Section 4A and 4B Review

Name_____

Part 1: Concepts

1a) What is a solution?

A solution is a homogeneous mixture of two or more substances in a single state of matter.

b) What are the 2 parts of every solution? Differentiate between them.

Every solution has a solute and a solvent. The solute is the substance that dissolves in to the solvent. The solvent absorbs the solute into it.

2) In the following examples, determine the solute and the solvent:

Solution	Solute(s)	Solvent
Ocean Water	salt	water
Kool-Aid	powder	water
Air	oxygen, carbon dioxide	nitrogen

3a)What is a saturated solution?

A solution where the solvent has dissolved as much solute as it can, and it cannot hold anymore solute.

b) What is a supersaturated solution?

A solution where the solvent has been rigged to hold more solute than it normally can at that particular temperature.

c) What is an unsaturated solution?

A solution in which the solvent has dissolved less than the maximum amount of solute, and could dissolve more solute into the solvent.

4) What would happen if you dropped a crystal of solute into each of the following?

a) A saturated solution:
the crystal would not dissolve

b) A supersaturated solution:
the crystal would cause the extra solute in the solution to reappear

c) An unsaturated solution:
the crystal will dissolve

5) Why are water and oil insoluble?

Water is polar and oil is nonpolar. Water can dissolve only polar and ionic compounds.

6) What can be done to cause a solid solute to dissolve more quickly in a solvent?

Crushing the solid into smaller particles, stirring the mixture and increasing the temperature of the solvent will all encourage the solute to dissolve.

7) How is gas solubility different from solid solubility?

In general, gases dissolve more at lower temperatures into a solvent, while solids dissolve more at higher temperatures.

8) Under what conditions of temperature would the water have

a) the most dissolved gas?
lower temperatures

b) the least dissolved gas?
higher temperatures

9) Why is water able to dissolve so many ionic compounds?
Ionic compounds have positive and negative charges. Water is polar, with positive and negative ends. The charges can interact to cause more dissolving.

10) Describe what happens to an ionic compound when it dissolves in water.
The negative ends of water molecules grab onto positive ions in the solid and rip it off and surround it and take it into the water. The positive ends of the water do the same to the negative ions. This rips the solid apart into small pieces that you cannot see.

11) Give an example of a solution, a colloid and a suspension and what makes them that kind of mixture.

- solution - kool aid - the kool aid powder is evenly mixed in the water and it all looks the same.
- colloid - chocolate chip cookie - can see the chocolate chips in the cookie, but stays mixed
- suspension - fruit on the bottom yogurt - can see the different layers, and fruit has settled.

Part 2: Calculations and Graphs
1) What is the pph of a solution in which 3.5 grams of salt is dissolved in 96.5 g of water?
3.5 %

2) What concentration, in pph, will a sucrose solution composed of 45.5 grams of sugar in 300. grams of water?
13.1 %

3) A tap water solution has a strong chlorine smell. You test 1000 grams of water and find it contains 0.50 grams of chlorine. What is the ppm of the solution?
500 ppm

4) How many grams of KCl can water dissolve at 60 ^{O}C?
about 46 g in 100 g of water

5) Is a solution of $KClO_3$ saturated if 20 grams are dissolved at 80 ^{O}C?
no, it is unsaturated

6) What is the percent concentration of a saturated solution of NaCl at 70 ^{O}C?
27.5 %