Certification Boulevard

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Test Your Knowledge of Collections & Distribution

1. Which may be the most appropriate chemical to use in a wet scrubber treating high levels of ammonia?
   A. Sodium hydroxide
   B. Sulfuric acid
   C. Unchlorinated water
   D. Polymer

2. When a check valve is mounted in a pipe, which direction will the flow normally be allowed to travel?
   A. In both directions.
   B. In one direction only.
   C. A check valve should never be installed in a pipe.
   D. It will totally stop the flow from traveling in either direction.

3. What is the most important reason why pumps in a lift station should not experience frequent starts and stops?
   A. There is not enough time for the pumps to be primed.
   B. Because of the power surge problems.
   C. Ultimately frequent starts and stops will result in premature failure of the check valve assembly.
   D. Ultimately frequent starts and stops will result in premature failure of the motor winding insulation.

4. Given the following data, what is the detention time in this 24-inch diameter force main?
   • The length is 14,700 feet.
   • The pump capacity is 3,000 gpm.
   • The pumping cycle is six minutes ON and five minutes OFF.
   A. 2 hours 4 minutes
   B. 3 hours 31 minutes
   C. 4 hours 5 minutes
   D. 250 minutes

5. What is the term that defines waste leaking out of a collection system pipe into the environment?
   A. Infiltration
   B. Aliquot
   C. Cavitation
   D. Exfiltration

6. Which gases may be found in sewer collection systems?
   A. Explosive gases
   B. Hydrogen sulfide
   C. Methane
   D. All of the above

7. Given the following data, how many cubic yards of backfill are needed to fill a trench?
   • 9.25 feet wide
   • 28 yards long
   • 6.5 feet deep
   A. 62 yd^3 B. 257 yd^3
   C. 959 yd^3 D. 187 yd^3

8. What is the minimum velocity in a sanitary sewer pipeline necessary to prevent settling of solids and debris?
   A. 1 fps B. 0.5 fps
   C. 2 fps D. 2 fpm

9. Given the following data, what is the capacity of this wet well?
   • Flow entering is 255 gpm.
   • Frequency and duration of flow are five minutes every 15 minutes.
   • Detention time is 1.75 hours.
   A. 169,280 gals B. 8,925 gals
   C. 4,464 gals D. 0.0744 mg

10. What is the pipeline called that is installed on the discharge side of a sewage pump?
    A. Suction B. Sump
    C. Gravity D. Force main

ANSWERS ON PAGE 74

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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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1. **B. Sulfuric acid**
   Sodium hydroxide is typically used when a wet scrubber is treating odorous air high in hydrogen sulfide; however, it typically requires a low pH when scrubbing air high in ammonia.

2. **B. In one direction only.**

3. **D. Ultimately frequent starts and stops will result in premature failure of the motor winding insulation.**

4. **B. 3 hours 31 minutes**
   Formula for Detention Time in Minutes
   = pipe volume in cubic feet ÷ (flow pumped in mgd x 92.84 cfm/mgd)

   Pipe Volume
   = πr^2 x length in feet
   = 3.14 x 1 foot x 1 foot x 14,700 feet
   = 46,158 ft^3
   Flow Pumped
   = 6 mins ON + 5 mins OFF
   = 11 mins per cycle
   = 1,440 mins per day / 11 mins per cycle
   = 130.9 cycles per day
   = 6 mins ON per cycle x 130.9 cycles per day
   = 785.4 mins per day
   = 3,000 gpm x 785.4 mins per day
   = 2,356,200 gpd
   = 2.3562 mgd
   46,158 ft^3 ÷ (2.3562 mgd x 92.84 cfm/mgd)
   Detention Time
   = 211 Minutes divided by 60 mins/hr
   = 3.516 hrs

5. **D. Exfiltration**
   Waste leaking out of a collection system pipe is called exfiltration. Water seeping into a collection system pipeline is called infiltration.

6. **D. All of the above**

7. **D. 187 yd^3**
   Cubic Yards
   = 9.25 feet wide x (28 yards long x 3 feet/yard) x 6.5 feet deep divided by 27 ft^3 per yd^3
   = 187.06 yd^3

8. **C. 2 fps**

9. **B. 8,925 gals**
   Q, mgd ÷ 24 hrs/day x D.T., hrs = Volume, mg
   Q = 20 mins/hr x 24 hrs/day
   = 480 mins/day x 255 gpm
   = 122,400 gpd
   0.1224 mgd ÷ 24 hrs/day x 1.75 hrs
   = 0.008925 mg x 1,000,000
   = 8,925 gals

10. **C. Gravity**