



Certification Boulevard

Roy Pelletier



Test Your Knowledge of Various Water-Related Topics

1. What typically happens to the pH of a pH-neutral water sample when sulfuric acid is added for pH adjustment?
A. The pH increases.
B. The pH decreases.
C. Sulfuric acid does not affect Ph.
2. A water plant has a ground storage reservoir that is 100 feet in diameter and fills to its maximum operating depth of 23 feet in 3.75 hours. What is the average flow rate entering the tank in gpm?
A. 1,650 gpm B. 7,136 gpm
C. 6,002 gpm D. 8,546 gpm
3. If the finished water product temperature after treatment is 25 °C, what is the conversion to °F?
A. 19°F B. 68°F
C. 103°F D. 77°F
4. What typically happens to the pH of a pH-neutral sample when alum is added?
A. The pH increases.
B. The pH decreases.
C. Alum does not affect sample pH.
5. If the discharge head on an electrically driven centrifugal pump increases, what happens to the motor current?
A. It remains the same. B. It goes up.
C. It goes down. D. It will oscillate.
6. What is created when chlorine reacts with volatile organics?
A. NH₃ B. THM
C. CaCO₃ D. TMA
7. What is the volume of a tank if the flow entering is 500 gpm and the detention time is 1.2 hours?
A. 36,000 gals B. 0.2344 mg
C. 69,399 gals D. 24 mg
8. Which best describes dynamic head?
A. Pressure in a pumping system at rest.
B. The total amount of pressure a pump must overcome to properly discharge.
C. Velocity of water in a main at full pumping pressure.
D. Same as static head.
9. How many pounds of a chemical applied at the rate of 3 mg/L are required to dose 200,000 gallons?
A. 3 lbs B. 8 lbs
C. 5 lbs D. 10 lbs

SEND US YOUR QUESTIONS FOR CERTIFICATION BOULEVARD

Do you have a question or an exercise you would like to feature in "Certification Boulevard?" We'll be glad to publish it. Just send your question (with the answer) or your exercise (with the solution) to:

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There is no limit to the number of questions or exercises you may submit. Please include your name, city, and organization or company so we can give you credit.

10. What is the process called when chlorine is added to water until the chlorine demand has been satisfied?
A. Contact time
B. Hypo-chlorination
C. Reliquefaction
D. Breakpoint Chlorination

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Certification Boulevard Answer Key

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1. **B. The pH decreases**

Sulfuric acid is acidic (low pH), and will typically decrease the pH of a sample.

2. **C. 6,002 gpm**

Capacity of Tank at Max Level

$$\begin{aligned} &= \pi r^2 \times \text{depth} \times 7.48 \text{ gal/ft}^3 \\ &= 3.14 \times 50 \text{ ft.} \times 50 \text{ ft.} \times 23 \text{ ft.} \times 7.48 \text{ gal/ft}^3 \\ &= 1,350,514 \text{ gals} \end{aligned}$$

Total Minutes of Pumping

$$\begin{aligned} &= 3.75 \text{ hrs} \times 60 \text{ mins/hr} \\ &= 225 \text{ minutes} \end{aligned}$$

Average Flow Rate

$$\begin{aligned} &= \text{Capacity, gals divided by Minutes Pumped} \\ &= 1,350,514 \text{ gals divided by 225 minutes} \\ &= 6,002 \text{ gpm} \end{aligned}$$

3. **D. 77°F**

$$\begin{aligned} &^{\circ}\text{C} \times 1.8 + 32 = ^{\circ}\text{F} \\ 25^{\circ}\text{C} \times 1.8 + 32 &= 77^{\circ}\text{F} \end{aligned}$$

4. **B. The pH decreases**

Alum (aluminum sulfate) is an acid and will typically reduce the pH of a sample after addition.

5. **C. It goes down**

Increasing the discharge pressure (head) on a centrifugal pump reduces the discharge flow; therefore, the pump does less work and the motor current goes down.

6. **B. THM**

Trihalomethane (THM) is created when chlorine reacts with volatile organics.

7. **A. 36,000 gals**

Tank Volume, mg

$$\begin{aligned} &= \text{flow, mgd} \div 24 \text{ hrs/day} \times \text{detention time, hours} \\ &= (500 \text{ gpm} \times 1440 \text{ mins/day} \div 1,000,000) \\ &= 0.72 \text{ mgd} \\ &= 0.72 \text{ mgd} \div 24 \text{ hrs/day} \times 1.2 \text{ hrs D.T.} \\ &= 0.036 \text{ mg} \end{aligned}$$

Tank Volume, gals

$$\begin{aligned} &= 0.036 \text{ mg} \times 1,000,000 \\ &= 36,000 \text{ gals} \end{aligned}$$

8. **C. Velocity of water in a main at full pumping pressure**

Dynamic head describes the velocity of a pumping system at full operating pressure. Dynamic head is fluid in motion ... static head is fluid at rest.

9. **C. 5 lbs**

Dose Rate, lbs

$$\begin{aligned} &= \text{volume, mg} \times \text{conc., ppm} \times 8.34 \\ &= (200,000 \text{ gals} \div 1,000,000) \times 3 \text{ mg/L} \times 8.34 \\ &\quad \text{lbs/gal} \\ &= 0.2 \text{ mg} \times 3 \text{ ppm} \times 8.34 \text{ lbs/gal} \\ &= 5.0 \text{ lbs} \end{aligned}$$

10. **D. Breakpoint Chlorination**

Breakpoint chlorination is accomplished after all the demand for chlorine has been satisfied and free chlorine residual is achieved.