

ESCO Air Conditioning Practice Exam (Sample)

Study Guide



Everything you need from our exam experts!

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SAMPLE

Questions

SAMPLE

- 1. What are ductless mini-split systems?**
 - A. Systems that require extensive ductwork**
 - B. Air conditioning systems without ductwork**
 - C. Heating systems only**
 - D. Systems limited to small spaces**
- 2. What effect does a rise in evaporator pressure have on an automatic expansion valve?**
 - A. Causes it to close**
 - B. Causes it to open**
 - C. Increases liquid refrigerant storage**
 - D. Reduces flash gas**
- 3. Air or non-condensable gases in a capillary tube air conditioning system typically cause which conditions?**
 - A. High oil level**
 - B. High suction pressure and high discharge pressure**
 - C. Low suction pressure and low discharge pressure**
 - D. Low operating pressures**
- 4. What can excessive moisture in an air conditioning system lead to?**
 - A. Lower cooling efficiency**
 - B. Increased energy consumption**
 - C. Mold growth and system damage**
 - D. All of the above**
- 5. Which HVAC component is most responsible for removing moisture from the air?**
 - A. Air filter**
 - B. Compressor**
 - C. Condensing coil**
 - D. Evaporator coil**

- 6. In the evaporator**
- A. Latent heat is absorbed by the refrigerant from the refrigerated space**
 - B. Latent heat is released to the refrigerated space**
 - C. Sensible heat is absorbed by the refrigerant**
 - D. Sensible heat is released to the refrigerated space**
- 7. What is the function of a low pressure cut off switch in an air conditioning system?**
- A. Prevent evaporator icing**
 - B. Establish a minimum operating pressure in the evaporator**
 - C. Increase compressor efficiency**
 - D. Regulate discharge pressure**
- 8. Which type of heat is removed when refrigerant changes from gas to liquid in the condenser?**
- A. Conductive heat**
 - B. Latent heat**
 - C. Radiant heat**
 - D. Sensible heat**
- 9. Which of the following is the most important consideration in the selection of an evaporator coil?**
- A. Match the coil to the compressor**
 - B. Match the coil to the condensing unit and the latent/sensible loads**
 - C. Match the coil to the refrigerant type**
 - D. Match the coil to the size of the space**
- 10. What is superheat in the context of refrigeration?**
- A. Condensation process**
 - B. Heat added to refrigerant in vapor state after evaporation**
 - C. Heat removed from refrigerant before compression**
 - D. Heat causing temperature change**

Answers

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

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Explanations

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1. What are ductless mini-split systems?

- A. Systems that require extensive ductwork
- B. Air conditioning systems without ductwork**
- C. Heating systems only
- D. Systems limited to small spaces

Ductless mini-split systems are specifically designed to provide heating and cooling without the need for ductwork, distinguishing them from traditional HVAC systems. These systems consist of an outdoor unit and one or more indoor units that are mounted on walls or ceilings, allowing for flexibility in installation and layout. By eliminating the need for ductwork, ductless mini-splits can be more efficient and easier to install in homes or buildings where running ductwork is impractical or impossible. This design allows for individualized climate control in different rooms, enhancing comfort and energy efficiency. The other options do not accurately describe ductless mini-split systems. For instance, while they can be used in small spaces, they are not limited to them; they can service larger areas with multiple indoor units. They also serve both heating and cooling functions, making the focus on heating systems only inappropriate. Additionally, the absence of ductwork is a defining characteristic, which rules out any suggestion that they require extensive ductwork.

