PRACTICE EXAM
GRADE III TREATMENT

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Class III

1. Turbidity in wastewater is caused by
   a. Color
   b. Dissolved calcium
   c. Hardness
   d. Finely divided suspended material
2. The gas most commonly associated with septic wastewater is
   a. Carbon dioxide
   b. Carbon monoxide
   c. Hydrogen sulfide
   d. Methane

5. Mechanical ventilation of a lift station is required to
   a. Lower the temperature
   b. Reduce chlorine demand
   c. Eliminate the presence of harmful gases
   d. Increase DO in raw wastewater
6. A wet well probe is usually used for _____ determination(s) of level.
   a. Approximate
   b. Dual-point
   c. Continuous
   d. Single-point
7. In electrical circuits a(n) _____ is used to reduce the voltage where necessary.
   a. Ammeter
   b. Thermal overload
   c. Transformer
   d. Voltmeter
8. Which of the following causes the greatest pipe friction loss?
   a. Decreasing the rate of flow
   b. Increasing the temperature of wastewater
   c. Increasing the velocity of wastewater
   d. Decreasing the pressure

9. A centrifugal pump is pumping 200 gpm against a 40-ft total pumping head. The output power of the pump is approximately _____ hp.
   a. 0.5
   b. 2
   c. 15
   d. 121

10. When a fire hydrant is operated, it should be
   a. Opened enough to have a flow
   b. Opened fully
   c. Opened halfway
   d. Regulated to flow required

11. A 42-in. diameter pipe is flowing at a rate of 6.5 ft/sec. What is the flow in cu ft/sec?
   a. 17.86
   b. 35.71
   c. 62.50
   d. 521.25

12. If the pump bearings on horizontal centrifugal pumps are overlubricated, the most important effect is that the extra lubricant
   a. Will result in smoother and more efficient operation of the pump
   b. Will not make any difference in the operation of the pump
   c. Will be wasted
   d. May cause overheating and possible failure of the bearings

13. If packing is not maintained properly,
   a. Cavitation damage will result
   b. Impeller will corrode
   c. Loss of suction will occur due to air being allowed to enter pump
   d. Pump efficiency will increase

14. Air flow through a trickling filter when the influent is warmer than the air temperature is
   a. Upward through the filter
   b. Downward through the filter
   c. Inadequate and may require forced air ventilation
   d. Improved by decreasing the recirculation

15. What is affected first when the aerobic digestion process is starting to deteriorate?
   a. Supernatant quality
   b. Temperature
   c. Volatile acid:alkalinity ratio
   d. Volatile solids concentration

16. The reaction of chlorine and ammonia in wastewater produces a compound that is called
   a. Ammonium chloride
   b. Chloral hydrate
   c. Chloramine
   d. Hydrazine

17. A malfunctioning gas chlorination system has normal gas pressure, no feed rate indicated on rotameter, and no injector vacuum. What is the most likely cause of the problem?
    a. Air leak upstream from the rotameter
    b. Gas line plugged
    c. Injector clogged
    d. Pressure-reducing valve diaphragm ruptured

18. The most critical criterion for determining when a mixed media filter should be backwashed is
    a. Filter effluent quality
    b. Flow rate
    c. Head loss
    d. Visual inspection of the filter surface

19. The precipitate in coagulation with alum is aluminum
    a. Bicarbonate
    b. Carbonate
    c. Hydroxide
    d. Sulfate

20. Given the following data, what is the most likely cause of the mechanically cleaned bar screen problem?
    Data: Above normal water differential across bar screen
    Drive motor shaft turning
    Drive sprocket, chain, and rake not moving
    Less than normal flow on bar screen downstream side
    Bar screen mode selector in automatic position
    Normal seasonal flow (influent) coming into bar screen
    Alarm systems operating normally
    a. Low influent (incoming) level
    b. Raw wastewater pumping units out of service
    c. Sheared pin or disengaged clutch on drive unit
    d. None of the above

21. The correct amount of chemical used to remove turbidity is known as the
    a. Coagulation range
    b. Combination dosage
    c. Efficiency range
    d. Optimum dosage

