Certification Boulevard

Test Your Knowledge of Treatment Technology & Operations Topics

1. What type of new effluent filtration process does not contain rock, pebble, sand or anthracite media?

    a. ABW filters
    b. Deep bed filters
    c. Filter press
    d. <u>Disc filters</u>

2. Which on-line instrumentation may provide a closer correlation to an ammonia value in final effluent?

    a. pH
    b. D.O.
    c. <u>ORP</u>
    d. Alkalinity

3. Which statement is most accurate associated with the nitrogen cycle in an activated sludge BNR process:

    a. Heterotrophic bacteria convert ammonia to nitrite
    b. Autotrophic bacteria consume $CBOD_5$ during denitrification
    c. Alkalinity is recovered during nitrification
    d. <u>Denitrification reduces the nitrate level</u>

4. Which statement is most accurate associated with the biological phosphorus cycle in an activated sludge BNR process:

    a. Phosphorus is precipitated (settled and removed) in the fermentation zone
    b. Phosphorus removal is enhanced by chlorinating the aerobic zone
    c. <u>Phosphorus is released (remains soluble in the MLSS) in the fermentation zone</u>
    d. Phosphorus is released (turns to gas) in the aerobic zone

5. Given the following data, calculate the F/M ratio in an activated sludge process:

    - Influent Flow is 375 gpm
    - Influent CBOD5 is 245 mg/l
    - Aeration Tank is 100 Feet Long 50 Feet Wide and 14 Feet Deep
    - MLSS is 3,750 mg/l
    - MLSS is 71% Volatile

    a. 0.25
    b. <u>0.095</u>
    c. 10.5
    d. 0.065

F/M Ratio = Lbs/Day Influent $CBOD_5$ ÷ Lbs Aeration MLVSS

Lbs/Day Influent $CBOD_5$ = Flow, mgd x Influent $CBOD_5$, mg/l x 8.34 lbs/gal
(375 gpm ÷ 694 gpm/mgd) x 245 mg/l x 8.34
1,104 Lbs/Day

Lbs MLVSS Aeration = Aeration Volume, mg x MLVSS, mg/l x 8.34 lbs/gal
(100 Feet x 50 Feet x 14 Feet x 7.48 gal/ft^3 ÷ 1,000,000) x
(3,750 mg/l x 0.71) x 8.34
0.5236 mg x 2,662 mg/l x 8.34
11,627 Lbs MLVSS

F/M Ratio = 1,104 Lbs/Day Influent $CBOD_5$ ÷ 11,627 Lbs Aeration MLVSS
= 0.095

6. Given the following data, calculate the SVI in an activated sludge process:

   - Influent Flow is 375 gpm
   - Influent CBOD5 is 245 mg/l
   - Aeration Tank is 100 Feet Long 50 Feet Wide and 14 Feet Deep
   - MLSS is 3,750 mg/l
   - MLSS is 71% Volatile
   - 30 Minute Settleometer Reading is 400 ml/l

   a. <u>107</u>
   b. 93
   c. 150
   d. 320

SVI = (30 Minute Settleometer, ml/l x 1,000) ÷ Aeration MLSS, mg/l

= 400 ml/l x 1,000 ÷ 3,750 mg/l

= 106.7

7. Which type of pump is typically used to supply sludge feed to a belt filter press?

   a. Centrifugal pump
   b. Hydraulic diaphragm
   c. <u>Positive displacement pump</u>
   d. Gear pump

8. In a typical activated sludge process, what adjustment should be made to the air rate if the effluent ammonia value is higher that desired?

   a. <u>Increase the air rate</u>
   b. Decrease the air rate
   c. The air rate has nothing to do with effluent ammonia levels
   d. Cut the air rate in half

9. Given the following conditions, in a plant without effluent TN or NH_3 limitations, which chlorine feed rate adjustment will provide the quickest increase in the effluent chlorine residual?

    - Stable Effluent Flow Volume
    - Increasing Effluent Ammonia Value
    - Chlorine Residual is Lower Than Desired
    - The Location Relative to the Breakpoint Chlorination Curve is to the Right Side of the “Hump”

    a. Increase the chlorine feed rate
    b. <u>Decrease the chlorine feed rate</u>
    c. The chlorine feed rate has nothing to do with effluent chlorine residual
    d. Double the chlorine feed rate

10. An anaerobic digester that has become unstable is referred to as "stuck" or "sour" … what may cause this condition?

    a. High acid production
    b. Low alkalinity in the sludge
    c. Sludge feed rate too high
    d. Sludge temperature swings greater than 1°F per day
    e. Improper mixing
    f. "a + b + c"
    g. <u>All of the above</u>