

(Aexam)

PRACTICE CLASS "A" CERTIFICATION EXAMINATION

(5th Edition – August 22, 2002)

1. What are the characteristics of a healthy activated sludge?
  - a. black color, dark foam, unpleasant odor.
  - b. black color, light foam, musty odor.
  - c. brown color, light foam, musty odor.
  - d. brown color, dark foam, unpleasant odor.
  
2. What can occur if a nitrification activated sludge has an insufficient MCRT?
  - a. increase in nitrification.
  - b. no nitrification.
  - c. more aeration needed.
  - d. needs less aeration.
  
3. A gravity filter is 9 feet long by 12 feet wide containing 2 feet of media. If the backwash flow rate is 60 gallons per minute per square foot, what is the total gallons of backwash water used, if the backwash lasted 10 minutes?
  - a. 648
  - b. 6,480
  - c. 64,800
  - d. 648,000
  
4. A return activated sludge has 5000 mg/L of suspended solids. If you wanted to waste 2000 pounds per day of solids, what would your wasting flow rate be in gallons per minute?
  - a. 3.3
  - b. 33.3
  - c. 333
  - d. 3,333
  
5. What is the best test to perform on nitrification to determine wasting rates?
  - a. a centrifuge test.
  - b. a 30 minute settling test.
  - c. a jar test.
  - d. a settleometer test.
  
6. In biological phosphorus removal, what type of environment are the microorganisms subjected?
  - a. anaerobic.
  - b. facultative.
  - c. anoxic.
  - d. reduced.

7. Microscreens are used to remove what type of solids?
  - a. suspended.
  - b. dissolved.
  - c. soluble.
  - d. organic.
  
8. When adding chemicals for flocculation, how would you mix the wastewater?
  - a. violently only.
  - b. violently, then gently.
  - c. slowly, then violently.
  - d. slowly only.
  
9. When using aluminum sulfate to aid settling, the floc that is formed, when compared to settled biological floc, is:
  - a. more dense.
  - b. less dense.
  - c. the same density.
  
10. The hydraulic loading to a gravity filter measuring 17 feet by 18 feet is 2 gallons per minute per square foot. What is the total flow to the filter in million gallons per day?
  - a. 0.088
  - b. 0.88
  - c. 8.8
  - d. 88
  
11. What does “aging” of polymer mean?
  - a. allowing the polymer to ferment.
  - b. allowing the polymer to sublime.
  - c. allowing the polymer chains to develop.
  - d. allowing the polymer concentration to increase.
  
12. When using aluminum sulfate to remove phosphorus, how is the alkalinity restored in the wastewater?
  - a. adding lime.
  - b. adding ferric chloride.
  - c. adding polymer.
  - d. adding carbon dioxide.
  
13. What is the biological phosphorus removal process called?
  - a. excess phosphorus removal.
  - b. biological nutrient extraction.
  - c. phosphorus extraction.
  - d. luxury uptake.

14. What is the detention time, in hours, for an aeration tank measuring 30 feet by 20 feet by 8 feet that is designed for 1.5 MGD but is processing only 750,000 gallons per day?
- 0.115
  - 1.15
  - 11.5
  - 115
15. If a positive displacement pump has a rated capacity of 50 gallons per minute at 100% stroke, what should the percent stroke setting be for the pump to deliver 11 gallons per minute?
- 0.22
  - 2.2
  - 22
  - 222
16. If at time zero the DO was 8 mg/L and after 10 minutes the DO was 2.5 mg/L, what is the oxygen uptake rate, in mg/L per hour?
- 0.33
  - 3.3
  - 33
  - 333
17. Where is the most efficient location to add alum for phosphorus removal?
- at the headworks.
  - after primary clarifiers.
  - after biological treatment.
  - after chlorination.
18. What effect does adding ferric chloride have on pH?
- lowers.
  - raises.
  - has no effect.
19. When using lime addition for ammonia nitrogen removal, what is the best operating pH range you should try to achieve?
- 7 – 8
  - 8 – 9
  - 9 – 10
  - 11 or more

20. What is the ideal wastewater conditions for adding ferric chloride for coagulation?
  - a. low pH, low alkalinity.
  - b. low pH, high alkalinity.
  - c. high pH, high alkalinity.
  - d. high pH, low alkalinity.
  
