ABSA 5th Class Practice Exam (Sample)

Study Guide

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Questions

1. What is the pressure in a fully charged self-contained breathing apparatus?

A. 21 MPa

B. 31 MPa

C. 41 MPa

D. 51 MPa

2. What type of valve can be operated by chains in the event of a gauge glass breaking?

A. Quick closing valve

B. Manual shutoff valve

C. Pressure relief valve

D. Butterfly valve

3. What is the main purpose of a condenser in a refrigeration system?

A. To cool down the environment

B. To release heat to the atmosphere

C. To keep pressure high

D. To remove heat from the refrigerant

4. What primarily affects the heat load from people in a room?

A. The number of people present

B. The temperature of the room

C. The activity of the people

D. The size of the room

5. Which of the following are categories of air conditioning systems?

A. Single-zone and combined

B. Unitary and ductless

C. Unitary and central

D. Split and portable

6. According to the second law of thermodynamics, heat will flow from which temperature to which temperature?

A. Cold to hot

B. Hot to cold

C. Warm to cool

D. Freezing to boiling

7. What is the name of the motor that has an extra winding in the stator for added torque?

A. Synchronous motor

B. Split-phase motor

C. Induction motor

D. Universal motor

8. What is a key characteristic of safety footwear used in welding?

A. It must be lightweight

B. It should have reinforced toes

C. It must be waterproof

D. It should have good traction

9. To avoid start-up difficulties in cold weather, a thermal fluid must have what property?

A. A low boiling point

B. A high viscosity

C. A low pour point

D. A high flash point

10. What is required to prevent oil from spreading beyond the confines of a heater in the event of a ruptured tube?

A. Containment boxes

B. Dikes

C. Oil traps

D. Absorbent pads

Answers

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

Explanations

1. What is the pressure in a fully charged self-contained breathing apparatus?

A. 21 MPa

B. 31 MPa

C. 41 MPa

D. 51 MPa

The pressure in a fully charged self-contained breathing apparatus (SCBA) is typically around 31 MPa, which is equivalent to 310 bar or about 4500 psi. This pressure ensures that the apparatus has a sufficient supply of breathable air for the user to operate safely in hazardous environments, such as during firefighting or rescue operations. Understanding this specific pressure is crucial for safety and operational readiness, as it impacts the duration of air supply and the effectiveness of the SCBA in emergency situations. The other options suggest pressures that exceed typical standards for SCBA devices used in most industries.

2. What type of valve can be operated by chains in the event of a gauge glass breaking?

A. Quick closing valve

B. Manual shutoff valve

C. Pressure relief valve

D. Butterfly valve

A quick closing valve is designed to rapidly shut off the flow of fluid in the event of an emergency, such as a gauge glass breaking. This feature is crucial in preventing any potential hazards that could arise from a rapid loss of fluid, which might occur if a gauge glass fails. The ability to operate the valve via chains adds an important layer of safety and accessibility, as it allows for immediate action in an emergency situation even if conventional controls might be compromised or inaccessible. The operational mechanism of quick closing valves is specifically suited for scenarios that require swift intervention to mitigate risks associated with high-pressure systems or critical fluid management processes. They are typically used in settings where maintaining safety and minimizing the impact of failures is paramount.

3. What is the main purpose of a condenser in a refrigeration system?

A. To cool down the environment

B. To release heat to the atmosphere

C. To keep pressure high

D. To remove heat from the refrigerant

The main purpose of a condenser in a refrigeration system is to release heat from the refrigerant. In a typical refrigeration cycle, the refrigerant absorbs heat from the environment or the space being cooled in the evaporator. As the refrigerant circulates and reaches the condenser, it needs to release this absorbed heat to return to a liquid state. In the condenser, the refrigerant transitions from a gas to a liquid as it loses heat due to the air or water circulating around the coils. This process is crucial because it allows the refrigerant to cool down and maintain an effective cycle, ensuring that the refrigeration system operates efficiently. By effectively removing heat from the refrigerant and discharging it into the atmosphere, the condenser plays a vital role in maintaining the cooling cycle of the system. This action helps achieve the desired temperature control in the space being refrigerated.

4. What primarily affects the heat load from people in a room?

A. The number of people present

B. The temperature of the room

C. The activity of the people

D. The size of the room

The heat load from people in a room is primarily affected by the activity of the people. When individuals engage in physical activities, they generate more body heat due to increased metabolic processes. For instance, a room filled with people exercising will have a higher heat load compared to one where people are sitting still. This is because active individuals exert energy, which converts to heat, increasing the overall temperature within the space. While the number of people present does contribute to the total heat load, the level of activity each person is engaged in plays a more critical role in determining how much heat is generated. The temperature of the room and its size can influence overall comfort and air circulation, but they do not directly measure the heat output from the individuals themselves. Thus, understanding the types of activities taking place is key to accurately assessing the heat load in any given environment.

