

12. Examination Questions

1. Fish life is dependent on oxygen dissolved in the water. The DO must be present in at least the following amount if the fish are to live and reproduce normally: *Basic*

- a. 1 to 4 mg/l.
- b. 4 to 8 mg/l.
- c. 8 to 10 mg/l.
- d. Over 10 mg/l.

2. Numerous small red worms present in the bed of a stream below a sewer outlet *Basic*

- a. Show the stream to be in good condition.
- b. Are evidence of the presence of pollutant material.
- c. Are evidence of an abundance of desirable fish food.
- d. Are of no importance as an indicator of stream conditions.

3. Green algae in a stream will add DO to the water *Basic*

- a. Only in warm weather.
- b. Only during the night or cloudy days.
- c. Only in the presence of sunlight.
- d. Not at any time.

4. The sag point in a stream is most likely to be determined by *Basic*

- a. The temperature of the water.
- b. The BOD load to the stream.
- c. The discharge of the stream.
- d. All of the above.

5. Self-purification of streams and bodies of water proceeds more rapidly in summer than in winter, principally because *Basic*

- a. The sunlight has greater bactericidal effects in summer than in winter.
- b. Fish life is more abundant and active in summer.
- c. Currents of air are not impeded in reaching the water by ice formation on the surface of the water in summer.
- d. High temperatures stimulate bacterial action.
- e. The greater flow in summer generally produces increased aeration of the water.

6. Studies to determine the adequacy of wastewater treatment from a public health standpoint usually include *Basic*

- a. Velocity of flow readings.
- b. Coliform tests.
- c. Total nitrogen determinations.
- d. Turbidity measurements.

7. Algae growth on a lake may usually be observed *Basic*
- Near the top of the lake.
 - Near the bottom of the lake.
 - Near the mid-depth of the lake.
 - Below 3.0 ft.
 - Below 10.0 ft.
8. During the daytime, algal growth in a lake generally causes an increase in *Basic*
- Water temperature.
 - Nitrate concentration.
 - Iron concentration.
 - Calcium concentration.
 - DO content.
9. When DO in a stream is removed, *Basic*
- It can never be replaced.
 - Reaeration may eventually increase the DO in the stream again.
 - The water can never be made useful again.
10. DO is desirable in a stream because *Basic*
- Fish require DO to live.
 - Water with DO may be considered safe to drink.
 - It is necessary if the water is to be used to irrigate crops.
 - Bacteria cannot live when DO is present.
11. DO tests should be made routinely on *Basic*
- The receiving stream below the treatment plant.
 - The treatment plant effluent.
 - The receiving stream above the treatment plant outfall.
 - All of the above.
12. When wastewater with a high BOD is discharged to a stream *Basic*
- The DO in the stream is increased.
 - The effect is to reduce the DO in the stream.
 - There is no effect on the DO in the stream.
 - The bacteria in the stream disappear.
13. Raw or inadequately treated wastewater will have the most serious effect when it is discharged to *Basic*
- A slow, sluggish stream during winter weather.
 - A fast-flowing, turbulent stream during winter weather.
 - A slow, sluggish stream during summer weather.
 - A fast-flowing, turbulent stream during summer weather.
14. Eutrophication of a lake may be accelerated when *Advanced*
- DDT is discharged to the lake.
 - Strontium is discharged to the lake.
 - Weeds are cut down.
 - Copper sulfate is sprayed on the lake.
 - Phosphorus compounds are discharged to the lake.

15. The form of nitrogen present in a receiving stream generally indicates when the stream was polluted. Waters that contained mostly organic and ammonia nitrogen may generally be considered to have been: *Advanced*

- a. Polluted a long time ago.
- b. Polluted by a plating plant waste.
- c. Polluted by brine from a water softening plant.
- d. Polluted quite recently.
- e. Polluted by acid mine drainage.

16. Nitrates are determined in a sample from treated or partially treated wastewater because they *Advanced*

- a. Measure the carbohydrates in wastewater.
- b. Are the final or stable form of oxidized nitrogen.
- c. Combine easily with cellulose.
- d. Measure the presence of oils and fats.
- e. Are readily converted to nitrites.

