Gas Fitter Practice Test (Sample)

Study Guide

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Questions

1. An adjustable sheave pulley is most commonly utilized on which type of motor?

A. Motor shaft

B. Variable speed motor

C. Blower shaft

D. Direct drive motor

2. If 1 cubic foot of natural gas is 1000 Btuh, what is the ratio of combustion air?

A. 10

B. 15

C. 5

D. 30

3. Single wall vent connectors:

A. may pass through floors, ceilings or roofs provided a metal thimble is used

B. may pass through floors, ceilings or roofs provided the required minimum distance from combustible material is maintained

C. may pass through floors, ceilings or roofs provided they are insulated

D. shall not pass through floors, ceilings or roofs

4. What type of current does a typical gas furnace use for ignition?

A. Direct current (DC)

B. Alternating current (AC)

C. Both AC and DC

D. None of the above

5. What does a heat anticipator do?

A. Shuts the burner down if loss of gas supply

B. Determines the length of the burner "on" cycle

C. Acts as a back up safety limit

D. Shuts down burner on excess flow

6. What is the minimum distance a vent from a 75,000 Btuh Category 3 furnace may terminate from a door?

A. 1 foot

B. 3 feet

C. 6 feet

D. 10 feet

7. An appliance should not exceed what percentage of the rated input?

A. 80%

B. 75%

C. 25%

D. 90%

8. What is the recommended water temperature setting from a mixing valve for domestic water in combined heating systems?

A. 43°C (110°F)

B. 49°C to 54°C (120°F to 130°F)

C. 60°C to 66°C (140°F to 150°F)

D. 83°C (180°F)

9. What is the result of increasing the size of a blower pulley?

A. Increases air flow

B. Decreases air flow

C. Increases current flow

D. Decreases temperature rise

10. What is a common reason for a water heater pilot light going out?

A. Low gas supply pressure

B. Faulty thermocouple

C. Improper air mixture

D. High humidity levels

Answers

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

Explanations

1. An adjustable sheave pulley is most commonly utilized on which type of motor?

A. Motor shaft

B. Variable speed motor

C. Blower shaft

D. Direct drive motor

An adjustable sheave pulley is primarily used with a variable speed motor. The significance of this lies in the ability of the adjustable sheave to change the ratio between the motor and the driven unit, allowing for speed adjustments. Variable speed motors are designed to operate over a range of speeds, and the adjustable sheave complements this capability by enabling the operator to modify the pulley diameter or belt tension, thus effectively changing the motor's output speed. When comparing it to a motor shaft, which typically maintains a constant speed and performance with a fixed sheave, the adjustable sheave's function is more aligned with providing variability—as seen in variable speed applications. It allows operators to refine the system's performance based on load requirements, which is a critical feature not found in direct drive or blower shaft configurations that are often more fixed in their operational characteristics.

2. If 1 cubic foot of natural gas is 1000 Btuh, what is the ratio of combustion air?

A. 10

B. 15

C. 5

D. 30

To determine the proper ratio of combustion air when burning natural gas, it's important to understand the basic combustion principles. The combustion of natural gas primarily uses methane, which requires a specific amount of oxygen to completely combust into carbon dioxide and water. When we consider that 1 cubic foot of natural gas generates 1000 Btuh (British Thermal Units per hour), the general rule of thumb for natural gas combustion is that it requires approximately 10 cubic feet of air for every cubic foot of natural gas burned. This translates to a combustion air-to-fuel gas ratio of 10:1. This ratio ensures that there is enough oxygen available to support effective combustion, preventing incomplete burning and ensuring efficiency. Utilizing this correct ratio also reduces the risk of byproducts like carbon monoxide, which is a colorless, odorless gas that can be hazardous. Thus, a ratio of 10 cubic feet of combustion air to 1 cubic foot of natural gas is widely accepted and represents the correct answer in this context.

3. Single wall vent connectors:

A. may pass through floors, ceilings or roofs provided a metal thimble is used

B. may pass through floors, ceilings or roofs provided the required minimum distance from combustible material is maintained

C. may pass through floors, ceilings or roofs provided they are insulated

D. shall not pass through floors, ceilings or roofs

Single wall vent connectors are designed specifically to transport the exhaust gases from appliances to the outside air while maintaining safe distances from combustible materials. The key principle with these vent connectors is to minimize the risk of fire hazards due to high temperatures, which can easily transpire when conducting flue gases. The stipulation that they shall not pass through floors, ceilings, or roofs is paramount because these spaces often contain combustible materials, such as wood, insulation, or other structures that could ignite if exposed to the heat produced by the vent connector. By prohibiting their transit through these parts of the structure, safety is significantly enhanced, preventing potential fire hazards. Alternative options suggest conditions under which it might be permissible for single wall vent connectors to pass through combustible areas, yet these conditions could pose safety risks in practical applications. Insulating the connectors or using thimbles may not fully mitigate the dangers associated with heat levels, which can lead to unwanted ignition of adjacent materials. Therefore, strictly disallowing single wall connectors in these spaces is the best practice for ensuring safety in gas fitting applications.

4. What type of current does a typical gas furnace use for ignition?

A. Direct current (DC)

B. Alternating current (AC)

C. Both AC and DC

D. None of the above

A typical gas furnace uses alternating current (AC) for ignition. This is because gas furnaces are designed to operate on the electrical supply commonly provided in households, which is AC power. The ignition system in gas furnaces often utilizes a transformer to step down the voltage, providing the necessary energy to create a spark for ignition. This process relies on AC power to function effectively, as it allows for the proper cycling of electrical components within the furnace. Direct current (DC) is not commonly used in gas furnace ignition systems, as these systems are configured to run on the AC voltage supplied from standard electrical outlets. Therefore, AC is the appropriate answer as it aligns with the design and operational standards of most residential gas furnaces.

