

Name: _____ Date _____ Period: _____

Molarity & Molality Notes and Practice

Answer the questions below. SHOW ALL WORK, including units!! Watch your significant digits and CIRCLE YOUR ANSWERS.

Molarity

Just a reminder, molarity is one of the many ways to measure concentration or the strength of a solution. When using molarity to measure concentration you must follow the formula below and then put a capital M at the end of your answer to let the world know you used the molarity formula.

$$M = \frac{\text{moles of solute}}{\text{Liters of solvent}}$$

1. Calculate the molarity of a solution which contains 0.40 mol of a substance dissolved in 1.6 L of a solution.
2. What is the molarity of a solution containing 325 g of NaCl dissolved in 750. mL of solution?
3. 140 g of KCl is dissolved in 600. mL of water. What is the molarity?
4. 724.4 g of ammonium phosphate in 4500 mL of alcohol. What is the molarity of the solution?
5. You are making 2.2 L of 3.1 M silver nitrate solution. How many moles of solute are there?
6. How many grams of MgCl_2 are needed to make 700.mL of a 1.4 M solution?
7. 93.2 g of copper (II) sulfate is mixed into 290. mL of water. What is the molarity?

Molality

Molality is an additional way to measure the strength or concentration of a solution. It is abbreviated with a little m and is calculate only slightly differently than molarity. Here is the formula.

Name: _____ Date _____ Period: _____

$$m = \frac{\text{moles of solute}}{\text{kg of solvent}}$$

- ♣ You will be given two mass measurements and you must decide which is the solute and which is the solvent.
- ♣ Look for the phrases "dissolved in," "placed in," or "mixed with" to identify the two parts. The solute comes before the phrase and the solvent comes after.
 - ♣ Change the solute into moles (factor label)
 - ♣ Change solvent into kg (KHDBdcm)
- ♣ Molality and molarity can be very close if water is the solvent.

Example:

190 g of CuSO_4 are placed in 3500 g of water. Determine the molality.

$$\text{Solute: } \frac{190 \text{ g CuSO}_4}{159.9 \text{ g}} \cdot 1 \text{ mole} = 1.2 \text{ mole CuSO}_4$$

$$\text{Solvent: } 3500 \text{ g} = 3.5 \text{ kg water}$$

$$\text{Molality} = \frac{1.2 \text{ moles}}{3.5 \text{ kg}} = 0.30\text{m}$$

Mixed Problems

Decide if the problem is molarity or molality so you know which formula to use

8. What mass of calcium hydroxide must dissolve in 850 mL of water to make a 2.4 M solution?

9. 326g of C_6H_6 dissolve in 820. g of acetone. What is the molality?

10. What mass of glucose must dissolve in 400. g of ethanol to make a 1.6 m solution?

11. What volume of water must be added to 325 g of chromium (III) carbonate to make a 0.90 M solution?

12. What mass of ethanol is 360. g of sucrose dissolved in to make a 1.6 m solution? If the density of ethanol is 0.89 g/mL, determine the volume of ethanol used.