AWWA ABC Water Distribution Grades 1 and 2 (Sample)

Study Guide

Everything you need from our exam experts!

Questions

1. **When collecting a water sample from a customer's faucet in response to a complaint, which type of faucet is the best choice?**

   A. Faucet with threads

   B. Faucet equipped with a filter

   C. Faucet without threads

   D. Faucet with a spray attachment

2. **What is generally considered the best location for a tap on a main?**

   A. At the top of the pipe

   B. At an angle of about 45 degrees down from the top of the pipe

   C. Directly on the side of the pipe

   D. At the bottom of the pipe

3. **Which valve type is typically used for on/off service in a pipeline?**

   A. Globe valve

   B. Gate valve

   C. Check valve

   D. Needle valve

4. **What is a common function of an air-and-vacuum relief valve in water systems?**

   A. Prevent pressure build-up

   B. Allow air to escape

   C. Control water flow

   D. Both A and B

5. **Which type of valve should be installed at a dead-end water main?**

   A. Check valve

   B. Blowoff valve

   C. Isolation valve

   D. Pressure relief valve

6. At what time of the day is the age of the water stored in the distribution system the highest?

A. Late evening

B. Early morning

C. Noon

D. Afternoon

7. Which type of valve is designed to prevent the collapse of a pipe?

A. Check valve

B. Air-and-vacuum relief valve

C. Ball valve

D. Globe valve

8. In what type of fire hydrant is both the entire barrel and head below ground elevation?

A. Wet-barrel Hydrant

B. Dry-barrel Hydrant

C. Flush Hydrant

D. Flow Hydrant

9. In a piping system, what is the primary function of a check valve?

A. To isolate a section of the pipe

B. To prevent backflow

C. To control pressure

D. To throttle flow

10. Why is it important to monitor the age of water in a distribution system?

A. To reduce maintenance costs

B. To ensure compliance with quality standards

C. To determine water color

D. To optimize pipe lifespan

Answers

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

Explanations

1. When collecting a water sample from a customer's faucet in response to a complaint, which type of faucet is the best choice?

A. Faucet with threads

B. Faucet equipped with a filter

C. Faucet without threads

D. Faucet with a spray attachment

Selecting a faucet without threads for collecting a water sample in response to a customer complaint is the best choice because it ensures that the sample accurately reflects the water quality as it comes directly from the plumbing system without any alterations. Faucets with threads often accommodate attachments, which can interfere with the sample collection by introducing contaminants or allowing for stagnant water to remain in the threads. This can skew the water quality results because it may not represent the water that will be coming from the main supply line. Similarly, a faucet equipped with a filter may not provide an accurate sample, as the filter could remove certain elements of the water, leading to an incomplete representation of the water quality. Consequently, the sample could mislead assessments of a water quality concern. Faucets with spray attachments also pose a problem because the spray mechanism can introduce air into the water and potentially trap contaminants that affect the sample's purity. The choice of a straightforward faucet without threads ensures that the water sample collected accurately demonstrates the conditions of the water as it is delivered to the customer. This is crucial for identifying any issues that may require attention by the water supply professionals.

2. What is generally considered the best location for a tap on a main?

A. At the top of the pipe

B. At an angle of about 45 degrees down from the top of the pipe

C. Directly on the side of the pipe

D. At the bottom of the pipe

The best location for a tap on a water main is at an angle of about 45 degrees down from the top of the pipe. This positioning allows for several advantages in terms of flow dynamics and functionality. When tapping at a 45-degree angle, the tap can help minimize turbulence that might occur if it were installed directly on the side. This angle ensures that water flows smoothly into the service line, promoting efficient water distribution. Additionally, this orientation helps mitigate the risk of debris being drawn into the tap from the water main, as water flows down into the opening, reducing the chance of contaminants entering the system. Tapping at an angle also assists in preventing air pockets from forming, which can occur if a tap is installed at the top or direct side of a pipe. These air pockets can lead to issues like poor water pressure, decreased water quality, and potential service disruptions. In contrast, options such as tapping directly at the top or bottom may lead to complications, such as increased likelihood of trapping air or debris that could affect water quality and pressure. Tapping directly on the side of the pipe might contribute to less efficient flow dynamics. Thus, tapping at a 45-degree angle generally offers the most practical benefits for maintaining effective water distribution.

