OREGON ENVIROTHON 2023 **TEAM #_____**

AQUATIC ECOLOGY **Test Total: _____/ 50**

Note to teams: *If you notice that a kit is missing pieces, please notify one of the test administrators.*

Part I: Hands-On Analysis & Aquatic Macroinvertebrates

1. Collect a water sample and analyze it with the test kits. Record the values you find for the following parameters: [5 points]

   a. Temperature: _____
   b. pH: _____
   c. Dissolved Oxygen: _____
   d. Phosphate: _____
   e. Nitrate: _____

   Answers will depend on water sample and macroinvertebrate collected.

2. What is the water quality classification for this sample according to the Oregon Water Quality Standards for Salmon and Steelhead? [1 point]

   Class AA Class A Class B

3. Identify the macroinvertebrate within the sample dish; include both the common name and the life stage. [2 points]

   _____

4. Circle the correct words from the underlined choices. [2 points]

   The macroinvertebrate in the sample dish could / could not have come from the same source as the water sample because this macroinvertebrate can / cannot tolerate water pollution.

5. Fill in the blanks with the words provided. [4 points]

   Stoneflies undergo _____incomplete_____ metamorphosis. This means there is a distinct ____larval_____ stage, usually called nymphs or naiads, and a distinct _____adult_____ stage but no ____pupal_____ stage.

   larval complete incomplete adult pupal aquatic exoskeleton

____/ 14 points

Part II: Current Issue – Adapting to a Changing Climate

6. Climate stress is often experienced as the following forms of water stress except: [1 point]

    a) weather events
    b) desalination
    c) floods
    d) drought
    e) sea level rise

7. True or False? Climate change should impact precipitation in Oregon by decreasing winter precipitation and increasing summer precipitation. [1 point]

8. True or False? Although total precipitation is not expected to be significantly impacted by climate change in Oregon, we will have more rain and less snow. [1 point]

9. Fill in the blanks with the words provided. [4 points]

    Over the past century, most of Oregon has warmed by about _____two_____ degrees. In the coming decades, coastal waters will become more ___acidic_____, and streams will be ____warmer_____ and have _____lower_____ flows in summer.

    cooler alkaline two warmer four eight acidic lower higher

10. MATCHING [4 points]

    Although wetlands are vulnerable to climate change, they play a role in mitigation and adaptation. Put the letter of the role wetlands play in each of the given scenarios.
    (V) vulnerable (susceptible to negative impacts of climate change)
    (A) adaptation (adjust to new conditions caused by climate change)

    ___A___ a) Wetlands can offset changes in precipitation and snow melt by storing water and reducing the effects of drought and severe storms.
    ___V___ b) Carbon stored in wetland soil may be released to the atmosphere.
    ___V___ c) Loss of habitats suitable for amphibians and wetland invertebrates.
    ___A___ d) Wetlands help keep waters flowing in streams, which helps offset the effects of increases in summer droughts on salmon and other species.

___ / 11 points

Part III: The Water Cycle

11. Match the following components of the water cycle with the definition on the right. [5 points]:

_e_ Condensation	a. Water movement over the Earth's surface
_d_ Evapotranspiration	b. Water movement from atmosphere to soil
_f_ Spring	c. From a solid state into gaseous
_b_ Infiltration	d. Directly from plants into atmosphere
_c_ Sublimation	e. From a gaseous state to a liquid
	f. Flow of groundwater to the Earth's surface

12. What must happen for water vapor to turn into liquid droplets? [1 point]

    a. It must be agitated.
    b. It must be heated.
    c. It must be cooled.
    d. It must be energized.

13. Which is the correct order in the water cycle? [1 point]

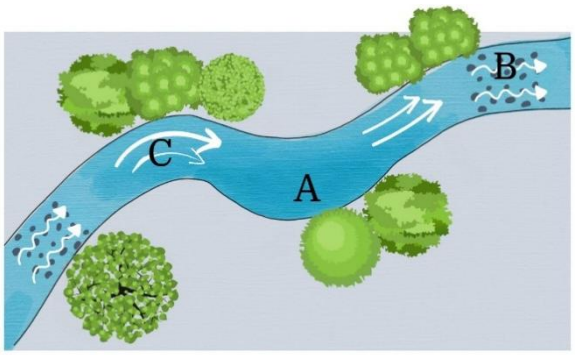
    a. Precipitation, evaporation, runoff, condensation
    b. Evaporation, run off, precipitation, condensation
    c. Evaporation, condensation, precipitation, runoff
    d. Runoff, condensation, evaporation, precipitation

___ / 7 points

Part IV: River Systems, Maps

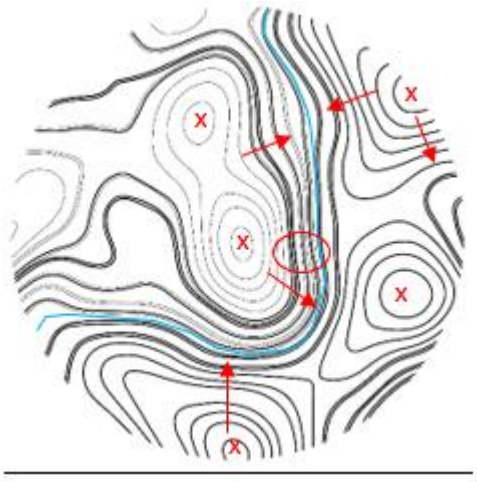
14. Describe three benefits provided by trees in the riparian zone. [3 points]
    Any of the following, or other correct answer:
    a. Habitat for wildlife
    b. Erosion control
       Shade for stream
       Water cooling/temp control
       Food for insects
    c.

15. Put the correct letter next to the term that describes the part of the river in the diagram to the right. [3 points]
    _B__riffle
    _A__pool
    _C__run



16. On the image below [3 points]:

    a. Place an X on one mountain peak
    b. Circle the area with the steepest slope.
    c. Place an arrow(s) pointing downhill.



___ **/ 9 points**

Part V: Human Impacts & Food Chains

17. In a water body experiencing artificial eutrophication, all the following conditions would be found except: [1 point]

a. an increase in nitrogen
b. an increase in phosphorus
c. an increase in algae
d. an increase in oxygen
e. a decrease in pH

18 A farmer has livestock, row crops, and Christmas trees. For each commodity, describe one management practice the farmer could take to mitigate potential negative impacts to water quality. [3 points]

a. Livestock – cover manure piles, keep cows out of creek (There may be other answers.)

b. Row crops – plant cover crops (There may be other answers.)

c. Christmas trees – contour planting, inter-row planting (There may be other answers.)

19. Place the letter of the term below on the line of the corresponding description. [3 points]

__b_Barriers to this can eliminate many miles of valuable habitat.
__a_Points of direct contact between streams and roads.
__c_A common, generally less costly stream crossing, often undersized.

a. stream crossing b. fish passage c. culvert d. resting pool e. bridge

21. Identify the trophic level for each of the following organisms found in an aquatic food chain. [2 points, 0.5 point each]

_d_ osprey
a/e cattail
_c_ salmon
_b_caddisfly

a. Producer
b. Primary consumer
c. Secondary consumer
d. Tertiary consumer
e. Autotroph

___ / 9 points