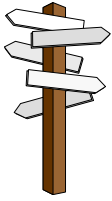


Certification Boulevard



Test Your Knowledge of Collections & Distribution - answer key

True or False

1. The natural slope of a pipe is called the “angle of repose?”
True
2. When a flap gate is mounted in a pipe, the flow will be allowed to travel in both directions?
False: A flap gate allows flow to travel in only one direction.
3. Oxidizing chemicals like ammonia and sulfuric acid are used to counteract the corrosion caused by hydrogen sulfide in collection systems and pumping stations?
False: The most common oxidizing chemicals to minimize corrosion caused by hydrogen sulfide are chlorine and hydrogen peroxide.
4. Waste leaking out of a collection system pipe, and into the environment, is called infiltration.
False: This is known as “Exfiltration.”

Multiple Choice

5. Given the following data, how many cubic yards of backfill will be required to fill a trench?
 - 6.75 feet wide
 - 125 feet long
 - 8.5 feet deep
 - a. 7,172 yd³
 - b. 959 yd³
 - c. 36 yd³
 - d. **266 yd³**

6.75 feet wide x 125 feet long x 8.5 feet deep ÷ 27 cubic feet per cubic yard

6. What type of machine is used to construct collection system pipelines when they are too deep 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?
- Domestic wastewater system
 - Combined sewer system**
 - Separate collection system
 - Sewer system evaluation survey
8. Given the following data, how long will it take for wastewater to flood a wet well if the wet well is empty and the pumping station fails?
- 450 feet of 10" forcemain pipe entering the wet well
 - wet well diameter is 10 feet
 - bottom elevation of wet well is 78.5 feet
 - top elevation of wet well is 89.4 feet
 - flow entering wet well at 75 cfm
- 2.1 hours
 - 11.4 minutes**
 - 9.35 minutes
 - 1.4 hours

$$\begin{aligned} \text{Detention Time, minutes} &= \text{Wet Well Capacity, ft}^3 \div \text{Flow, cfm} \\ (0.785 \times d^2) \times (89.4 \text{ ft} - 78.5 \text{ ft}) &\div 75 \text{ cfm} \\ 78.5 \text{ ft}^2 \times 10.9 \text{ ft} &\div 75 \text{ cfm} \\ 855.65 \text{ ft}^3 &\div 75 \text{ cfm} = 11.4 \text{ minutes} \end{aligned}$$

9. What is the minimum velocity in a sanitary sewer pipeline necessary to prevent settling of solids and debris?
- 1 fps
 - 0.5 fps
 - 2 fps**
 - 2 fpm
10. Given the following data, what is the capacity of this wet well?
- flow entering is 155 gpm
 - frequency and duration of flow is 4 minutes every 10 minutes
 - detention time is 1.2 hours
- 169,280 gals
 - 0.08928 mg
 - 4,464 gals**
 - 0.0744 mg

$$\begin{aligned} Q, \text{ mgd} \div 24 \text{ hrs/day} \times D.T., \text{ hrs} &= \text{Volume, mg} \\ Q = 24 \text{ mins/hr} \times 24 \text{ hrs/day} &= 576 \text{ mins/day} \times 155 \text{ gpm} = 89,280 \text{ gpd} \\ 0.08928 \text{ mgd} \div 24 \text{ hrs/day} \times 1.2 \text{ hrs} &= 0.004464 \text{ mg} \times 1,000,000 = 4,464 \text{ gals} \end{aligned}$$