



Certification Boulevard

Test Your Knowledge of Collections & Distribution – answer key

1. Which may be the most appropriate chemical to use in a wet scrubber treating high levels of hydrogen sulfide?

- A. **Sodium hydroxide**
- B. Sulfuric acid
- C. Unchlorinated water
- D. Polymer

(submitted by John Lomberk, Civil Engineer III, City of Orlando Wastewater Bureau)

2. Given the following data, what is the detention time in this 24-inch diameter forcemain?

- 14,700 feet long
- 3,000 gpm pump capacity
- Pumping cycle is 6 minutes ON and 5 minutes OFF

- A. 2 hours 4 minutes
- B. **212 minutes**
- C. 4 hours 5 minutes
- D. 213 minutes

Formula for Detention Time in Minutes =

$$\frac{\text{pipe volume in cubic feet}}{\text{flow pumped in mgd} \times 92.4 \text{ cfm/mgd}}$$

$$\begin{aligned} \text{Pipe Volume} &= \pi r^2 \times \text{length, ft.} \\ &= 3.14 \times 1 \text{ ft.} \times 1 \text{ ft.} \times 14,700 \text{ feet} \\ &= 46,158 \text{ ft}^3 \end{aligned}$$

$$\begin{aligned} \text{Flow Pumped} &= 6 \text{ mins On} + 5 \text{ mins OFF} = 11 \text{ mins per cycle} \\ &= 1,440 \text{ mins per day} / 11 \text{ mins per cycle} = 130.9 \text{ cycles per day} \\ &= 6 \text{ mins ON per cycle} \times 130.9 \text{ cycles per day} = 785.4 \text{ mins per day} \\ &= 3,000 \text{ gpm} \times 785.4 \text{ mins per day} \\ &= 2,356,200 \text{ gpd} \\ &= 2.3562 \text{ mgd} \end{aligned}$$

$$\frac{46,158 \text{ ft}^3}{2.3562 \text{ mgd} \times 92.4 \text{ cfm/mgd}}$$

$$\text{Detention Time} = 212 \text{ Minutes}$$

3. What device is used in a wastewater pipeline to prevent flow from traveling in both directions?

- A. Plug valve
- B. Siphon inducer

Flap gate

C. Pinch valve

4. 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 yd³
- B. 257 yd³
- C. 959 yd³
- D. **187 yd³**

$$\begin{aligned} \text{Cu. Yards} &= 9.25 \text{ feet wide} \times (28 \text{ yards long} \times 3 \text{ feet/yard}) \times 6.5 \text{ feet deep} / 27 \text{ ft}^3 \text{ per yd}^3 \\ &= 187.06 \text{ yd}^3 \end{aligned}$$

5. Waste leaking out of a collection system pipe, and into the environment, is called infiltration. *True or **False***

Waste leaking out of a collection system pipe is called exfiltration

6. What type of machine is used to construct collection system pipelines when they are too difficult for trench excavations?

- A. Pig
- B. TV Device
- C. **Boring Machine**
- D. Backhoe Machine

7. Which type of sewer system contains both sanitary wastewater and storm water?

- A. Domestic wastewater system
- B. **Combined sewer system**
- C. Separate collection system
- D. Sewer system evaluation survey

8. Given the following data, what is the capacity of this wet well?

- wet well diameter is 20 feet
- bottom elevation of wet well is 72.5 feet
- top elevation of wet well is 91.4 feet

- A. 177,563 gallons
- B. 23,738 ft³
- C. 332,043 ft³
- D. **44,391 gallons**

$$\text{Liquid depth in wet well} = 91.4 \text{ feet} - 72.5 \text{ feet} = 18.9 \text{ feet}$$

$$\text{Gallons Capacity} = .785 \times \text{diameter}^2 \times \text{depth} \times 7.48 \text{ gal per ft}^3$$
$$.785 \times 20 \text{ feet} \times 20 \text{ feet} \times 18.9 \text{ feet} \times 7.48 \text{ gal per ft}^3 = 44,390.8 \text{ gallons}$$

9. 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
10. Which gases may be found in sewer collection systems?
- A. Explosive gases
 - B. Hydrogen sulfide
 - C. Methane
 - D. **All of the above**