17. The high level of nitrates in a treated domestic wastewater shows *Advanced*

- a. The presence of toxic industrial wastes.
- b. A good degree of treatment.
- c. A poor degree of treatment.
- d. That there is no need for chlorination.

18. Nitrogen occurring in the zone of decomposition of a highly polluted stream is most likely in what form? *Advanced*

- a. NO_3 .
- b. NO_2 .
- c. N.
- d. NH_3 .

19. In the self-cleaning process that takes place in a stream, BOD reduction in the zones of degradation (1st zone) is principally caused by *Advanced*

- a. Bacterial action.
- b. Turbidity.
- c. Temperature change.
- d. Settling.

20. To determine the location and amount of lowest DO downstream from a discharge it is necessary to *Advanced*

- a. "Flail the water."
- b. Observe safety precautions.
- c. Measure the effluent.
- d. Make an "oxygen profile" of the stream.
- e. Make yearly measurements.

21. The stream purification cycle represents *Advanced*

- a. A figment of imagination.
- b. A precise law.
- c. A sequence of events.
- d. A legislative decree.

22. When organic wastes are discharged into a small river and an appreciable oxygen depletion occurs, the point of minimum DO level would be expected to be *Advanced*

- a. Immediately below the point of discharge where the waste first mixes with the river.
- b. One-fourth to 2 days flow time below the point of discharge of the waste.
- c. Three to 5 days flow time below the point of discharge of the waste.

23. Green plant life in a stream will add DO to the water *Advanced*

- a. Only in warm weather.
- b. Only during the night or on cloudy days.
- c. Only in the presence of sunlight.
- d. Not at any time.

24. The term "DO sag curve," as normally used, refers to *Advanced*

- a. The depletion in DO that occurs in the BOD test.
- b. The decrease in DO that occurs in a stream receiving pollutional organic material.
- c. The depletion in BOD through a wastewater treatment plant.
- d. The reduction in organic matter in a digester.

25. The zone of recent pollution is best characterized by *Advanced*

- a. Low DO, balanced species of stream organisms, and low turbidity.
- b. High DO, few species of stream organisms, and medium turbidity.
- c. Variable DO, shifting in species of stream organisms, and high turbidity.
- d. Variable DO, mosquito larvae, rat-tail maggots, and oily surface water appearance.

26. The discharge into streams of wastewater and industrial wastes or of effluent from plants treating such wastewater and wastes is most effectively modified by *Advanced*

- a. Dilution in the streams.
- b. Selection of the point of discharge with due regard to varying stages of flow height in the stream.
- c. The use of multiple outlets.
- d. The depth of flow at the point of discharge.
- e. Selection of a remote or obscure point of discharge.

27. To determine if plant effluent has a detrimental effect on the receiving stream, the best method would be to *Advanced*

- a. Let the Pollution Control Commission run tests on the plant and stream and give you the results.
- b. Determine the BOD, DO, and SS in the effluent and stream at regular intervals and compare them with the water quality standards for the stream.
- c. Visually observe for dead fish.
- d. Read a text book on sanitary engineering to see how efficient your plant should be.

28. Untreated wastewater discharged into a stream may

- a. Add oxygen needed by fish. *Advanced*
- b. Decrease organic content of the stream.
- c. Add dangerous bacteria to the stream.
- d. Eliminate odors in the stream.

29. In the examination of a sample from a body of water, its pollution and subsequent natural purification could best be measured by *Advanced*

- a. A sanitary bacteriological examination.
- b. The physical appearance of the water in terms of color, turbidity, and odor.
- c. A determination of the changes in the hydrogen ion concentration.
- d. A sanitary chemical analysis.
- e. A complete mineral analysis.

ANSWER KEY

SECTION 12 - Effluent and Stream Quality

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|-------|-------|
| 1. b | 16. b |
| 2. b | 17. b |
| 3. c | 18. d |
| 4. d | 19. a |
| 5. d | 20. d |
| 6. b | 21. c |
| 7. a | 22. b |
| 8. e | 23. c |
| 9. b | 24. b |
| 10. a | 25. c |
| 11. d | 26. a |
| 12. b | 27. b |
| 13. c | 28. c |
| 14. e | 29. d |
| 15. d | |