

Oceanography Section 5-3 and 5-4 Questions**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- _____ 1. All of the following are unique properties of water *except*
- High melting point.
 - Great heat capacity.
 - Great solvent power.
 - High boiling point.
 - Great contraction as freezes.
- _____ 2. The structure of the water molecule is unusual for all of the following reasons *except*
- It is asymmetric with the hydrogen atoms grouped together about 105° apart at one end of the molecule in the liquid or gaseous state.
 - Electrons are not evenly distributed across the molecule.
 - It is dipolar with a slight positive and a slight negative end.
 - It is hexagonal in shape.
 - Its hydrogen atoms move farther apart to about 109.5° as water becomes ice.
- _____ 3. The hydrogen bond is important because
- It allows water to dissolve salts by neutralizing the ionic bonds between the atoms in the salt.
 - It indirectly makes ice less dense than water.
 - It attracts the water molecules to each other to form hexagonal patterns.
 - It makes water below 3.98°C less dense.
 - All of the above
- _____ 4. Salinity
- Is a measure of how much solvent has been dissolved in a solute.
 - In a sample of seawater is a measure of the number of sodium and chlorine ions present.
 - Is a nonconventional property of the sea.
 - Is a measure of all salts dissolved in a sample of water.
 - All of the above
- _____ 5. Inert gases are
- The most abundant gases dissolved in the sea because they do not react.
 - Highly reactive and used by plants in photosynthesis.
 - Types of nutrients called noble gases.
 - Released by organisms when they decompose.
 - components of the dissolved gases in the sea and are chemically unreactive.
- _____ 6. Based on the principle of constant proportions,
- Salinity never changes within the ocean.
 - The ratios of various salts are unstable in volcanic areas.
 - The residence times of salts are very long.
 - Chlorinity provides a good basis for determining salinity.
 - All of the above

- _____ 7. Salt sinks reduce the amount of salt in the sea and include all of the following *except*
- Formation of evaporites.
 - Formation of shells.
 - Absorption of ions by clays.
 - Dilution of salt by springs and rivers.
 - None of the above
- _____ 8. Rivers supply most of the salt to the sea, but river water is very different from ocean water in terms of the ratios of salts present because
- The ocean is rapidly mixed and salts are evenly distributed.
 - Some salts have long residence time and accumulate in the sea.
 - More organisms that use the salts live in the sea.
 - Many salts are deposited as the river flows into the ocean.
 - All of the above
- _____ 9. Adding salts to water results in all the following *except*
- A freezing point below 0°C because salts prevent the easy formation of hexagons.
 - Higher vapor pressure because salts disrupt the formation of hexagons, crowding the water molecules together and forcing them to evaporate more rapidly.
 - A higher density by preventing the formation of hexagons and by adding material in solution.
 - A lower gas content that can be held in solution.
 - Less acidic water by decreasing the saturation value for CO₂.

Completion

Complete each statement.

10. The unique structure of the water molecule creates an electronic attraction between water molecules, called the _____. As fresh water cools below 3.98°C, the attraction between groups of water molecules leads to the formation of a multisided figure called a _____. This arrangement becomes rigidly structured in _____. This same electrostatic attraction of water molecules allows water to dissolve salts through _____ of the ions, leading to the formation of positive ions called _____ and negative ions called _____.
11. Chemicals that are essential for plant growth and survival are called _____. Unlike salts, the concentration of these components can vary greatly with time and geography. Because of this, they are referred to as a _____ property of seawater. Due to their rapid recycling, they remain in solution for only a short interval and are said to have a short _____.
12. Substances that occur in parts per billion in seawater are called _____.
13. The total amount of salts dissolved in water is called _____. The water is the _____ because it does the dissolving and the salt is the _____ because it is dissolved. If in 1 kg of saltwater there are 20 grams of salts dissolved in 980 grams of water, this would be written as 20 _____ or 20 _____. The two major components of salt in seawater are _____ and _____.