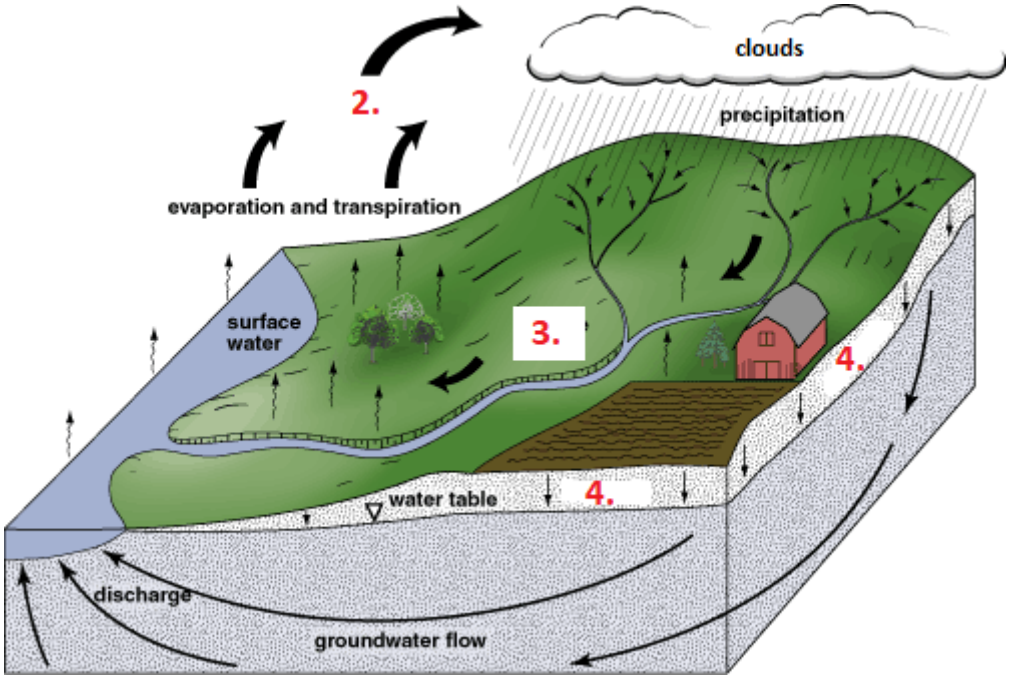
Water Quality Practice Test

1. Approximately what percent of the world's water is freshwater? What percent is accessible freshwater? (2 pts)
    a. 10%; 5%
    b. 10%; 1%
    c. 7%; 5%
    d. 7%; 0.01%
    e. 3%; 1%
    f. 3%; 0.01%

For questions 2 – 4, fill in the blank on the diagram below: (1 pt each)



2. _____

3. _____

4. _____

5. Circle the correct answer: Ponds and lakes are (lotic/lentic) ecosystems, while rivers and streams are (lotic/lentic) ecosystems. (2 pts)

6. Why is turnover in lakes important to aquatic life? (3 pts)

_____

_____

_____

_____

7. Provide one example of point source pollution and one example of nonpoint source pollution.
    a. Point source: _____ (1 pt)

    b. Nonpoint source: _____ (1 pt)

Use the food chain below to answer questions 8 and 9.

8. Based on its position in this food chain, a pike is a _____ order consumer. (2 pts)
9. A heron has a mass of 2 kilograms. Approximately how much biomass of diatoms is required to sustain one heron? (3 pts)

_____

10. Place the following steps of drinking water treatment in order: fluoridation/chlorination, filtration, flocculation/coagulation (3 pts)

_____ → _____ → _____

For questions 11-13, match the following descriptions to the corresponding step of wastewater treatment. (1 pt each)

11. _____ Biological treatment in which the majority of nutrients are removed
12. _____ Removal of large particles through filtration, sedimentation, etc.
13. _____ Removal of all remaining nutrients and harmful microorganisms

A. Primary treatment

B. Secondary treatment

C. Tertiary treatment

Use the image below of "Organism A" to answer questions 14-16.

14. Identify the organism. (2 pts)

_____

15. Is the individual in the picture male or female? (1 pt)

_____

16. Larvae of this organism live on _____ stream beds and take _____ to pupate. (2 pts)
    a. Rocky; 4-6 weeks
    b. Rocky; 2-4 months
    c. Rocky; 1-3 years
    d. Sandy; 4-6 weeks
    e. Sandy; 2-4 months
    f. Sandy; 1-3 years

Use the image below of “Organism B” to answer questions 17-19.