2. What effect does a rise in evaporator pressure have on an automatic expansion valve?

- A. Causes it to close**
- B. Causes it to open
- C. Increases liquid refrigerant storage
- D. Reduces flash gas

A rise in evaporator pressure directly influences the function of an automatic expansion valve, which is designed to regulate the flow of refrigerant into the evaporator based on pressure changes. When the evaporator pressure increases, it indicates that there is a higher amount of refrigerant in the evaporator or that the refrigerant is absorbing heat more effectively. In this scenario, the automatic expansion valve responds to the increase in evaporator pressure by closing or reducing its opening. This action helps to limit the amount of refrigerant entering the evaporator in order to maintain a consistent pressure and prevent flooding, which could lead to inefficient operation and potential damage to the system. By controlling refrigerant flow, the valve helps maintain optimal conditions within the evaporator, enhancing overall system performance and efficiency. The remaining options do not accurately describe the action of the valve in response to rising evaporator pressure, demonstrating that the valve is specifically designed to close when the pressure increases to prevent excessive refrigerant flow.

3. Air or non-condensable gases in a capillary tube air conditioning system typically cause which conditions?

A. High oil level

B. High suction pressure and high discharge pressure

C. Low suction pressure and low discharge pressure

D. Low operating pressures

Air or non-condensable gases in a capillary tube air conditioning system typically cause high oil level. When air or non-condensable gases enter the system, they can cause the compressor oil to foam up and circulate abnormally. This leads to a high oil level in the system, which can disrupt proper lubrication of the compressor components and reduce the system's efficiency. The other options are not the typical conditions caused by the presence of air or non-condensable gases in a capillary tube air conditioning system.

High suction pressure and high discharge pressure, low suction pressure and low discharge pressure, and low operating pressures are not directly related to the presence of air or non-condensable gases in the system.

4. What can excessive moisture in an air conditioning system lead to?

A. Lower cooling efficiency

B. Increased energy consumption

C. Mold growth and system damage

D. All of the above

Excessive moisture in an air conditioning system can lead to several serious issues, making "All of the above" the most comprehensive answer. Lower cooling efficiency occurs as moisture can affect the system's ability to effectively transfer heat. When humidity levels are too high, the system may struggle to dehumidify the air, which can lead to less effective cooling and a discomforting indoor environment. Increased energy consumption is another consequence of excess moisture. As the system works harder to achieve the desired cooling conditions, it uses more energy. This increased workload typically leads to higher utility bills. Moreover, excessive moisture can result in mold growth and system damage. High humidity creates a conducive environment for mold spores to thrive, which can not only deteriorate the air quality but also potentially lead to health risks for the occupants. Additionally, moisture can lead to corrosion and other damage to the internal components of the system, further diminishing its lifespan and performance. Therefore, recognizing that all these elements are interrelated reinforces why "All of the above" is the correct response. Each aspect highlights the importance of maintaining proper humidity levels for both system efficiency and overall health.

5. Which HVAC component is most responsible for removing moisture from the air?

- A. Air filter**
- B. Compressor**
- C. Condensing coil**
- D. Evaporator coil**

The evaporator coil is located inside the condensing unit of the HVAC system and is responsible for cooling the air by removing heat and moisture. As warm air passes over the cold evaporator coil, the moisture condenses on the coil and is then drained away. This is why the evaporator coil is considered the most responsible for removing moisture from the air. On the other hand, the air filter primarily helps remove particles and allergens from the air, while the compressor and condensing coil work together to compress and cool refrigerant to further remove heat from the air.

6. In the evaporator

- A. Latent heat is absorbed by the refrigerant from the refrigerated space**
- B. Latent heat is released to the refrigerated space**
- C. Sensible heat is absorbed by the refrigerant**
- D. Sensible heat is released to the refrigerated space**

In the evaporator, latent heat is absorbed by the refrigerant from the refrigerated space. This absorption of latent heat is a crucial part of the refrigeration cycle. As refrigerant passes through the evaporator coils, it evaporates by absorbing heat from the surrounding air or space. This process cools the air or space being refrigerated. Therefore, Option A is the correct answer. Sensible heat, on the other hand, is heat that can be measured by a change in temperature and is not directly related to phase change (solid to liquid, liquid to gas). Sensible heat is typically absorbed by the refrigerant in the condenser rather than the evaporator. Therefore, Options B, C, and D are not characteristic of the evaporator in the refrigeration cycle.

