

BOMA-HVAC Practice Test (Sample)

Study Guide



Everything you need from our exam experts!

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SAMPLE

Questions

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- 1. What is often a consequence of neglecting regular HVAC maintenance?**
 - A. Enhanced air quality**
 - B. Increased system efficiency**
 - C. Higher repair costs due to system breakdown**
 - D. Extended lifespan of the system**
- 2. A heat exchanger ____.**
 - A. Heats up the refrigerant**
 - B. Subcools the liquid refrigerant**
 - C. Increases the pressure**
 - D. Ventilates the system**
- 3. The purpose of a primary control is to ____.**
 - A. Regulate system pressure**
 - B. Maintain a constant temperature**
 - C. Start or stop the system**
 - D. Monitor energy consumption**
- 4. What type of fan is mostly used in HVAC and industrial systems?**
 - A. Axial**
 - B. Centrifugal**
 - C. Blower**
 - D. Exhaust**
- 5. What characteristic of a system could potentially lead to low efficiency rates?**
 - A. High humidity**
 - B. Improper maintenance**
 - C. Poor duct design**
 - D. All of the above**

- 6. What is the term for the temperature at which boiling occurs in any liquid?**
- A. Saturation temperature**
 - B. Freezing temperature**
 - C. Critical temperature**
 - D. Melting temperature**
- 7. How is the movement of the pre-rotation vanes controlled?**
- A. Fan speed**
 - B. Chill water temperature control**
 - C. Refrigerant flow**
 - D. Pressure differential**
- 8. Enthalpy refers to the ____.**
- A. Mass of the refrigerant**
 - B. Temperature of the refrigerant**
 - C. Heat content of the refrigerant**
 - D. Pressure of the refrigerant**
- 9. What is true regarding cylinder head bypass in multi-cylinder compressor systems?**
- A. A valve separates active from inactive cylinders**
 - B. A check valve is used to separate inactive cylinders from active ones**
 - C. A filter separates gas from liquid refrigerant**
 - D. A controller regulates the temperature**
- 10. An accumulator in a refrigeration system prevents slugging by separating what?**
- A. Gas and liquid refrigerant**
 - B. High and low pressure**
 - C. Vapor and liquid refrigerant**
 - D. Coolant and air**

Answers

SAMPLE

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

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Explanations

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1. What is often a consequence of neglecting regular HVAC maintenance?

- A. Enhanced air quality**
- B. Increased system efficiency**
- C. Higher repair costs due to system breakdown**
- D. Extended lifespan of the system**

Neglecting regular HVAC maintenance can lead to higher repair costs due to system breakdowns. When maintenance is overlooked, small issues can escalate into significant problems that require more extensive repairs or even complete system replacements. Routine maintenance helps identify potential problems early, ensuring that components function efficiently and effectively. Without it, systems may operate under stress, leading to increased wear and tear. For instance, if filters are not changed regularly, dust and debris can accumulate, causing the system to struggle and eventually fail. Similarly, failing to check refrigerant levels or inspect components can lead to major malfunctions. The result is not only a lack of efficiency but also the potential for costly repairs that could have been avoided with regular maintenance.

2. A heat exchanger ____.

- A. Heats up the refrigerant**
- B. Subcools the liquid refrigerant**
- C. Increases the pressure**
- D. Ventilates the system**

A heat exchanger plays a crucial role in HVAC systems by facilitating the transfer of heat between two fluids without allowing them to mix. In the context of refrigeration, it primarily focuses on enhancing the cooling process. One important function of a heat exchanger is to subcool the liquid refrigerant. When the refrigerant leaves the condenser, it is in a high-pressure, saturated liquid state. The subcooling process allows the refrigerant to be cooled even further below its saturation point before it enters the expansion valve. This additional cooling improves the efficiency of the refrigeration cycle because it ensures that all the refrigerant is in the liquid state, preventing any vapor from entering the expansion valve, which could lead to decreased efficiency and potential damage to the compressor. Subcooling the liquid refrigerant contributes to the overall system performance by maximizing the refrigeration capacity and enhancing the ability to absorb heat in the evaporator. This function is critical for maintaining efficient operation in HVAC systems, ultimately leading to better energy efficiency and comfort levels in the spaces being conditioned. The other options do not accurately describe the primary role of a heat exchanger in this context. Heating up the refrigerant or increasing the pressure would refer more to components like compressors or heaters, while ventilating refers to airflow through ducts

