REHS/RS Waste Water and Potable Water Practice Test (Sample)

Study Guide

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Questions

1. What typically causes cross-connections in water supply systems?

A. Improper sewage disposal methods

B. Backflow and backsiphonage of contaminated liquids

C. Excessive water pressure

D. Additives in water treatment

2. What methods can be employed to prevent backsiphonage?

A. Gravity filters, strainers

B. Chemical treatments, filtration

C. Vacuum breakers, air gaps, backpressure units

D. Ozonation, chlorination

3. Which disinfecting compound can be used full strength for disinfection purposes?

A. Chlorine dioxide

B. Sodium hypochlorite

C. Hydrogen peroxide

D. Calcium hypochlorite

4. What kind of finish does a new concrete septic tank need?

A. One layer of epoxy coat

B. Two 1/2 inch cement plaster coats for a smooth finish

C. A rough finish to enhance durability

D. No finish required for concrete tanks

5. What is the primary purpose of a water sampling plan?

A. To ensure compliance with regulatory standards

B. To increase consumer awareness

C. To track seasonal variations in taste

D. To reduce maintenance costs

6. What is the purpose of chemical coagulation in water treatment?

A. To sterilize water

B. To aggregate suspended particles for easier removal

C. To reduce dissolved oxygen levels

D. To enhance taste of water

7. What is the primary purpose of using an air gap in water systems?

A. Increase pressure

B. Prevent contamination

C. Enhance filtration

D. Reduce sedimentation

8. What could potentially happen if a septic tank is pumped during a wet period?

A. Tank may overflow

B. Tank may become clogged

C. Tank may float out of the ground

D. Tank may stop functioning

9. What is the EPA stream water quality rate for fecal coliforms?

A. 1 colony/1 ml

B. 5 colonies/1 ml

C. 2 colonies/1 ml

D. 10 colonies/1 ml

10. What does the Safe Drinking Water Act regulate?

A. Private wells and groundwater systems

B. Nation's public drinking water supply

C. Industrial water discharge standards

D. Agricultural water use rights

Answers

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

Explanations

1. What typically causes cross-connections in water supply systems?

A. Improper sewage disposal methods

B. Backflow and backsiphonage of contaminated liquids

C. Excessive water pressure

D. Additives in water treatment

Cross-connections in water supply systems occur when there is a physical connection between a potable water supply and a source of contamination. The primary cause of these cross-connections is backflow and backsiphonage of contaminated liquids. Backflow happens when the normal flow of water is reversed, allowing non-potable water or contaminants to flow back into the clean water supply. Backsiphonage is a specific type of backflow that occurs due to a pressure drop in the water supply, creating a vacuum that draws water from a connected source. This situation can lead to serious health risks if the contaminants from the non-potable source enter the drinking water supply, which is why preventing cross-connections is critical in water system management. While improper sewage disposal methods and excessive water pressure can create other issues in water treatment, they are not direct causes of cross-connections. Additives in water treatment can contribute to water quality but do not inherently cause physical connections to occur that would lead to contamination. Thus, backflow and backsiphonage provide the specific mechanism under which cross-connections can develop, making it essential knowledge for ensuring safe drinking water and protecting public health.

2. What methods can be employed to prevent backsiphonage?

A. Gravity filters, strainers

B. Chemical treatments, filtration

C. Vacuum breakers, air gaps, backpressure units

D. Ozonation, chlorination

To prevent backsiphonage, the most effective methods involve the use of vacuum breakers, air gaps, and backpressure units. Backsiphonage occurs when there is a negative pressure in the distribution system, causing contaminants to be drawn back into the potable water supply. Vacuum breakers are devices that allow air to enter a system to prevent a vacuum from forming, ensuring that water flows in the intended direction. Air gaps create a physical separation between the water supply and possible contaminants, effectively preventing any backflow. Backpressure units help to maintain pressure in the system, preventing backflow due to pressure differentials. These methods are critical in maintaining the integrity of drinking water systems and ensuring public health by avoiding contamination. Other options, while they may improve water quality or treat water, do not specifically address the mechanism of backsiphonage or backflow prevention.

