

## Operator Quiz

# Test No. 101 – Mathematics

The following questions are designed for trainees as they prepare to take the ABC wastewater operator test. It is also designed for existing operators to test their knowledge. Each issue of *Clear Waters* will have more questions from a different section of wastewater treatment. Good luck!

1. What is the calculated BOD of an influent sample if initial DO = 8.07, final DO = 1.8 with an 8 ml non-diluted sample?
  - a. 157.8
  - b. 258.4
  - c. 208.6
  - d. 122.23
2. How many pounds of solids are in a 750,000 gallon aeration tank if the MLSS concentration is 1,650 mg/L?
  - a. 10,321 pounds
  - b. 13,761 pounds
  - c. 10,231 pounds
  - d. 20,642 pounds
3. If a wasting pump has a fixed pump rate of 250 GPM, and your calculation indicates you must waste 126,000 gallons, what hourly cycle rate do you set the timer?
  - a. Turn pump on 21 minutes every day
  - b. Turn pump on 504 minutes every hour
  - c. Turn pump on 42 minutes every day
  - d. Turn pump on 21 minutes every hour
4. A positive displacement pump is connected to a 25' wide x 125' long x 12' side water depth aerobic digester. How long will it take to empty the contents of the digester if the pump rate is 225 gallons per minute?
  - a. 15.3 hours
  - b. 2.8 hours
  - c. 20.8 hours
  - d. 15.6 hours
5. A centrifuge is fed sludge with a concentration of 3.4% solids. If the sludge feed rate is set at 50 gallons per minute, what is the centrifuge loading rate in pounds per hour?
  - a. 763 lbs/hour
  - b. 850 lbs/hour
  - c. 735 lbs/hour
  - d. 960 lbs/hour
6. Calculate the surface loading rate for a treatment plant with 4 clarifiers each with a 100 foot diameter. The plant has an influent flow of 35 MGD.
  - a. 279 gal/sq ft
  - b. 950 gal/sq ft
  - c. 4,459 gal/sq ft
  - d. 1,115 gal/sq ft
7. Calculate the flow velocity in feet/minute if 7.5 MGD of flow passes through a channel that is 3' wide x 4' deep, and the depth of flow is 15 inches.
  - a. 186 ft/min
  - b. 58 ft/min
  - c. 202 ft/min
  - d. 46.5 ft/min
8. Determine the pounds per day of primary solids removed at a plant with a flow rate of 1.5 MGD and the following data:

Influent TSS = 250 mg/L, Primary Effluent TSS = 150 mg/L,  
Final Effluent TSS = 12 mg/L

- a. 1,101 lbs/day
  - b. 1,251 lbs/day
  - c. 982 lbs/day
  - d. 2,977 lbs/day
9. A sewage pump is located above the wet well which is 8 feet deep and the pump is pumping to an above ground clarifier with 12 feet depth of water. The pump manufacturer has given you the pump characteristics curve which shows Total Dynamic Head vs. flow rates. If the operating wet well water depth is 6 feet, what is the total dynamic head in order to determine pumping rate from the chart? Assume the top of the wet well and the bottom of the clarifier are at the same elevation.
    - a. 12 feet
    - b. 20 feet
    - c. 14 feet
    - d. 10 feet
  10. A sewage pump is located above the 8-foot diameter wet well which is 8 feet deep and the pump is pumping to an above ground clarifier. The flow meter on the pump is not operating and you want to calculate the pumping rate by measuring the drop in wet well water level during when inflow to wet well is minimal? If the drop in water level in one minute is 2 feet, what is the approximate pumping rate in gallons per minute?
    - a. 250 GPM
    - b. 375 GPM
    - c. 500 GPM
    - d. 750 GPM
  11. An industrial plant has organic waste discharge which contains 1,450 mg/L of BOD and discharges 5,000 gallons per day into sewers. If the surcharge rate is \$1.00 per lbs of BOD above 250 mg/L then what will be the *daily amount* to charge this customer for excess BOD discharge?
    - a. \$5.00
    - b. \$25.00
    - c. \$50.00
    - d. \$75.00
  12. Your treatment plant is operating at 50% organic design capacity. The plant is designed to process 2,000 lbs of BOD per day. A food processing plant wants to bring 6,000 gallons per day of their waste with 12,000 mg/L of BOD for treatment at your plant. What is their daily organic loading to decide if you have the capacity to treat?
    - a. 600 lbs
    - b. 60 lbs
    - c. 160 lbs
    - d. 120 lbs

1b, 2a, 3d, 4c, 5b, 6d, 7a, 8b, 9c, 10d, 11c, 12a

Answers:

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