

Mohawk Basic AC and Refrigeration Practice Exam (Sample)

Study Guide



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SAMPLE

Questions

- 1. Which factor is critical for the lubrication in a refrigerant system?**
 - A. Temperature of the environment**
 - B. Type of compressor used**
 - C. Quality of the refrigerant**
 - D. Flow rate of the refrigerant**
- 2. What unit is used to measure electrical power?**
 - A. Volts**
 - B. Amperes**
 - C. Watt**
 - D. Ohm**
- 3. What is the primary purpose of a pressure limiting thermostatic expansion valve?**
 - A. To enhance refrigerant flow**
 - B. To regulate refrigerant pressure**
 - C. To optimize compressor efficiency**
 - D. To prevent overloading compressor**
- 4. What is the primary function of a suction accumulator in a refrigeration system?**
 - A. To separate liquid and vapor refrigerants**
 - B. To store excess refrigerant**
 - C. To provide lubrication to compressor**
 - D. To cool the refrigerant before the compressor**
- 5. Which type of air conditioning system removes humidity as a key part of its function?**
 - A. Evaporative cooling**
 - B. Refrigerative cooling**
 - C. Geothermal cooling**
 - D. Window unit cooling**

- 6. What year will HCFC refrigerants be phased out in Ontario?**
- A. 2025**
 - B. 2030**
 - C. 2040**
 - D. 2028**
- 7. Approximately how much air is required per ton by an air cooled condenser?**
- A. 500 CFM per ton**
 - B. 1000 CFM per ton**
 - C. 1500 CFM per ton**
 - D. 2000 CFM per ton**
- 8. Why must suction filters be sized correctly?**
- A. To prevent noise in the system**
 - B. To avoid excessive pressure drop in the suction line**
 - C. To enhance the efficiency of the compressor**
 - D. To allow for faster refrigerant flow**
- 9. What is the purpose of insulating the oil separator in a refrigeration system?**
- A. To reduce the overall system weight**
 - B. To ensure better thermal exchange**
 - C. To prevent the accumulation of oil in the separator**
 - D. To protect against external temperature changes**
- 10. What does the temperature differential in thermostats refer to?**
- A. The maximum temperature the thermostat can handle**
 - B. The difference between ambient and inside temperatures**
 - C. The temperature range for safe operation**
 - D. The difference between cut in and cut out point**

Answers

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

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Explanations

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1. Which factor is critical for the lubrication in a refrigerant system?

- A. Temperature of the environment**
- B. Type of compressor used**
- C. Quality of the refrigerant**
- D. Flow rate of the refrigerant**

In a refrigeration system, the flow rate of the refrigerant plays a crucial role in ensuring effective lubrication. Adequate flow allows the refrigerant to carry lubricant to various components of the system, particularly to the compressor, where it is essential for maintaining operational integrity and preventing wear and tear. The lubricant must effectively coat moving parts to reduce friction, dissipate heat, and provide a barrier against corrosion. If the flow rate is not sufficient, the lubricant may not reach all necessary areas, leading to increased friction and potential damage to the compressor and other components. This can lead to overheating, decreased efficiency, and ultimately system failure. Thus, maintaining an appropriate flow rate is vital for the lubrication system to function correctly, ensuring longevity and reliability in the refrigeration cycle.

2. What unit is used to measure electrical power?

- A. Volts**
- B. Amperes**
- C. Watt**
- D. Ohm**

The unit used to measure electrical power is the watt. Power, in electrical terms, is defined as the rate at which electrical energy is transferred or converted and is calculated as the product of voltage and current in an electrical circuit. This means that if you multiply the voltage (measured in volts) by the current (measured in amperes), the resulting value is expressed in watts, which quantifies the amount of energy consumed or produced in that circuit over time. Understanding this concept is essential because it helps in assessing energy usage and efficiency in electrical systems, critical components in both AC and refrigeration applications. The other units, such as volts, amperes, and ohms, are important in their own right, serving to measure voltage, current, and resistance respectively, but they do not directly quantify electrical power itself.

