

Name: _____

Solutions and Concentration

1. A 135-g sample of sea water evaporates to dryness, leaving behind 4.73 g of solid residue.
 - a. What was the **mass percent** of solute in the original sea water?
 - b. What do you need to know to find the **mole fraction** of the original solution?
 - c. What do you need to know to find the **molarity** of the original solution?
 - d. What do you need to know to find the **molality** of the original solution?
2. **Normal saline** solution is defined as 9 g NaCl per 1 L of solution in water. The density of normal saline is 1.0046 g/mL at 22°C.
 - a. How many grams of NaCl are present in 1.000 L of normal saline at 22°C?
 - b. How many moles of NaCl are present in 1.000 L of normal saline at 22°C?
 - c. How many grams of water are present in 1.000 L of normal saline at 22°C?
 - d. How many moles of water are present in 1.000 L of normal saline at 22°C?
 - e. What is the molarity of normal saline?

f. What is the molality of normal saline?

g. What is the mole fraction of NaCl in normal saline?

3. Write out concise procedures to follow in lab to make the following solutions.

a. 100 grams of a ten percent solution of sugar in water.

b. 200 mL of a 0.500 M solution of sugar ($C_{12}H_{22}O_{11}$) in water.

c. A 0.50 m solution of sugar in 300 grams water.

d. 350 grams of a solution of sugar in water at a mole fraction of sugar of 0.050.