

## Mole Conversions Worksheet #1

1. Mole → Mass Conversions – using molar mass of each substance, convert the following quantities.

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|--|--|
| a. 10.0 mol Cr <b>520 g</b>                    | f. 0.160 mol H <sub>2</sub> O <b>2.88 g</b>  |
| b. 3.32 mol K <b>130 g</b>                     | g. 5.08 mol Ca(NO <sub>3</sub> ) <sub>2</sub> <b>834 g</b>   |
| c. $2.20 \times 10^{-3}$ mol Sn <b>0.261 g</b> | h. 15.0 mol H <sub>2</sub> SO <sub>4</sub> <b>1470 g</b>   |
| d. 0.720 mol Be <b>6.48 g</b>                  | i. $4.52 \times 10^{-5}$ mol C <sub>2</sub> H <sub>4</sub> <b><math>1.27 \times 10^{-3}</math> g</b> |
| e. 2.40 mol N <sub>2</sub> <b>67.2 g</b>       | j. 0.0112 mol K <sub>2</sub> CO <sub>3</sub> <b>1.55 g</b>   |

2. Mass → Mole Conversions – using molar mass of each substance convert the following quantities.

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|---|--|
| a. 72.0 g Ar <b>1.80 mol</b>  | f. 27.4 g NO <sub>2</sub> <b>0.596 mol</b>   |
| b. $3.70 \times 10^{-1}$ g B <b><math>3.43 \times 10^{-2}</math> mol</b>  | g. 5.00 g H <sub>2</sub> <b>2.50 mol</b>   |
| c. 187 g Al <b>6.93 mol</b>   | h. $2.64 \times 10^{-4}$ g Li <sub>3</sub> PO <sub>4</sub> <b><math>2.28 \times 10^{-6}</math> mol</b> |
| d. 333 g SnF <sub>2</sub> <b>2.13 mol</b>                                 | i. 11.0 g CH <sub>4</sub> <b>0.688 mol</b>   |
| e. $7.21 \times 10^{-2}$ g He <b><math>1.80 \times 10^{-2}</math> mol</b> | j. 847 g (NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub> <b>8.82 mol</b>                               |

3. What is the volume of the following gases?

- 5.40 mol O<sub>2</sub> **121 L**
- $3.20 \times 10^{-2}$  mol CO<sub>2</sub> **0.717 L**
- 0.960 mol SO<sub>3</sub> **21.5 L**

4. How many moles are in each of the following volumes?

- 89.6 L Ne **4.00 mol**
- $1.00 \times 10^3$  L C<sub>2</sub>H<sub>6</sub> **44.6 mol**
- $5.42 \times 10^{-1}$  L F<sub>2</sub>  **$2.42 \times 10^{-2}$  mol**

5. Find the number of moles in each of the number of representative particles.

- $1.20 \times 10^{25}$  atoms of P **19.9 mol**
- $3.87 \times 10^{21}$  molecules of AlF<sub>3</sub>  **$6.43 \times 10^{-3}$  mol**
- $4.81 \times 10^{14}$  molecules of NH<sub>3</sub>  **$7.99 \times 10^{10}$  mol**

6. How many representative particles are in each of the following mole quantities?

- 1.24 mol Cl<sub>2</sub>  **$7.46 \times 10^{23}$  molecules**
- $4.20 \times 10^{-3}$  mol K<sub>2</sub>S  **$2.53 \times 10^{21}$  molecules**
- 34.02 mol Ca(OH)<sub>2</sub>  **$2.048 \times 10^{25}$  molecules**

7. Convert the following two-step quantities, converting first to moles and then to the desired quantity.

- Find the number of molecules in 60.0 g of N<sub>2</sub>O.  **$8.21 \times 10^{23}$  molecules**
- Find the volume of  $3.24 \times 10^{22}$  molecules of Ne **1.21 L**
- Find the mass of 18.0 L of CH<sub>4</sub> **12.9 g**
- Find the volume of 835 g of SO<sub>3</sub> **234 L**
- Find the mass of one atom of nickel.  **$1 \times 10^{-22}$  g**