3. Which valve type is typically used for on/off service in a pipeline?

A. Globe valve

B. Gate valve

C. Check valve

D. Needle valve

The gate valve is commonly used for on/off service in a pipeline due to its design that provides a straight flow path and minimal resistance when fully opened. This allows for efficient flow regulation and ensures that when the valve is closed, it creates a tight seal, preventing the passage of liquid. The gate valve operates by raising or lowering a gate or wedge within the valve body, which can swiftly transition between fully open and fully closed positions. This characteristic makes it ideal for situations where the fluid flow needs to be completely stopped or allowed without causing pressure changes that might disrupt the system's performance. In contrast, other valve types serve different purposes. Globe valves are typically used for throttle control and fine adjustments in flow rather than complete shut-off. Check valves allow fluid to flow in only one direction and are designed to prevent backflow, not for on/off service. Needle valves provide precise flow control but are not intended for quick shut-off applications; they are used for small flow rates. Thus, the gate valve stands out as the preferred choice for simple on/off operation in water distribution systems.

4. What is a common function of an air-and-vacuum relief valve in water systems?

A. Prevent pressure build-up

B. Allow air to escape

C. Control water flow

D. Both A and B

An air-and-vacuum relief valve plays a crucial role in maintaining the integrity of water systems by performing dual functions that ensure the system operates smoothly. One of its primary responsibilities is to prevent pressure build-up within the pipelines. When water flows through the system, it can create pressure, especially when there are changes in flow conditions or in the event of pipe blockages. The air-and-vacuum relief valve opens to release excess pressure, thereby protecting the system from potential damage due to over-pressurization. Additionally, this valve allows air to escape from the system. When water is draining from a pipeline, a vacuum can form, which can lead to pipe collapse or disruption in flow. The air-and-vacuum relief valve automatically opens to let air in and balance the pressure, ensuring that the system remains operational and preventing any negative effects that may arise from a lack of air. Together, these functions of preventing pressure build-up and allowing air to escape are critical for the safe and efficient operation of water distribution systems. This is why the correct answer encompasses both these essential roles.

5. Which type of valve should be installed at a dead-end water main?

A. Check valve

B. Blowoff valve

C. Isolation valve

D. Pressure relief valve

In water distribution systems, a blowoff valve is specifically designed for installation at dead-end water mains. The primary function of a blowoff valve is to allow for the draining of water from the system to facilitate maintenance, inspection, or repairs. This is particularly important at dead ends where water can stagnate, leading to potential water quality issues. Blowoff valves provide a means to remove sediment and debris that might accumulate in stagnant water, thereby maintaining overall system health. By allowing for periodic flushing of the dead-end section of the main, these valves help ensure that water quality remains acceptable and that the pipes are kept clean. In contrast, while check valves, isolation valves, and pressure relief valves serve critical roles in the water distribution system, they do not fulfill the specific purpose of managing stagnant water in dead-end mains. Check valves help prevent backflow, isolation valves are used to control flow or isolate sections of the system for maintenance, and pressure relief valves are designed to protect the system from overpressure conditions. However, none of these are suited for the specific task of draining and maintaining water quality at dead ends in the distribution system.

6. At what time of the day is the age of the water stored in the distribution system the highest?

A. Late evening

B. Early morning

C. Noon

D. Afternoon

The age of the water stored in the distribution system is highest during the early morning. This is primarily due to the water consumption patterns of most communities. During the night, water usage is typically minimal as homes and businesses are mostly inactive. As a result, water that has been in the distribution system for an extended period is not drawn from hydrants or taps until the morning when demand increases. Consequently, by early morning, the water remaining in the pipes has had time to accumulate age since it was last moved or used. Understanding this concept is crucial for water distribution management, as older water can lead to issues such as degradation of water quality and may require monitoring to ensure it meets safety standards.