21. When placing a gravity filter into service after it has been drained and cleaned, how should you fill it?
  - a. from the influent.
  - b. from the surface wash arms.
  - c. from the wash water valve.
  - d. with a hose from above the media.
  
22. Why do you want to expand the filter during a backwash?
  - a. allows the trapped solids to be removed.
  - b. provides the filter underdrain system time to open.
  - c. allows the filter media to stratify.
  - d. the backwash sequence uses less energy this way.
  
23. What information does a head loss gauge on a gravity filter give you?
  - a. filter effluent turbidity.
  - b. efficiency of the backwash.
  - c. filter effluent discharge pressure.
  - d. length of time since last backwash.
  
24. What is the best lab test to monitor the nitrification process?
  - a.  $\text{NH}_3$ .
  - b. ON.
  - c. TKN.
  - d.  $\text{NO}_3$ .
  
25. What is the best lab test to monitor the denitrification process?
  - a.  $\text{NH}_3$ .
  - b. ON.
  - c. TKN.
  - d.  $\text{NO}_3$ .
  
26. What is the correct denitrification sequence?
  - a. ammonia to nitrogen gas.
  - b. nitrite to nitrate.
  - c. ammonia to nitrate.
  - d. nitrate to nitrogen gas.

27. When using polymer to aid settling, how should the wastewater be mixed?
- slowly.
  - rapidly.
  - violently.
  - only with diffused air.
28. What causes mudballs in a gravity filter?
- organic floc in the influent.
  - dosing the filter with chlorine.
  - using coagulants prior to the filter.
  - inadequate surface wash and backwash.
29. Which of the following chemicals are used for phosphorus removal?
- chlorine.
  - sulfur dioxide.
  - sodium aluminate.
  - polymer.
30. Which chemical would be best to use for phosphorus removal in a nitrification process?
- lime.
  - ferric.
  - alum.
  - polymer.
31. What chemical precipitant is used with the luxury uptake process?
- polymer.
  - lime.
  - sodium hydroxide.
  - sodium aluminate.
32. What does a lime slaker produce?
- calcium chloride.
  - lime slurry.
  - sodium chloride.
  - sodium hydroxide.
33. How does alum remove phosphorus?
- chemical evaporation.
  - chemical sublimation.
  - chemical precipitation.
  - hydrolysis.

34. What will the effluent valve do on a gravity filter as the head loss increases?
- gradually close.
  - gradually open.
  - suddenly close.
  - suddenly open.
35. What is the correct nitrification sequence?
- ammonia to nitrite to nitrate.
  - ammonia to nitrate to nitrite.
  - nitrate to nitrite to ammonia.
  - nitrate to ammonia to nitrite.
36. What is the best test to measure coagulant dosage?
- leaf test.
  - centrifuge test.
  - jar test.
  - pH test.
37. What is the external carbon source used with denitrification?
- alcohol.
  - hydrazine.
  - methanol.
  - gasoline.
38. What happens to the pH following denitrification?
- it increases.
  - it decreases.
  - no change.
39. When adding alum for coagulation, what is used to control the pH?
- chlorine.
  - ferric chloride.
  - sodium hydroxide.
  - sodium hypochlorite.
40. What is the purpose of returning sludge to the nitrification basin?
- maintain the proper balance of microorganisms.
  - maintain the proper pH.
  - increase the BOD loading to the clarifier.
  - reduce the MCRT in the system.

