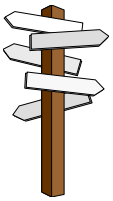

Certification Boulevard

Test Your Knowledge of Conservation and Reuse – Answer Key

1. Given the following data, calculate the volume of flow in gallons that will be delivered through this flume in a 4-hour period:

    - 10 inches long
    - 10 inches wide
    - 8 inches water depth
    - 2 fps flow velocity

    A. 62,330
    B. 87,160
    C. <u>119,693</u>
    D. 247,310

Gallons capacity of flume = L, ft x W, ft x D, ft x 7.48 gal/cu ft

10 inches divided by 12 inches/foot = 0.833 feet
8 inches divided by 12 inches/foot = 0.667 feet

0.833 ft x 0.833 ft x 0.667 ft x 7.48 gal/cu ft = 3.462 gals
2 fps divided by 0.833 ft length = 2.401 seconds
2.401 secs x 3.462 gals = 8.312 gal/sec
8.312 gal/sec x 60 sec/min = 498.72 gal/min
4 hours x 60 min/hr = 240 mins per 4 hrs
498.72 gal/min x 240 mins = 119,693 gals in 4 hours

2. Which of these 3/4" meters on a test bench is recommended to be tested with the positive displacement meters?

    A. Turbine Meters
    B. Multi-jet Meters
    C. <u>Piston Meters</u>
    D. Compound Meters

Piston and positive displacement meters measure the same amount going through the meter.

Turbine meters start at 2" and larger.
Compound meters start at 2" and larger.
Multi-jet meters measure on the same level as a turbine meter.

3. What is a typical permit requirement for chlorine residual maintenance of reuse water that is being applied to a Public Access Reuse System in Florida?

    A. No greater than 1.0 mg/L Total Chlorine Residual
    B. <u>No less than 1.0 mg/L Total Chlorine Residual</u>
    C. No greater than 1.0 mg/L Free Chlorine Residual
    D. No less than 0.1 mg/L Total Chlorine Residual

4. What is a typical permit requirement for chlorine residual maximum of effluent disposal in an open body of water in Florida (other than the ocean)?

   A. <u>No greater than 0.01 mg/L Total Chlorine Residual</u>
   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

5. Given the following data, what is the total solids concentration of Primary Sludge and Thickened Waste Activate Sludge (TWAS) after being mixed together?

   - 3,200 gallons of primary sludge
   - Primary sludge concentration is 3.9% total solids
   - 2,800 gallons of TWAS
   - TWAS concentration is 5.5 % total solids

   A. <u>4.6 %</u>
   B. 3.1 %
   C. 4.1 %
   D. 5.2 %

ppm = lbs combined solids divided by (flow, mgd x 8.34)

lbs of primary solids = 0.0032 mgd x 39,000 ppm x 8.3 lbs/gal = 1,041 lbs
lbs of TWAS = 0.0028 x 55,000 ppm x 8.6 lbs/gal = 1,284 lbs

Total combined solids = 2,325 lbs

ppm = 2,325 lbs divided by (0.006 mgd x 8.34) = 46,463 ppm TSS
TS = TSS divided by 10,000 = 46,463 ppm divided by 10,000 = 4.6 % TS

6. Given the following information, does this reuse water satisfy the FDEP requirements for fecal coliform standards?

   - 50% of the sample are below the detection limits per 100 ml of sample
   - The highest day of the month was 30 per 100 ml of sample

   A. Yes, this meets typical requirements in Florida for reuse water fecal coliform
   B. <u>No, this fails to meet typical requirements in Florida for reuse water fecal coliform</u>

The rule for fecal coliform in reuse water states: "over a 30 day period, 75% 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."

7. Which statement best describes typical analytical requirements for effluent to be applied as reuse water in Florida?

   A. $CBOD_5$ = 3-5 mg/L · TSS = 10 to 20 mg/L · TP = 1.0 mg/L · TN = 3 mg/L
   B. $CBOD_5$ = 20 - 30 mg/L · TSS = 1 to 2 mg/L · TP = 0.5 mg/L · NO_3 = 15 mg/L
   C. $CBOD_5$ = 10 - 20 mg/L · TSS = 5 mg/L · TP = 0.5 mg/L · TN = 15 mg/L

D. <u>$CBOD_5$ = 10 - 20 mg/L · TSS = 5 mg/L · TP = no limit · NO_3 = 10 - 12 mg/L</u>

8. How much alkalinity is required to oxidize 0.45 kg of ammonia?

A. 4.65 kg
B. 6.70 kg
C. 7.14 kg
D. <u>3.2 kg</u>

7.14 lbs alkalinity to oxidize 1 lb of ammonia
0.45 kg ammonia x 7.14 = 3.2 kg

9. 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. **<u>4 mg/L</u>**
C. 2 mg/L
D. 8 mg/L

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

10. Which statement is the most accurate?

A. A percolation pond usually does not have an overflow
B. A rapid infiltration basin usually does have an overflow
C. A percolation pond usually has a solid bottom liner
D. <u>A rapid infiltration basin usually does not have an overflow</u>

Question No.1 was submitted by Ken Martin, Certified Operator

Question No.2 was submitted by Bud Tomlinson, Water Systems Tech II
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Questions Nos.5 and 8 were submitted by Jon Meyer, Florida Water Services

Thanks to all for their input.

Please forward your comments and sample questions for publication to:

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