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39	A	B	C	D	E

PRACTICE QUESTIONS

Colorado Certified Water Professionals

PW8VTM6R

Colorado Water Distribution System Operator Class 1

EDITION

Demo

QUESTIONS

9

FORMAT

Limited Edition PDF

Before you begin

What this is

9 practice questions for Colorado Certified Water Professionals **PW8VTM6R**, each with its answer key and an explanation. Answer a question before you read its key — the explanation is worth more once you have committed.

If something looks wrong

Send us three things and we will check it:

- the exam code, **PW8VTM6R**
- the question number
- the email address on your order

Write to **support@mometrix.net**. We reply within one business day.

QUESTION 1

MULTIPLE CHOICE

A water distribution operator measures the free chlorine residual leaving the treatment plant at 2.0 mg/L. The residual measured at a distant point in the distribution system is 0.3 mg/L. Which two factors most commonly contribute to this loss of chlorine residual? (Choose two.)

- ☒ **A** Elevated water age in dead-end mains and storage facilities
- ☒ **B** Reaction of chlorine with biofilm and organic matter in pipe walls
- ☐ **C** Increased water hardness causing scale formation
- ☐ **D** Higher operating pressures in elevated service zones
- ☐ **E** Dissolution of carbon dioxide from the atmosphere

ANSWER A - B

WHY Free chlorine residual decreases as water travels through the distribution system primarily due to extended water age (longer contact time) in dead-end mains, storage tanks, and low-demand areas, and due to demand exerted by biofilm, tubercles, and natural organic matter on pipe walls. Hardness, system pressure, and CO₂ dissolution are not significant drivers of chlorine decay in a typical distribution system.

QUESTION 2

MULTIPLE CHOICE

An irrigation system using chemical fertilizer injection is connected to a potable water service line. Which two backflow prevention assemblies are acceptable for protection against a high health hazard at this cross-connection? (Choose two.)

- ☒ **A** Reduced Pressure Zone (RPZ) backflow preventer
- ☐ **B** Double Check Valve Assembly (DCVA)
- ☐ **C** Pressure Vacuum Breaker (PVB)
- ☒ **D** Reduced Pressure Detector Assembly (RPDA)
- ☐ **E** Atmospheric Vacuum Breaker (AVB)

ANSWER A - D

WHY An irrigation system with chemical injection is considered a high health hazard cross-connection, requiring a high-level protection device. The Reduced Pressure Zone (RPZ) backflow preventer provides high-level protection suitable for this hazard. The Reduced Pressure Detector Assembly (RPDA) is an RPZ variant used on fire service lines to detect unauthorized water use. Double check assemblies and vacuum breakers are not acceptable for high hazard applications involving chemical injection.

QUESTION 3

TRUE FALSE

True or False: Air release valves are typically installed at high points in a water distribution pipeline to release accumulated air and prevent air pockets that can restrict flow or cause water hammer.

- ☒ **A** True
- ☐ **B** False

ANSWER A

WHY True. Air release valves are installed at high points in water mains where dissolved air can accumulate and form air pockets or air-bound sections. These pockets reduce the cross-sectional flow area and can cause flow restrictions, reduced pump efficiency, and contribute to surge events (water hammer). Automatic air release valves vent accumulated air while the line is under pressure.

QUESTION 4 SINGLE CHOICE

During a unidirectional flushing (UDF) program, the recommended target flushing velocity at the hydrant is typically:

- ☐ A 0.5 feet per second
- ☐ B 1.0 feet per second
- ☒ C 2.5 to 5.0 feet per second
- ☐ D 10.0 to 15.0 feet per second

ANSWER C

WHY Unidirectional flushing is designed to achieve pipeline scouring velocities sufficient to resuspend and remove sediments, biofilm, and deposits. The standard target velocity is 2.5 to 5.0 feet per second (some references cite 3 to 5 fps), which is well above the typical daily-flow velocity of around 1 fps or less. Velocities below 2.5 fps generally will not scour settled material effectively.

QUESTION 5 SINGLE CHOICE

A ground storage tank operates with a normal working range between the overflow elevation and the low-water cutoff elevation. The elevation between the overflow and the low-water cutoff defines the tank's:

- ☐ A Head range
- ☒ B Effective storage capacity
- ☐ C Pressure rating
- ☐ D Fire suppression reserve

ANSWER B

WHY The vertical distance between the overflow elevation and the low-water cutoff (or the lowest usable water level) defines the effective (or operational) storage capacity of a ground storage tank. Water below the low-water cutoff is generally not available for normal service, and any volume above the overflow is not retained. Fire reserves are a designated portion within the effective capacity, not the total range.

QUESTION 6

SINGLE CHOICE

The Hazen-Williams equation is commonly used in water distribution to estimate head loss due to friction. In this equation, an increase in the Hazen-Williams roughness coefficient (C) for a pipe of the same diameter and flow rate will:

- ☐ A Increase friction head loss
- ☒ B Decrease friction head loss
- ☐ C Have no effect on friction head loss
- ☐ D Double the friction head loss

ANSWER B

WHY In the Hazen-Williams equation, the C value represents the pipe's smoothness or carrying capacity. A higher C value (e.g., 140 for new smooth pipe versus 80–100 for older tuberculated pipe) indicates less friction, so head loss per unit length is reduced as C increases. Operators use this relationship to estimate how aging and tuberculation reduce distribution capacity.

QUESTION 7

SINGLE CHOICE

Which type of valve is most appropriate for isolating a section of water main during repair work, where the valve must provide a tight, bi-directional shutoff with minimal pressure loss when fully open?

- ☒ A Gate valve
- ☐ B Globe valve
- ☐ C Needle valve
- ☐ D Pinch valve

ANSWER A

WHY Gate valves are the standard isolation valves used in water distribution mains. When fully open, the gate is out of the flow path, providing an unobstructed passage with minimal head loss, and they provide a tight shutoff suitable for isolating a main for repair. Globe valves have high head loss and are used for throttling. Needle valves are for fine flow control, and pinch valves are used primarily for slurry or chemical service.

QUESTION 8

SINGLE CHOICE

Under the Colorado Primary Drinking Water Regulations administered by the Colorado Department of Public Health and Environment (CDPHE), a water distribution system operator at a public water system is required to:

- ☒ **A** Hold a valid CDPHE water distribution operator certificate appropriate to the system classification
- ☐ **B** Complete an annual backflow tester recertification only if the system has > 500 connections
- ☐ **C** Submit a lead and copper rule sampling plan every five years regardless of past results
- ☐ **D** Personally conduct all bacteriological sampling at every service connection monthly

ANSWER A

WHY Colorado regulations require that public water systems operate under the supervision of certified operators whose certification level matches the system's classification. Operators must hold the appropriate CDPHE-issued certificate. The other options misrepresent the actual regulatory requirements for certification, sampling frequency, and backflow tester requirements, which are not tied to connection counts in the way described.

QUESTION 9

SINGLE CHOICE

A long, flat section of distribution main is being filled rapidly after a shutdown. Operators hear repeated banging sounds from the pipe and see the pressure gauge spike sharply above normal operating pressure. This condition is most likely caused by:

- ☐ A Cavitation at the pump
- ☒ B Water hammer (hydraulic surge)
- ☐ C Air-bound pipes
- ☐ D Valve seat leakage

ANSWER B

WHY Rapid valve closure or sudden changes in flow velocity—such as those that occur when refilling a main too quickly—can cause water hammer (hydraulic surge). The kinetic energy of the moving column of water is converted into a pressure wave that can spike well above normal static pressure and produce banging noises. Proper filling procedures, slow valve operation, and surge-control devices are used to mitigate this.