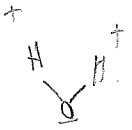
Key

Unit 10: Problem Set 1
Chapter 15 worksheet

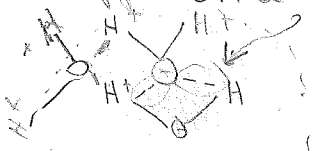
1. Why does water bend towards a comb charged with static electricity?



Water is polar:  The charged H^+ are attracted to the neg. comb.

2. Describe hydrogen bonding: The bond that forms between the hydrogen of one water molecule and the oxygen on a different water molecule

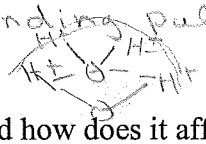
3. How does hydrogen bonding effect vapor pressure?



Hydrogen bonds hold the water molecules & pull them. This makes it more difficult for H_2O to evaporate

4. Why is a water droplet round? Explain.

Hydrogen bonding pulls inward toward the center of the drop.



5. What is a surfactant and how does it affect the surface tension of water?

Surfactant = surface acting agent that breaks the hydrogen bonds & this lowers the surface tension of the water.

6. What is the difference between the structure of liquid water and ice? How does this explain why ice floats on water? Water particles are tightly packed. Ice is a honeycomb structure due to hydrogen bonding. This bonding moves the water molecules apart, making them less dense. This cause the ice to "float".

7. Kool-aid is a type of solution. Identify the parts that make up this solution.

Solute: koolaid (+ sugar)

Solvent: water

8. How is carbonated water an aqueous solution. Explain.

It is a gas (solute) dissolved in a solvent (water).

9. What does "like dissolves like" mean?

Charged substances dissolves charged { Ionic + Polar (Covalent) — salt + H_2O ; Ionic + Ionic ; Polar + Polar — Sugar + H_2O }

Non charged dissolves in non charged (nonpolar covalent + nonpolar covalent)

10. Gasoline is poured into a glass of oil. Explain why the two substances mix.

Oil & gas are both non polar

+10 Polar-Polar = Nm-Nr
Polar-Ionic = M-Nr

11. Which of these substances will dissolve in water? Explain in terms of bonding.

NP-Nr-Nr

a. CH_4 no : tetrahedral ; nonpolar covalent

I b. KCl yes : ionic

NP c. N_2 No ; linear : N≡N

I d. $MgSO_4$: yes : ionic

Polar Nr e. $C_{12}H_{22}O_{11}$ (sugar) ; yes ; covalent polar
Sugar

12. Why does sodium chloride (NaCl) conduct electricity while sugar ($C_{12}H_{22}O_{11}$) does not? Identify each as an electrolyte or nonelectrolyte.
Sodium chloride is an ionic bond + has metals ; electrolyte
Sugar is a covalent bond with no metals ; non

13. What is a better electrolyte: $AlCl_3$ or K_2S and why? K_2S $NaCl$
K_2S ; more metals to conduct electricity

$CuSO_4 \cdot 5H_2O$

14. What will happen to the mass of a hydrated crystal (crystal of hydration) when it is heated? Explain. $CuSO_4 \cdot 5H_2O$
The mass will lower. Hydrated cryptals are cryptals with water inside of them. When they are heated, the water evaporates.

15. Many shoes are sold with hygroscopic odor eaters inside. Explain how odor eaters work. Hygroscopic materials absorb water & reduces the amount of sweat.

16. How is a colloid different from a suspension? How can you make an emulsion of oil and water? A colloid has particles that stay intermixed.
A suspension has particles that separate (Both exhibit the Tyndal Effect).
A emulsion is a liquid/liquid colloid : Oil + H_2O w/egg + it stays intermixed.

17. When driving in the fog you can see the beam of your headlights. Why? What type of mixture is this? Colloid. The particles of the fog stay intermixed in the air & reflect light (Tyndal Effect.)