HVAC Journeyman Practice Exam (Sample)

Study Guide

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Questions

1. **What appliance is designed primarily to supply hot water with automatic controls limiting water temperature to a maximum of 210°F?**

   A. Water heater

   B. Steam boiler

   C. Expansion tank

   D. Gas heater

2. **According to code, how high must the clearance be above an unlisted upflow furnace casing?**

   A. 12 inches

   B. 6 inches

   C. 8 inches

   D. 24 inches

3. **The minimum distance from the adjoining ground level should be at least how many inches above?**

   A. 3 inches

   B. 6 inches

   C. 2 inches

   D. 12 inches

4. **A positive means of disconnect is required for electrical connections of more than how many volts?**

   A. 25

   B. 50

   C. 120

   D. 240

5. **What type of ductwork system is generally prohibited from serving more than one story?**

   A. Flexible ducts

   B. Metal ducts

   C. Factory-made air ducts

   D. Spiral duct systems

6. How often should metal ducts be secured when installed vertically?

A. Every 3 feet

B. Every 6 feet

C. Every 10 feet

D. At each corner

7. What is the term for a joint formed by joining metal parts with alloys that melt at temperatures above 840°F?

A. Brazed

B. Fused

C. Soldered

D. Welded

8. Where should the manual shutoff valve for a gas fired boiler be installed?

A. Upstream of all control devices

B. Downstream of all control devices

C. Either upstream or downstream of all control devices

D. When no regulating valve is installed

9. For ducts conveying explosive materials, where should their terminus ideally be located?

A. Inside the building

B. Above the roof surface

C. Near the floor

D. At a lateral distance from the wall

10. For each elbow greater than 45 degrees up to and including 90 degrees, what is important to consider?

A. the joint's location

B. the maximum common vent

C. the pitch required

D. the material used

Answers

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

Explanations

1. What appliance is designed primarily to supply hot water with automatic controls limiting water temperature to a maximum of 210°F?

A. Water heater

B. Steam boiler

C. Expansion tank

D. Gas heater

The appliance designed primarily to supply hot water with automatic controls limiting the temperature to a maximum of 210°F is a water heater. Water heaters are specifically engineered for heating water for various domestic purposes such as bathing, cooking, and cleaning. They incorporate automatic temperature controls to ensure safe operation and prevent scalding, keeping the water below the maximum temperature threshold. Steam boilers, on the other hand, are used for generating steam rather than hot water and typically operate at higher temperatures and pressures. Expansion tanks serve a different function entirely, as they are used in hydronic heating systems to absorb excess pressure changes in the system. Gas heaters are not specifically designed for hot water supply; they can also refer to heating appliances for air or other functions without the same focus on water heating and temperature control. Thus, the water heater's specific design and function make it the correct choice in this context.

2. According to code, how high must the clearance be above an unlisted upflow furnace casing?

A. 12 inches

B. 6 inches

C. 8 inches

D. 24 inches

The requirement for clearance above an unlisted upflow furnace casing is set to ensure adequate airflow and safety. A clearance of 8 inches above the furnace casing allows for proper ventilation, minimizing the risk of overheating and ensuring that any maintenance activities can be performed safely without obstruction. This specification is typically outlined in the National Fire Protection Association (NFPA) codes and the local building codes where the installation is being done. Adhering to these requirements not only helps in maintaining the efficiency of the furnace but also plays a critical role in preventing potential fire hazards caused by insufficient airflow or restricted heat dissipation. The other measurements listed do not meet the minimum requirements set by the code, which is why the choice specifying 8 inches is the appropriate one.

3. The minimum distance from the adjoining ground level should be at least how many inches above?

A. 3 inches

B. 6 inches

C. 2 inches

D. 12 inches

The minimum distance from the adjoining ground level that is required to be maintained for HVAC equipment, especially for air conditioning systems or heat pumps, is typically set at 2 inches. This height is crucial because it helps prevent water accumulation around the unit, which might lead to corrosion or damage to the electrical components. Maintaining this elevation also assists in ensuring adequate airflow, as debris and vegetation that might obstruct the condenser's air intake can be kept at bay, enhancing the system's efficiency and longevity. While other options suggest greater heights, the standard code requirements generally recognize 2 inches as sufficient for the specified purposes, balancing practical concerns and regulatory compliance.

4. A positive means of disconnect is required for electrical connections of more than how many volts?

A. 25

B. 50

C. 120

D. 240

A positive means of disconnect is required for electrical connections exceeding 50 volts to ensure safety and compliance with electrical codes. This requirement is rooted in the need to safeguard individuals working on or near electrical systems, as voltages above this threshold significantly increase the risk of electrical shock and hazards. In practice, having a reliable disconnect means ensures that equipment can be safely de-energized before maintenance or repair work is undertaken. This precaution is crucial for protecting technicians and other personnel from inadvertent contact with live circuits, especially in industrial or commercial settings where equipment may be operating under high power conditions. Understanding these safety standards is essential for HVAC professionals, as they routinely work with electrical systems that may operate at or above these voltage levels.

