

# answers to homework due today:



Name ANSWERS  
 Period \_\_\_\_\_

1. What is the (memorized) formula for finding concentration?  

$$\text{conc} = \frac{\text{moles}}{\text{volume}}$$

2. What is the formula for finding volume if you're given moles and concentration?  

$$\text{volume} = \text{moles} \times \text{conc}$$

3. In a solution, the substance that is being dissolved is the \_\_\_\_\_.  
 a. gas  
 c. solute SUGAR  
 b. liquid  
 d. solvent ↑ water

4. From memory, what is the formula of each  
 sulfuric acid H<sub>2</sub>SO<sub>4</sub>  
 carbonic acid H<sub>2</sub>CO<sub>3</sub>  
 phosphoric acid H<sub>3</sub>PO<sub>4</sub>  
 hydrochloric acid HCl

Identify the solvent and solutes in the following solution.

5. Dry air contains about 78.1% nitrogen, 21.0% oxygen, 0.9% argon, and trace amounts of other gases.  
 solvent NITROGEN  
 solute(s): Oxygen  
ARGON

6. Natural gas contains 97% methane (CH<sub>4</sub>), 1.5% ethane (C<sub>2</sub>H<sub>6</sub>), 1% CO<sub>2</sub>, and 0.5% nitrogen gases.  
 solvent methane  
 solute(s): ethane  
CO<sub>2</sub>  
Nitrogen

7. Rubbing alcohol contains 70% isopropyl alcohol and 30% water.  
 solvent isopropyl alcohol  
 solute(s): water

8. A standard solution of potassium hydrogen phthalate (KHP), KHC<sub>8</sub>H<sub>4</sub>O<sub>4</sub> (molar mass = 204.2 g), was prepared by dissolving 5.105 g of KHP in enough water to give 250.0 mL solution. What is the molarity of the KHP solution? (Answer: 0.1000 M)  

$$\text{molarity} = \frac{\text{moles}}{\text{liters}}$$

$$\text{molarity} = \frac{0.025 \text{ mol}}{0.250 \text{ L}}$$

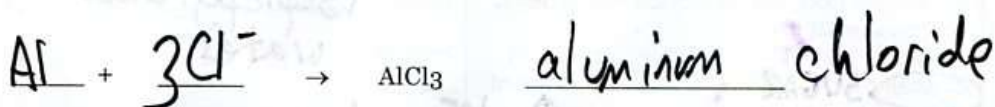
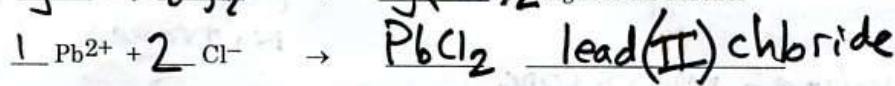
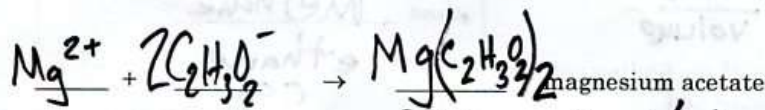
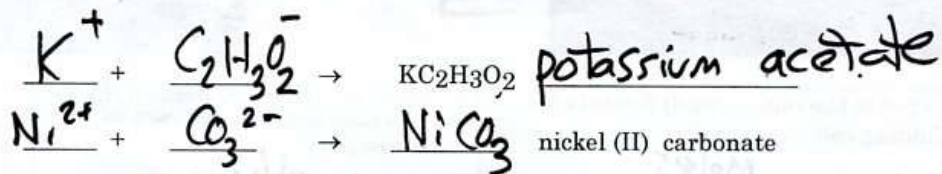
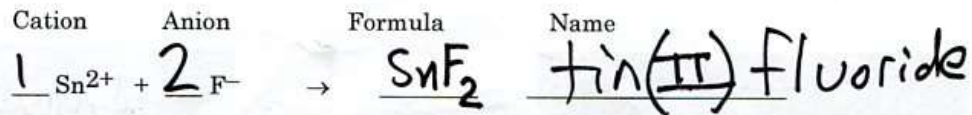
$$\text{molarity} = 0.1000 \text{ M}$$

9. How many grams of solid potassium dichromate, K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> (molar mass = 294.2 g) must be weighed out to prepare 500. mL of 0.200 M K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> solution? (Answer: 29.4 g)

Inventory	
moles	—
volume	0.500 L
conc	0.200 M

moles = conc × volume  
 moles = 0.200  $\frac{\text{mol}}{\text{L}}$  × 0.500 L  
 moles = 0.100 moles

0.100 mol,  $\left(\frac{294.2 \text{ g}}{1 \text{ mole}}\right) = 29.4 \text{ grams}$



## class notes for today:

PURPOSE How do we find the ratios of ions in a solution?

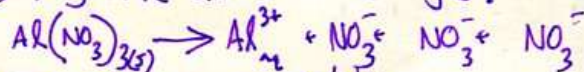
WARMUP Copy this list:

<u>SOLID:</u>	<u>DISSOLVED:</u>	<u>Pieces</u>
$\text{FeNO}_3(\text{s})$	$\text{Fe}_{(\text{aq})}^{+} + \text{NO}_{3(\text{aq})}^{-}$	two
$\text{Ca}(\text{NO}_3)_2(\text{s})$	$\text{Ca}_{(\text{aq})}^{2+} + \text{NO}_3^{-} + \text{NO}_3^{-}$	three
$\text{AlPO}_4(\text{s})$	$\text{Al}_{(\text{aq})}^{3+} + \text{PO}_{4(\text{aq})}^{-3}$	two
$\text{AlCl}_3(\text{s})$	$\text{Al}_{(\text{aq})}^{3+} \text{Cl}_{(\text{aq})}^{-} \text{Cl}_{(\text{aq})}^{-} \text{Cl}_{(\text{aq})}^{-}$	four

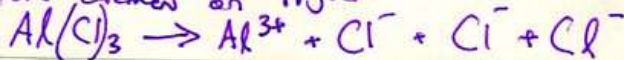
How To DRAW THE Dissolved Pieces:

① chop the positive left half off (either a metal cation or  $\text{NH}_4^{+}$ )

② polyatomic anion on the right:



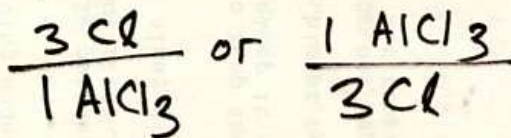
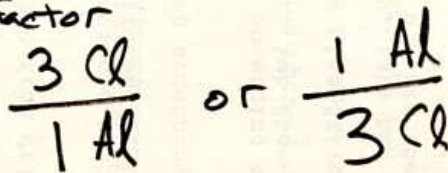
③ pure element on right:



PROBLEM:

If a solution is  
 $0.55 \frac{\text{mol}}{\text{L}}$  of  $\text{AlCl}_3$ ,  
what is its concentration  
of  $\text{Cl}^-$ ?

Conversion  
Factor



$$0.55 \frac{\text{mol}}{\text{L}} \text{ AlCl}_3 \times \left( \frac{3 \frac{\text{mol Cl}}{\text{L}}}{1 \frac{\text{mol AlCl}_3}{\text{L}}} \right) = 1.65 \frac{\text{mol}}{\text{L}} \text{ Cl}$$