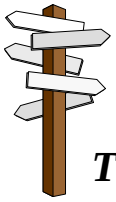

# Certification Boulevard

## *Test Your Knowledge of Disinfection • Answer Key*

1. What happens to the chlorine residual when the nitrite ($NO_2$) content in the effluent increases?

   A. The residual stays the same … nitrite has nothing to do with chlorine demand
   **B. <u>The residual goes down</u>**
   C. The residual goes up
   D. The residual doubles

   ***Nitrite has a demand for chlorine equal to about 5 lbs of chlorine for every 1 lb of nitrite to be oxidized. As nitrites go up, chlorine residual goes down.***

2. If your plant has a flow rate of 2.75 mgd, a chlorine demand in pre-treatment of 2.5 mg/L, pre-filtration of 1.5 mg/L and final effluent of 6.5 mg/L, and you maintain a chlorine residual of 2.5 mg/L, how many lbs/day of chlorine will be used?

   A. 241 lbs/day
   B. 1,398 lbs/day
   **C. <u>298 lbs/day</u>**
   D. 57 lbs/day

   ***Total mg/L = 2.5 + 1.5 + 6.5 + 2.5 = 13 mg/L***
   ***Lbs/day = flow, mgd x conc., mg/L x 8.34***
   ***= 2.75 mgd x 13 mg/L x 8.34***
   ***= 298.1 lbs/day***

3. What chemical is used to identify a chlorine leak?

   **A. <u>Ammonia</u>**
   B. Sulfur Dioxide
   C. Sodium Hydroxide
   D. Sulfuric Acid

   ***Ammonia fumes should be used to identify leaks … do not spray liquid ammonia directly on fittings or valves.***

4. One volume of chlorine liquid will expand 92.84 times when it evaporates to a gas? *True or* ***<u>False</u>***

   ***False: While it is true that chlorine liquid expands when converted to a gas, it actually expands nearly 460 times the original volume.***

5. Which effluent quality condition may cause the most problems with efficiency of a UV disinfection process?

   A. High $NH_3$
   B. High $NO_3$
   C. High $NO_2$
   D. **High TSS**

6. Calculate the chlorine demand, given the following data:

   • Total daily pounds used = 240 lbs/day
   • The plant flow = 2.75 mgd
   • The effluent chlorine residual = 2.5 mg/L

   A. 158 lbs/day
   B. 240 lbs/day
   C. 297 lbs/day
   **D. 182 lbs/day**

   ***Supply – Residual = Demand***

   ***• Supply is given at 240 lbs/day***
   ***• Residual = 2.75 mgd x 2.5 mg/l x 8.34 lbs/gal = 57.3 lbs/day***
   ***• Demand = 240 lbs/day – 57.34 lbs/day = 182.7 lbs/day***

7. What action should never be performed when working with liquid chlorine?

   A. Wear a respirator
   **B. Trap liquid between two closed valves**
   C. Feed liquid to an evaporator
   D. Use ammonia to test for leaks

8. What does this formula best represent?

$$\frac{\text{Tank Volume, ft}^3}{\text{Flow, mgd x 92.84 cfm/mgd}}$$

   A. Chlorine residual
   **B. Contact chamber detention time, minutes**
   C. Contact chamber detention time, hours
   D. Tank volume in gallons

9. Leaking chlorine liquid will tend to collect near the floor of a closed room.
   ***True*** *or False*

   ***True: Chlorine liquid is about 1.5 times heavier than water and, during a leaking condition, will typically remain on the floor. As the liquid evaporates to a gas, the gas will also remain low lying – gas is about 2.5 times heavier than air.***

10. What type of chlorine residual is created when ammonia is present and breakpoint has not been accomplished?

    **A. <u>Combined</u>**
    B. Free residual
    C. Tri-chloride
    D. Dioxide

***Combined residual (chloramines) predominates before the breakpoint.***

*Please forward your comments and sample questions for publication to:*

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