5. What type of ductwork system is generally prohibited from serving more than one story?

A. Flexible ducts

B. Metal ducts

C. Factory-made air ducts

D. Spiral duct systems

Factory-made air ducts are typically prohibited from serving more than one story due to safety and design considerations. These ducts are designed and manufactured to specific standards, often intended for particular types of installations, and when applied to multi-story systems, they may not adequately address the complexities involved, such as air travel distance, pressure differentials, and potential airflow issues. Using factory-made air ducts in multi-story applications can lead to challenges in achieving even air distribution and maintaining temperature control across different floors. Additionally, proper fire safety measures need to be adhered to in multi-story applications, and many factory-made ducts may not have the necessary certifications or fire ratings required for such uses. In contrast, other types of ducts, such as flexible ducts, metal ducts, and spiral duct systems, can often be adapted for multi-story applications given their design flexibility or specific construction materials that can meet safety standards for various building configurations.

6. How often should metal ducts be secured when installed vertically?

A. Every 3 feet

B. Every 6 feet

C. Every 10 feet

D. At each corner

When metal ducts are installed vertically, they need to be secured at regular intervals to ensure stability and prevent sagging or movement, which could lead to air leaks or inefficient operation. The standard practice for securing these ducts is every 6 feet. This spacing helps maintain the integrity of the duct system by minimizing the risk of bending or stress that could affect airflow and system performance. Additionally, securing ducts at this interval also aligns with building codes and industry standards, which prioritize safety and functionality in HVAC systems. While securing ducts at corners is important for maintaining proper alignment and supporting changes in direction, the regular interval of every 6 feet provides adequate support along the vertical run of the ductwork. This ensures that any forces acting on the duct, such as airflow and weight, are adequately countered, maintaining system efficiency and safety.

7. What is the term for a joint formed by joining metal parts with alloys that melt at temperatures above 840°F?

A. Brazed

B. Fused

C. Soldered

D. Welded

The term for a joint formed by joining metal parts with alloys that melt at temperatures above 840°F is indeed "brazed." Brazing is a metal-joining process that involves melting a filler metal that has a melting point above 840°F but below the melting point of the base metals being joined. This process allows for a strong joint while maintaining the integrity of the base metals. In contrast, "fused" refers to a method where materials are joined by melting them together without the specific inclusion of a filler material, which doesn't apply here. "Soldered" involves a filler metal with a lower melting point, typically below 840°F, suitable primarily for electronics or plumbing applications where lower temperatures are sufficient. "Welded" refers to a process where the base metals are melted together at their own melting points, which can vary significantly and often requires very high temperatures, but it is distinct from brazing because it doesn't utilize a filler metal in the same way. Thus, understanding the definition and the temperature requirements of brazing clarifies why it is the correct term for this type of metal joint.

8. Where should the manual shutoff valve for a gas fired boiler be installed?

A. Upstream of all control devices

B. Downstream of all control devices

C. Either upstream or downstream of all control devices

D. When no regulating valve is installed

The installation of a manual shutoff valve for a gas-fired boiler should be done upstream of all control devices. This configuration is essential for safety and operational efficiency. By positioning the shutoff valve upstream, it ensures that the entire system, including any control devices such as regulators or safety switches, can be isolated from the gas supply in the event of maintenance or an emergency. Having the valve upstream allows for immediate access to shut off the gas flow, which is critical in case of a leak or malfunction. It prevents the control devices from being exposed to gas when the system is being serviced, thereby reducing the risk of accidents. Additionally, this positioning complies with most building codes and safety standards, which emphasize the importance of being able to quickly and safely shut off the gas supply. In contrast, placing the shutoff valve downstream could leave the control devices energized and at risk during maintenance or emergencies. This practice would not only be potentially hazardous but could also violate safety regulations. Thus, the correct placement of the shutoff valve serves both as a safety measure and a proper adherence to recommended industry practices.

9. For ducts conveying explosive materials, where should their terminus ideally be located?

A. Inside the building

B. Above the roof surface

C. Near the floor

D. At a lateral distance from the wall

The ideal location for the terminus of ducts conveying explosive materials is above the roof surface. This positioning is crucial for safety reasons. When ducts are designed to transport potentially explosive substances, placing the vent above the roof allows for the dispersal of any harmful gases or vapors into the atmosphere, reducing the risk of accumulation within the building. If these materials were to be vented inside the building, there is a heightened risk of creating a hazardous environment, potentially resulting in an explosion or harmful exposure to occupants. Similarly, if the ducts were terminated near the floor, any leaks or releases could lead to dangerous concentrations of explosive materials close to ignition sources. Terminating the ducts at a lateral distance from the wall, while providing some separation, does not adequately mitigate the risk of explosive vapors accumulating in the structure, given that they could still pose a danger to individuals nearby. Thus, positioning the terminus above the roof is the safest alternative and promotes effective ventilation of harmful substances.

10. For each elbow greater than 45 degrees up to and including 90 degrees, what is important to consider?

A. the joint's location

B. the maximum common vent

C. the pitch required

D. the material used

Considering the factors involved with elbows greater than 45 degrees, especially up to 90 degrees, it is essential to recognize that the maximum common vent capacity is particularly important. This is because significant changes in direction, such as those caused by the elbow, can create additional resistance to airflow. This resistance may impact the venting efficiency and could lead to pressure changes within the system, affecting the overall performance of the HVAC equipment. When there are more elbows in a system, especially those at sharper angles, the friction loss increases, possibly requiring adjustments to the vent size or configuration to maintain efficient airflow. This makes understanding the maximum common vent capacity crucial to ensure that the system operates effectively and prevents potential issues like backdrafting or inadequate venting. While other factors such as the joint's location, pitch required, and material used are certainly relevant to plumbing and HVAC installations, they do not directly address how elbows influence the overall vent capacity and airflow dynamics to the same extent as the maximum common vent does in this specific context.