Test Your Knowledge of Conservation and Reuse

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1. What are typical plant permit limitations for reuse water applications?
   A. 1-2 mg/L $CBOD_5$, 10 mg/L TSS, and 25 mg/L NO_3
   B. 10-12 mg/L $CBOD_5$, 15 mg/L TSS, and 20 mg/L NO_3
   C. 20-30 mg/L $CBOD_5$, 5 mg/L TSS, and 10-12 mg/L NO_3
   D. 40-50 mg/L $CBOD_5$, 1 mg/L TSS, and 5 mg/L NO_3

2. What is the typical permit requirement for total suspended solids (TSS) of reuse water as it leaves the reclamation facility in Florida?
   A. No greater than 1.0 mg/L
   B. No greater than 10.0 mg/L
   C. No greater than 5.0 mg/L
   D. No less than 12.0 mg/L

3. What is the main difference between a percolation pond (Pond) and a rapid infiltration basin (RIB)?
   A. A Pond generally has an overflow discharge, and a RIB infiltrates all of its water into the ground through the bottom.
   B. A RIB generally has an overflow discharge, and a Pond infiltrates all of its water through the bottom.
   C. Water infiltrates into a RIB and exfiltrates out of a Pond.
   D. No difference; they are both the same.

4. What will a pressure gauge read on the suction of a reuse water pump, if the pump is located at floor elevation of a storage tank and the tank has a static water level of 20 feet?
   A. About 46 psi B. About 21.6 psi
   C. About 8.7 psi D. About 15.2 psi

5. What is a typical permit requirement for chlorine residual maintenance of reuse water that is being applied to a rapid infiltration basin?
   A. No greater than 1.0 mg/L total chlorine residual
   B. No less than 0.5 mg/L total chlorine residual
   C. No greater than 1.0 mg/L free chlorine residual
   D. No less than 0.1 mg/L total chlorine residual

6. What is a typical permit requirement for chlorine residual maximum of effluent disposal in an open body of water, other than the ocean?
   A. No greater than 0.01 mg/L total chlorine residual
   B. No less than 0.5 mg/L total chlorine residual
   C. No greater than 1.0 mg/L free chlorine residual
   D. No less than 0.1 mg/L total chlorine residual

7. Given the following information, does this reuse water satisfy the Florida Department of Environmental Protection (FDEP) requirements for fecal coliform standards?
   - 75 percent of the sample is below the detection limits per 100 mL of sample
   - The highest day of the month was 20 per 100 mL of sample

   A. Yes, this meets typical requirements for reuse water fecal coliform.
   B. No, this fails to meet typical requirements for reuse water fecal coliform.

8. Given the following data, what is the TSS concentration of a reuse grab sample:
   - 100 ml of sample
   - Tare weight of filter is 11.8873 grams
   - Final weight of filter after drying is 11.8877 grams

   A. 10 mg/L B. 4 mg/L
   C. 2 mg/L D. 8 mg/L

9. Given the following data, how much rainwater will enter this open storage pond?
   - Rainfall is 4.7 inches
   - The storage pond is 225 ft long, 75 ft wide and has a maximum depth of 5 ft

   A. 126,225 gals B. 49,438 gals
   C. 336,600 gals D. 3,506 gals

10. Why should a sample of spent washwater be collected during a backwash of an effluent filter?
    A. To check for solids content
    B. To check for chlorine residual
    C. To check for lost media
    D. To place into final effluent sampler

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 email to roy.pelletier@cityoforlando.net, or by mail to:

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Certification Boulevard Answer Key

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1. **C) 20 to 30 mg/L $CBOD_5$, 5 mg/L TSS, 10 to 12 mg/L NO_3**

2. **C) No greater than 5.0 mg/L TSS**

3. **A) A Pond generally has an overflow discharge, and a RIB infiltrates all of its water into the ground through the bottom.**

4. **C) About 8.7 psi**
   20 ft x 0.433 psi per ft of head = 8.66 psi
   Or
   20 ft ÷ 2.31 ft of head per psi = 8.658 psi

5. **B) No less than 0.5 mg/L total chlorine residual**

6. **A) No greater than 0.01 mg/L total chlorine residual**

7. **A) Yes, this meets typical requirements for reuse water fecal coliform.**
   The rule for fecal coliform in reuse water states: Over a 3- day period, 75 percent of the fecal coliform values (the 75 percentile value) shall be below detection limits. Any one sample shall not exceed 25 fecal coliform values per 100 mL of sample.

8. **B) 4 mg/L**
   TSS, mg/L
   = (final wt., gm – tare wt., gm) x 10,000
   = (11.8877 gm – 11.8873 gm) x 10,000
   = 4 mg/L

9. **B) 49,438 gals**
   Volume of pond per ft
   = 225 ft x 75 ft x 1 ft. x 7.48 gals per cu. ft.
   = 126,225 gals per ft

   Volume of pond per in.
   = 126,225 gals per ft divided by 12 in./ft
   = 10,518.75 gals per in.

   Volume of pond per 4.7 in.
   = 10,518.75 gals per in. x 4.7 in.
   = 49,438 gals

10. **C) To check for lost media**
    If media is lost, it will typically be leaving the filter with the spent backwash water. Washwater rates should be high enough to remove the trapped solids, but not the media.