

## 2024 Area 1 Envirothon Aquatics Test

1. The water molecule is made up of the following atoms:
  - A. Helium, Helium, Oxygen
  - B. Hydrogen, Hydrogen, Oxygen**
  - C. Helium, Helium, Osmium
  - D. Hydrogen, Hydrogen, Osmium
2. Wind is important to ponds and lakes because it:
  - A. Circulates pond/lake water
  - B. Increases water clarity
  - C. Enhances natural aeration
  - D. A and C**
3. What is the most common non-point source pollutant in Ohio streams?
  - A. Sand
  - B. Silt**
  - C. Clay
  - D. Human waste
4. Aquatic plants that grow with their roots and lower stems in the water, but most of the plant is above the water's surface are called:
  - A. Submerged Plants
  - B. Floating Plants
  - C. Emergent Plants**
  - D. A and B
5. Summer fish kills can usually be attributed to a loss of dissolved oxygen that results in total or partial death of the pond's fish population. Which one is not likely a cause of a summer fish kill?
  - A. Daytime oxygen production exceeds the nighttime oxygen use.**
  - B. Shallow pond
  - C. Thermal inversions
  - D. Chemical applications
6. In a pond/lake the interface zone between the land and open water is called the:
  - A. Pelagic Zone
  - B. Littoral Zone**
  - C. Limnetic Zone
  - D. Benthic Zone

7. When conducting a bioassessment of aquatic macro-invertebrates in a stream, which of the following aquatic macro-invertebrate assemblages are the most sensitive to pollution:
- A. Blood midge, aquatic worm, crayfish.
  - B. Dragonfly nymph, damselfly nymph, crane fly larvae.
  - C. Pouch snails, leeches, beetle larvae.
  - D. Dobsonfly larvae, stonefly larvae, riffle beetle.
8. Which of the following has the distinction of being the smallest flowering plant in the world?
- A. Watermeal.
  - B. Filamentous Algae.
  - C. Spatterdock.
  - D. Water Milfoil
9. Aerobic bacteria require which of the following:
- A. Water
  - B. Soil
  - C. Carbon
  - D. Oxygen
10. The best example of a lotic habitat is:
- A. Bog
  - B. Pond
  - C. Lake
  - D. Creek
11. Which of the following is a difference you notice between the upstream area and downstream closer to the bridge?
- A. Gravel and sand upstream vs. silt substrates near the bridge
  - B. More litter near the bridge
  - C. Greater sinuosity upstream
  - D. More riparian habitat (trees) upstream
  - E. All of the above
12. Which of the following is not a way you could restore the stream's floodplain?
- A. Plant more native plants around the stream
  - B. Remove the invasive plant species
  - C. Decrease the incising of the stream through watershed management and establishment of grade controls (e.g., riffles, rock vanes)
  - D. Add more walking trails
  - E. a, b, and c

13. What changes would you expect to occur in this stream if a housing development with large parking lots were to be built immediately upstream of this area?
- A. Decreased water quality through pollutants
  - B. Warmer water
  - C. Increased flow during rain events
  - D. Greater erosion
  - E. All of the above
14. What is one tool used to measure water transparency (conversely turbidity) in aquatic systems?
- A. Secchi disk
  - B. Flow meter
  - C. Electrofisher
  - D. Auger
15. Which of the following features that can be observed in this stream reach is not anthropogenic?
- A. Bridge/road
  - B. mowing of plants in buffer
  - C. fluctuation of water level
  - D. Rip-rap under the bridge
  - E. sewer and petroleum pipeline
16. Which has more potential to permanently lower the water quality of streams?
- A. Erosion.
  - B. Urbanization.
  - C. Agriculture.
  - D. Timber harvesting.
17. The following members of the lamprey family *Petromyzontidae* are parasitic except?
- A. Sea Lamprey.
  - B. Least Brook Lamprey.
  - C. Silver Lamprey.
  - D. Ohio Lamprey.
18. Mayflies belong to which order?
- A. Plecoptera.
  - B. Ephemeroptera.
  - C. Trichoptera.
  - D. Hemiptera.

19. When classifying organisms into their proper taxonomic rank, which of the following is the correct hierarchical order?
- A. Class, Order, Family, Kingdom, Phylum, Genus, Species.
  - B. Kingdom, Phylum, Class, Order, Family, Genus, Species.**
  - C. Kingdom, Class, Phylum, Order, Family, Genus, Species.
  - D. Phylum, Kingdom, Order, Family, Class, Genus, Species.
20. Lake Erie has gained international attention for Harmful Algae Blooms (HABs) affecting drinking and recreational waters. Which of the following statements is true about HABS?
- A. HABs only occur in large bodies of water, such as Lake Erie or Grand Lake St Mary
  - B. HABs are caused by low oxygen conditions, usually as a result of fish kills
  - C. The presence and severity of a HAB in surface water depends on nutrient loading from the surrounding watershed.**
  - D. Boiling fresh surface water will remove the HAB toxins and make it safe to drink or cook with.
21. The junction of two rivers, streams or creeks is known as.
- A. Meander
  - B. Confluence**
  - C. Contributory
  - D. Thalweg
22. Which aquatic macroinvertebrate is a primary consumer?
- A. Stonefly.
  - B. Crayfish.
  - C. Alderfly.
  - D. Caddisfly.**
23. The amount of dissolved oxygen necessary to oxidize the readily decomposable organic matter is known as:
- A. Titration.
  - B. Buffering Capacity.
  - C. Biochemical Oxygen Demand.**
  - D. Ion Exchange.
24. You are developing a plan to improve water quality in a watershed that includes multiple land uses. Which of the following potential sources of pollution can NOT be addressed via a NPDES permit?
- A. Confined Animal Feeding Facilities
  - B. Municipal sewage treatment
  - C. Urban stormwater
  - D. Bulk cargo vessels
  - E. Agricultural runoff**

