



# Certification Boulevard

Roy Pelletier



## Test Your Knowledge of Water Resources Management & Miscellaneous Wastewater Treatment Topics

1. What does the term absorption mean?
  - A. To impregnate a liquid with air.
  - B. The release of one substance from the body of another.
  - C. To gather onto the surface of a substance.
  - D. To soak like a sponge.
2. Which types of bacteria are responsible for converting ammonia to nitrite in the nitrification process?
 

A. Nitrosomonas	B. Nitrobacter
C. Carbon Eaters	D. Heterotrophic
3. Which type of solid is typically the highest percentage in the total solids profile of

raw wastewater?

- |              |               |
|--------------|---------------|
| A. Suspended | B. Dissolved  |
| C. Colloidal | D. Settleable |

4. What is the term when ammonia-N and organic-N are added together?
 

A. TKN	B. SON
C. TN	D. NO <sub>x</sub>
5. What happens to the activity rate of activated sludge microorganisms when the temperature decreases?
  - A. It decreases.
  - B. It increases.
  - C. It remains the same.
6. Given the following data, calculate the Oxygen Uptake Rate (OUR) in mg/L/hr.
  - Beginning D.O. is 7.2 mg/L.
  - Ending D.O. is 2.0 mg/L.
  - Test time is 5.25 minutes.

A. 27.5 mg/L/hr	B. 59.4 mg/L/hr
C. 35.8 mg/L/hr	D. 9.2 mg/L/hr
7. Based on the correct answer to Question 6, is this an acceptable OUR for a fresh sample of mixed liquor obtained from the effluent end of a conventional activated sludge aeration tank?

- A. Yes, this is an acceptable OUR value for that sample location.
  - B. No, this value is too low for that sample location.
  - C. No, this value is too high for that sample location.
  - D. There is not enough data to make an informed decision.
8. Select the closest oxygen demand value, in lbs of O<sub>2</sub> for each pound of NH<sub>3</sub> converted to NO<sub>x</sub>.
 

A. 0.1 to 0.5	B. 0.8 to 1.2
C. 4.0 to 5.0	D. 5.0 to 10.0
  9. What component is used to convert liquid chlorine into chlorine gas?
    - A. Expander
    - B. Evaporator
    - C. Liquefier
    - D. Vacuum regulator
  10. What is the standard temperature in the drying oven for the TSS test?
 

A. 20 to 25°C	B. 110 to 115°C
C. 103 to 105°C	D. 545 to 555°C

ANSWERS ON PAGE 42

## SEND US YOUR QUESTIONS FOR CERTIFICATION BOULEVARD

Do you have a question or an exercise you would like to feature in "Certification Boulevard?" We'll be glad to publish it. Just send your question (with the answer) or your exercise (with the solution) to:

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There is no limit to the number of questions or exercises you may submit. Please include your name, city, and organization or company so we can give you credit.

# Certification Boulevard Answer Key

From page 36

1. D. To soak like a sponge
2. A. Nitrosomonas
3. B. Dissolved  
Typically, the dissolved solids fraction is about 80 percent of the overall total solids concentration.
4. A. TKN  
*TKN ... Total Kjeldahl Nitrogen ... is the combination of ammonia-nitrogen and organic-nitrogen. Typically, the majority of TKN of domestic raw wastewater is in the ammonia form.*
5. A. It decreases  
*Microorganisms will decrease their rate of activity as the temperature of the water decreases. Basically, for every 10°C increase in water temperature, the microorganism activity rate doubles; however, there is an upper limit to increasing temperatures, and, eventually the bugs' activity rate will drop off as water temperature rises above their acceptable threshold.*
6. B. 59.4 mg/L/hr  
*OUR Formula, mg/L/hr*  
*(Beginning D.O., mg/L – Ending D.O., mg/L*  
*÷ Test Time, minutes) x 60 mins/hr*  
*= (7.2 mg/L – 2.0 mg/L ÷ 5.25 minutes) x 60*  
*mins/hr*  
*=59.4 mg/L/hr*
7. C. No, this value is too high for that sample location  
*Typical OUR values from the end of an aeration tank should be about 20 to 30 mg/L/hr. By the end of the aeration tank, the food value should be reduced and the bug activity level should be decreasing. OURs in excess of those values indicate that too much food (CBOD<sub>5</sub>) is still available, allowing the bugs to remain highly active as they enter the secondary clarifier.*
8. C. 4.0 to 5.0  
*Theoretically, it takes about 4.7 pounds of oxygen to convert (or oxidize) one pound of ammonia nitrogen to nitrate nitrogen.*
9. B. Evaporator  
*A typical evaporator contains a heated water bath with tubes where liquid chlorine is conveyed through the heated bath to accomplish conversion of liquid to gas (evaporation). The design is such that the liquid chlorine never comes in direct contact (is not mixed) with the heated water.*
10. C. 103 to 105°C  
*The standard temperature for a drying oven to conduct TSS analyses should be no less than about 103°C and no more than about 105°C.*