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This month's questions and answers were developed by Scott Ruland, chief operator for the City of Deltona. Thank you, Scott!

1. What is the term used to describe the removal of volatile odor producing compounds through the process of forcing air up against a column of downward flowing water?
A. Destratification B. Reaeration
C. Degasification D. Diversion
2. What test can be performed that will give an operator a quick indication of the performance of the sedimentation process?
A. Turbidity into and out of the tank.
B. Conductivity into and out of the tank.
C. Coliform sampling at the tank outlet.
D. Dissolved oxygen content to verify there is no anaerobic conditions septic sludge.
3. Which process is used to rapidly mix and disperse a coagulant chemical with raw water?
A. Hydraulic mixing
B. Mechanical mixing
C. Diffuser mixing
D. Flash mixing
4. What water velocity will create a specific type of corrosion called erosion corrosion?
A. 3 feet per second (fps) B. 4 fps
C. Less than 5 fps D. Over 5 fps
5. Convert 162 mg/l as CaCO₃ to grains per gallons (gr per gal).
A. 22.3 gr per gal B. 9.47 gr per gal
C. 2,770 gr per gal D. 145 gr per gal
6. What is the velocity in feet per second (fps) of water travelling 1,200 ft in 4 minutes?
A. 2.5 fps
B. 5 fps
C. 7 fps
D. 7.48 fps
7. When are finished drinking water storage tanks typically filled?
A. During low flow demands.
B. During high flow demands.
C. During the night.
D. During the morning.

8. Under what condition should a positive displacement pump never be operated?
A. Closed discharge valve
B. High head conditions
C. Low flow demands
D. Opened discharge valve
9. What safety feature is included in 150-lb chlorine cylinders to prevent tank rupture in the event of a fire?
A. Soft brass base
B. Fusible metal plug
C. Conical design near neck
D. Graphite packing in valve
10. What type of water supply is available when a confining layer of impermeable material confines the zone of saturation (groundwater) under pressure?
A. Riparian B. Appropriative
C. Prescriptive D. Artesian

Answers on page 78

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Certification Boulevard Answer Key

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1. **C) Degasification**

Degasification is the term used to describe the removal of volatile compounds from water. The removal rate of volatile compounds increases as the rate of air through water is increased. The basic principle of degasification is to force a column of air up and through a column of water flowing down. The degasifier has three main components: the tower, the blower, and the sump.

2. **A) Turbidity into and out of the tank.**

Turbidity readings are essential not only in the sedimentation process but throughout the treatment process from source water to post filtration. In the sedimentation basin comparing the turbidity of water entering and leaving the basin will give the operator a good idea of the removal efficiency of the process. Increases in the inlet may indicate changes in source water turbidity or chemical feed problems. In the tank outlet, increased turbidity could indicate a high sludge blanket of a hydraulic overload. Turbidity is one of the essential process control tests for an operator using coagulation.

3. **D) Flash mixing**

Flash mixing is the process used to disperse and initially mix coagulant chemicals with water. The entire process occurs in only a few seconds. All the other answers are types of mixers used in the flash mix process

4. **D) Over 5 fps**

Water velocity in excess of 5 fps (feet per second) will erode pipes caused by the abrasion of the water against the pipe. The effect is very noticeable in copper pipe systems and evidenced by leaks that develop at tees and elbows in the plumbing system.

5. **B) 9.47 grains per gallons**

Convert 162 mg/l as CaCO to grains per gallon by dividing 162 by 17.1 as follows:
 $162 \div 17.1$
 $= 9.47 \text{ gr per gal.}$

6. **B) 5 ft per second**

Velocity = distance divided by time
 $= 1,200 \text{ ft divided by } 4 \text{ minutes}$
 $= 300 \text{ ft per minute}$

To convert to feet per second, divide by 60.
 $= 300 \text{ ft per minute divided by } 60 \text{ seconds}$
 per minute
 $= 5 \text{ ft per second}$

7. **A) During low flow demands**

Water storage tanks are filled during periods of low demand. This allows plenty of available water in storage to compensate for peak system demands. Water systems have varying demands and the low flow periods will vary during the course of a 24-hour period.

8. **A) Closed discharge valve**

A positive displacement pump should never be operated against a closed discharge valve. The pump will continue to produce flow until the pressure in the discharge line is increased and the line or pumps are damaged.

9. **B) Fusible metal plug**

To prevent the cylinder from rupturing when it gets too hot, such as exposure to a fire, every 150 chlorine cylinder has a "fusible plug" that is designed to melt at 158° to 168° F. There is one in the valve assembly of every 150-lb. cylinder and six (three on each end) in the body of every 1-ton container.

10. **D) Artesian**

Artesian pressure describes when the water underground is under pressure. If a well is in such a formation that allows the water to rise above the top of the aquifer, it is called an artesian well. The other three choices are types of water rights.