Certification Boulevard

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Test Your Knowledge of Collections & Distribution

True or False:

1. The natural slope of a pipe is called the "angle of repose."

2. When a flap gate is mounted in a pipe, the flow will be allowed to travel in both directions.

3. Oxidizing chemicals like ammonia and sulfuric acid are used to counteract the corrosion caused by hydrogen sulfide in collection systems and pumping stations.

4. Waste leaking out of a collection system pipe and into the environment is called infiltration.

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. 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 stormwater?
   a. Domestic wastewater system
   b. Combined sewer system
   c. Separate collection system
   d. 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.

   a. 2.1 hours   b. 11.4 minutes   c. 9.35 minutes   d. 1.4 hours

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. Given the following data, what is the capacity of this wet well?
    - Flow entering is 155 gpm.
    - Frequency and duration of flow is four minutes every 10 minutes.
    - Detention time is 1.2 hours.

    a. 169,280 gals   b. 0.08928 mg   c. 4,464 gals   d. 0.0744 mg

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True or False

1. **True**
   Angle of repose refers to loose, unconsolidated materials (gravel, sand, soil, etc.). The angle of repose is the angle at which loose material sits at rest. Typically 25 - 40 degrees.

2. **False**
   A flap gate allows flow to travel in only one direction.

3. **False**
   The most common oxidizing chemicals to minimize corrosion caused by hydrogen sulfide are chlorine, hydrogen peroxide and potassium permanganate.

4. **False**
   This is known as "Exfiltration."

Multiple Choice

5. **d. 266 yd³**
   6.75 feet wide x 125 feet long x 8.5 feet deep ÷ 27 cubic feet per cubic yard

6. **c. Boring Machine**
   Boring machines have cutting heads that are used to excavate deep crossings, like under a river.

7. **b. Combined sewer system**
   Facilities with combined sewer systems can double or triple their influent flow rate during a rain event.

8. **b. 11.4 minutes**
   Detention Time, minutes
   = Wet Well Capacity, ft³ ÷ Flow, cfm
   = (0.785 x d²) x (89.4 ft – 78.5 ft) ÷ 75 cfm
   = 78.5 ft² x 10.9 ft ÷ 75 cfm
   = 855.65 ft³ ÷ 75 cfm
   = 11.4 minutes

9. **c. 2 fps**

10. **c. 4,464 gals**
    Volume, mg = Q, mgd ÷ 24 hrs/day x D.T., hrs
    Q = 24 mins/hr x 24 hrs/day
    = 576 mins/day x 155 gpm
    = 89,280 gpd
    = 0.08928 mgd ÷ 24 hrs/day x 1.2 hrs
    = 0.004464 mg x 1,000,000
    = 4,464 gals