2025 Iowa Envirothon State Aquatics Exam Team_____
Each Question is worth three points – 75 points possible

Questions 1-5:
Water samples and testing will be the basis for these questions.

Complete a transparency test to measure water clarity by using the Transparency tube. Follow these steps: 1. Make sure the finger clamp on the hose is closed; 2. Hold the tube upright and in the shade. Use your body to shade the tube if nothing else is available; 3. With your back to the sun, look directly into the tube from the open top and release water through the small hose, regulating the flow with the finger clamp until you are able to distinguish the black and white pattern (Secchi pattern) on bottom of the tube. Close the finger clamp; 4. Read the number on the outside of the tube that is closest to the water line. Record your reading in centimeters (cm).

1. Transparency Test reading: _____cm

2. Low transparency (or high number of suspended particles) _____.
   A. is a condition that is rarely toxic to aquatic animals.
   B. harms aquatic animals when solids settle out and clog gills.
   C. reduces the availability of food for aquatic animals.
   D. promotes solar heating which can increase water temperatures.
   E. all of these are correct

3. How would a heavy rainfall event change the transparency (e.g., ability to see through the water) of stream water when comparing the transparency after the event compared to before the event?
   A. Increase transparency
   B. Decrease transparency
   C. There would be no change
   D. It would depend on the pH of the water

Use the Hach® pH test strips to determine the pH of the aquatics area at this station. **Review the directions on the Hach® pH test strips vial before you conduct the test**. You will need to dip the test strip in the water and remove immediately. Hold strip level for 15 seconds. DO NOT SHAKE excess water from the test strip. Estimate pH by comparing test pad to pH scale color chart on test strip bottle. The pad will continue to change color, so make a determination immediately after 15 seconds. Record your result below.

4. What pH value did you get with your test? _____

5. Most Iowa aquatic organisms require habitats with a pH of_____.
   A. 1.5 to 4
   B. 3.5 to 6.0
   C. 4.5 to 7.0
   D. 5.5 to 8.0
   E. 6.5 to 9.0

6. What are the two nutrients that the "Iowa Nutrient Reduction Strategy" attempts to reduce for improving Iowa's water quality?
   A. nitrogen and potassium
   B. phosphorus and potassium
   C. nitrogen and phosphorus
   D. sulfur and potassium
   E. calcium and nitrogen

7. Which of the following fish species are classified as "threatened or endangered" in Iowa?
   A. Blue Catfish, Mottled Sculpin, and Paddlefish
   B. Bluegill, Green Sunfish, and Yellow Perch
   C. Goldeye, Mooneye and White Crappie
   D. Grass Pickerel, Lake Sturgeon and Topeka Shiner
   E. All of these are "threatened or endangered" species

8. What is the name for this species of fish? (see picture)
   A. Lake sturgeon
   B. Largemouth bass
   C. Smallmouth bass
   D. White crappie



9. Largemouth bass and great blue herons are examples of _____ in an aquatic ecosystem.
   A. detritivores/decomposers
   B. primary consumers
   C. producers
   D. secondary consumers
   E. tertiary consumers

10. Invasive species pose an ongoing threat to Iowa lakes, rivers, and wetlands because these species
   A. lead to the loss of biodiversity.
   B. hinder economic development and reduce or prevent recreational activities.
   C. serve as vectors for diseases.
   D. decrease the aesthetic value of Iowa's water.
   E. all of these

11. Non-Point Source Pollution is
    A. any single identifiable source from which pollutants are discharged, such as a pipe or ditch.
    B. pollution that does not have a specific point of discharge and results from rainfall or snowmelt moving over and through the ground carrying natural and human-made pollutants.
    C. associated with wastewater treatment plants and industrial facilities.
    D. All of these are correct.

12. _____ is the scientific study of water on earth and includes not only water on the earth's surface, but also groundwater and water in the atmosphere.
    A. Hippology
    B. Horology
    C. Hydrodynamics
    D. Hydrology

13. _____ are a unique, rare type of wetland often found on hillsides and fed by groundwater. As you walk through this type of wetland area, you will experience a unique spongy feel caused by the peat soil formed from non-decomposed vegetation.
    A. Fens
    B. Oxbows
    C. Prairie potholes
    D. Grassed waterways

14. There are many impacts from straightening a naturally, meandering (curvy, with an "S"-shaped pattern) stream. Please select the impact that is NOT observed due to straightening a river.
    A. Faster water movement
    B. Increase in streambed and bank erosion
    C. Loss of riffle/pool structures that provide aquatic habitat
    D. Decrease in stream length
    E. All of these are potential impacts

15. What is the name of this butterfly that starts its life by eating turtlehead, a plant which is primarily found growing in Iowa fens? (See picture below)
    A. Viceroy butterfly
    B. Baltimore checkerspots butterfly
    C. Mock Monarch butterfly
    D. Queen butterfly



