

EPA 609 Technician Certification Practice Exam Sample Study Guide



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SAMPLE

Questions

- 1. What type of refrigerant does not allow moisture content to exceed 50 PPM by weight?**
 - A. R-22**
 - B. R-12**
 - C. R-134a**
 - D. R-404A**
- 2. Which of the following is NOT a factor in the formation of ozone?**
 - A. UV light**
 - B. Chlorine.**
 - C. Oxygen molecules**
 - D. Carbon monoxide**
- 3. What is the color code for a disposable R-134a refrigerant cylinder?**
 - A. Red**
 - B. Light blue**
 - C. Green**
 - D. Yellow**
- 4. Which of the following is true regarding the regulation of CFCs?**
 - A. Their use is entirely banned**
 - B. They can be sold freely**
 - C. They are strictly regulated under environmental laws**
 - D. They have no restrictions if recycled properly**
- 5. Are MVAC systems required to be evacuated to a vacuum before servicing?**
 - A. Yes, they must be evacuated**
 - B. No, they need not be evacuated**
 - C. Only when refrigerant levels are low**
 - D. Only in older model vehicles**

- 6. What is the maximum award amount that may be paid for information leading to a penalty against a technician who intentionally vents refrigerants?**
- A. \$5,000**
 - B. \$7,500**
 - C. \$10,000**
 - D. \$15,000**
- 7. What is the maximum moisture content allowed in recycled R-134a intended for mobile air-conditioning systems?**
- A. 10 PPM**
 - B. 25 PPM**
 - C. 50 PPM**
 - D. 100 PPM**
- 8. What is a potential effect of skin or eye contact with fluorocarbon refrigerants?**
- A. Irritation**
 - B. Frostbite**
 - C. Death**
 - D. All of the above**
- 9. Is the ozone layer present in both the stratosphere and mesosphere of the Earth's atmosphere?**
- A. True**
 - B. False**
 - C. Only in the stratosphere**
 - D. Only in the mesosphere**
- 10. What is the significance of the 3.7% concentration limit in HFC-152a MVAC systems?**
- A. It is the minimum safe concentration**
 - B. It is the maximum allowable concentration**
 - C. It is the average operational level**
 - D. It is an unused measurement**

Answers

SAMPLE

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

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Explanations

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1. What type of refrigerant does not allow moisture content to exceed 50 PPM by weight?

A. R-22

B. R-12

C. R-134a

D. R-404A

The refrigerant R-134a is designed to have a moisture content limit that does not exceed 50 parts per million (PPM) by weight. This characteristic is crucial because moisture in refrigerants can lead to various problems, such as corrosion, reduced efficiency, and the formation of acids within the refrigeration system. R-134a's development included properties that minimize issues related to moisture contamination, making it essential in applications where maintaining low moisture levels is critical. In contrast, other refrigerants listed may not have the same stringent moisture requirements or could face different challenges related to moisture management. R-22, R-12, and R-404A have different operational considerations and moisture tolerance levels that don't align with the specific threshold that R-134a presents. Thus, R-134a is the correct choice for refrigerants that prevent moisture content from exceeding 50 PPM by weight.

2. Which of the following is NOT a factor in the formation of ozone?

A. UV light

B. Chlorine.

C. Oxygen molecules

D. Carbon monoxide

Ozone is formed in the atmosphere primarily through a photochemical process involving ultraviolet (UV) light, oxygen molecules, and various reactive chemicals. The process generally occurs when UV light acts on oxygen molecules (O₂), leading to the formation of ozone (O₃). While UV light and oxygen molecules are directly involved in the formation of ozone, chlorine plays a role in atmospheric chemistry that can lead to ozone depletion rather than formation. Chlorine is a reactive element that can break down ozone molecules in the stratosphere, notably through chlorofluorocarbons (CFCs) and other compounds. Carbon monoxide, on the other hand, does not contribute to the production of ozone. While it can indirectly affect ozone levels by influencing the atmosphere's reactivity and the behavior of other pollutants, it is not a primary ingredient or factor in ozone formation. Therefore, it is appropriate to identify carbon monoxide as the substance that does not belong in the context of ozone formation.