3. The purpose of a primary control is to ____.

- A. Regulate system pressure**
- B. Maintain a constant temperature**
- C. Start or stop the system**
- D. Monitor energy consumption**

The primary control in an HVAC system plays a crucial role in the overall operation and efficiency of the system. Its main function is to start or stop the system based on conditions such as temperature, pressure, or demand for heating or cooling. This control is essential because it initiates the system's operation when conditions require it and shuts it down when those conditions no longer prevail, thereby helping to maintain energy efficiency and system performance. For example, in a typical heating system, the primary control may activate the boiler or furnace when the indoor temperature drops below a set point. Conversely, it would turn the system off once the desired temperature is reached, preventing unnecessary energy consumption. This on/off function is a fundamental mechanism in maintaining comfort levels within a space while also managing energy use. The other options, while important aspects of HVAC systems, do not encapsulate the primary function of the primary control. Regulating system pressure, maintaining a constant temperature, and monitoring energy consumption are typically handled by secondary or auxiliary controls and indicators that work alongside the primary control to enhance overall system operation.

4. What type of fan is mostly used in HVAC and industrial systems?

- A. Axial**
- B. Centrifugal**
- C. Blower**
- D. Exhaust**

Centrifugal fans are predominantly used in HVAC and industrial systems due to their ability to generate high pressure and move large volumes of air efficiently. They operate by drawing air into the center of the fan and then forcing it outwards through a discharge nozzle. This design allows centrifugal fans to handle high resistance in the ductwork and achieve sufficient airflow, making them ideal for applications requiring consistent and controlled airflow, such as in heating, cooling, and ventilation systems. Furthermore, their versatility makes them suitable for various configurations and applications, whether in commercial buildings, industrial processes, or even in more complex systems requiring precise air management. The characteristics of centrifugal fans allow them to be effective in situations where other fan types may not perform as effectively, such as in systems that require high static pressure or in circumstances where air needs to be moved through long duct runs.

5. What characteristic of a system could potentially lead to low efficiency rates?

- A. High humidity**
- B. Improper maintenance**
- C. Poor duct design**
- D. All of the above**

A system's efficiency can be significantly impacted by a variety of factors, and in this case, multiple characteristics can contribute to low efficiency rates. High humidity can cause an HVAC system to work harder to dehumidify the air, which can lead to increased energy consumption and reduced efficiency. When humidity levels are elevated, the system must operate longer and with more energy to achieve the desired comfort level. Improper maintenance is another critical factor that can hinder efficiency. When HVAC systems are not regularly serviced, components such as filters, coils, and fans can become dirty or malfunctioning, leading to decreased airflow and inefficiencies. Neglecting maintenance can also shorten the lifespan of the equipment and result in higher operational costs. Poor duct design can obstruct airflow and create hot or cold spots within a building. If the ducts are incorrectly sized or poorly insulated, or if there are excessive bends or obstructions, the system's efficiency can suffer as it struggles to maintain the desired temperature throughout the space. Collectively, these factors—high humidity, improper maintenance, and poor duct design—can all contribute to low efficiency rates, making the answer encompass all of these issues effectively. This comprehensive understanding helps to appreciate how multiple aspects of an HVAC system interact with each other to influence overall

6. What is the term for the temperature at which boiling occurs in any liquid?

- A. Saturation temperature**
- B. Freezing temperature**
- C. Critical temperature**
- D. Melting temperature**

The term for the temperature at which boiling occurs in any liquid is known as the saturation temperature. At this specific temperature, the vapor pressure of the liquid equals the atmospheric pressure surrounding it, allowing the liquid to transition into the gas phase, which is the process of boiling. Understanding saturation temperature is crucial in HVAC systems, as it relates to the performance and efficiency of refrigeration and heating cycles. For example, in a refrigeration cycle, knowing the saturation temperature at different pressures helps in determining the state of the refrigerant at various stages in the system, impacting overall performance. Other terms like freezing temperature, critical temperature, and melting temperature serve different purposes. The freezing temperature refers to the point at which a liquid turns into a solid, while the critical temperature is the highest temperature at which a substance can exist as a liquid regardless of pressure. Melting temperature specifically describes the transition from solid to liquid. These definitions clarify the unique role of saturation temperature in the context of phase changes and thermal dynamics.

