

Name: _____ Block: _____ Date: _____

Making a Solution and Calculating its Concentration Homework

$$\text{Molarity} = \frac{\text{Moles of solute}}{\text{Liters of solution}}$$

Ex. 1: Determine the molarity of a solution when 206.41 grams of potassium nitrate, KNO_3 , is dissolved in water. The resulting volume of the solution is 3.5 L.

$$\text{MM}_{\text{KNO}_3} = \frac{101.11 \text{ g}}{\text{mole}} \rightarrow \frac{206.41 \text{ g KNO}_3}{101.11 \text{ g}} \times \frac{1 \text{ mole}}{1 \text{ mole}} = 2.0414 \text{ mol KNO}_3 \rightarrow \text{Molarity} = \frac{2.0414 \text{ mol}}{3.5 \text{ L}} = \boxed{0.58 \text{ M}}$$

Ex. 2: Determine the molarity of a solution when 5.32 grams of lithium hydroxide, LiOH , is dissolved in water. The resulting volume of the solution is 100.0 mL.

$$\text{MM}_{\text{LiOH}} = \frac{23.95 \text{ g}}{\text{mole}} \rightarrow \frac{5.32 \text{ g LiOH}}{23.95 \text{ g}} \times \frac{1 \text{ mole}}{1 \text{ mole}} = 0.222 \text{ mole LiOH} \rightarrow \text{Molarity} = \frac{0.222 \text{ mole}}{0.1000 \text{ L}} = \boxed{2.22 \text{ M}}$$

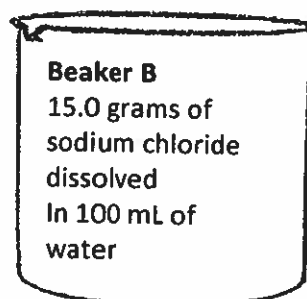
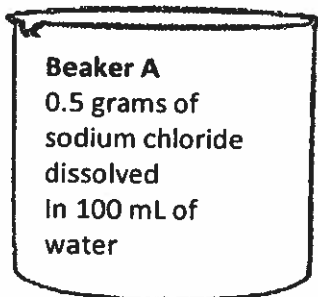
$$\frac{100.0 \text{ mL}}{1000 \text{ mL}} = 0.1000 \text{ L}$$

Ex. 3: D' Angelo wants to make 2.0 liters of a 0.75 M solution of copper (II) bromide. Calculate the mass of copper (II) bromide needed to make this solution.

$$\text{Molarity} = \frac{\text{mol CuBr}_2}{\text{L sol'n}} \rightarrow 0.75 \text{ M} \rightarrow \frac{0.75 \text{ mol CuBr}_2}{1 \text{ L}} \times 2.0 \text{ L} = 1.5 \text{ mol CuBr}_2$$

$$\text{MM}_{\text{CuBr}_2} = \frac{223.35 \text{ g}}{\text{mole}} \rightarrow \frac{1.5 \text{ mol CuBr}_2}{1 \text{ mole}} \times \frac{223.35 \text{ g}}{1 \text{ mole}} = 335 \text{ g} = \boxed{340 \text{ g}}$$

Directions: Use beakers A and B to answer questions 1-5.



1. Calculate the number of moles of sodium chloride in each beaker. *Show your work*

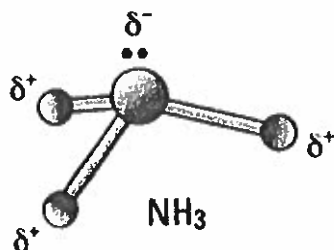
2. Calculate the amount of water in liters for each beaker. *Show your work*

3. Which beaker (solution) is more concentrated?

4. Calculate the molarity of each solution. *Show your work*

5. Which solution is the stronger electrolyte? Explain your reasoning.

6.



Will this substance dissolve in water? Why or Why not?

7. Determine the molarity of a solution when 16.2 moles of lead (II) acetate is dissolved in water. The resulting volume of the solution is 5.00 L. (3.24 M)

8. Determine the molarity of a solution when 27.1 grams of aluminum fluoride, AlF₃, is dissolved in water. The resulting volume of the solution is 2.55 L. (0.126 M)

9. Determine the molarity of a solution when 50.3 grams of potassium chloride, KCl, is dissolved in water. The resulting volume of the solution is 375.0 mL. (1.80 M)

10. Juanita wants to make 2.50 liters of a 0.125 M solution of sodium bicarbonate, NaHCO₃. Calculate the mass of sodium bicarbonate needed to make this solution. (26.3 grams)