

Water Quality Test 2013

SECTION ONE – WATER ECOLOGY 40 points

True or False

1. Detritus produced in estuarine communities stays within that estuary and does not enter the open ocean
2. The thermocline layer in a lentic water body is a thick layer of water with very slow temperature change occurring.
3. Activated sludge is pumped into the aeration tank in the secondary treatment state of wastewater management.
4. Pollutants and toxins are less harmful to life forms higher up on the food chain because the toxins decrease at a rate of 10% at each level of the food chain.

FILL IN THE BLANK WITH THE CORRECT TERM

5. The curve upper surface of a column of water is called the _____
6. The process of a body of water receiving excess ammonia which stimulates algae growth is called _____
7. Two trees of the same species that grow very close together and vie for sunlight and soil nutrients are an example of _____ competition.
8. Birds eat fruit and then excrete the seeds. This is an example of which community interaction? _____
9. The change of water from a gas to a liquid is known as _____.
10. The change from a solid to a gas is known as _____.
11. The process in which water becomes a vapor in the atmosphere is known as _____
12. The gaseous state of water is called _____
13. The forms of condensed water vapor such as snow, rain, or sleet are collectively called _____
14. Water stored in aquifers is known as _____

List the following steps of potable water treatment in order from start to finish– NOTE – not all steps are listed. (sedimentation, disinfection, chemical addition, coagulation and flocculation)

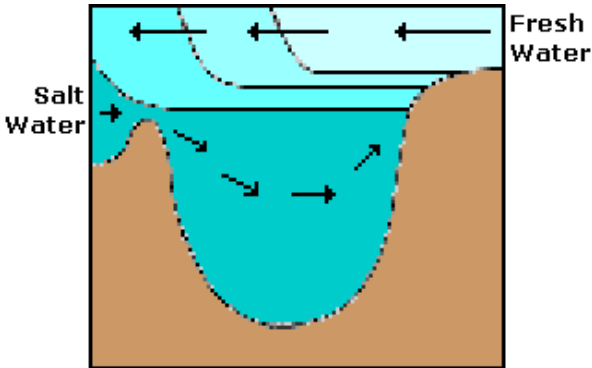
- | | |
|-----|-----|
| 15. | 16. |
| 17. | 18. |

What are the two ways in which estuaries are generally classified?

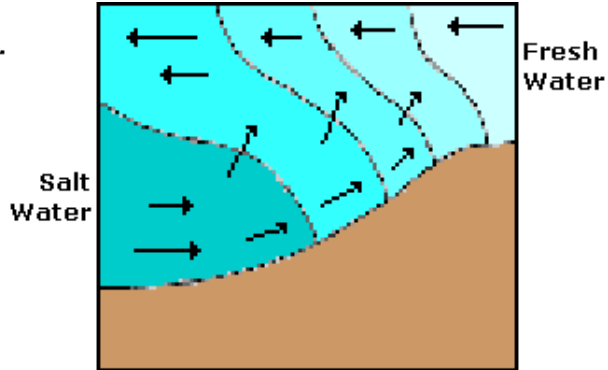
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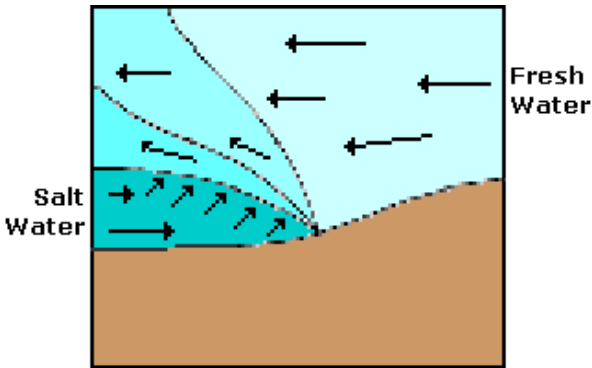
Label the diagrams below with the correct estuary classification.