22. The temperature of anaerobic digester should be changed as slowly as possible to
    a. Avoid overloading the heat exchanger
    b. Avoid excess heat loss
    c. Allow digester walls time to adjust
    d. Allow bacteria time to adjust

24. The quantity of volatile solids in the content of the incoming sludge is an indirect measure of the
    a. Amount of the sample that will evaporate when standing
    b. "Food" available for bacteria in the digester
    c. Number of bacteria in the digester
    d. Primary effluent suspended solids

25. What organisms will be found in a balanced, good settling mixed liquor?
    a. Flagellate and amoeboid organisms
    b. Flagellates and free-swimming ciliates, but no stalked ciliates and rotifers
    c. Free-swimming and stalked ciliates, some flagellates, and rotifers
    d. Nematodes, rotifers, ciliates, flagellates, and amoeboids

26. Belt filter presses are operated as a _____ process.
    a. Batch
    b. Continuous
    c. Either one, depending on circumstances

27. Given the following data, calculate the desired pounds of mixed liquor suspended solids (MLSS) in the aeration tank.
    Data: Primary effluent suspended solids = 120 mg/L
    Influent flow = 2.0 mgd
    Desired sludge age = 5.0 days
    Aeration tank = 100 ft x 45 ft x 15 ft
    Influent BOD = 235 mg/L
    Effluent suspended solids = 15 mg/L
    a. 6 000 lb
    b. 8 000 lb
    c. 10 000 lb
    d. 12 000 lb

28. Required chemical coagulation doses are commonly determined by
    a. Jar tests
    b. Measurements of zeta potential
    c. Oxidation–reduction investigations
    d. Stoichiometric calculations

29. Given the following data, calculate the average velocity in the channel.
    Data: 2.5-ft wide channel
    Flow depth is 1.4 ft
    Flow rate is 7.2 mgd
    a. 1.2 ft/sec
    b. 3.2 ft/sec
    c. 11.2 ft/sec
    d. 32.2 ft/sec

30. A 240-gpm mixed media filter operated at a rate of 2 gpm/sq ft is backwashed at a rate of 15 gpm/sq ft. How many gallons of wash water were used?
    a. 5 000
    b. 5 400
    c. 6 000
    d. 6 200

31. Given the data below, what is the most likely cause of a low DO level in an activated sludge aeration tank with a diffused aeration system problem?
    Data: Blower air rate output high
    Organic load normal
    Hydraulic load normal
    Low turbulence throughout aeration tank

    a. Aeration system piping leaking
    b. Excessive air bubble shearing by diffusers
    c. Return sludge rate too high
    d. Underaeration because of low blower speed

32. Given the data below, what is the most likely cause of the extended aeration facility problem?
    Data: Blower normal
    Flow normal for dry weather
    DO level normal
    Drop pipe air control valves half open
    Dead spot on surface around one drop pipe
    Dead spot remains when drop pipe air control valve fully open

    a. Air header pipe clogged
    b. Blower discharge pipe clogged
    c. Blower intake filter clogged
    d. Drop pipe clogged

33. An incubator for the BOD test should be controlled at _____ °C.
    a. 15
    b. 20
    c. 25
    d. 30

34. Results of the settleable solids test run using Imhoff cones may be used to
    a. Calculate the Imhoff settling index (ISI)
    b. Calculate the pounds of primary solids pumped to the digester
    c. Indicate the quality of the final effluent
    d. Calculate the sludge volume index (SVI)

35. Calculate the percent volatile solids.
    Data: 100 mL of sample
    Crucible weight = 19.985 0 g
    Crucible plus dry solids = 20.050 3 g
    Crucible plus ash = 20.006 8 g

    a. 33%
    b. 50%
    c. 67%
    d. 74%

36. In certain situations, a supervisor encourages the employees to make their own decisions. This is considered to be
    a. Against the rules to follow past experiences in decision making
    b. Bad form because the supervisor eventually loses control
    c. Highly desirable because it encourages employee growth and frees the supervisor for other tasks
    d. Passing the buck