5. What does a heat anticipator do?

A. Shuts the burner down if loss of gas supply

B. Determines the length of the burner "on" cycle

C. Acts as a back up safety limit

D. Shuts down burner on excess flow

A heat anticipator is a crucial component in heating systems, particularly in thermostats. Its primary function is to determine the length of the burner "on" cycle by anticipating the temperature rise in the space being heated. When the system is activated, the anticipator monitors the temperature and, based on its settings, can turn off the burner before the desired temperature is reached. This prevents overshooting the set temperature, thereby improving comfort and efficiency. By regulating the burner cycle, it helps maintain a more stable indoor environment and reduces energy waste. The other options pertain to different functions: for instance, shutting down the burner due to a loss of gas supply or excessive flow relates to safety mechanisms, while acting as a backup safety limit involves ensuring that the heating system does not exceed certain operational thresholds. These are not the roles of the heat anticipator, which specifically focuses on managing heating cycles rather than safety measures.

6. What is the minimum distance a vent from a 75,000 Btuh Category 3 furnace may terminate from a door?

A. 1 foot

B. 3 feet

C. 6 feet

D. 10 feet

The minimum distance a vent from a 75,000 Btuh Category 3 furnace must terminate from a door is 3 feet. This requirement is established to ensure safety and effective ventilation. Category 3 appliances, such as this furnace, produce flue gases that can contain high levels of moisture and can be corrosive. If the vent terminates too close to a door, there can be a risk of those flue gases re-entering the building, which can create dangerous conditions, including carbon monoxide accumulation or increased humidity inside the structure. The 3 feet distance serves as a precaution against these risks, ensuring the safe dispersion of exhaust gases away from entrances and exits. It helps to maintain indoor air quality and minimize the potential for any harmful effects associated with flue gases.

7. An appliance should not exceed what percentage of the rated input?

A. 80%

B. 75%

C. 25%

D. 90%

The correct percentage indicates the maximum rated input an appliance should reach to ensure efficient and safe operation. When it is stated that an appliance should not exceed 90% of its rated input, this threshold is set to avoid operational strain and potential hazards. Operating at or below this percentage helps to maintain optimal performance, prolong the lifespan of the appliance, and ensure safety standards are met. Appliances that operate consistently near or at their maximum rated input can become overloaded, which increases the risk of malfunctions, overheating, and safety issues like gas leaks. Adhering to the guideline of maintaining input at or below 90% helps prevent these risks and promotes energy efficiency. Other percentage values, such as 80%, 75%, and 25%, may not be appropriate limits for all appliances, as they do not align with standard practices or recommendations for ensuring safety and reliability in gas appliance operation.

8. What is the recommended water temperature setting from a mixing valve for domestic water in combined heating systems?

A. 43°C (110°F)

B. 49°C to 54°C (120°F to 130°F)

C. 60°C to 66°C (140°F to 150°F)

D. 83°C (180°F)

The recommended water temperature setting from a mixing valve for domestic water in combined heating systems falls within the range of 49°C to 54°C (120°F to 130°F). This temperature is optimal for several reasons. First, this range provides a safe and comfortable level for domestic hot water, minimizing the risk of scalding while ensuring effective sanitation. At temperatures lower than this range, there might be a heightened risk of bacterial growth, particularly from microorganisms such as Legionella, which thrive in lukewarm water. Second, setting the temperature in this range strikes a balance between energy efficiency and sufficient heating performance. Water that is too hot can lead to wasted energy, while water that is too cool may not effectively meet household needs. Setting temperatures above this recommended range, such as options discussing 60°C to 66°C (140°F to 150°F) or higher, can increase the risk of burns and scalding, particularly for vulnerable populations, such as children and elderly individuals. By adhering to the recommended temperature setting, combined heating systems can effectively provide safe and efficient domestic hot water service.

9. What is the result of increasing the size of a blower pulley?

A. Increases air flow

B. Decreases air flow

C. Increases current flow

D. Decreases temperature rise

Increasing the size of a blower pulley directly affects the blower's performance by changing its speed. When the pulley size is increased, it leads to a slower rotation of the blower, which results in a decrease in air flow produced by the blower. This happens because the larger pulley requires more torque to drive the same blower motor, ultimately reducing the speed at which the blower operates. A slower blower speed means less air is moved through the system, making it essential for gas fitters to understand the implications of pulley sizes on air flow and system efficiency. Understanding blower operation is crucial because maintaining the correct air flow ensures optimal performance of heating systems, ventilation, and air conditioning applications. An increase in the size of a blower pulley will typically not lead to increased current flow or a reduction in temperature rise, as those factors rely more on the efficiency and heat distribution of the system rather than just the pulley size.

10. What is a common reason for a water heater pilot light going out?

A. Low gas supply pressure

B. Faulty thermocouple

C. Improper air mixture

D. High humidity levels

A common reason for a water heater pilot light going out is low gas supply pressure. When the gas pressure is insufficient, it may not be able to maintain a consistent flame in the pilot light. This can happen due to issues with the gas supply line, a malfunctioning gas regulator, or a partially closed valve. Without the right pressure, the gas can’t flow properly, leading to a weak flame or extinguishing the pilot light completely. While other factors may contribute to pilot light issues, low gas supply pressure is a primary cause because gas appliances are designed to operate within specific pressure ranges for optimal performance. If the pressure drops too low, it directly impacts the ability of the pilot light to stay lit.