7. How is the movement of the pre-rotation vanes controlled?

- A. Fan speed
- B. Chill water temperature control**
- C. Refrigerant flow
- D. Pressure differential

The movement of the pre-rotation vanes is primarily controlled by chill water temperature control because these vanes are designed to optimize the performance of a cooling system, particularly in variable air volume (VAV) systems. By adjusting the position of the pre-rotation vanes, the system can effectively enhance the airflow characteristics and improve the energy efficiency of the cooling process. Specifically, when the chilled water temperature is adjusted, the cooling load in the space changes, leading to a need for modifications in air distribution. The pre-rotation vanes help manage this airflow in response to the chilled water temperature to maintain appropriate indoor conditions. This adaptability ensures that the system can efficiently respond to varying cooling demands while maximizing efficiency. The other options pertain to different aspects of HVAC operation. Fan speed affects airflow but does not directly control the positioning of the vanes. Refrigerant flow is more related to the cooling process and the operation of the compressor and evaporator, rather than directly impacting the vanes. Pressure differential may influence air movement but is not the primary control mechanism for the pre-rotation vanes themselves.

8. Enthalpy refers to the ____.

- A. Mass of the refrigerant
- B. Temperature of the refrigerant
- C. Heat content of the refrigerant**
- D. Pressure of the refrigerant

Enthalpy refers to the heat content of a system, which is a critical concept in thermodynamics and HVAC applications. Specifically, enthalpy encompasses both the internal energy of the substance and the energy required to displace its environment to make room for its volume, effectively combining thermodynamic properties into a single measurement. In HVAC systems, understanding the enthalpy of refrigerants is essential for processes like heat exchange and for determining the efficiency of cooling and heating cycles. Differentiating enthalpy from the other choices, the mass of the refrigerant pertains to its quantity, while temperature is a measure of thermal energy but does not account for the total energy that is involved in the thermodynamic processes. Pressure, on the other hand, is related to the force exerted by the refrigerant per unit area but does not inherently indicate the heat content within the system. Therefore, the concept that best aligns with enthalpy is indeed the heat content of the refrigerant, as it plays a crucial role in the analysis and design of HVAC systems.

9. What is true regarding cylinder head bypass in multi-cylinder compressor systems?

- A. A valve separates active from inactive cylinders**
- B. A check valve is used to separate inactive cylinders from active ones**
- C. A filter separates gas from liquid refrigerant**
- D. A controller regulates the temperature**

In multi-cylinder compressor systems, the mechanism for managing the operation of active and inactive cylinders is crucial for maintaining efficiency and performance. The correct choice, which states that a check valve is used to separate inactive cylinders from active ones, highlights the role of this component in preventing backflow and ensuring that only the desired flow of refrigerant enters the active cylinders. The check valve allows refrigerant to flow in one direction, ensuring that the inactive cylinders are isolated from the system's active operation. This allows the system to adjust its capacity according to the load demands efficiently, maximizing energy efficiency and preventing potential issues that could arise from mixing pressure or flow among different cylinders. Other choices do not accurately describe the mechanism of cylinder head bypass. For instance, a valve separating active from inactive cylinders is more broadly associated with different compressor configurations, rather than specifying the function of a check valve. A filter's role is related to ensuring clean refrigerant flow, particularly to avoid liquid refrigerant entering components that require gaseous refrigerant, but this does not correlate with bypassing or managing cylinder operation. Finally, while a controller can regulate temperature in a broader system context, it does not specifically manage the direct separation of active and inactive cylinders, which is the key function of the check valve.

10. An accumulator in a refrigeration system prevents slugging by separating what?

- A. Gas and liquid refrigerant**
- B. High and low pressure**
- C. Vapor and liquid refrigerant**
- D. Coolant and air**

In a refrigeration system, an accumulator plays a critical role in managing the flow of refrigerant, particularly in preventing slugging, which occurs when liquid refrigerant enters the compressor. This can lead to damage, as compressors are designed to handle vapor rather than liquid. The correct answer highlights that the accumulator separates vapor and liquid refrigerant. It collects surplus liquid refrigerant from the evaporator to ensure only vapor is sent to the compressor. By doing so, the accumulator effectively stores any excess liquid while allowing the compressor to operate smoothly with the vapor, thus protecting it from potential damage caused by liquid slugging. Understanding the function of an accumulator is essential for maintaining system efficiency and longevity. It helps in balancing the phases of refrigerant, ensuring that the compressor receives vapor and preventing any liquid refrigerant that could cause issues within the system.