37. Treatment basin (such as primary sedimentation, grit tank, aeration tank, and final clarifier) drains
    a. Must be higher than the receiving sump to allow for gravity flow out of the basin
    b. Must be lower than the receiving sump to allow for gravity flow out of the basin and into the sump
    c. Need not be valved closed if the drain is higher than the receiving sump
    d. Need not be maintained because it is always faster to pump a treatment basin dry than allow it to drain to the receiving sump

38. Successful communication requires mutual
    a. Agreement
    b. Confusion
    c. Transmission
    d. Understanding

39. When a great deal of authority is delegated on many levels, an organization may be described as
    a. Authoritarian
    b. Centralized
    c. Decentralized
    d. Unstructured

40. What should a new crew leader on a shift do if he/she discovers a better way of doing a certain operation?
    a. Discuss the plan with other shift supervisors
    b. Explain the plan and its benefits to the chief operator or plant supervisor
    c. Implement the plan
    d. Write a letter to the plant supervisor outlining the intended improvements

41. Generally, as an individual progresses upward in management, reliance on personal technical skill
    a. Becomes more complex
    b. Decreases
    c. Increases
    d. Remains the same

42. If the sewer rate is $5.50 for the first 500 cu ft and all wastewater generated over the minimum is billed at the rate of $0.25 per 100 cu ft, how much would a customer generating 1 200 cu ft be billed?
    a. $5.25
    b. $6.25
    c. $6.75
    d. $7.25

43. What equipment should be calibrated in a treatment plant?
    a. Chemical feeders
    b. Continuous-recording chlorine residual analyzer
    c. Continuous-recording pressure gauges
    d. All of the above

44. Special parts that should be carried by the maintenance worker are usually listed in the
    a. Machine blue print
    b. Machine history record
    c. Machine manufacturer's manual
    d. Daily log

45. Information on preventive maintenance procedures, materials, and frequencies for plant structures should be taken from
    a. As-built blueprints
    b. Experience at the particular plant
    c. Lab records
    d. Manufacturer's operation and maintenance manuals

46. How can the supervisor document that scheduled maintenance is completed?
    a. Ask the workers
    b. Hire someone to inspect completed work
    c. Use a form that compares work assigned with work completed
    d. Wait and see if there are any failures

TREATMENT III - ANSWERS

Item #	Answer	Subject
1.	D	General
2.	C	General
5.	C	General
6.	D	Support Systems
7.	C	Support Systems
8.	C	Support Systems
9.	B	Support Systems
10.	B	Support Systems
11.	C	Support Systems
12.	D	Support Systems
13.	C	Support Systems
14.	A	Unit Process/Process Control
15.	C	Unit Process/Process Control
16.	C	Unit Process/Process Control
17.	C	Unit Process/Process Control
18.	A	Unit Process/Process Control
19.	C	Unit Process/Process Control
20.	C	Unit Process/Process Control
21.	D	Unit Process/Process Control
22.	D	Unit Process/Process Control
23.	D	Unit Process/Process Control
24.	B	Unit Process/Process Control
25.	C	Unit Process/Process Control
26.	B	Unit Process/Process Control
27.	C	Unit Process/Process Control
28.	A	Unit Process/Process Control
29.	B	Unit Process/Process Control
30.	B	Unit Process/Process Control
31.	A	Unit Process/Process Control
32.	D	Unit Process/Process Control
33.	B	Unit Process/Process Control
34.	B	Unit Process/Process Control
35.	C	Unit Process/Process Control
36.	C	Technical Supervision/Management
37.	A	Technical Supervision/Management
38.	D	Technical Supervision/Management
39.	C	Technical Supervision/Management
40.	B	Technical Supervision/Management
41.	B	Technical Supervision/Management
42.	D	Technical Supervision/Management
43.	D	Technical Supervision/Management
44.	C	Technical Supervision/Management
45.	D	Technical Supervision/Management
46.	C	Technical Supervision/Management