5. Which of the following are categories of air conditioning systems?

A. Single-zone and combined

B. Unitary and ductless

C. Unitary and central

D. Split and portable

In the context of air conditioning systems, identifying the categories is essential for understanding their functionality and application. The correct choice categorizes air conditioning systems into unitary and central systems. Unitary air conditioning systems are designed to provide cooling or heating for a single space or a defined area. They incorporate all components in one package, making them efficient for use in smaller spaces or single-story buildings. In contrast, central air conditioning systems operate to cool or heat an entire building from a centralized unit, distributing air through ducts to various rooms or areas. This setup is ideal for larger spaces or multi-story buildings, providing a consistent climate throughout. Understanding these categories is crucial when determining the right system for a particular application, as they each come with different operational efficiencies and installation requirements. They aim to cater to specific heating and cooling needs, ensuring comfort and energy efficiency within different environments.

6. According to the second law of thermodynamics, heat will flow from which temperature to which temperature?

A. Cold to hot

B. Hot to cold

C. Warm to cool

D. Freezing to boiling

The second law of thermodynamics states that heat energy naturally flows from a region of higher temperature to a region of lower temperature. This principle highlights that energy tends to disperse or spread out over time. Thus, when we have two objects at different temperatures, the one that is hotter will transfer heat to the cooler object until thermal equilibrium is reached. This natural direction of heat flow is a fundamental characteristic of thermodynamic processes. In practical terms, it means that if you place a hot cup of coffee on a table, heat will flow from the coffee, which is at a higher temperature, to the cooler air surrounding it, causing the coffee to gradually lose heat and cool down. This concept is essential not only in understanding heat transfer but also in a wide range of applications in physics and engineering. While other options may describe different ideas of temperature relationship, the correct answer aligns directly with the established principles of thermodynamics.

7. What is the name of the motor that has an extra winding in the stator for added torque?

A. Synchronous motor

B. Split-phase motor

C. Induction motor

D. Universal motor

The motor with an extra winding in the stator for added torque is known as the split-phase motor. This design feature allows the motor to create a starting torque that is essential for getting the rotor moving from a standstill. The split-phase motor achieves this by having two windings: a main winding and an auxiliary winding. The auxiliary winding is positioned in such a way that it enables a phase shift in the current, which produces a magnetic field that helps in generating the necessary starting torque. The use of two windings provides a significant advantage during startup, as it allows the motor to overcome inertia and begin to turn. Once the motor reaches a certain speed, the auxiliary winding is typically disconnected from the circuit, allowing the main winding to take over and maintain operation. This design is particularly useful in applications requiring moderate starting torque, making it suitable for small appliances and machinery where starting torque is important but not excessively high, such as fans and small pumps.

8. What is a key characteristic of safety footwear used in welding?

A. It must be lightweight

B. It should have reinforced toes

C. It must be waterproof

D. It should have good traction

A key characteristic of safety footwear used in welding is that it should have reinforced toes. This feature is crucial because welders work in environments where heavy materials may be moved, and sparks or molten metal can fall onto their feet. Reinforced toes provide the necessary protection against injuries that could result from dropped objects or accidental exposure to heat. In addition to guarding against impacts, this characteristic is vital for maintaining safety compliance in workplaces where welding occurs, helping to prevent serious foot injuries that could lead to significant downtime or disability. While factors like weight, waterproofing, and traction are also relevant to overall footwear performance, they do not directly address the specific risks associated with welding operations in the same critical manner as reinforced toes. Thus, reinforced toes stand out as an essential requirement for welding safety footwear.

9. To avoid start-up difficulties in cold weather, a thermal fluid must have what property?

A. A low boiling point

B. A high viscosity

C. A low pour point

D. A high flash point

A thermal fluid needs to have a low pour point to ensure it remains fluid and can flow easily in cold weather conditions. If a thermal fluid has a high pour point, it can become thick or even solidify, preventing it from circulating effectively through the system. This can lead to start-up difficulties such as pump failure or inadequate heating, as the fluid won't move where it needs to go to facilitate the necessary processes. Choosing a thermal fluid with a low pour point allows for reliable operation in low temperatures, ensuring that the system can start up effectively without the risk of blockages or damage due to inadequate fluidity.

10. What is required to prevent oil from spreading beyond the confines of a heater in the event of a ruptured tube?

A. Containment boxes

B. Dikes

C. Oil traps

D. Absorbent pads

Dikes are essential for containing liquids, including oil, to prevent their spread in case of a rupture, such as a broken tube. They are generally constructed as barriers that can effectively hold back fluids, ensuring that any leakage is confined to a specified area. In the context of a heater with oil, dikes provide a physical barrier to mitigate the risk of environmental contamination and hazards associated with spilled oil. Containment boxes, while useful in certain situations, are typically designed for specific equipment rather than as broad protective barriers. Oil traps can be effective for filtering or separating oil from other substances but do not necessarily contain the oil spread. Absorbent pads are helpful for cleaning up spills once they have occurred but do not prevent the oil from spreading in the first place. Thus, dikes are the most effective solution for the prevention of oil dispersal in this scenario.