

Test Your Knowledge of Alternative Water Supply and Other Topics



Roy Pelletier

- Given the following data, calculate the approximate horsepower (HP) delivered by this pump:
 - Flow is 1,500 gpm
 - TDH is 125 ft
 - Does not consider pump and motor efficiency

A. 20 HP B. 47 HP
C. 175 HP D. 55 HP
- If a gallon of water weighs 8.34 lbs, and a cubic ft of water holds 7.48 gallons, how much does a cubic ft of water weigh?

A. 92.4 lbs B. 89.6 lbs
C. 62.4 lbs D. 3.14 lbs
- What test is typically performed to identify toxicity on effluent discharged to an open body of water in Florida?

A. CBOD₅ B. TSS
C. pH D. Bioassay
- What are typical fecal coliform standards for wastewater effluent applied as reuse water in Florida?

A. No greater than 200 per 100 ml.
B. 50 percent of the samples less than 2 per 100 ml.
C. 75 percent of the samples nondetectable per 100 ml; no single sample greater than 25 per 100 ml.
D. 75 percent of the samples greater than 25 per 100 ml; no single sample less than 1 per 100 ml.
- What are the principle nutrients that must be reduced to low levels before treated effluent is safe for discharge to Florida waters?

A. Sulfate and carbon.
B. Nitrogen and carbon.
C. Phosphorus and sulfate.
D. Nitrogen and phosphorus.

LOOKING FOR ANSWERS? *Check the Archives*

Are you new to the water and wastewater field? Want to boost your knowledge about topics you'll face each day as a water/wastewater professional?

All past editions of Certification Boulevard through the year 2000 are available on the Florida Water Environment Association's website at www.fwea.org. Click the "Site Map" button on the home page, then scroll down to the Certification Boulevard Archives, located below the Operations Research Committee.

- Given the following data, how many gallons per year of sodium hypochlorite are used to disinfect effluent at this plant?
 - Chlorine application rate required is 450 lbs/day
 - Sodium hypochlorite solution strength is 12 percent
 - Bulk density of solution is 10.0 lbs/gal

A. 136,875 gal/year
B. 57,772 gal/year
C. 164,980 gal/year
D. 81,939 gal/year
- When pumping water from a well to a treatment process, the total dynamic head is the sum of four components; list these components:

A)
B)
C)
D)
- A potable water flow meter reads 83 gpm for 13 hrs/day and 47 gpm for the remaining 11 hrs/day; what is the total daily flow in mgd?

A. 0.64740 mgd
B. 0.09576 mgd
C. 0.03102 mgd
D. 0.1870 mgd
- What is the flow velocity in a 6-in. pipe as compared to the flow velocity in a 12-in. pipe, assuming both pipes are carrying water flow rate of 50 gpm?

A. The same.
B. Twice the velocity.
C. Three times the velocity.
D. Four times the velocity.
- Which Florida Department of Environmental Protection (FDEP) rule governs water reuse in the state?

A. 62-900 B. 62-720
C. 62-503 D. 62-610

Answers on page 70

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. **B) 47 HP**

Horsepower

$$\begin{aligned} &= (\text{gpm} \times \text{TDH, ft} \times 8.34 \text{ lbs/gal}) \div \\ &\quad 33,000 \text{ ft lbs/second} \\ &= 1,500 \text{ gpm} \times 125 \text{ TDH} \times 8.34 \text{ lbs/gal} \div \\ &\quad 33,000 \\ &= 47.4 \text{ HP} \end{aligned}$$

2. **C) 62.4 lbs**

$$\begin{aligned} &8.34 \text{ lbs/gal} \times 7.48 \text{ gal/ft}^3 \\ &= 62.4 \text{ lbs/ft}^3 \end{aligned}$$

3. **D) Bioassay**

4. **C) 75 percent of the samples
nondetectable per 100 ml; no single
sample greater than 25 per 100 ml.**

5. **D) Nitrogen and phosphorus.**

6. **A) 136,875 gal/year**

Lbs/day of solution

$$= \text{lbs/day chlorine used} \div \text{solution strength}$$

Gals/day solution

$$= \text{lbs/day solution} \div \text{density of solution}$$

$$\begin{aligned} &450 \text{ lbs/day chlorine applied} \div 0.12 \\ &= 3,750 \text{ lbs/day solution} \\ &3,750 \text{ lbs/day solution} \div 10.0 \text{ lbs/gal} \\ &= 375 \text{ gpd} \times 365 \text{ days/year} \\ &= 136,875 \text{ gal/year} \end{aligned}$$

7. **A) Friction head**

B) Suction head

C) Static head

D) Velocity head

8. **B) 0.09576 mgd**

$$\begin{aligned} &(83 \text{ gpm} \times 13 \text{ hrs/day} \times 60 \text{ mins/hr}) + \\ &(47 \text{ gpm} \times 11 \text{ hrs/day} \times 60 \text{ mins/day}) \\ &= 64,740 \text{ gpd} + 31,020 \text{ gpd} = 95,760 \text{ gpd} \\ &\quad \div 1,000,000 \\ &= 0.09576 \text{ mgd} \end{aligned}$$

9. **D) Four times the velocity.**

$$\begin{aligned} &\text{Cross section of a 6-in. pipe} = \pi r^2 \\ &= 3.14 \times (3 \text{ in.} \div 12 \text{ in.})^2 = 0.196 \text{ ft}^2 \end{aligned}$$

$$\begin{aligned} &\text{Cross section of a 12-in. pipe} = \pi r^2 \\ &= 3.14 \times (6 \text{ in.} \div 12 \text{ in.})^2 = 0.785 \text{ ft}^2 \end{aligned}$$

$$= 0.785 \text{ ft}^2 \div 0.196 \text{ ft}^2 = 4.0$$

10. **D) 62-610**