



Certification Boulevard

Roy Pelletier



Test Your Knowledge of Various Water-Related Topics

- What typically happens to the pH of a pH-neutral water sample when sodium bicarbonate is added for pH adjustment?
 - The pH increases.
 - The pH decreases.
 - Sodium bicarbonate does not affect pH.
- A water plant has a ground storage reservoir that is 125 feet in diameter and fills to its maximum operating depth of 21 feet in 4.5 hours. What is the average flow rate entering the tank in gpm?
 - 1,650 gpm
 - 7,136 gpm
 - 4,078 gpm
 - 8,546 gpm
- The finished water product temperature after treatment is 74 °F, what is the conversion to °C?
 - 19 °C
 - 68 °C
 - 23 °C
 - 72 °C
- Which two chemicals typically are used in a water system chlor-ammoniation process?
 - Chlorine and sulfur dioxide
 - Ammonia and sodium hydroxide
 - Chlorine and caustic
 - Chlorine and ammonia
- Which ions are measured by alkalinity?
 - Carbonate, bicarbonate, and hydroxide
 - Calcium and magnesium
 - Hydrogen and hydroxide
 - Sulfate, chlorate, and nitrate
- Which of the following is not a byproduct of chlorine disinfection?
 - Trihalomethanes
 - Bromate
 - Haloacetic acids
 - Nitrite
- Which of the following chemicals is not an ozone scavenger?
 - Sodium bisulfite
 - Calcium sulfate
 - Hydrogen peroxide
 - Calcium thiosulfate
- If the discharge head on an electrically driven centrifugal pump decreases, what happens to the motor current?
 - It remains the same.
 - It goes up.
 - It goes down.
 - It will oscillate.
- What is created when chlorine reacts with volatile organics?
 - NH₃
 - THM
 - CaCO₃
 - TMA
- What is the volume of a tank if the flow entering is 2.25 mgd and the detention time is 2.5 hours?
 - 583,000 gals
 - 0.2344 mg
 - 145,833 mg
 - 312,500 gals

ANSWERS ON
PAGE 54

Looking for Answers? Check the Archives

Are you new to the water and wastewater field? Want to boost your knowledge about topics you'll face each day as a water/wastewater professional?

All past editions of *Certification Boulevard* back through the year 2000 are available on the Florida Water Environment Association's Web site at www.fwea.org. Click the "Site Map" button on the home page, then scroll down to the Certification Boulevard Archives, located below the Operations Research Committee.

SEND US YOUR QUESTIONS

Readers are welcome to submit questions or exercises on water or wastewater treatment plant operations for publication in *Certification Boulevard*. Send your question (with the answer) or your exercise (with the solution) by e-mail to roy.pelletier@cityoforlando.net, or by mail to:

Roy Pelletier
Wastewater Project Consultant
City of Orlando
Public Works Department
Environmental Services Wastewater Division
5100 L.B. McLeod Road,
Orlando, FL 32811

Certification Boulevard Answer Key

From page 37

- A. The pH increases.**
Sodium bicarbonate is basic and will typically increase the pH of a sample.
- B. 7,136 gpm**
Capacity of Tank at Max Level
 $= \pi r^2 \times \text{depth} \times 7.48 \text{ gal/cu. ft.}$
 $= 3.14 \times 62.5 \text{ ft.} \times 62.5 \text{ ft.} \times 21 \text{ ft.} \times 7.48$
 gal/cu. ft.
 $= 1,926,684 \text{ gals}$
Total Minutes of Pumping
 $= 4.5 \text{ hrs} \times 60 \text{ mins/hr} = 270 \text{ minutes}$
Average Flow Rate
 $= \text{Capacity, gals divided by minutes pumped}$
 $= 1,926,684 \text{ gals divided by 270 minutes}$
 $= 7,136 \text{ gpm}$
- C. 23 °C**
 $^{\circ}\text{F} - 32 \div 1.8 = ^{\circ}\text{C}$
 $74^{\circ}\text{F} - 32 \div 1.8 = 23^{\circ}\text{C}$
- D. Chlorine and Ammonia**
- A. Carbonate, bicarbonate, and hydroxide**
Borate, silicate, and phosphate also contribute to alkalinity but typically are not found in high enough concentrations to be significant.
- D. Nitrite**
Nitrite is not generated or produced by chlorine disinfection. Also, depending on water characteristics, bromate may be a byproduct of chlorine disinfection.
- B. Calcium sulfate**
Ozone systems often require the ozone residual to be quenched with an ozone scavenger before leaving the contact chamber. Sodium bisulfite and hydrogen peroxide are used most often.
- B. It goes up.**
Reducing the discharge pressure on a centrifugal pump increases the discharge flow; therefore, the pump does more work and the motor current goes up.
- B. THM**
Trihalomethane (THM) is created when chlorine reacts with volatile organics.
- B. 0.2344 mg**
Tank volume, mg
 $= \text{flow, mgd} \div 24 \text{ hrs/day} \times \text{detention time, hours}$
 $= 2.25 \text{ mgd} \div 24 \text{ hrs/day} \times 2.5 \text{ hrs D.T.}$
 $= 0.234375 \text{ mg}$