CWEA Collection Systems Maintenance Practice Test Sample Study Guide

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Featuring practice questions, answers, and explanations for each question.

Questions

1. What type of soil is considered the least stable?

A. Type A

B. Type B

C. Type C

D. Type D

2. What type of pump is used in lift station wet wells?

A. Centrifugal pump

B. Submersible pump

C. Diaphragm pump

D. Gear pump

3. If a flow of 650 pgm is converted, what is the flow in mgd?

A. 0.650

B. 0.936

C. 1.215

D. 1.000

4. Corrosivity refers to chemicals that can cause what type of damage?

A. Environmental damage

B. Permanent bodily harm

C. Short-term irritation

D. Pollution

5. Which term describes the horizontal distance from the ground surface to the bottom of a trench?

A. Depth

B. Invert

C. Cover

D. Excavation

6. What are some factors that can contribute to soil instability?

A. Dryness and compactness

B. Excessively wet, loose, and excessive roots

C. Frozen conditions and rock presence

D. Uniform compaction and small particle size

7. To be deemed a competent person, what must an individual be capable of doing?

A. Only performing assigned tasks

B. Identifying hazards and taking corrective measures

C. Conducting training sessions

D. Maintaining records of safety incidents

8. Which characteristic is NOT associated with a competent person?

A. Trained and knowledgeable

B. Can identify soil class

C. Needs to have a college degree

D. Understands the importance of PPE

9. Vitrified clay pipe is classified as what type of pipe?

A. Flexible

B. Rigid

C. Corrugated

D. Plastic

10. What should you do before starting a maintenance operation in a residential backyard?

A. Begin working immediately

B. Contact the resident for permission

C. Ignore the resident

D. Leave a note for the resident

Answers

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

Explanations

1. What type of soil is considered the least stable?

A. Type A

B. Type B

C. Type C

D. Type D

Type C soil is considered the least stable among the soil classifications. This classification encompasses soils that tend to have high moisture content, are granular in nature, and have a lower cohesive strength. Such soils are more susceptible to erosion and collapse, especially when disturbed or when subjected to heavy loads. Examples of Type C soil include loose sands and gravels, which do not retain stability without the support of other materials. In construction and excavation contexts, understanding the stability of soil types is crucial for safety and effective engineering practices. Type C soils are often associated with more stringent safety measures, such as additional shoring or bracing, to prevent potential hazards during construction activities. In contrast, Type A and Type B soils are recognized for their greater stability and cohesive properties, making them safer for construction without extensive supports when compared to Type C soils.

2. What type of pump is used in lift station wet wells?

A. Centrifugal pump

B. Submersible pump

C. Diaphragm pump

D. Gear pump

Submersible pumps are specifically designed to operate underwater, making them ideal for use in lift station wet wells. These pumps are submerged directly in the wastewater, allowing them to efficiently lift sewage and other fluids to higher elevations for treatment or disposal. The design of submersible pumps enables them to handle solids and other debris commonly found in wastewater, while minimizing the risk of damage from exposure to water. Their ability to operate while submerged also eliminates the need for pump or motor cooling, which can be a concern with other types of pumps. Additionally, submersible pumps are often designed with features that reduce the risk of clogging and are easier to maintain than some surface-mounted alternatives. Overall, the application of submersible pumps in lift station wet wells leverages their efficiency, durability, and performance in handling wastewater effectively.

3. If a flow of 650 pgm is converted, what is the flow in mgd?

A. 0.650

B. 0.936

C. 1.215

D. 1.000

To convert flow from gallons per minute (gpm) to million gallons per day (mgd), you use the conversion factors related to the units involved. 1. First, recognize that there are 60 minutes in an hour and 24 hours in a day, giving us a total of 1,440 minutes in a day. 2. There are also 1,000,000 gallons in a million gallons. To convert 650 gpm to mgd, the following calculation is performed: \[\text{Flow in mgd} = \left(\text{Flow in gpm} \times \text{minutes in a day} \right) / \text{gallons in a million} \] Applying this to the flow rate: \[\text{Flow in mgd} = \left(650 \text{ gpm} \times 1,440 \text{ minutes/day} \right) / 1,000,000 \text{ gallons/million} \] Calculating that step-by-step: 1. Multiply 650 gpm by 1,440 minutes/day: \[650 \times 1,440 = 936,000 \text

4. Corrosivity refers to chemicals that can cause what type of damage?

A. Environmental damage

B. Permanent bodily harm

C. Short-term irritation

D. Pollution

Corrosivity specifically pertains to the ability of a chemical to cause damage to living tissues, which can manifest as severe injuries, burns, or other forms of permanent bodily harm. This classification of chemicals is critical, particularly in industries where hazardous materials are handled, as it emphasizes the need for appropriate safety measures and personal protective equipment to prevent serious injuries. While corrosive materials can indeed lead to environmental damage, lead to pollution, or cause short-term irritation, the defining characteristic of corrosivity is its potential for lasting harm to human health. Therefore, options relating to environmental impact or non-permanent effects do not align with the specific context of corrosivity.

