2023 Iowa Envirothon State Aquatics Exam Team_____

Each Question is worth three points – 75 points possible

MULTIPLE CHOICE: Select the best possible answer from those provided.

1. Too much nitrogen and phosphorus in water can directly cause _____.
   A. Increased sediment load
   B. Increased turbidity
   C. Increased algae growth
   D. Reduced dissolved oxygen levels

2. Which of the following aquatic species is an important link between primary producers and higher consumers?
   A. Dragonflies
   B. Algae
   C. Largemouth Bass
   D. Mayflies

3. According to the Benthic Macroinvertebrate Flow Chart, the Mayfly and the Caddisfly are listed as _____.
   A. Having three tails.
   B. Pollution intolerant
   C. Having wings
   D. Pollution tolerant

4. Which of the following is NOT an aquatic habitat found in Iowa?
   A. Farm pond
   B. River
   C. Playa wetland
   D. Intermittent stream
   E. Vernal pool

5. What type of plant is coontail?
   A. Emergent
   B. Floating leaf
   C. Submersed
   D. Herbivore

MATCHING: Complete the following statements with the best word from below.

A. Zooplankton	D. Allochthonous materials	G. Biological monitoring
B. Wetland	E. Nutrient cycling	H. Organic matter
C. Watershed	F. Indicator bacteria	I. Phytoplankton

6. _____ are used to detect and estimate the level of fecal contamination of water. E coli is an example.

7. A hydrologic unit code is a sequence of numbers that identify a specific _____.

8. The use of living organisms to determine presence, amounts, changes in pollution, and effects of both abiotic and biotic factors in the environment is called _____.

9. The primary factor that distinguishes _____ from other land forms or water bodies is the characteristic vegetation of aquatic plants, adapted to the unique hydric soil.

10. Leaves, branches, and logs falling into the stream are examples of _____.

11. Diatoms and blue-green algae are examples of _____.

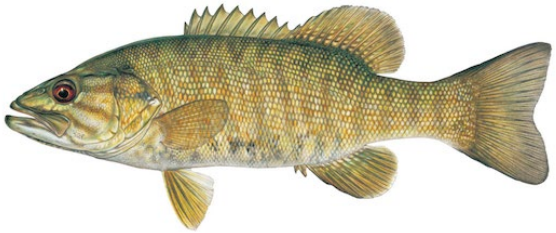
MATCHING: Match the picture to the name.

A. Yellow Perch
B. Black Crappie
C. Common Carp
D. Channel Catfish
E. Smallmouth Bass

12. _____



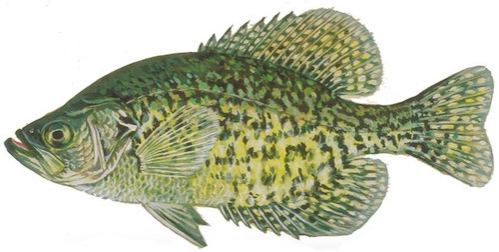
13. _____



14. _____



15. _____



REMAINING QUESTIONS:
ANSWER AT THE LAB STATION

Using the "Iowa Benthic Macroinvertebrate Key", identify the macroinvertebrate collected from the site of today's aquatics event and answer the following questions.

16. Common Name: _____

Which group does this macroinvertebrate belong to? (Select 1)

17. _____ Pollution Intolerant (High Quality Group)
_____ Somewhat Pollution Tolerant (Middle Quality Group)
_____ Pollution Tolerant (Low Quality Group)

18. Which grouping of macroinvertebrates found in an aquatic location would indicate a high-quality water ecosystem?

A. dobsonfly, mayfly and riffle beetle
B. backswimmer, dragonfly and water boatman
C. crawdad, scud and water strider:
D. aquatic worm, leech and rat-tailed maggot
E. all of these are found in high quality water ecosystems

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.

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

20. Most Iowa aquatic organisms require habitats with a pH of_____.

A. 3.5 to 6.0
B. 4.5 to 7.0
C. 5.5 to 8.0
D. 6.5 to 9.0
E. None of the above

Review the directions with the Chemetrics® dissolved oxygen test kit before you conduct the test. Remove the 25 ml sample cup from the kit and rinse it three times with stream water. Fill the sample cup to 25 ml mark, mixing the water and air as little as possible. Lower the sample cup down to wrist

depth while holding it upside down. Turn the opening downstream so that the cup backfills with water, then turn the cup upstream and carefully remove cup and water sample from stream. GENTLY tip the sample cup to pour off excess water. Place the ampoule in the sample cup, tilting it so the tip is wedged in one of the spaces along the side of the sample cup. Snap off the tip of the ampoule by pressing it against the side of the cup, allowing it to fill with water. Remove the ampoule from the cup and mix the water by inverting the ampoule slowly several times. Be careful not to touch the broken end as it will be sharp. Two minutes after you break off the ampoule tip, compare the ampoule to the color standards provided in the kit. Read the ampoule right at two minutes as the ampoule will continue to change color. Remove your sunglasses before making a determination. Hold the comparator nearly flat while standing directly beneath a bright source of light. Place your ampoule between the color standards moving it from left to right until the best color match is found. Record your result below.

***Note**: The ampoule and ampoule tip may be disposed of in your household trash – be careful of the broken glass. Avoid breaking the ampoule open, as the contents may be mild skin and/or eye irritants. Keep color comparator and unused ampoules away from direct sunlight, as they will change to a blue color and are no longer usable.*

21. What dissolved oxygen value did you get with your test? _____

22. Dissolved oxygen is measured in milligrams per liter of water (mg/L). Iowa standards, which are set to protect aquatic life, call for a minimum of

A. 7 mg/L of DO in warm water streams and 5 mg/L in coldwater streams.
B. 5 mg/L of DO in warm water streams and 7 mg/L in coldwater streams.
C. 8 mg/L of DO in warm water streams and 10 mg/L in coldwater streams.
D. 10 mg/L of DO in warm water streams and 8 mg/L in coldwater streams.

Complete a transparency test to measure of water clarity by using the Transparency tube.
Follow these steps: 1. Make sure the finger clamp on the hose is closed. Facing upstream, in the area along your transect with the greatest flow, fill the transparency tube; 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).

23. Transparency Test reading: _____cm
24. Is a higher of lower reading more desirable: _____

25. _____ are very shallow depressions that were formed in the North Central Iowa landscape by retreating glaciers.

A. Fens
B. Oxbows
C. Prairie potholes
D. Riverine wetlands