3. What is the color code for a disposable R-134a refrigerant cylinder?

A. Red

B. Light blue

C. Green

D. Yellow

The correct color code for a disposable R-134a refrigerant cylinder is light blue. This designation is an important safety and identification feature, allowing technicians and professionals working with refrigerants to easily distinguish between different types and classes of refrigerants. Light blue cylinders are standardized for R-134a, which helps prevent mistakes when handling refrigerants, as using the wrong type can lead to equipment damage, improper functioning of cooling systems, and safety hazards. Knowing the appropriate color coding is essential for compliance with regulations and for ensuring that all technicians can safely and efficiently manage refrigerant handling and storage. Understanding the specific color coding for refrigerants helps streamline processes in service and repair situations, ultimately contributing to better environmental practices and the proper use of refrigerants in the HVAC industry.

4. Which of the following is true regarding the regulation of CFCs?

A. Their use is entirely banned

B. They can be sold freely

C. They are strictly regulated under environmental laws

D. They have no restrictions if recycled properly

The regulation of chlorofluorocarbons (CFCs) is primarily grounded in environmental laws aimed at protecting the ozone layer. CFCs are known to deplete the ozone layer, which is crucial for blocking harmful ultraviolet radiation from the sun. As a result, many countries, including those that are part of the Montreal Protocol, have enacted strict regulations on the production and use of CFCs. These regulations require a significant reduction in CFC usage and have also phased out many applications where CFCs were previously utilized, particularly in refrigeration and air conditioning systems. The regulations ensure that any remaining uses of CFCs are strictly controlled, making certain that they are handled appropriately to minimize environmental harm. While their use is significantly restricted and subject to strict environmental laws, it's important to note that there are nuances in the regulations that may allow for the limited use of certain types of CFCs under controlled conditions. In contrast, stating that their use is entirely banned oversimplifies the situation, as there are still some allowances for very specific applications in certain contexts. As for the idea that CFCs can be sold freely or have no restrictions if recycled properly, these options miss the critical nuances of the regulatory framework, which emphasizes

5. Are MVAC systems required to be evacuated to a vacuum before servicing?

- A. Yes, they must be evacuated**
- B. No, they need not be evacuated**
- C. Only when refrigerant levels are low**
- D. Only in older model vehicles**

The requirement for evacuating MVAC (Motor Vehicle Air Conditioning) systems before servicing is a critical aspect of maintaining system integrity and ensuring environmental safety. The correct response reflects that MVAC systems do not always have to be evacuated to a vacuum before servicing, particularly if the service involves simple tasks such as refrigerant topping off or changing components without refrigerant removal. In practice, while evacuation is recommended to remove moisture and non-condensable gases—particularly during repairs involving a change of major components or full refrigerant recovery—the specific requirement to evacuate to a vacuum is situation-dependent. For straightforward servicing tasks that do not disrupt the refrigerant charge, evacuation may not be necessary. This is particularly relevant in certain scenarios with properly functioning systems, where refrigerant can remain within the system while components are replaced. Understanding these nuances helps technicians comply with both safety regulations and best practices in automotive service, emphasizing the importance of evaluating each service situation individually.

6. What is the maximum award amount that may be paid for information leading to a penalty against a technician who intentionally vents refrigerants?

- A. \$5,000**
- B. \$7,500**
- C. \$10,000**
- D. \$15,000**

The maximum award amount that may be paid for information leading to a penalty against a technician who intentionally vents refrigerants is indeed \$10,000. This amount is established under the Clean Air Act, which imposes strict regulations on the handling and disposal of refrigerants to protect the environment. The reasoning behind this figure is that it serves as a strong financial incentive for individuals to report violations. The intentional venting of refrigerants contributes significantly to ozone layer depletion and global warming, and thus, the federal government has put mechanisms in place to discourage such actions through substantial penalties. This award amount is a reflection of the seriousness of the offense and the importance of compliance with environmental laws. In contrast, amounts lower than \$10,000 do not adequately represent the potential damage caused by intentional refrigerant venting or the importance of encouraging whistleblowers to come forward with information about such violations.