3. What is the primary purpose of a pressure limiting thermostatic expansion valve?

- A. To enhance refrigerant flow**
- B. To regulate refrigerant pressure**
- C. To optimize compressor efficiency**
- D. To prevent overloading compressor**

The primary purpose of a pressure limiting thermostatic expansion valve is to prevent overloading the compressor. This valve plays a crucial role in the refrigeration cycle by controlling the amount of refrigerant that enters the evaporator, which can lead to operational imbalances that put excessive strain on the compressor. When the system experiences a change in pressure that could potentially overload the compressor, the thermostatic expansion valve automatically adjusts to reduce refrigerant flow. By doing so, it helps maintain suitable operating conditions that prevent the compressor from becoming overburdened. This not only protects the compressor from damage but also contributes to the overall efficiency and reliability of the refrigeration system, ensuring it operates within safe parameters. In this context, other options may present aspects related to the operation of the refrigeration system, but they do not address the primary function of the pressure limiting thermostatic expansion valve as directly as the preventive aspect regarding compressor overload.

4. What is the primary function of a suction accumulator in a refrigeration system?

- A. To separate liquid and vapor refrigerants**
- B. To store excess refrigerant**
- C. To provide lubrication to compressor**
- D. To cool the refrigerant before the compressor**

The primary function of a suction accumulator in a refrigeration system is to separate liquid and vapor refrigerants. In a refrigeration cycle, it's crucial to ensure that only vapor refrigerant enters the compressor, as liquid refrigerant can cause damage to the compressor by leading to hydraulic shock or liquid slugging. By utilizing a suction accumulator, the system allows for the separation of any liquid refrigerant that may inadvertently make it back to the suction line. The accumulator acts as a reservoir, capturing and holding excess liquid refrigerant, while allowing only vapor to be drawn into the compressor. This separation prevents complications and enhances the overall efficiency and longevity of the refrigeration system. Other functions, such as storing excess refrigerant or cooling refrigerant before it enters the compressor, are not the primary purpose of the suction accumulator. While lubrication is essential in a refrigeration cycle, it is not a function associated with the suction accumulator; that role is typically handled by the lubricating oil supplied within the system.

5. Which type of air conditioning system removes humidity as a key part of its function?

- A. Evaporative cooling**
- B. Refrigerative cooling**
- C. Geothermal cooling**
- D. Window unit cooling**

Refrigerative cooling systems are specifically designed to control both temperature and humidity in indoor environments. This type of air conditioning functions by utilizing a refrigeration cycle involving the compression and expansion of refrigerant, which absorbs heat from the indoor air. As this heat is removed, the air cools, and in the process, moisture is also extracted. This is primarily due to the cooling coils in the system, where the temperature of the coils drops below the dew point of the air, causing moisture to condense and drain away. This effective humidity control is essential in many applications, particularly in residential and commercial buildings, as it enhances comfort and helps prevent issues related to excess humidity, such as mold growth and structural damage. The ability to manage humidity directly contributes to the overall indoor air quality, making refrigerative cooling systems a vital option for achieving a balanced and comfortable indoor climate.

6. What year will HCFC refrigerants be phased out in Ontario?

- A. 2025**
- B. 2030**
- C. 2040**
- D. 2028**

The phase-out of HCFC (Hydrochlorofluorocarbon) refrigerants in Ontario is aligned with international agreements and federal regulations. The year 2030 is significant as it reflects Canada's commitment to the gradual elimination of substances that deplete the ozone layer, in line with the Montreal Protocol. HCFCs are still being used in some applications due to their lower impact on the ozone layer compared to the older CFCs (Chlorofluorocarbons), but they still pose environmental risks. The decision to phase them out by 2030 allows for a transition toward more environmentally friendly alternatives, such as HFCs (Hydrofluorocarbons) and natural refrigerants, with the goal of minimizing ozone depletion and climate change. The other years listed do not align with current regulatory timelines regarding HCFC phasing out, making 2030 the established target year for this transition in Ontario.

