



Certification Boulevard

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Test Your Knowledge of 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 oF. What is the conversion to oC?
 - 19 °C
 - 68 °C
 - 23 °C
 - 72 °C
- Which two chemicals are typically 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 turbine pump decreases, what does the motor current do?
 - 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 74

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.

Certification Boulevard Answer Key

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- 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
 $= \pi r^2 \times \text{depth} \times 7.48 \text{ gal/cu. ft.}$
 $= 3.14 \times 62.5 \text{ ft.} \times 62.5 \text{ ft.} \times 21 \text{ ft.} \times 7.48 \text{ gal/cu. ft.}$
 $= 1,926,684 \text{ gals}$

Total Minutes of Pumping
 $= 4.5 \text{ hrs} \times 60 \text{ mins/hr}$
 $= 270 \text{ minutes}$

Average Flow Rate
 $= \text{Capacity, gals divided by Minutes Pumped}$
 $= 1,926,684 \text{ gals divided by } 270 \text{ minutes}$
 $= 7,136 \text{ gpm}$
- 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 are not typically 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
 $= \text{flow, mgd} \div 24 \text{ hrs/day} \times \text{detention time, hours}$
 $= 2.25 \text{ mgd} \div 24 \text{ hrs/day} \times 2.5 \text{ hrs D.T.}$
 $= 0.234375 \text{ mg}$

