

Name: _____ Hydrosphere Time Allotted: 20 minutes

Key: (*) = more than one answer possible (e.g. Answer: A, D, and E)

1. Which of the following is true of the net transport behavior of wind-driven ocean currents? (*)

- a) It is a consequence of the Coriolis effect
- b) It pushes surface water to the left of the wind direction in the northern hemisphere
- c) The spiral forms a right angle to the wind direction
- d) The deeper layers of water move at the same pace as shallow water

2. Which of the following best characterizes magnetic anomalies on the seafloor?

- a) Occur in stripes parallel to mid-ocean ridges and offset along transform faults
- b) Occur in stripes perpendicular to mid-ocean ridges and parallel to transform faults
- c) Occur in stripes parallel to continental margins and to transform faults
- d) Occur in stripes perpendicular to continental margins and parallel to transform faults

3. Thermohaline circulation is a large-scale global ocean circulation system. This system has multiple driving forces. Which of the following are the driving force(s) of thermohaline circulation? (*)

- a) Ocean gyres
- b) Freshwater fluxes
- c) Coriolis effect
- d) Surface heat

4. Benthic foraminifera are characterized by all of the following except:

- a) Used in paleoceanographic reconstructions
- b) Widespread distributions, including marshes, coastal estuaries, bays, and lagoons
- c) Are a major component of siliceous ooze
- d) Cannot exist below CCD of about 5000 m

5. In which of the following locations is someone most likely to find calcareous ooze?

- a) At the bottom of the northern Pacific ocean
- b) Below a region of the ocean with periodic diatom blooms
- c) Along the coast next to a poorly regulated carbonic acid factory
- d) A shallow marine environment commonly used for coccolithophore research

A large ocean vessel delivering rubber ducks suffers a major crash at the point marked with an X. Answer the following three questions based on this image.



6. Which of the following is the most likely destination of the majority of the rubber ducks?

- a) A
- b) B
- c) C
- d) D

7. Which of the following winds are primarily responsible for generating the circulation responsible for the movement of ducks? (*)

- a) Prevailing westerlies
- b) Polar easterlies
- c) Trades
- d) Polar jet stream
- e) Subtropical jet stream

8. At which point is the velocity of ocean currents highest?

- a) A
- b) B
- c) C
- d) D

9. Which of the following is true of hydrogenous sediments? (*)

- a) They tend to form rather quickly under high-pressure environments
- b) They usually comprise more than half of the sediment on the seafloor
- c) They commonly form near geysers, fumaroles, and black smokers
- d) They come from the continental shelf and are deposited via river transport
- e) They often form hydrates when produced via evaporation

10. Forest cover in Thailand has declined from 61 percent of the country's land area to 34 percent. Deforestation has several effects—a major one being soil erosion which flows into rivers. This soil erosion results in: (*)

- a) Reduced bedrock dissolution
- b) Increase in suspended load
- c) Overloaded river deltas
- d) Depletion of useful nutrients present in waterways

11. Consider a massive rain event and the amount of time that it takes for the runoff to reach the water.

- a) The landscape has a large effect on the amount of flow and the amount of time for the flow to occur, which of the following is the most accurate?
- b) Large rainstorm events produce large amounts of runoff directly after the rainstorm with flow occurring over forested habitats
- c) Large rainstorm events produce small amounts of runoff over a longer period of time with delayed onset in a forested environment
- d) Large rainstorm events produce large amounts of runoff over a longer period of time beginning during the rain event originating in a forested ecosystem
- e) Large rainstorm events produce large amounts of runoff during the rain event and a small amount of runoff that continues for the next week beginning in a forested environment

12. The Great Pacific Garbage Patch is in a specific location in the middle of the Pacific Ocean. What results in the location of the garbage patch?

