



Certification Boulevard · Answer Key

Test Your Knowledge of Water Resources Management ... And Other Miscellaneous Wastewater Treatment Topics

1. What does the term absorption mean?
 - A. Impregnate a solid with air
 - B. The taking in of one substance in the body of another**
 - C. To gather onto the surface of a substance
 - D. To stick like fly paper

2. What are typical loading equivalents in domestic wastewater?
 - A. About 0.17 lbs BOD/capita/day
 - B. About 0.2 lbs TSS/capita/day
 - C. About 100 to 150 gal/capita/day
 - D. D. All of the above**
 - E. None of the above

3. Given the following data, how much alkalinity is required to accomplish nitrification?
 - Influent Flow is 0.18 mgd
 - Influent TKN is 35 mg/L
 - 95% of TKN will become NH₃ to be nitrified
 - SCBOD₅ removal is 98%
 - 7.14 lbs of alkalinity consumed per lb of ammonia converted
 - A. 375 lbs
 - B. 160 lbs
 - C. 250 lbs
 - D. 356 lbs**

*Lbs/day of ammonia converted = 0.18 mgd x (35 * .95) x 8.34 = 49.9 Lbs/day*
Alkalinity required = 49.9 lbs/day ammonia converted x 7.14 lbs alkalinity per lb ammonia = 356 lbs/day alkalinity required

4. Given the following data, what percentage of TSS is removed through the entire treatment plant?
 - Influent Flow is 2.3 cfs
 - Influent TSS is 250 mg/L
 - Primary Effluent TSS is 110 mg/L
 - Secondary Effluent is 8 mg/L
 - Final Effluent is 2 mg/L
 - A. 96.5%
 - B. 99.2%**
 - C. 98.3%

D. 89.6%

$$\frac{250 \text{ mg/L, Inf TSS} - 2 \text{ mg/L, Eff TSS}}{250 \text{ mg/L, Inf TSS}} \times 100 = 99.2\%$$

5. Which types of bacteria are responsible for stabilization of organic material (CBOD₅) in wastewater?

- A. Nitrosomonas
- B. Heterotrophic**
- C. Nitrobacter
- D. Autotrophic

6. In a well-operated anoxic zone, what is the desired electron acceptor present in the MLSS?

- A. NO₂
- B. NH₃
- C. NH₄
- D. NO₃**

7. Which types of bacteria are responsible for converting NO₂ to NO₃?

- A. Heterotrophic
- B. Nitrosomonas
- C. Nitrobacter**
- D. Fermenters

8. Given the following data, what is the daily volume of WAS to be removed in this activate sludge plant?

- Aeration Tank Capacity is 75,000 cubic feet
- MLVSS Concentration is 3,750 mg/L
- Mixed Liquor is 74% Volatile
- Desired MLSS Inventory is 21,054 Lbs
- WAS Concentration is 10,000 mg/L

- A. 31,705 gals/day**
- B. 55,845 gals/day
- C. 13,332 gals/day
- D. 15,956 gals/day

Lbs MLSS Inventory

= Aeration tank volume, mg x MLSS conc., mg/L x 8.34

= (75,000 c.f. x 7.48 gal/c.f. ÷ 1,000,000) x (3,750 mg/L ÷ .74) x 8.34 lbs/gal

= 0.561 mg x 5,068 mg/L x 8.34

= 23,712 lbs MLSS in Aeration Tank

Lbs WAS to remove

= Actual Inventory – Desired Inventory

= 23,712 lbs Inventory – 21,054 lbs Desired Inventory

= 2,658 lbs WAS to Remove

Gals/Day WAS to Remove
 = *Lbs WAS to Remove ÷ (WAS Concentration, mg/L x 8.34 lbs/gal)*
 = *2,658 lbs WAS to Remove ÷ (10,000 mg/L x 8.34)*
 = *0.031870503 mgd x 1,000,000*
 = *31,870 gals/Day WAS to Remove*

9. What is the term that describes the combination of ammonia-nitrogen, nitrate-nitrogen and nitrite-nitrogen?
- A. Total Nitrogen (TN)
 - B. Total Soluble Nitrogen (TSN)
 - C. Total Kjeldahl Nitrogen (TKN)
 - D. Total Inorganic Nitrogen (TIN)**

10. Match the following:

1. Suspended	▼ A. Particles in solid state, which can be removed from liquid by physical means, but too small to settle out.
2. Colloidal	▼ B. Substance homogeneously dispersed in liquid.
3. Dissolved	▼ C. Particles large enough to settle out.

Thanks to John Ristau, B Operator, City of Sebring, for submitting Question No.6

Please forward your comments and sample questions for publication to:

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