Stoichiometric Conversions Answer Key

Review: Mole-to-Mole Conversions

1. **18.00 mol O_2**

2. Consider the following reaction:

$$\mathbf{4\ Zn + 10\ HNO_3 \rightarrow 4\ Zn(NO_2)_3 + N_2O + 5\ H_2O}$$

   a. **5.63 mol HNO_3**
   b. **1.4 mol $Zn(NO_2)_3$**
   c. **0.94 mol N_2O**
   d. **6.00 mol Zn**

Mole and Mass Conversions

3. Complete the following tables with the missing information. Find any masses or moles from the amount that you are given.

	Mercury (II) oxide	→	**Mercury**	+	Oxygen
Equation:	**2 HgO**	→	**2** Hg	+	**O_2**
Mass (g):	5.23 g	→	**4.83 g**	+	**0.387 g**
Moles:	**0.0241 mol**	→	**0.0241 mol**	+	**0.0121 mol**

	Hydrogen peroxide	→	Oxygen	+	Water
Equation:	**2** H_2O_2	→	**O_2**	+	**2 H_2O**
Mass (g):	**35.45 g**	→	**16.67 g**	+	**18.78 g**
Moles:	**1.042 mol**	→	**0.5210 mol**	+	1.042 mol

	Hydrogen	+	Oxygen	→	Water
Equation:	**2 H_2**	+	**O_2**	→	**2 H_2O**
Mass (g):	10.24 g	+	**81.28 g**	→	**91.52 g**
Moles:	**5.079 mol**	+	**2.540 mol**	→	**5.079 mol**

4. A thermite reaction is a very violent reaction between aluminum metal and iron (III) oxide. Use the equation for this reaction to answer the following questions.

$$\mathbf{Fe_2O_3 + 2\ Al \rightarrow 2\ Fe + Al_2O_3}$$

   a. **0.964 mol Fe_2O_3**
   b. **306 g Al_2O_3**
   c. **0.806 mol Al_2O_3**
   d. **67.9 g Fe_2O_3**
   e. **8.52×10^3 mol Fe_2O_3**

5. **113 g Cl_2**

6. In automobiles, one of the reactions common in air bags is the decomposition of sodium azide (NaN_3) into sodium and nitrogen.
   a. **$2\ NaN_3 \rightarrow 2\ Na + 3\ N_2$**
   b. **64.64 g N_2**

7. **41.7 g $ZnCl_2$**

8. Calcium chloride reacts with sodium phosphate to produce calcium phosphate and sodium chloride.

   a. **$3\ CaCl2 + 2\ Na_3PO_4 \rightarrow Ca_3(PO_4)_2 + 6\ NaCl$**
   b. **0.909 mol $CaCl_2$**
   c. **4.87 g $Ca_3(PO_4)_2$**
   d. **1564 g NaCl**
   e. **421 g $CaCl_2$**
   f. **0.0341 mol Na_3PO_4**

9. **1.1954 mol O_2**

10. **Use density to convert g to mL.**