3. Which disinfecting compound can be used full strength for disinfection purposes?

A. Chlorine dioxide

B. Sodium hypochlorite

C. Hydrogen peroxide

D. Calcium hypochlorite

Sodium hypochlorite is commonly utilized in its full strength for disinfection purposes, primarily because of its effectiveness as a chlorine-based disinfectant. When used in concentrated forms, sodium hypochlorite has a high oxidation potential, making it highly effective at inactivating bacteria, viruses, and other pathogens present in water. It acts by disrupting cellular processes within microorganisms, effectively eliminating them from the treated environments. Using sodium hypochlorite at full strength provides flexibility in application depending on the specific disinfection needs, but it requires careful handling due to its caustic nature and potential hazards. Its efficacy and ease of use make it a popular choice in both municipal water treatment facilities and for household applications. In contrast, other disinfectants may require dilution or have different applications that don’t permit their use in full strength for effective disinfection. For example, chlorine dioxide is typically generated on-site from sodium chlorite and does not come in a full-strength form directly available for disinfection. Hydrogen peroxide has its limitations based on concentration and does not always act effectively in all water conditions. Calcium hypochlorite, while also effective as a disinfectant, is generally used in a diluted form to ensure safety and proper handling.

4. What kind of finish does a new concrete septic tank need?

A. One layer of epoxy coat

B. Two 1/2 inch cement plaster coats for a smooth finish

C. A rough finish to enhance durability

D. No finish required for concrete tanks

A new concrete septic tank should have two 1/2 inch cement plaster coats applied to achieve a smooth finish. This practice serves several purposes. First, the smooth surface helps to minimize the accumulation of waste and sludge, which can lead to clogs and require more frequent maintenance. Second, it can reduce the likelihood of cracks in the concrete by providing a more uniform surface. A smooth finish also facilitates easier cleaning and inspection of the tank, which is essential for the long-term function of the septic system. While other options might suggest different kinds of finishes, the application of two coats of cement plaster is recognized as a standard practice for ensuring both functionality and longevity of the concrete structure. It's important to note that rough finishes may enhance surface bonding but do not contribute positively to the overall maintenance and performance of a septic tank. Similarly, while some might argue that a rougher finish could improve durability, the benefits associated with a smooth finish take precedence within the context of septic tank functionality. No finish may seem convenient, but it neglects the potential advantages provided by a well-prepared surface.

5. What is the primary purpose of a water sampling plan?

A. To ensure compliance with regulatory standards

B. To increase consumer awareness

C. To track seasonal variations in taste

D. To reduce maintenance costs

The primary purpose of a water sampling plan is to ensure compliance with regulatory standards. Water quality testing is crucial for public health and safety, as it helps identify contaminants that may pose risks to consumers. Regulators set specific guidelines and limits for various substances in drinking water, and a water sampling plan is designed to collect samples systematically to verify that these standards are met. Through regular monitoring and testing, water suppliers can document the quality of the water they provide, take corrective actions when necessary, and ultimately ensure that the water is safe for consumption. Consumer awareness, seasonal variations in taste, and maintenance cost reductions, while important considerations in the broader scope of water quality management, do not represent the primary goal of a water sampling plan. Ensuring compliance with regulations is the fundamental focus, as it directly addresses public health requirements and legal obligations for water providers.

6. What is the purpose of chemical coagulation in water treatment?

A. To sterilize water

B. To aggregate suspended particles for easier removal

C. To reduce dissolved oxygen levels

D. To enhance taste of water

Chemical coagulation plays a crucial role in water treatment by aggregating suspended particles, making them easier to remove from water. This process involves adding coagulants, such as aluminum sulfate or ferric chloride, to the water. These chemicals facilitate the clustering of small particles and colloids into larger aggregates or "flocs." The formation of these flocs increases the efficiency of subsequent treatment processes, such as sedimentation and filtration, by allowing the larger particles to settle out of the water more effectively. This aggregation is essential because untreated water often contains a variety of impurities, including silt, bacteria, and organic matter, which can compromise water quality. By using chemical coagulation to enhance the removal of these impurities, the overall quality of the treated water is improved, making it safer and cleaner for consumption or usage. While sterilizing water, reducing dissolved oxygen levels, or enhancing the taste may be goals of other treatment processes, they do not relate directly to the primary function of coagulation in the context of treating suspended solids.