5. Which term describes the horizontal distance from the ground surface to the bottom of a trench?

A. Depth

B. Invert

C. Cover

D. Excavation

The term that accurately describes the horizontal distance from the ground surface to the bottom of a trench is "Depth." This term is commonly used in construction and civil engineering to quantify how deep a trench or excavation is relative to the surface level. Understanding this measurement is crucial for determining factors such as excavation safety, the placement of underground utilities, and ensuring proper drainage. While "Invert" refers to the lowest point of a piping system, typically inside the pipe itself, and "Cover" relates to the vertical distance from the top of the pipe to the ground surface, neither of those terms correctly defines the horizontal distance from the surface to the bottom of the trench. "Excavation" refers to the act of digging or removing material from a site, not directly measuring the distance involved. Therefore, recognizing that "Depth" specifically addresses the distance from the ground surface to the bottom of the trench clarifies why it is the correct and most appropriate choice in this context.

6. What are some factors that can contribute to soil instability?

A. Dryness and compactness

B. Excessively wet, loose, and excessive roots

C. Frozen conditions and rock presence

D. Uniform compaction and small particle size

Soil instability can result from a variety of environmental and physical conditions that affect the structure and cohesion of soil. The presence of excessive moisture, particularly when the soil becomes overly saturated, can weaken its ability to support structures or maintain its integrity. Loose soil, combined with a high water content, reduces friction between particles, increasing the likelihood of landslides or subsidence. Additionally, an abundance of roots in the soil can sometimes contribute to instability, especially when the moisture conditions lead to root rot or decay, weakening their supportive structures. The combination of excessively wet conditions, loose soil, and dramatic changes in the landscape can significantly compromise soil stability. In contrast, the other options either describe conditions that don't directly contribute to instability as significantly or reflect stabilizing factors, such as compactness, uniform compaction, or frozen conditions which, while they may influence soil characteristics, do not have the same impact on destabilizing soil as moisture does.

7. To be deemed a competent person, what must an individual be capable of doing?

A. Only performing assigned tasks

B. Identifying hazards and taking corrective measures

C. Conducting training sessions

D. Maintaining records of safety incidents

An individual is considered a competent person when they possess the ability to identify hazards and take corrective measures. This capability is critical in ensuring workplace safety, particularly in environments like collection systems maintenance where risks may vary widely and can impact both personnel and the surrounding community. A competent person not only identifies potential risks but also implements appropriate actions to mitigate those risks, which could include modifying work practices, providing guidance to coworkers, or using personal protective equipment effectively. This proactive role is essential in fostering a safe work environment and minimizing accidents or injuries. While performing assigned tasks, conducting training sessions, and maintaining records of safety incidents are valuable skills and responsibilities, they do not embody the full range of competencies required for someone to be deemed a competent person. The essence of being a competent person lies in the ability to actively recognize and manage safety-related issues within the workplace.

8. Which characteristic is NOT associated with a competent person?

A. Trained and knowledgeable

B. Can identify soil class

C. Needs to have a college degree

D. Understands the importance of PPE

A competent person, particularly in the context of collection systems maintenance, is one who has the appropriate training and knowledge required to perform tasks safely and effectively. Characteristics that define such a person include having a solid understanding of the relevant subject matter, the ability to identify critical elements in their work environment, such as soil classification, and a commitment to safety practices, including proper personal protective equipment (PPE). The need for a college degree does not universally apply to being a competent person in this field. Competency can often be demonstrated through practical experience, vocational training, certifications, and on-the-job training rather than formal education. Thus, while a degree may enhance an individual's knowledge and skills, it is not a mandatory requirement for competence.

9. Vitrified clay pipe is classified as what type of pipe?

A. Flexible

B. Rigid

C. Corrugated

D. Plastic

Vitrified clay pipe is classified as rigid pipe due to its inherent structural properties. This type of pipe is made from clay that has undergone a vitrification process, whereby the clay is fired at high temperatures to become glass-like and non-porous. As a result, vitrified clay pipes are known for their strength and durability, making them suitable for various applications, especially in sewage and drainage systems. The rigidity of vitrified clay pipes means they maintain their shape under load and do not easily bend or deform, which is critical in maintaining the integrity of underground piping systems. This characteristic allows them to resist collapse from external forces, such as soil pressure or traffic load. The other types of pipes listed, such as flexible and plastic, possess different attributes. Flexible pipes can bend and absorb movement without breaking, which is opposed to the rigid nature of vitrified clay pipes. Similarly, plastic pipes typically are lighter and can offer flexibility and resistance to corrosion, while corrugated pipes usually have a wavy structure that provides flexibility and lightweight properties, allowing for easier installation in certain scenarios. These differences highlight why vitrified clay is distinctly categorized as a rigid pipe.

10. What should you do before starting a maintenance operation in a residential backyard?

A. Begin working immediately

B. Contact the resident for permission

C. Ignore the resident

D. Leave a note for the resident

Before initiating any maintenance operation in a residential backyard, it is essential to contact the resident for permission. This step is crucial for several reasons. First, the resident has ownership rights and authority over their property, and gaining their consent ensures that you respect their space and privacy. Secondly, the resident may have specific instructions or preferences regarding the work to be performed, which can help avoid misunderstandings or disputes later on. Additionally, the resident may also provide important information about potential hazards, such as the presence of pets or specific areas to avoid, thereby promoting safety for everyone involved. Engaging with the resident fosters good communication and helps maintain a positive relationship between service personnel and homeowners.