inches?

A. 12 inches

B. 18 inches

C. 24 inches

D. 30 inches

The requirement for elevating evaporative coolers serves multiple practical purposes, primarily related to maintaining efficiency, ensuring proper drainage, and preventing water damage or pooling around the unit. Elevating the cooler by at least 12 inches above the ground helps to ensure that water can properly drain away from the unit, reducing the risk of rusting or corrosion caused by prolonged exposure to standing water. Additionally, this elevation assists in preventing debris, dirt, and other contaminants from entering the unit, which can hinder its performance and lead to maintenance issues. It's also relevant in areas where local building codes specify minimum elevation heights to avoid flood risks, enhance airflow, and promote better access for maintenance and service tasks. Understanding the minimum elevation requirement helps HVAC professionals ensure their installations comply with safety and performance standards, contributing to the longevity and reliability of the evaporative cooler.

5. At what intervals must metal ducts be securely fastened in place?

A. 3 foot intervals

B. 6 foot intervals

C. 10 foot intervals

D. At each change of direction

The requirement for fastening metal ducts is generally governed by building codes and best practices within the HVAC industry. Fastening the ducts at specific intervals ensures that they maintain their structural integrity and functionality, preventing sagging and potential damage that could lead to air leaks or inefficiency. The correct answer reflects the standard practice of securing metal ducts at 6-foot intervals. This interval strikes a balance between ensuring the ductwork system is stable while allowing for practical installation. Securing at this interval helps to maintain adequate support without overcomplicating the installation process or using excessive materials. Additionally, fastening ducts at each change of direction is important for ensuring that the transitions are stable and do not create points of stress that could lead to failure. While intervals of 3 feet or 10 feet may also be permissible in different contexts, the 6-foot guideline is widely recognized as a standard for metal duct installation in residential and commercial applications.

6. What condition must be fulfilled after installing a cooling coil in the duct system?

A. Air pressure should be in a specific range

B. The furnace must be operational for tests

C. Ensure compliance with local building codes

D. The air should first pass through the cooling coil

After installing a cooling coil in the duct system, ensuring compliance with local building codes is essential. Local codes often dictate standards for safety, efficiency, and performance. These codes can include specifications about the installation process, material requirements, and performance metrics that must be achieved. Adhering to these guidelines helps ensure that the cooling system functions correctly and safely, protecting both the occupants and the integrity of the building. While the other conditions mentioned—such as air pressure parameters, operational furnaces for testing, and the order of air passage through the cooling coil—are important for the overall functionality and efficiency of the HVAC system, they are not as critical as compliance with legal and safety standards established by local building regulations. Ensuring that the installation meets these codes reduces liability issues and supports the long-term reliability of the HVAC system.

7. Which type of operated damper should not be placed in any equipment vent connector?

A. Automatically operated

B. Manually operated

C. Gear operated

D. Air operated

Automatically operated dampers are designed to respond to control signals, typically from sensors or a control system, to open or close as needed based on conditions like temperature or airflow. When placed in equipment vent connectors, these dampers could unintentionally obstruct airflow if they fail or if control signals malfunction. This poses significant safety risks, particularly in combustion appliances where proper venting is critical. If an automatically operated damper closes unexpectedly, it could lead to improper ventilation, potentially causing the buildup of harmful gases or combustion byproducts. In contrast, manually operated dampers require physical intervention to open or close, making it easier for technicians to monitor and ensure proper operation. Gear-operated dampers and air-operated dampers also have specific applications where their functionalities can be effectively controlled without risking unintended blockages in vent connectors. By adhering to guidelines that prohibit automatically operated dampers in these critical locations, HVAC professionals can help ensure safety and proper system performance.

8. What defines an explosive atmosphere in terms of airflow ducts?

A. Temperatures below freezing

B. Presence of certain vapors and fumes

C. High humidity levels

D. Low air pressure

An explosive atmosphere in terms of airflow ducts is primarily defined by the presence of certain vapors and fumes. This occurs when flammable gases, vaporized liquids, or combustible dust are present in the air at sufficient concentrations, creating a risk of combustion or explosion if an ignition source is introduced. In HVAC systems, especially in industrial settings, it is crucial to recognize and mitigate these risks by ensuring that ducts are designed and maintained to prevent the accumulation of such hazardous materials. The potential for an explosive atmosphere underscores the importance of proper ventilation, segregation, and safety protocols when dealing with substances that may create flammable conditions.

9. Unlisted units heaters must have clearances to combustible material of at least how many inches?

A. 6 inches

B. 12 inches

C. 18 inches

D. 24 inches

The requirement for unlisted unit heaters to maintain clearances to combustible materials is essential for ensuring safety and preventing fire hazards. A clearance of 18 inches is specified to allow adequate space for heat dissipation and to minimize the risk of igniting any nearby combustible objects. This distance helps in maintaining an effective thermal barrier between the heater and any materials that can catch fire, ensuring that the heat generated does not reach a level that could cause ignition. Clearance requirements are designed based on industry standards that consider the potential temperature rise in surrounding areas due to the heater's operation. Keeping an 18-inch distance reduces the chances of heat buildup in enclosed areas where combustible materials might be present. It is crucial for both residential and commercial installations to adhere to these safety standards to protect occupants and property from fire risks.

10. Modifications made to the supporting framework of buildings due to the installation of an evaporative cooler must comply with which code?

A. Mechanical

B. ASME

C. Fire

D. Building

Modifications to the supporting framework of buildings during the installation of an evaporative cooler must comply with the building code. This code governs the structural integrity and safety of the building, ensuring that any changes made to the framework do not compromise its stability or safety. When installing equipment like an evaporative cooler, the additional weight and potential alterations to the structure necessitate adherence to the building code to ensure that the modified areas can bear the loads applied to them. Compliance with the building code typically addresses aspects such as load-bearing requirements, structural reinforcement, and general safety measures, which are crucial when making any alterations to the building's architecture. In contrast, while the mechanical and fire codes are essential for ensuring the correct installation and safe operation of HVAC systems and fire safety respectively, they do not specifically address structural modifications to the supporting framework as the building code does. ASME codes typically pertain to mechanical systems and pressure vessels and are less relevant to the structural aspects of building modifications required for the installation of an evaporative cooler.