17. Identify the organism. (2 pts)

    _____

18. What is the diet of the organism? (2pts)

    _____

19. Circle the correct answer: The immature stages of this organism develop in (oxygenated/deoxygenated) waters. (1 pt)

Use the image below of “Organism C” to answer questions 20-22.

20. Identify the organism. (2 pts)

    _____

21. What stage of the of the organism’s life cycle is pictured? (1 pt)

    _____

22. Give an ecologic role of this organism. (2 pts)

    _____

23. List Organism A (questions 14-16), Organism B (questions 17-19), and Organism C (questions 20-22) in order from *most* to *least* pollution tolerant, in general. (Write the letter given to the organism, not its name.) (3 pts)

    _____ → _____ → _____

Use the two images below to answer questions 24 and 25.

24. Identify the organism in the image to the left. (2 pts)

    _____

25. Identify the organism in the image to the right. (2 pts)

    _____

26. pH is a measure of (1 pt)
    a. The concentration of hydrogen ions
    b. The concentration of salt ions
    c. The solubility of oxygen in water
    d. The solubility of carbon dioxide in water
27. At which time of the day is pH of a lake generally the lowest? (2 pts)

    _____

28. How does the presence of limestone rock ($CaCO_3$) in and around a body of water affect the water's pH? (2 pts)

_____

_____

29. Two instruments commonly used to measure turbidity include a _____ and a _____. (2 pts)

30. How does turbidity affect an aquatic ecosystem? (3 pts)

_____

_____

_____

31. Biochemical oxygen demand (BOD) is a measure of _____, which in turn indicates _____. (2 pts)

    a. The time it takes for all organic matter in a water sample to be broken down; the number of microorganisms in the water sample
    b. The time it takes for all organic matter in a water sample to be broken down; the amount of organic matter in the water sample
    c. The amount of oxygen required to break down all organic mater in a water sample; the number of microorganisms in the water sample
    d. The amount of oxygen required to break down all organic matter in a water sample; the amount of organic matter in the water sample

32. Why is biochemical oxygen demand an important measure with respect to the food webs of aquatic ecosystems? (3 pts)

_____

_____

_____

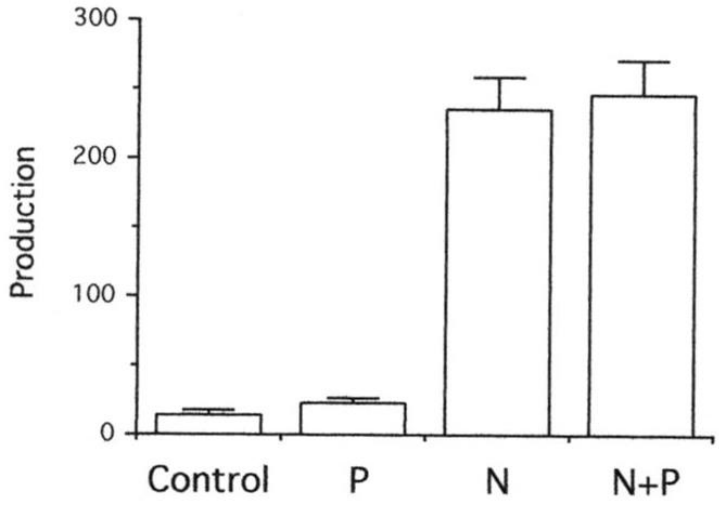
_____

33. Which of the following are concerns with the presence of nitrates in surface waters? (Select all that apply; 3 pts)

    a. Nitrates are toxic for young humans and livestock
    b. Nitrates react readily with oxygen, lowering dissolved oxygen levels
    c. Nitrates combine with suspended soils in water to produce sticky particles that clog water intake pipes
    d. Nitrates contribute to the process of eutrophication

34. Which of the following are common human sources of nitrates in surface waters? (Select all that apply; 3 pts)
    a. Agricultural fertilizers
    b. Lawn fertilizers
    c. Livestock operations
    d. Septic tank effluent

In a theoretical experiment, four water samples are taken from a pond and their level of productivity is measured over one week. In the control condition, no nutrients are added to the sample. In the sample labeled "P", only phosphorus is added. In the sample labeled "N", only nitrogen is added. In the sample labeled "N+P", both nitrogen and phosphorus is added. The graph below shows data from such an experiment.



35. Which nutrient, nitrogen or phosphorus is the limiting nutrient in the pond? (2 pts)

    _____

36. Why is the identity of a limiting nutrient important information for water resource managers? (3 pts)

    _____

    _____

    _____

    _____