7. Which type of valve is designed to prevent the collapse of a pipe?

A. Check valve

B. Air-and-vacuum relief valve

C. Ball valve

D. Globe valve

The air-and-vacuum relief valve is specifically designed to prevent the collapse of a pipe by allowing air to enter the system when negative pressure occurs. When water is rapidly drawn from a pipeline, it can create a vacuum that may lead to pipe collapse due to external atmospheric pressure exceeding the internal pressure. The air-and-vacuum relief valve opens to admit air into the pipeline, breaking the vacuum and thus protecting the structural integrity of the pipe. This function is crucial in maintaining a stable pressure within the water distribution system and preventing potential damage to the infrastructure. In contrast, check valves are used to prevent backflow in the system; ball valves are primarily used to isolate sections of pipe or control flow; and globe valves are mainly utilized for throttling flow rather than protecting against vacuum conditions. Understanding the distinct functionalities of these valves reinforces why the air-and-vacuum relief valve is the appropriate choice for preventing pipe collapse.

8. In what type of fire hydrant is both the entire barrel and head below ground elevation?

A. Wet-barrel Hydrant

B. Dry-barrel Hydrant

C. Flush Hydrant

D. Flow Hydrant

The type of fire hydrant where both the entire barrel and head are below ground elevation is known as a flush hydrant. This design allows the hydrant to remain out of service and protected from the elements, which can be particularly beneficial in areas prone to freezing temperatures, as it minimizes the risk of water accumulation that could freeze and damage the hydrant. Flush hydrants typically have a cover that is flush with the ground, making them less obtrusive and reducing the risk of accidents or damage compared to above-ground types. These hydrants are often used in locations where aesthetics are a concern or where the hydrant may not need to be accessed frequently. In contrast, wet-barrel hydrants have their water source above ground, allowing for immediate access to water without needing to drain after use. Dry-barrel hydrants, while designed to prevent freezing by having only the top part containing water and a mechanism to drain the rest, still have a portion of their structure above ground. Flow hydrants, typically referring to any hydrant capable of discharging water, can also include both wet and dry-barrel designs, thus not fitting the specific characteristics of being completely underground like flush hydrants.

9. In a piping system, what is the primary function of a check valve?

A. To isolate a section of the pipe

B. To prevent backflow

C. To control pressure

D. To throttle flow

The primary function of a check valve in a piping system is to prevent backflow. Check valves are designed to allow fluid to flow in one direction only. When the flow ceases or reverses, the valve's mechanism, typically a hinged disc or ball, closes to block the reverse flow. This is crucial in various applications to protect equipment, maintain system integrity, and prevent contamination in water distribution systems. By ensuring that fluids can only travel in a designated direction, check valves help maintain proper operational conditions and enhance the safety and reliability of the overall system.

10. Why is it important to monitor the age of water in a distribution system?

A. To reduce maintenance costs

B. To ensure compliance with quality standards

C. To determine water color

D. To optimize pipe lifespan

Monitoring the age of water in a distribution system is crucial for ensuring compliance with quality standards. As water remains stagnant in the system for extended periods, it can undergo chemical and biological changes that may compromise its safety and potability. Factors such as temperature fluctuations, sunlight exposure, and the presence of contaminants can lead to harmful byproducts, bacterial growth, or other adverse effects on water quality. By keeping track of the age of water, water utility managers can implement strategies to maintain water quality, carry out timely flushing of the system, and ensure the delivery of safe drinking water to consumers. The other considerations, while important in their own right, do not directly address the core issue of maintaining water safety and compliance with health regulations as effectively as monitoring water age does.