7. What is the primary purpose of using an air gap in water systems?

- A. Increase pressure
- B. Prevent contamination
- C. Enhance filtration
- D. Reduce sedimentation

The primary purpose of using an air gap in water systems is to prevent contamination. An air gap is a physical separation between the water supply and potential contaminants, ensuring that any backflow or siphoning of polluted water into the clean water supply is avoided. This is particularly important in preventing the introduction of pathogens, chemicals, and other harmful substances into potable water systems, thereby safeguarding public health. An air gap is an effective measure because it creates a barrier that prohibits direct contact between contaminated water and clean water. For example, when water is drawn from a faucet, it is crucial that there is no direct connection to the source potentially containing contaminants, such as a sink or basin where waste could accumulate. While increasing pressure, enhancing filtration, and reducing sedimentation are important considerations in water treatment and distribution systems, they do not specifically relate to the air gap's function. Each of those aspects pertains to different methods and technologies used to manage and improve water quality or system performance, rather than directly preventing backflow and cross-contamination. Thus, the focus of the air gap as a protective feature highlights its critical role in maintaining the integrity of potable water systems.

8. What could potentially happen if a septic tank is pumped during a wet period?

- A. Tank may overflow
- B. Tank may become clogged
- C. Tank may float out of the ground
- D. Tank may stop functioning

Pumping a septic tank during a wet period can lead to the tank floating out of the ground due to the hydrostatic pressure exerted by the surrounding saturated soil and groundwater. When the soil is excessively saturated, the buoyant force can become strong enough to lift the tank out of its installed position. This is especially true if the tank is not secured or if it is lightweight compared to the amount of groundwater present. While other issues, such as overflowing or clogging, may also be concerns with septic systems during wet periods, they are more commonly associated with regular usage rather than directly linked to the act of pumping. The potential for a tank to float out of the ground is a critical risk that can result in the loss of system integrity, requiring significant repairs and posing environmental hazards. Recognizing the context of soil saturation and groundwater levels is vital when considering septic tank maintenance, and it underscores the importance of timing for pumping and maintaining these systems to prevent such issues from arising.

9. What is the EPA stream water quality rate for fecal coliforms?

A. 1 colony/1 ml

B. 5 colonies/1 ml

C. 2 colonies/1 ml

D. 10 colonies/1 ml

The correct answer highlights that the EPA's standard for stream water quality regarding fecal coliform bacteria is established for assessing water safety, particularly in recreational waters and sources of drinking water. The value of 2 colonies/1 ml is significant as it is a threshold used by environmental and health agencies to identify water safety levels. At this colony count, higher levels of fecal coliforms indicate potential contamination by fecal material from warm-blooded animals, which could pose health risks to humans through exposure or ingestion. This standard is critical for maintaining public health and protecting aquatic environments by ensuring that the water quality is monitored and managed effectively.

10. What does the Safe Drinking Water Act regulate?

A. Private wells and groundwater systems

B. Nation's public drinking water supply

C. Industrial water discharge standards

D. Agricultural water use rights

The Safe Drinking Water Act (SDWA) is a crucial piece of legislation enacted to ensure the safety and integrity of drinking water in the United States. It primarily regulates the nation's public drinking water supply, which includes drinking water provided by public water systems. Under this act, the Environmental Protection Agency (EPA) sets standards for water quality, monitors compliance, and provides guidelines to protect public health from harmful contaminants in drinking water. The emphasis on public drinking water systems is vital, as they serve a significant portion of the population and are subject to regular testing and maintenance to ensure they meet federal safety standards. This act plays a key role in safeguarding the health of communities by establishing reliable sources of safe drinking water. Private wells and groundwater systems may fall under other regulations or state programs, but they are not directly managed under the SDWA by the federal government. Similarly, industrial discharge and agricultural water use rights, while important for water management and environmental protection, are addressed through different regulatory frameworks, separate from the provisions of the SDWA.