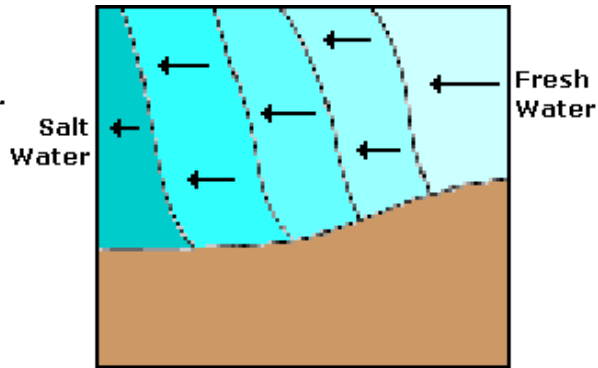
21 _____



22 _____



23 _____



24 _____

Use the word bank below to match each type of estuary to the correct description, and then provide an example to each **using the estuaries listed**.

Type of estuary	Description	Examples
25.	barrier beaches or islands	26.
27.	drowned river valleys	28.
29.	earths tectonic plates run into or fold underneath each other	30.
31.	occur when sediments accumulate more rapidly than ocean currents can carry them away	32.
33.	step-walled river valleys formed by advancing glaciers	34.

WORD BANK – fjord, tectonic, bar built, delta, coastal plain, Puget Sound, Mississippi River LA, Hudson River NY, Pamlico Sound NC, Puget Sound WA)

35. Are the fresh-salt mixing areas of the Great Salt Lake in Utah (or other salt lakes) considered to be "estuaries"?

36. Why or why not?

Name two phenomena that control the physical and chemical parameters in estuaries.

37.

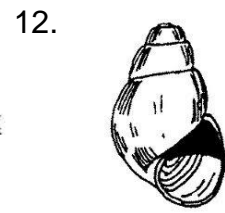
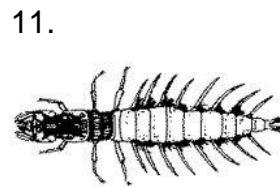
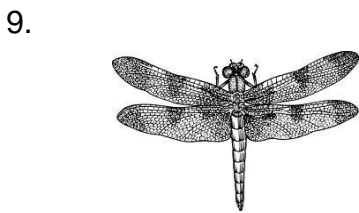
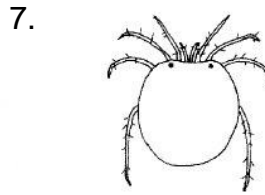
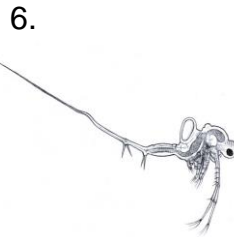
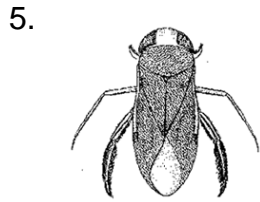
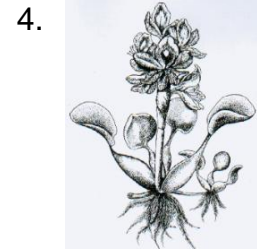
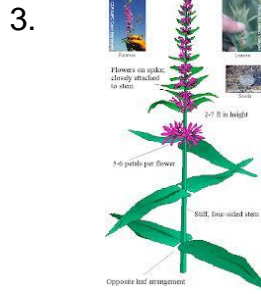
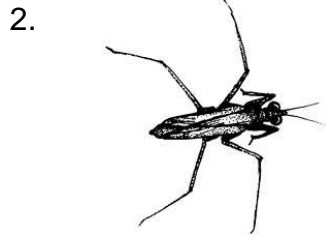
38.

39. Explain why estuaries are sometimes referred to as "nurseries of the sea."

40. Name the largest undeveloped mangrove ecosystem in the United States.

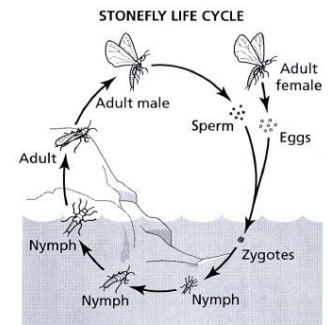
SECTION 2 - – MACRO-FLORA AND FAUNA 30 points

Identify each picture with common name, including adult, nymph or larvae when applicable.