7. What is the maximum moisture content allowed in recycled R-134a intended for mobile air-conditioning systems?

- A. 10 PPM**
- B. 25 PPM**
- C. 50 PPM**
- D. 100 PPM**

The correct answer is that the maximum moisture content allowed in recycled R-134a intended for mobile air-conditioning systems is 50 PPM (parts per million). This specification is critical for ensuring the efficient and effective performance of air-conditioning systems. Excess moisture in refrigerants can lead to various problems, including corrosion of components, degradation of lubricants, and formation of acid, which could negatively affect the system's longevity and efficiency. The standards for moisture content in refrigerants like R-134a are established to maintain system integrity and operational reliability. Keeping moisture levels below 50 PPM ensures that the refrigerant remains stable and does not introduce moisture-related issues into the air-conditioning systems during operation. This helps in maintaining optimal performance and prolonging the life of the components involved. Such stringent limits are essential, especially in mobile air-conditioning systems, where reliability and performance are paramount.

8. What is a potential effect of skin or eye contact with fluorocarbon refrigerants?

- A. Irritation**
- B. Frostbite**
- C. Death**
- D. All of the above**

Fluorocarbon refrigerants can have several harmful effects if they come into contact with the skin or eyes. One notable effect is irritation, which can occur due to the chemical nature of these substances. Additionally, due to their low boiling points, these refrigerants can rapidly cool upon evaporation, leading to frostbite on contact with skin or mucous membranes. In severe cases, exposure can result in more serious medical emergencies, including the risk of death if the exposure is extensive and not addressed properly. While irritation and frostbite are critical effects, the inclusion of death among potential outcomes underscores the importance of handling these refrigerants with care. It is crucial for technicians to wear protective equipment and follow safety protocols to minimize the risk of exposure, as the cumulative impact of these effects can lead to significant health risks. Given these points, "all of the above" accurately encapsulates the range of serious consequences associated with skin or eye contact with fluorocarbon refrigerants.

9. Is the ozone layer present in both the stratosphere and mesosphere of the Earth's atmosphere?

A. True

B. False

C. Only in the stratosphere

D. Only in the mesosphere

The correct assessment of the presence of the ozone layer is that it primarily exists in the stratosphere. The stratosphere is the second atmospheric layer above the Earth's surface, and it contains a high concentration of ozone (O₃), which plays a critical role in absorbing the majority of the sun's harmful ultraviolet (UV) radiation. This ozone layer is crucial for protecting living organisms on Earth from excessive UV exposure. While there is some ozone present in the mesosphere, it exists at significantly lower concentrations and does not play the same protective role as it does in the stratosphere. The mesosphere, which is the third layer of the atmosphere above the stratosphere, extends up to about 85 kilometers (53 miles) high. Here, the conditions do not support the same density of ozone as found in the stratosphere. Therefore, the statement that the ozone layer is present in both the stratosphere and mesosphere is not accurate, making the answer that indicates this is true incorrect. The correct answer is reflected in the understanding that the ozone layer primarily resides within the stratosphere, responsible for its significant protective function.

10. What is the significance of the 3.7% concentration limit in HFC-152a MVAC systems?

A. It is the minimum safe concentration

B. It is the maximum allowable concentration

C. It is the average operational level

D. It is an unused measurement

The significance of the 3.7% concentration limit in HFC-152a motor vehicle air conditioning (MVAC) systems lies in its designation as the maximum allowable concentration. This limit is established to ensure safety during the servicing and use of refrigerants in automotive systems. In practice, exceeding this concentration could pose risks related to flammability and environmental safety. HFC-152a is classified as a flammable refrigerant; thus, the 3.7% threshold helps to mitigate potential hazards, ensuring that the refrigerant remains within a safe boundary where ignition and associated risks are minimized. Understanding this concentration limit is critical for technicians to safely handle refrigerants, comply with regulatory guidelines, and ensure the effectiveness of the cooling system while minimizing environmental impact.