

**WKS 3-3 & 3-4**  
**Mole Conversions**

Name Answer Key  
Period \_\_\_\_\_

**PART I:** Find the Molar Masses (MM) for the following substances. (*Look up the mass of each element on the periodic table and add them all up.*) Write all molar masses with at least 4 sig figs.

- a) MM of Al = 26.98 g/mol  
b) MM of PCl<sub>3</sub> = 30.97 + 3(35.45) = 137.3 g/mol  
c) MM of Na<sub>2</sub>SO<sub>4</sub> = 2(22.99) + 32.07 + 4(16.00) = 142.1 g/mol  
d) MM of Mg(NO<sub>3</sub>)<sub>2</sub> = 24.31 + 2(14.01) + 6(16.00) = 148.3 g/mol

**For the Rest of the WKS:** Use the dimensional analysis/factor label method. Every number must have units. Write answers with correct number of sig figs.

**PART II: Conversions between grams and moles.** (*All molar mass values must have at least 4 sig figs.*)

Use: grams  $\xleftarrow{\text{Molar Mass (? g/mol)}}$  moles

- 1) 45.0 g of Ca = ? moles of Ca

$$45.0 \text{ g Ca} \times \frac{1 \text{ mol Ca}}{40.08 \text{ g Ca}} = \boxed{1.12 \text{ mol Ca}}$$

- 2) 0.0190 moles MgO = ? grams of MgO  
MM MgO = 24.31 + 16.00 = 40.31 g/mol

$$0.0190 \text{ mol MgO} \times \frac{40.31 \text{ g MgO}}{1 \text{ mol MgO}} = \boxed{0.766 \text{ g MgO}}$$

- 3) 7.32 g of Ba(OH)<sub>2</sub> = ? moles of Ba(OH)<sub>2</sub>  
MM Ba(OH)<sub>2</sub> = 137.33 + 2(16.00) + 2(1.008) = 171.35 g/mol

$$7.32 \text{ g Ba(OH)}_2 \times \frac{1 \text{ mol Ba(OH)}_2}{171.35 \text{ g Ba(OH)}_2} = \boxed{0.0427 \text{ mol Ba(OH)}_2}$$

**PART III: Conversions between moles and atoms or molecules**

**REMEMBER:** moles  $\xleftarrow{\text{Avogadro's \#}}$  atoms, mlcls, f. un.  
(6.022 × 10<sup>23</sup> atoms, mlcls, f.un./mol)

- 4) 4.87 × 10<sup>23</sup> atoms of H = ? moles of H

$$4.87 \times 10^{23} \text{ atoms H} \times \frac{1 \text{ mol H}}{6.022 \times 10^{23} \text{ atoms H}} = \boxed{0.809 \text{ mol H}}$$

- 5) 0.56 moles of PCl<sub>5</sub> = ? molecules of PCl<sub>5</sub>

$$0.56 \text{ mol PCl}_5 \times \frac{6.022 \times 10^{23} \text{ mlcl PCl}_5}{1 \text{ mol PCl}_5} = \boxed{3.4 \times 10^{23} \text{ mlcl PCl}_5}$$