Key

Chapter 21 Review

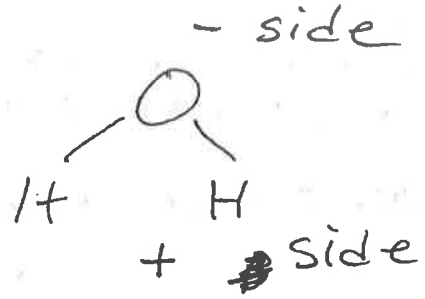
1. Describe the structure and shape of a water molecule.

Consists of 2 Hydrogens & 1 Oxygen

V-shape

2. Water is a polar molecular. What does this mean? Show the separation of charge in a water molecule.

It has a separation of charge.



3. What are hydrogen bonds?

Attractions between a hydrogen atom on one molecule and the negative atom of another molecule.

4. How does hydrogen bonding cause ice to take up more space than liquid water?

Causes the molecules to line up in an organized way - like a honeycomb - with space between and around the molecules.

5. Describe the properties of water that are related to hydrogen bonding.

- high specific heat: take lots of energy to heat up water because of strong attraction between molecules
- high boiling point: takes lots of energy to separate molecules.
- high surface tension – H-bonds cause H_2O molecules to make a "skin" on surface as they are attracted downward to other molecules.
- Universal solvent - because of polarity

6. Why is water called the "universal solvent?"

Can dissolve many types of substances.

7. How does water dissolve ionic compounds such as salt and molecular compounds such as sugar?

Separates salt into Na^+ & Cl^- ions because of attractions between Na^+ & oxygen side and Cl^- and hydrogen side

Separates sugar into individual molecules of sugar because of polarity of both water & sugar.

8. What does "like dissolves like" mean?

Polar dissolves polar

non-polar dissolves non-polar

9. Define a mixture and differentiate between a homogeneous and a heterogenous mixture.

Mixture: 2 or more substances combined where each retains its properties.

- Homogeneous: evenly dispersed
- Heterogeneous: not evenly dispersed - can see individual components.

10. What is the difference between a colloid and a suspension?

Colloid: small particles that stay dispersed - Ex: fog, milk

Suspension: large particles that settle out upon standing.

11. What are the two parts of a solution?

Solute: what is dissolved (smaller part)

Solvent: what does dissolving (larger part)

12. Define the following terms.

a. solubility:

Amount of a substance that can be dissolved in a certain amount of water at a certain temp.

b. unsaturated solution:

less than maximum amount is dissolved.

c. saturated solution:

maximum amount of solute that can be dissolved is dissolved.

d. supersaturated solution:

more than maximum amount dissolved - very unstable; comes out of solution easily.

13. How does temperature affect the dissolving of solids in liquids?

High temp increases solubility of solids because water molecules moving faster and interacting with solid more frequently

14. How does temperature affect the dissolving of gases in liquids?

High temp decreases the solubility of gas, because high temp causes gas particles to move faster and escape.

Essay Prompt: Water has both a high specific heat capacity and a high boiling point. Describe these properties and how hydrogen bonding relates to them..