

## **Aquatics Station: 2017 Area IV Envirothon**

By Anne Lyon, Water Quality Project LLC Director, Greenacres Foundation

- 1) Use the Hach Kits provided to measure Reactive Phosphate and record the results in the proper units. Which answer below is closest to but not over your result?
  - a. 0.0 mg/L
  - b. 0.2 mg/L
  - c. 0.5 mg/L
  - d. 0.8 mg/L
  - e. 1.0 mg/L
  
- 2) The riparian zone upstream is completely intact, but downstream the river is exposed to full sun. What differences would you expect between the two sites?
  - a. Section exposed to full sun would have higher nutrient levels and excessive algal blooms
  - b. Colder water in section upstream would cause fish kills when the temperature drops at night
  - c. Lack of cover in downstream section would increase turbidity levels
  - d. The water quality data for both sites would be very similar.
  
- 3) If you were given the following data for a beach on Harsha Lake from Ohio EPA, which data show the water is safe for swimming?
  - a. 410 colonies per 100 mL of E. coli
  - b. 4,200 colonies per 100 mL of total coliforms
  - c. 2,318 colonies per 100 mL of total coliforms
  - d. 78 colonies per 100 mL of E. coli
  
- 4) The term climate refers to:
  - a. Current temperatures and meteorological events
  - b. Average and extreme conditions of temperature, humidity, type and amount of precipitation, winds, and cloud cover, measured over an extended period of time.
  - c. Distribution of water in all its forms on, in and over the land areas of the earth, including its chemical and physical properties, together with the reaction of the environment
  - d. Physical and biological patterns often seen in different zones of rivers from source to mouth.
  
- 5) Which of the following is a point source pollutant?
  - a. Road salt
  - b. Combined sewer outfalls (CSOs)
  - c. Agricultural runoff
  - d. Litter thrown onto streets, sidewalks and beaches, or directly into the water
  
- 6) Which of the following best describes what a watershed is?
  - a. A functioning natural unit with interacting biotic and abiotic components whose boundaries are determined by the cycles and flux of energy, materials and organisms.
  - b. An area of land that drains water, sediment and dissolved materials to a common receiving body or outlet.
  - c. Water-bearing stratum of permeable rock, sand, or gravel
  - d. Area defined by law that determines borders of towns, villages, and municipalities.

- 7) Storm water runoff from a construction site is filling a local stream with sediment and impacting aquatic life. What Best Management Practice (BMP) would you suggest?
- Cover disturbed soil with an erosion control blanket
  - Re-grade the slope of the construction site so it is flat
  - Re-route the stream away from construction site
  - Dig a ditch around the construction site that diverts water to an adjacent storm drain.
- 8) Where is water most likely to become polluted with sediment?
- Clouds
  - Streams
  - Glaciers
  - Groundwater
- 9) Which of the following group of tests would you perform to determine if a stream is being polluted with discharge from a failing household septic system?
- Ammonia and chloride
  - Fecal coliforms and lead
  - Nitrate and turbidity
  - E. coli and optical brighteners
- 10) What causes ‘acid rain’?
- Ozone gases mix with the with water droplets in clouds and fall to the earth as Freon
  - Water droplets in clouds absorb carbon from the atmosphere and turn into carbonic acid
  - Smoke particles mix with water droplets in clouds and fall to the earth as sulfuric or nitric acid
  - Water droplets absorb sunlight in the atmosphere and turn into hydrochloric acid
- 11) What might happen in a local lake if the historic spawning sites of Lake Trout were destroyed by dredging?
- Remaining trout would now be free of predation pressure and increase in population.
  - Trout would no longer have enough food causing them to either die out or become severely malnourished.
  - Smaller fish that trout feed on would eventually reduce in numbers and be eliminated from the Lake.
  - Other fish species in the lake on would increase in population.
- 12) To make water free of harmful bacteria, which treatment method below is used at drinking water treatment plants?
- Coagulation and flocculation with alum
  - Filtration through sand, gravel, and charcoal
  - Aeration and mixing using bleach
  - Addition of chlorine or chloramine
- 13) What keeps streams full of water even during periods of drought?
- Groundwater
  - Rain Gardens
  - Storm water runoff
  - Riparian Vegetation

- 14) How could Fracking for Fossil fuels affect municipal water supplies?
- Water withdrawals increase ground water discharge to streams, potentially improving surface water quality
  - Fracking chemicals and degradation products such as metals and radionuclides react with the metal pipes used to bore the fracking wells.
  - Fracking fluid chemical spills and faulty construction of fracking wells can contaminate both aquifers and surface waters used for drinking water.
  - Fracking has no impact on drinking water supplies.
- 15) Which of the following characteristics best describe a stable and healthy riparian zone?
- 75-foot wide zone with steep slopes, dense Honeysuckle, and undercut banks
  - 30-foot wide zone with gentle slopes, dense stands of Johnson grass, and a concrete retaining wall
  - 30-foot wide zone with steep slopes, undisturbed and permeable soils, and dense native vegetation
  - 100-foot wide zone densely vegetated with shrubs and lined with rip rap
- 16) Which water conservation practice could potentially save the most amount of water in your home?
- Compost your food scraps rather than using a garbage disposal in your sink.
  - Take short showers and draw less water for baths.
  - Run your washing machine with a full load of clothes.
  - Install a rain barrel.
- 17) Which water quality-related act designates *'selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations?'*
- Clean Water
  - Wild and Scenic Rivers
  - Watershed Protection and Flood Prevention
  - Endangered Species
- 18) The Clean Water Act (CWA) is the cornerstone of surface water quality protection in the United States. The Act:
- Finances research on water related diseases like the Zika Virus and Malaria
  - Governs the sale of fish, shellfish, and wildlife in and from the nations' waters
  - Regulates the safety of bottled water for sale
  - Employs a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways
- 19) There is a bright green spill of what looks like lime green paint on the surface of the water in your favorite fishing area (see picture). What is most likely causing this problems?
- Duckweed or Lemna species.
  - Coontail or Ceratophyllum species..
  - Microcystis or cyanobacteria species.
  - Filamentous algae or Spirogyra species..

- 20) Look at the map provided, please list 5 potential sources of human water use along this river.
- A, C, D, E, F
  - B, C, F, G, H
  - A, D, F, G, I
  - B, C, D, H, J
  - C, D, E, F, J

- 21) View specimens of aquatic plants provided and identify which ~~one is~~ the invasive species.
- Pond Lily
  - Purple Loosestrife
  - Narrowleaf Cattail
  - Spadderdock
  - Arrowhead

**Please Select  
Two  
Answers**

- 22) View the pictures card of the macroinvertebrates provided and identify which on is a Level 3 organism tolerant of pollution.
- Stonefly nymph
  - Cranefly larva
  - Dragonfly nymph
  - Blackfly larva
  - Crayfish

- 23) View the picture cards of fish provided and identify which fish is the most tolerant of pollution.
- Largemouth Bass
  - Mountain Madtom
  - Green Sunfish
  - Rainbow Darter
  - Lake Trout

- 24) Use the Dichotomous Key provided to identify the macroinvertebrate.
- Burrowing Mayfly Nymph
  - Alderfly larvae
  - Hellgrammite
  - Fishfly larva
  - Caddisfly larva

- 25) Observe the watershed boundary overlays on topographic map sections provided. Which watershed boundary map is drawn correctly?
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