

## Solution Concentrations

Name: \_\_\_\_\_

1) One teaspoon of table sugar ( $C_6H_{12}O_6$ ) is dissolved in a cup of water. Identify

The solute: \_\_\_\_\_

The solvent: \_\_\_\_\_

2) What is the concentration of each of these solutions expressed as percent sucrose by mass?

a) 17 g sucrose is dissolved in 183 g water

b) 30.0 g sucrose is dissolved in 300.0 g water

3) What is the concentration of each of these solutions expressed as ppm?

a) 0.0020 g iron(III) ions dissolved in 500.0 g water

b) 0.25 g calcium ions dissolved in 850.0 g water.

4) Expressed in ppm, what is the concentration of each solution in question 2?

5) At 60 degrees Celsius, 100.0 g water can dissolve a maximum of 45 g KCl.

a) What is the concentration of this solution, expressed as percent KCl by mass?

b) What would be the new concentration if 155 g water were added to the original solution?

c) What would be the new concentration if 20 more grams of KCl were added to the solution in (b)?

6) You make a pitcher of flavored drink using the instructions on a packet of unsweetened powder. It says to place the powder and 1 cup sugar into a pitcher and then add water until you have a total volume of 2 quarts. One cup of sugar ( $C_{12}H_{22}O_{11}$ ) weighs 200 grams. One quart of water weighs 950 grams.

a) What is the percent of the sugar in the solution?

b) Our friend states that she prefers her flavored drink to be less sweet. She pours 200 mL of your flavored drink solution into a glass and then adds another 200 mL of water. Before she adds the water, what is the percent of sugar in the solution of the 200 mL of solution?

c) What is the percent of sugar in the new solution the friend makes after adding the water? Explain how you figured this out.

d) Your friend's beverage will not be as sweet as yours. How will the actual flavor compare? Describe your reasoning.

7) A concentrated solution of salt water at room temperature has a concentration of 26%. If you had 500 g of this solution

a) How many grams of salt would be in the solution?

b) How many grams of water would be in the solution?

8) A lemonade packet is added to a bottle of water. If a 4 gram lemonade packet is added to a 500 gram water bottle, what is the ppm of lemonade in the solution?