25. Which aquatic plant is not an example of an invasive species in Ohio?
- A. Curly-leaf Pondweed.
  - B. Common Reed.
  - C. Narrowleaf Cattail.
  - D. Spatterdock.
26. What type of pollutant adversely affects reproduction rates and life spans of aquatic organisms?
- A. Metals.
  - B. Sulfates
  - C. Radionuclides.
  - D. None of the above.
27. When identifying and classifying water pollution problems, one of the tools biologists use is the Fish Index of Biological Integrity (IBI). There are several metrics that are used to determine the IBI. Which is not a metric used to determine the fish IBI?
- A. Number and identity of benthic insectivorous species.
  - B. The total suspended solids in the stream.
  - C. Proportion of with disease or anomalies.
  - D. Total Number of Fish.
28. Streams tendency to meander in the flood plain is called sinuosity. Sinuosity of a stream is calculated by:
- A. Determining the overall distance of travel, it takes from one point to another.
  - B. Subtracting the overall gradient change from a starting point to a determined end location.
  - C. The total volume of water flow over any given period of time.
  - D. Dividing the length of the stream channel from one point to another by the straight-line distance between the same points.
29. When using fish as biological indicators to determine if a stream is a cold-water stream, which of the following species would not be an indicator of a cold-water stream?
- A. Redside Dace.
  - B. Brook Stickleback.
  - C. Rainbow Darter.
  - D. Mottled Sculpin.
30. What percentage of Ohio's land mass is in the Ohio River watershed.
- A. 85%
  - B. 33%.
  - C. 66%.
  - D. 50%

31. Decaying organic matter such as leaves in streams, ponds and lakes is known as:
- A. Detritus.
  - B. Periphyton.
  - C. Alluvial
  - D. Pigmentation.
32. When landowners are managing their floodplain forests along streams, rivers, wetlands, ponds and lakes it is important to leave trees (living or dead) with cavities (holes in the tree) because some birds nest in these tree cavities. All of the following are cavity nesting birds in floodplain forests except.
- A. Wood Ducks.
  - B. Belted Kingfisher.
  - C. Prothonotary Warblers.
  - D. Common Mergansers.
33. In headwater streams that are too small to support fish, salamanders are the key indicator species in these waters. Which of the following group of two salamanders would you most likely find living in these small headwater streams?
- A. Spotted salamander & marbled salamander.
  - B. Two-lined salamander & dusky salamander.
  - C. Ravine salamander & red-backed salamander.
  - D. Hellbender salamander & mudpuppy salamander.
34. Which of the following is a direct use of geothermal energy?
- A. Electricity generation
  - B. Heating buildings
  - C. Fuel for vehicles
  - D. Battery storage
35. Which one of the following is a sustainable and renewable resource?
- A. Oil
  - B. Gas
  - C. Coal
  - D. Wood
36. Which renewable energy source has the highest energy density per unit mass?
- A. Wind energy
  - B. Solar power
  - C. Biomass energy
  - D. Nuclear power

37. Which renewable energy source involves harnessing the kinetic energy of ocean tides and currents to generate electricity?
- A. Tidal energy
  - B. Wave energy
  - C. Ocean thermal energy conversion (OTEC)
  - D. Marine biomass
38. What is one thing that Ohio can do to increase the amount of renewable/sustainable resources available for future generations?
- A. Create wetlands
  - B. Plant more trees
  - C. Improve wildlife habitat
  - D. All of the above
39. Why are trees a sustainable resource?
- A. Because they look nice
  - B. Because they can be regrown and reused if done in a proper manner
  - C. Because they help maintain soil structure along river banks
  - D. They help mitigate the effects of hurricanes along the coast
40. Which renewable energy technology uses the temperature difference between warmer and cooler water sources to generate electricity?
- a. Ocean thermal energy conversion (OTEC)
  - b. Tidal energy
  - c. Wave energy
  - d. Marine biomass
41. What renewable energy source involves capturing and utilizing the methane produced by decaying organic matter in landfills or waste treatment facilities?
- A. Wind energy
  - B. Biomass energy
  - C. Geothermal energy
  - D. Hydroelectric power