41. What is the effect of over-aerating the re-aeration tank following the activated sludge denitrification process?
- primary sedimentation tank efficiency decreases.
  - suspended solids in the effluent decreases.
  - suspended solids in the return activated sludge increases.
  - suspended solids in the effluent increases.
42. What will be the effect when floc does not settle well before the tertiary process?
- coagulant use will decrease.
  - return activated sludge flow will decrease.
  - return activated sludge flow will increase.
  - filter run times will shorten.
43. What should be present in the denitrification process?
- carbon, hydrogen, oxygen.
  - no oxygen, hydrogen, carbon.
  - no oxygen, carbon, nitrate.
  - oxygen, carbon, ammonia.
44. How many pounds of MLVSS are in an aeration tank that has a volume of 1.5 million gallons and an MLSS of 2250 mg/L at 75% volatiles?
- 2,100
  - 21,100
  - 28,100
  - 281,000
45. When first placing a gravity filter in service, what should you do?
- close all valves.
  - backwash the filter.
  - hose the filter media.
  - chlorinate the filter media.
46. What types of filter media are found in a "multi-media" gravity filter?
- activated carbon and sand.
  - anthracite and sand.
  - plastic and anthracite.
  - gravel and plastic.
47. What increases as the filter media becomes increasingly clogged with solids?
- filter head loss.
  - backwash flow rate.
  - filtration efficiency.
  - filter effluent pH.



48. If the backwash flow rate is 2100 gal / min, find the backwash rate in gal / min / square foot if the filter measures 18 feet long by 12 feet wide.
- 2.1
  - 4.5
  - 7.7
  - 9.7
49. In one of the biological phosphorus removal processes, what process is used to treat the anaerobic stripper supernatant?
- chemical precipitation.
  - ammonia stripping.
  - high-rate activated sludge.
  - extended aeration activated sludge.
50. Which of the following decreases in the nitrification process?
- biomass.
  - nitrites.
  - nitrates.
  - alkalinity.
51. If 1,325 gallons of alum are added to a flow of 6,800,000 gals/day, how many gallons of alum are used per million gallons?
- 155
  - 195
  - 215
  - 275
52. A floc will not form when alum is used as a coagulant unless what is present?
- iron.
  - hydrogen sulfide.
  - alkalinity.
  - dissolved oxygen.
53. Where is the sample used in the oxygen uptake test collected from?
- aeration tank influent.
  - return activated sludge.
  - primary clarifier influent and MLSS.
  - aeration tank influent and RAS.

ANSWERS FOR PRACTICE "A" EXAM  
(5th Edition – August 22, 2002)

- |     |   |     |   |
|-----|---|-----|---|
| 1.  | C | 41. | D |
| 2.  | B | 42. | D |
| 3.  | C | 43. | C |
| 4.  | B | 44. | B |
| 5.  | A | 45. | B |
| 6.  | A | 46. | B |
| 7.  | A | 47. | A |
| 8.  | B | 48. | D |
| 9.  | A | 49. | A |
| 10. | B | 50. | D |
| 11. | C | 51. | B |
| 12. | A | 52. | C |
| 13. | D | 53. | A |
| 14. | B |     |   |
| 15. | C |     |   |
| 16. | C |     |   |
| 17. | C |     |   |
| 18. | A |     |   |
| 19. | D |     |   |
| 20. | C |     |   |
| 21. | C |     |   |
| 22. | A |     |   |
| 23. | B |     |   |
| 24. | C |     |   |
| 25. | D |     |   |
| 26. | D |     |   |
| 27. | A |     |   |
| 28. | D |     |   |
| 29. | C |     |   |
| 30. | A |     |   |
| 31. | B |     |   |
| 32. | B |     |   |
| 33. | C |     |   |
| 34. | B |     |   |
| 35. | A |     |   |
| 36. | C |     |   |
| 37. | C |     |   |
| 38. | A |     |   |
| 39. | C |     |   |
| 40. | A |     |   |