Water Quality **Participants** _____

C-Division _____

Station 1: General Water Quality

(1 point) 1) Briefly define the term “watershed”.

Answer: _____

_____

(1 point) 2) Briefly define the term “point source”.

Answer: _____

_____

(1 point) 3) Briefly define the term “nonpoint source”.

Answer: _____

_____

(7 points) 4) Match the definitions with the terms in the word bank below. Record the letter of the term on the blank line preceding the statement.

_____ a. The change of water from a gas to a liquid

____ b. The process in which water becomes a vapor in the atmosphere

_____ c. The method in which water continually moves from the earth to the atmosphere and back again

_____ d. A resource needed by all the living things in an ecosystem

_____ e. The gaseous state of water

_____ f. The forms of condensed water vapor such as snow, rain, or sleet

_____ g. Water stored in the ground

Word Bank:
A. condensation
B. water
C. water vapor
D. evaporation
E. water cycle
F. precipitation
G. groundwater

(1 point) 5) Define the term “invasive species”.

Answer: _____

_____

_____

(1 point) 6) To what region are Zebra mussels native?

Answer: _____

(1 point) 7) What process may be defined as the wearing away of the earth’s surface by running water, wind, ice, or other geological agents, processes, including weathering, dissolution, abrasion, corrosion, and transportation, by which material is removed from the earth’s surface?

Answer: _____

(1 point) 8) (True/False) Contour and terracing are two farming methods that may be used to prevent erosion.

Answer = _____

Station 2: Macroinvertebrates

A. Identify the following macroinvertebrates using common names only:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____

B. Determine water quality of each stream by calculating the cumulative pollution tolerance index from the macroinvertebrates found here:

(Example: If 2 different kinds are found in class 1 (2 x 4=8) + 1 in class 2 (1 x 3) + 2 in class 3 (2 x 2=4) +3 in class 4 (3 x 1=3) for a total of 18 would indicate good water quality based on the following scale:

Excellent = 23; Good = 17 – 22; Fair = 11 – 16; Poor – 10 or less

Tolerance Index

Class 1 (pollution sensitive)

Index Value=4
Mayfly nymph
Caddisfly larvae
Stonefly larvae
Dobsonfly larvae
Gilled Snails
Water penny larvae
Gilled snails
Riffle Beetle larvae

Class 2 (moderately sensitive)

Index Value=3
Aquatic sowbug
Damselfly nymph
Dragonfly nymph
Scuds
Crane fly larvae

Class 3 (moderately tolerant)

Index Value=2
Water mite
Midge larvae
Blackfly larvae
Flatworm
Leeches

Class 4 (pollution tolerant)

Index Value=1
Air breathing snail
Maggot
Tubifex
Blood midge

(6 points) 1) Would you rate Stream A as excellent, good, poor or fair? _____

(6 points) 2) Would you rate Stream B as excellent, good, poor or fair? _____

Stream A:

1 dobsonfly nymph (4)
1 cranefly nymph (3)
1 scud (3)
1 blackfly larvae (2)
1 mayfly nymph (4)

Stream B:

1 mayfly (4)
1 maggot (1)
1 stonefly (4)
1 caddisfly (4)
1 midge (2)
1 damselfly (3)

Station 3: Water Monitoring and Analysis Station

pH:

(1 point) 1) A water sample with a pH of 2 is considered to be:
a) basic.
b) acidic.
c) neutral.
d) perfect for aquatic life.

Answer: _____

(1 point) 2) (True/False) The pH of natural water falls between 9 and 14.

Answer: _____

(1 point) 3) Compare the color of the sample to the pH color chart. Record the result as pH.

Answer:

(1 point) 4) Is this result poor, good or excellent?

Answer: _____

Turbidity:

(1 point) 5) The test for turbidity describes:
b. the odor of water.
a) mineral concentration of water.
b) suspended material in the water.
c) metal concentration of water.

Answer: _____

(1 point) 6) Hold the turbidity chart on the top edge of the jar. Looking down into the jar, compare the appearance of the secchi disk icon in the jar to the chart. Record the result in JTU. _____

(1 point) 7) Does this result indicate good or poor conditions? _____

(1 point) 8) For what do the letters JTU stand?

Answer: _____

Secchi disk:

(1 point) 9) A secchi disk is used to measure:

a) the dissolved material in the water.
b) light penetration of a lake or pond.
c) flow of a stream or river.
d) the depth of silt on the bottom of a lake.

Answer: _____

(1 point) 10) Pollutants have a tendency to concentrate in higher life forms because:

a) pollutants become more toxic as time passes.
b) evaporation of lakes and streams concentrates them.
c) bioaccumulation of pollutants in the food chain.
d) higher life forms drink water.

Answer: _____

Dissolved oxygen:

(1 point) 11) (True/False) Warm water can hold more dissolved oxygen than cold water.

Answer: _____

(1 point) 12) Record the dissolved oxygen result of the water sample using the color chart.

Answer: _____

(2 points) 13) The water temperature is 16° C. Consult the color chart for dissolved oxygen at this temperature and record it from question 12. What is the percent saturation of the sample using the chart? _____. Is this good, fair or poor? _____

(1 point) (True/False) 14) Temperature effects the amount of dissolved oxygen in water.

Answer: _____

Nutrients:

(2 points) 15) Name two nutrients needed for plant and animal growth and are fundamental elements in metabolic reactions?

Answer: _____ and _____

(1 point) 16) Compare the color of samples to the phosphate color chart. Record the result as ppm phosphate.

Answer: _____

(1 point) 17) Is this result good or bad?

Answer: _____

(1 point) 18) Compare the color of the sample to the nitrate color chart. Record the result as ppm nitrate.

Answer: _____

(1 point) 19) Is this result good or bad?

Answer: _____

Fecal Coliform:

(1 point) 20) Explain why fecal coliform bacteria is used as an indicator of poor water quality.

Answer: _____

_____

1 point) 21) Compare the appearance of the tube to the picture on the coliform color chart. Is the result positive or negative?

Answer: _____

Alkalinity:

(1 point) 22) Hard water is a term commonly used to describe:

a) frozen springs.
b) groundwater found in arid areas.
c) water with many dissolved ions.
d) water distilled from acid rain.

Answer: _____

(3 points) 23) Alkalinity is the result of three negatively charged ions which shift pH to the alkaline (basic) side of neutrality. Name these three negatively charged ions.

Answer: _____

_____

Biological Oxygen Demand:

(1 point) 24) Describe Biological Oxygen Demand, or BOD.

Answer: _____

_____

(2 points) 25) List two reasons why people would be interested in sampling water for its quality.

Answer: _____

(1 point) 26) The hydrological cycle involves evaporation, precipitation, transpiration, infiltration, percolation, and runoff. Which of these terms describes the release of water from atmospheric vapor?

a) evaporation
b) precipitation
c) transpiration
d) percolation

Answer: _____

(1 point) 27) The hydrologic cycle is a term that describes:

a) the eventual loss of all water from the earth.
b) why three-quarters of the earth's surface is covered by water.
c) when we can expect heavy rains and floods.
d) the continuous natural recycling of water on the earth.

Answer: _____