

Test Your Knowledge of Stormwater Management and Other Wastewater Treatment Topics



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1. Which of the following is not considered stormwater?

- A. Storm runoff
- B. Snowmelt runoff
- C. Drainage
- D. Sanitary

2. In today's environmentally conscious business/industrial community, stormwater management is a primary concern. A pollution prevention plan is a major component of a facility stormwater management program; name three other components that are required for stormwater management.

1. _____
2. _____
3. _____

3. What is created when chlorine reacts with ammonia in an effluent stream?

- A. Chloramines
- B. Free residual
- C. No residual
- D. Breakpoint

4. 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

5. What is the detention time in a primary clarifier that is 100 ft long, 25 ft wide, 13 ft deep, and with influent flow that is 5 mgd?

- A. 2.3 hours
- B. 1.8 hours
- C. 1.2 hours
- D. 3.1 hours

6. Given the following data, what is the surface settling rate of the secondary clarifiers?

- Three secondary clarifiers
- Each clarifier has a diameter of 100 ft
- The plant influent flow is 15 mgd

- A. 637 gal/day/ft²
- B. 3,414 gal/day/ft²
- C. 736 gal/day/ft²
- D. 159 gal/day/ft²

7. Given the following data, how many gallons of waste activated sludge (WAS) should be removed daily if a 10-day solids retention time (SRT) is the desired target?

- Two aerations tanks
- Each aeration tank is 140 feet long, 45 feet wide, and 15 feet deep
- The mixed liquor suspended solids (MLSS) concentration is 3,500 ppm
- The WAS concentration is 8,500 ppm

- A. 1.12 mgd
- B. 158,250 gpd
- C. 20,790 gpd
- D. 58,217 gpd

8. Which term is most related to vector attraction reduction in an anaerobic digester?

- A. Settleometer
- B. Pathogen
- C. Specific Oxygen Uptake Rate (SOUR)
- D. 40-day bench test

9. What does the term absorption mean?

- A. Impregnate a liquid with air.
- B. The taking of one substance into the body of another.
- C. To gather onto the surface of a substance.
- D. One substance repelling another.

10. Which chemical is most commonly used for odor control when dealing with ammonia odors from a solids handling process?

- A. Polymer
- B. Acid
- C. Alum
- D. Water

Answers on page 62

SEND US YOUR QUESTIONS

Readers are welcome to submit questions or exercises on water or wastewater treatment plant operations for publication in Certification Boulevard. Send your question (with the answer) or your exercise (with the solution) by e-mail to roy.pelletier@cityoforlando.net, or by mail to:

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Certification Boulevard Answer Key

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1. **D) Sanitary**

1. **Sampling program**
2. **Periodic inspections**
3. **Employee training**

3. **A) Chloramines**

4. **C) 2 fps**

5. **C) 1.2 hours**

$$\text{length } 100 \text{ ft} \times \text{width } 25 \text{ ft} \times \text{depth } 13 \text{ ft} \\ \times 7.48 \text{ gal/ft}^3 \times 24 \text{ hrs/day} \div 5,000,000 \\ \text{gal/day}$$

6. **A) 637 gal/day/ft²**

Each Clarifier Surface Area in ft²

$$= 50 \times 50 \times 3.14$$

$$= 7,850 \text{ ft}^2$$

Total Clarifier Surface Area in ft²

$$= 7,850 \text{ ft}^2 \times 3 \text{ Clarifiers}$$

$$= 23,550 \text{ ft}^2$$

Surface Settling Rate

$$= 15,000,000 \text{ gal per day} \div 23,550 \text{ ft}^2$$

$$= 637 \text{ gal/day/ft}^2$$

7. **D) 58,217 gpd**

Lbs in Aeration

$$= 140 \text{ ft} \times 45 \text{ ft} \times 15 \text{ ft} \times 7.48 \text{ gal/ft}^3 \times 2 \\ \text{tanks}$$

$$= 1,413,720 \text{ gals}$$

$$= 1.41372 \text{ mg} \times 3,500 \text{ ppm} \times 8.34 \text{ lbs/gal}$$

$$= 41,266 \text{ lbs MLSS}$$

Lbs/day to WAS

$$= 41,266 \text{ lbs MLSS} \div 10\text{-day SRT}$$

$$= 4,127 \text{ lbs/day WAS}$$

Gals/day to WAS

$$= 4,127 \text{ lbs/day WAS} \div 8,500 \text{ ppm WAS}$$

$$\times 8.34 \text{ lbs/gal}$$

$$= 0.058217 \text{ mgd} \times 1,000,000$$

$$= 58,217 \text{ gpd}$$

8. **D) 40-day bench test**

9. **B) The taking of one substance into the body of another**

10. **B) Acid**