16. Use the "Iowa Benthic Macroinvertebrate Key" to identify the common name for the macroinvertebrate shown below:

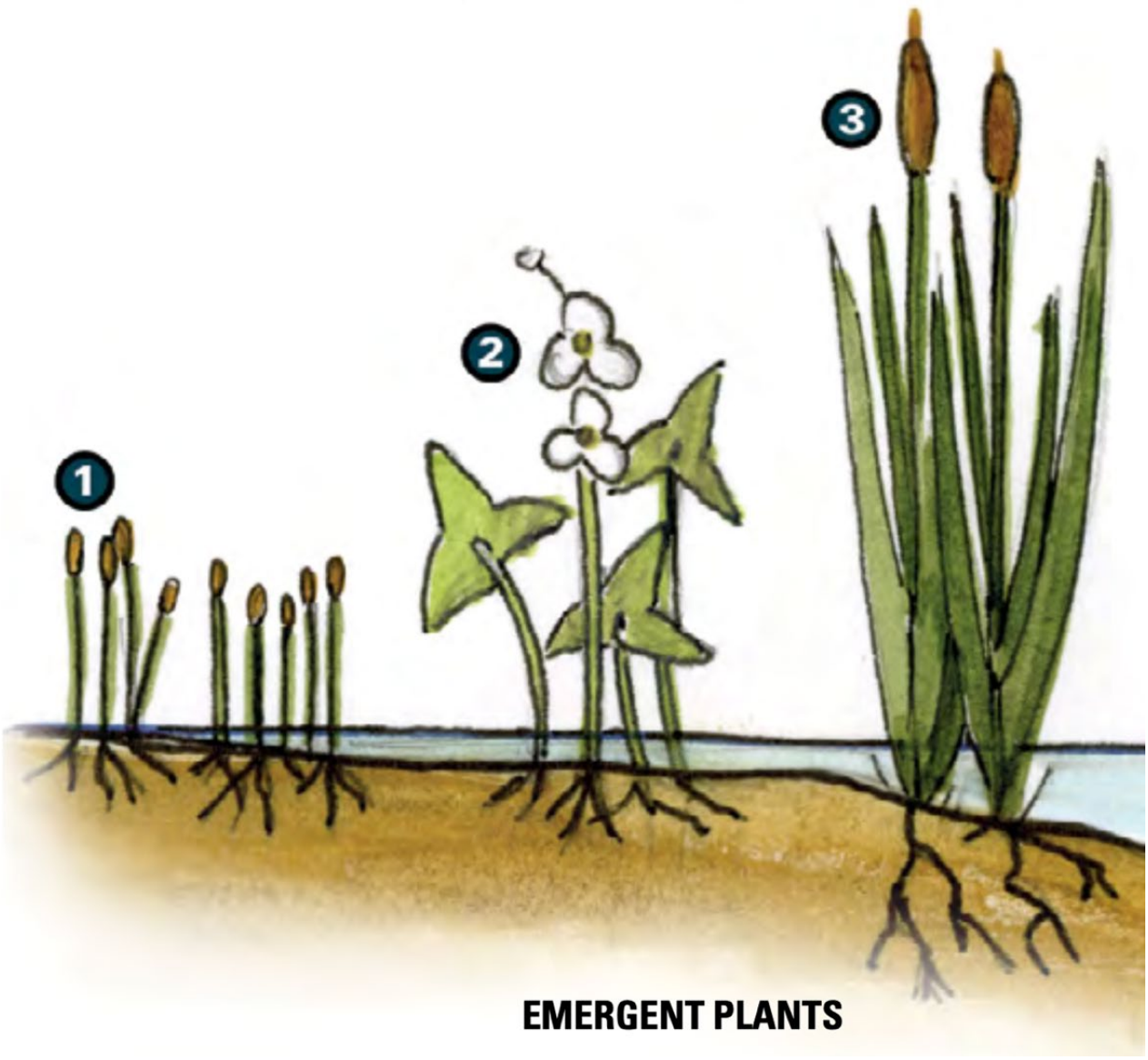
_____



17. The macroinvertebrate shown above, belongs to which group?
    A. Pollution Intolerant (High Quality Group)
    B. Somewhat Pollution Tolerant (Middle Quality Group)
    C. Pollution Tolerant (Low Quality Group)
    D. None of these

18. Wetlands help improve water quality by:
    A. Intercepting surface runoff
    B. Trapping sediment
    C. Processing nutrients and organic wastes before they reach open water
    D. All of the above

19. The emergent aquatic plants shown below are correctly identified as _____. (See picture)
    A. 1) cattails, 2) arrowheads and 3) coontails
    B. 1) coontails, 2) white water lilies and 3) cattails
    C. 1) spikerush, 2) arrowheads and 3) cattails
    D. 1) arrowheads 2) spikerush and 3) cattails
    E. 1) mini cattails, 2) arrowheads and 3) cattails



MATCHING: (Questions 20--25)

A. Calcium
B. Cover crops
C. Fen
D. Hypoxia
E. Lentic ecosystems
F. Lotic ecosystems
G. Oxidation
H. Oxbow
I. Phosphorus
J. pH
K. Photoperiodism
L. Potassium
M. Pothole
N. Rainscaping
O. Rill
P. Nitrogen
Q. Riverine
R. Storm sewer
S. Tertiary
T. Tiling
U. Tilling
V. Toxification
W. Transpiration

Write the correct letter for the term above that matches each description below:

20. _____ is a drainage system that runs underneath farmland and drains water out of the ground (usually) directly into waterways.

21. _____ wetlands are found where rivers spread from their banks into adjacent floodplains.

22. _____ are aquatic environments such as rivers and streams with running water.

23. _____ is a concept promoting infiltration-based urban stormwater management practices.

24. _____ is a nutrient that can be fixed into a usable form for plants by a soil bacteria in soil.

25. _____ refers to the condition of reduced levels of oxygen in the Gulf of Mexico that results in a dead zone that is roughly the size of the state of Massachusetts.