- a) Thermohaline circulation concentrates surface debris in this location
- b) Density gradients resulting in specific current patterns around the Pacific
- c) The abundance of anthropogenic activity along the California Coast
- d) Convergence of Ekman transport spirals in the North Pacific

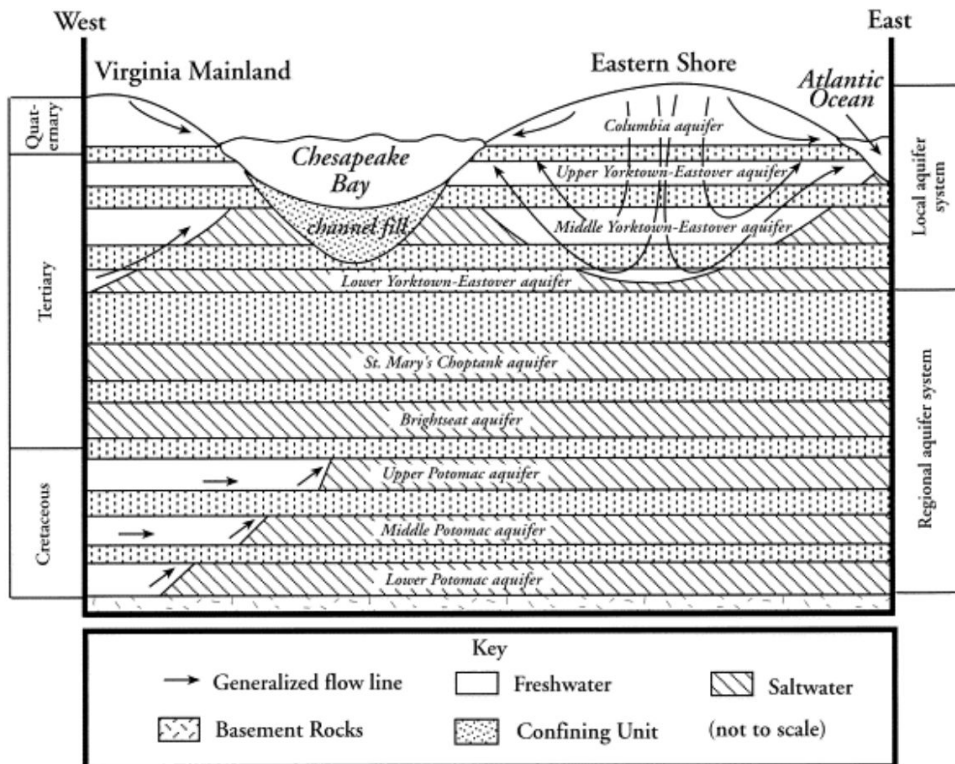
Consider the data below in answering the following question. Precip refers to monthly precipitation; PE refers to monthly potential evapotranspiration.

Silver Lake	J	F	M	A	M	J	J	A	S	O	N	D	T
Precip	1.84	2.29	3.15	3.37	3.16	2.57	2.73	2.4	1.65	1.7	1.68	1.47	28.01
PE	0	0	0	0	0.93	3.66	4.71	3.93	2.24	0	0	0	15.47

13. During what time period does groundwater in Silver Lake initiate recharge again?

- a) January-February
- b) April-May
- c) June-August
- d) September-October
- e) November-December

Consider the figure below depicting saltwater intrusion and different aquifers in the Chesapeake Bay area. Answer the question that follows.



14. What can you deduce about the aquifers in the Chesapeake Bay area?

- a) The freshwater aquifers are recharged by infiltration of the surface waters and yearly precipitation.
- b) The shallow unconfined aquifers are unable to recharge the deeper layers
- c) The confining units in the upper layers are most likely permeable
- d) The lower confined aquifers, although saline, are less concentrated than the upper confined aquifers:

15. Which one of the following statements is true? (> means greater than and < means less than respectively.)

- a) Conductivity of ocean water < Conductivity of groundwater < conductivity of rain water
- b) Conductivity of ocean water < Conductivity of groundwater > conductivity of rain water
- c) Conductivity of ocean water > Conductivity of groundwater < conductivity of rain water
- d) Conductivity of ocean water > Conductivity of groundwater > conductivity of rain water