7. Approximately how much air is required per ton by an air cooled condenser?

- A. 500 CFM per ton**
- B. 1000 CFM per ton**
- C. 1500 CFM per ton**
- D. 2000 CFM per ton**

An air-cooled condenser typically requires about 1000 cubic feet per minute (CFM) of air per ton of refrigeration. This standard is based on the system's design and operational efficiency, ensuring that the condenser can effectively dissipate heat absorbed from the refrigerant circulating within the system. A ton of refrigeration is defined as the cooling effect equivalent to melting one ton of ice in a 24-hour period, which translates to approximately 12,000 BTU per hour. To remove this amount of heat efficiently, the condenser must be supplied with enough air flow to maintain optimal operating temperatures and pressure levels. Air flow is crucial because insufficient air can lead to overheating of the condenser, reduced efficiency, and potential system failures. Therefore, 1000 CFM per ton is considered a balanced figure that allows the condenser to operate efficiently while managing the heat load from the refrigeration cycle. Higher or lower CFM values could indicate either oversizing or undersizing of the cooling component, potentially leading to operational issues. Hence, understanding this standard helps technicians ensure that air-cooled systems are correctly designed and maintained.

8. Why must suction filters be sized correctly?

- A. To prevent noise in the system**
- B. To avoid excessive pressure drop in the suction line**
- C. To enhance the efficiency of the compressor**
- D. To allow for faster refrigerant flow**

Suction filters are crucial components in refrigeration systems as they play a significant role in maintaining system performance. Sizing the suction filter correctly is essential to avoid excessive pressure drop in the suction line. When a filter is too small or improperly sized, it can create a significant resistance to the flow of refrigerant. This pressure drop can lead to insufficient refrigerant reaching the compressor, potentially causing it to operate inefficiently or even fail. A correctly sized suction filter allows for adequate refrigerant flow while trapping debris and contaminants that could damage the compressor or impair system function. By ensuring that the suction line maintains appropriate pressure levels, the overall efficiency, reliability, and longevity of the refrigeration system are enhanced, allowing the compressor to function as intended without the risk of damage from foreign particles.

9. What is the purpose of insulating the oil separator in a refrigeration system?

- A. To reduce the overall system weight**
- B. To ensure better thermal exchange**
- C. To prevent the accumulation of oil in the separator**
- D. To protect against external temperature changes**

Insulating the oil separator in a refrigeration system is primarily aimed at protecting against external temperature changes. This insulation helps maintain the separator at a consistent temperature, which is crucial for the proper functioning of the refrigeration system. When the oil separator is insulated, it ensures that the oil within does not cool down excessively, preventing issues such as oil viscosity changes that can impact the system's efficiency. Proper insulation minimizes thermal losses and protects the oil from fluctuations in outside temperature, allowing it to perform optimally. By maintaining suitable operating temperatures, the oil can effectively separate from the refrigerant, ensuring that the system runs efficiently. This insulation is crucial for the reliable operation of the system, as any temperature change might affect the separation process, leading to oil return issues or even system malfunctions. While other options address various aspects of refrigeration systems, they do not directly relate to the primary role of insulating the oil separator as it pertains to maintaining consistent operational temperatures and effective oil management within the system.

10. What does the temperature differential in thermostats refer to?

- A. The maximum temperature the thermostat can handle**
- B. The difference between ambient and inside temperatures**
- C. The temperature range for safe operation**
- D. The difference between cut in and cut out point**

The temperature differential in thermostats primarily refers to the difference between the cut-in and cut-out points. This differential represents the range of temperatures that a thermostat operates within to control a heating or cooling system effectively. When a system reaches the cut-in point, the thermostat activates the heating or cooling equipment to reach the desired setpoint. When the temperature reaches the cut-out point, the thermostat deactivates the system to prevent it from overheating or overcooling. The differential ensures that the system does not frequently switch on and off, which could lead to rapid wear and inefficiency. This understanding is crucial in HVAC design and operation, as it affects the comfort level in a space, energy consumption, and the longevity of the equipment.