7. What is the function of a low pressure cut off switch in an air conditioning system?

A. Prevent evaporator icing

B. Establish a minimum operating pressure in the evaporator

C. Increase compressor efficiency

D. Regulate discharge pressure

The primary function of a low pressure cut off switch in an air conditioning system is to prevent evaporator icing. This switch monitors the pressure within the evaporator and is designed to turn off the compressor if the pressure drops below a certain threshold. When the pressure is too low, it may indicate that the refrigerant is not properly circulating, which can lead to an excessively cold evaporator and, subsequently, icing. Ice formation can severely impede airflow and reduce the efficiency of the system, leading to potential damage to components and compromised system performance. By cutting off the compressor operation when low pressure is detected, the switch helps maintain appropriate conditions within the evaporator, ensuring that it operates effectively without the risk of icing. This crucial safety mechanism protects the system's integrity and functionality. While a low pressure cut off switch helps maintain system efficiency indirectly by preventing icing, its primary role is focused on protecting the evaporator environment rather than directly addressing compressor efficiency or regulating discharge pressure.

8. Which type of heat is removed when refrigerant changes from gas to liquid in the condenser?

A. Conductive heat

B. Latent heat

C. Radiant heat

D. Sensible heat

In the condenser of an air conditioning system, the refrigerant changes from a gas state to a liquid state. This phase change process releases heat from the refrigerant to the surroundings. The heat being removed in this phase change is known as latent heat. Latent heat is the heat energy associated with a change of state without a change in temperature. In this case, the refrigerant is transitioning from a gas to a liquid, and latent heat is being released to the surroundings, which helps in cooling the refrigerant. Conductive heat refers to heat transfer through solids, while radiant heat refers to heat transfer through electromagnetic waves. Sensible heat refers to heat energy that causes a change in temperature. In the context of the refrigerant changing state in the condenser, it is the latent heat being removed, making choice B the correct answer.

9. Which of the following is the most important consideration in the selection of an evaporator coil?

- A. Match the coil to the compressor**
- B. Match the coil to the condensing unit and the latent/sensible loads**
- C. Match the coil to the refrigerant type**
- D. Match the coil to the size of the space**

The most important consideration in the selection of an evaporator coil is to match the coil to the compressor. This is crucial because the evaporator coil and the compressor work together to ensure the effective and efficient operation of the air conditioning system. The evaporator coil needs to be compatible with the compressor in terms of capacity, refrigerant flow rates, and other technical specifications to guarantee optimal performance. This matching ensures that the system functions as intended and avoids problems such as reduced efficiency, increased energy consumption, or even system failure. Matching the evaporator coil to the compressor helps maintain the proper balance within the system and ensures that both components can work in harmony to provide the desired cooling capacity. While considering other factors such as the condensing unit, latent/sensible loads, refrigerant type, and space size is also important in the selection of an evaporator coil, matching the coil to the compressor takes precedence due to its direct impact on the overall performance and reliability of the air conditioning system.

10. What is superheat in the context of refrigeration?

- A. Condensation process**
- B. Heat added to refrigerant in vapor state after evaporation**
- C. Heat removed from refrigerant before compression**
- D. Heat causing temperature change**

Superheat refers to the heat added to refrigerant vapor after it has fully evaporated and transitioned from a liquid state to a vapor state. This process increases the temperature of the refrigerant vapor above its boiling point at a given pressure. In refrigeration systems, superheat is important because it ensures that the refrigerant entering the compressor is entirely vaporized, which prevents liquid refrigerant from damaging the compressor mechanisms. By monitoring superheat, technicians can assess the performance and efficiency of the system. It also helps in avoiding issues such as compressor flooding and system inefficiency. The other options touch on different aspects of refrigeration but do not accurately define superheat in this context. The condensation process relates to how refrigerant changes from gas to liquid, while heat removal refers to the cooling effect before compression. The last alternative mentions heat causing a temperature change, which is too broad and does not specifically align with the definition of superheat.