13. What do the images #1, 3, 4 and 6 have in common?

14. Based on this following diagram, a stonefly will go through a(n) _____ life cycle.



15. If you only found the following benthic macroinvertebrates in a streambed, which assemblage would indicate poor water quality?

- a. caddisfly larvae, gilled snail, water penny larvae
- b. giant water bug, mosquito, back swimmer
- c. midge, water mite, flatworm

SECTION 3 – WATER MONITORING AND ANALYSIS 30 points

1. On a pH scale, which number indicates a neutral pH?
2. Which pH value is more acidic – 4 or 12?

<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>
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True or False

3. Seawater is more acidic than pure water.
4. Water at 72°F would have a higher DO than water at 55°F.
5. On a pH scale, each successive number represents a 5-fold change in pH.
6. A Secchi disc is used to measure the turbidity of a stream.
7. A pH reading of 3-6 indicates optimal parameters for aquatic life.
8. Total Solids consist of only suspended solids in the water.
9. NTU is a unit of measurement used to determine turbidity in water.
10. Raw sewage has a lower BOD measurement than unpolluted water.
11. Dissolved Oxygen needs to be measured over a period of five days.
12. In estuaries, salinity levels are generally highest near the mouth of a river where the ocean water enters, and lowest upstream where freshwater flows in.
13. The amount of oxygen that can dissolve in water, or solubility, increases as salinity increases.
14. Bodies of water only obtain oxygen from photosynthesis by aquatic plants.

Multiple Choice

15. If a Secchi disc can be viewed 10 feet under water, then what is the approximate distance that light can penetrate that water?
a. less than 10 feet b. 15-20 feet c. 20-30 feet d. Secchi disc are not used underwater
16. Which of the nine WQ tests is weighed the highest?
a. total solids b. pH c. DO d. temperature
17. What is a hydrometer?
a. an instrument used to measure the flow of water
b. a meter that is used to measure the depth of water
c. any instrument used to measure in wet conditions
d. an instrument used to measure salinity

18. The condition in which DO is below 1 mg. and no life that requires oxygen can be supported is called
- a. hypoxia
 - b. bioaccumulation
 - c. apoxia
 - d. stagnation
19. There is a famous dead zone in the Gulf of Mexico where dissolved oxygen concentrations are nearly zero. What do scientists believe is causing the dead zone in the Gulf of Mexico?
- a. Sediment
 - b. High levels of nitrates
 - c. Heavy metals
 - d. Cryptosporidium
20. Why is coliform bacteria used as an indicator of poor water quality?
- a. indicates high phosphate levels
 - b. indicates high oxygen levels
 - c. indicates acid rain
 - d. indicates fecal contamination
21. Which of the following statements about phosphates is true?
- a. Phosphates will enter waterways from runoff
 - b. Phosphates are measured with an Imhoff cone
 - c. Phosphates stimulate the growth of water plants and plankton
 - d. a and c
22. Which of the following statements about nitrates is false?
- a. Nitrogen is required for building proteins by all living plants and animals
 - b. Nitrates stimulate the growth of plants and algae in the water allowing for more animal food
 - c. excess amounts of nitrates do not effect water quality
 - d. Nitrogen is required for building proteins by all living plants and animals
23. NOAA sponsors this Science Olympiad Event. What does NOAA stand for?
24. Water in most estuaries is brackish due to the mixing of salt water and fresh water. A drought in the by watershed would most likely cause the water in the bay to
- a. increase in salinity
 - b. stay the same
 - c. decrease in salinity
 - d. rise
25. SALINITY TESTING – WORTH 5 POINTS
EACH TIME MAY COME UP TO WATER SAMPLES WHEN CALLED TO TEST SALINITY WITH THEIR SALINOMETERS.