

NAME : _____

Date : _____

Chemistry Of Life : Review #1

Cell Compounds: (Learning Outcomes B1-B3)

L.O. B-1 Hydrogen bonding in water molecules

- ___ 1. What kind of bond forms between the oxygen and hydrogen of the same water molecule?
- ___ 2. What kind of bond forms between the oxygen and hydrogen of the different water molecules?
- ___ 3. Which of the two types of bonds above is stronger?
- ___ 4. Why does the oxygen atom take on a slightly negative charge?
- ___ 5. What is the definition of a polar molecule?
- ___ 6. Briefly describe the formation of the hydrogen bond, and draw a picture of one that forms between two water molecules.
- ___ 7. Explain the difference between an ionic bond and a covalent bond.

L.O. B-2 Properties of water

- ___ 1. Water dissolves many chemical substances. It is therefore called the.....
- ___ 2. What sorts of molecules easily dissolve in water?
- ___ 3. Give at least two crucial reasons why it is essential that Blood is about 50 % water. HINT: Think of the main properties of water, and think of how a couple of those properties can help sustain life.
- ___ 4. List a characteristic or two of water that are responsible for supporting all aquatic food chains and aquatic life and explain your answers.
- ___ 5. Explain why water has such a high specific heat capacity.
- ___ 6. As far as thermoregulation goes, explain why the human body being composed of about 65% H₂O is essential to sustain life.
- ___ 7. What happens to the majority of heat that is produced by the cells during metabolic reactions?
- ___ 8. When ice forms in a body of water, where does it form and explain why?
- ___ 9. Why is this property crucial for sustaining aquatic life forms?
- ___ 10. Water molecules are cohesive. What does this mean?

L.O. B-3 Acid, Bases, and Buffers

- ___ 1. When acids are dissolved in water, what ions are released/produced?
- ___ 2. When bases are dissolved in water, what ions are released/produced?
- ___ 3. A substance that keeps the pH constant despite the addition of more H⁺ and OH⁻ is called a _____.
- ___ 4. Where do acids fall on the pH scale and list three acids?
- ___ 5. What do we call a substance with a pH equal to 7 and name one?
- ___ 6. A change of one (ex 5→4) on the pH scale refers to a change in H⁺ ion concentration of _____ times.
- ___ 7. A pH of 6 has _____ times as many H⁺ ions than a pH of 9.

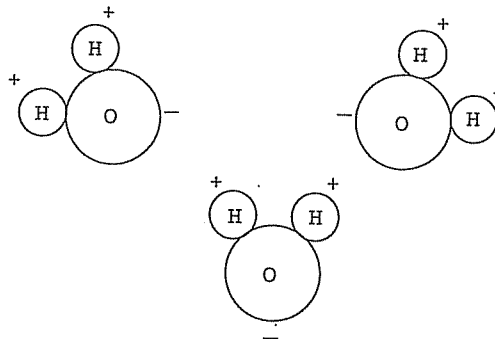
8. Imagine that your blood is becoming too Basic (you have a condition known as "Alkalosis" of the blood. Describe the chemical reaction that will take place to buffer this condition to prevent your blood rising to a pH of more than 7.4.

Quick Quiz below:

1. The polarity of a water molecule results from
- more of the protons being in the hydrogen nucleus.
 - more of the electrons being near the hydrogen nucleus.
 - the equal numbers of protons in hydrogen and oxygen.
 - the unequal sharing of electrons between hydrogen and oxygen.

2. The phenomenon of surface tension is a result of _____ between water molecules.
- cohesion
 - adhesion
 - capillary action
 - imbibition

3. The indicated charges allow these molecules to

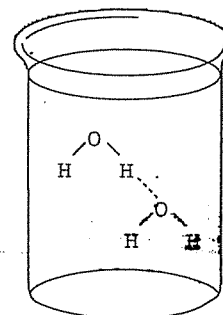


- act as a solvent.
 - form the cell membrane.
 - buffer a solution.
 - store energy for cellular use.
4. In a solution that is acidic, the number of:
- OH^- ions is greater than the number of H^+ ions.
 - OH^- ions is less than the number of H^+ ions.
 - H^+ ions is less than the number of OH^- ions.
 - H^+ ions is equal to the number of OH^- ions.

5. Hydrophilic molecules:
- are nonpolar.
 - never interact with water.
 - readily interact with water.
 - completely ionize in water.
 - form strong hydrogen bonds among themselves.

6. Acids are defined as compounds that dissociate in water to release:
- chloride ions (Cl^-).
 - calcium ions (Ca^{2+}).
 - hydrogen ions (H^+).
 - hydroxide ions (OH^-).

7. The type of bond shown between the two water molecules is



- ionic.
- peptide.
- covalent.
- hydrogen.