

**Worksheet: Mixed Problems—Mole/Mole
and Mole/Mass**

Name KEY

Answer each of the following questions using the equation provided. BE SURE TO BALANCE EACH EQUATION BEFORE SOLVING ANY PROBLEMS. SHOW ALL WORK.



- a. If 101 grams of copper is used, how many moles of copper (II) oxide will be formed?

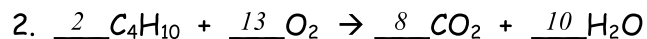
$$? \text{ mol CuO} = 101 \cancel{\text{g Cu}} \times \frac{1 \cancel{\text{mol Cu}}}{63.5 \cancel{\text{g Cu}}} \times \frac{2 \text{ mol CuO}}{2 \cancel{\text{mol Cu}}} = 1.59 \text{ mol CuO}$$

- b. If 5.25 moles of copper are used, how many moles of oxygen must also be used?

$$? \text{ mol O}_2 = 5.25 \cancel{\text{mol Cu}} \times \frac{1 \text{ mol O}_2}{2 \cancel{\text{mol Cu}}} = 2.63 \text{ mol O}_2$$

- c. If 78.2 grams of oxygen react with copper, how many moles of copper (II) oxide will be produced?

$$? \text{ mol CuO} = 78.2 \cancel{\text{g O}_2} \times \frac{1 \cancel{\text{mol O}_2}}{32.0 \cancel{\text{g O}_2}} \times \frac{2 \text{ mol CuO}}{1 \cancel{\text{mol O}_2}} = 4.89 \text{ mol CuO}$$

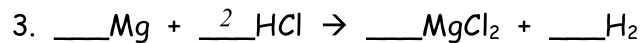


- a. How many moles of butane, C_4H_{10} , are needed to react with 5.5 moles of oxygen?

$$? \text{ mol C}_4\text{H}_{10} = 5.5 \cancel{\text{mol O}_2} \times \frac{2 \text{ mol C}_4\text{H}_{10}}{13 \cancel{\text{mol O}_2}} = 0.85 \text{ mol C}_4\text{H}_{10}$$

- b. How many grams of carbon dioxide will be produced if 3.5 moles of O_2 react?

$$? \text{ g CO}_2 = 3.5 \cancel{\text{mol O}_2} \times \frac{8 \cancel{\text{mol CO}_2}}{13 \cancel{\text{mol O}_2}} \times \frac{44.0 \text{ g CO}_2}{1 \cancel{\text{mol CO}_2}} = 95 \text{ g CO}_2$$



- a. What mass of HCl is consumed by the reaction of 2.50 moles of magnesium?

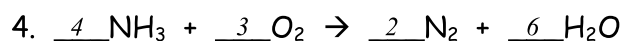
$$? \text{ g HCl} = 2.50 \text{ mol Mg} \times \frac{2 \text{ mol HCl}}{1 \text{ mol Mg}} \times \frac{36.5 \text{ g HCl}}{1 \text{ mol HCl}} = 183 \text{ g HCl}$$

- b. What mass of MgCl_2 is produced if 3.67 moles of HCl react?

$$? \text{ g MgCl}_2 = 3.67 \text{ mol HCl} \times \frac{1 \text{ mol MgCl}_2}{2 \text{ mol HCl}} \times \frac{95.3 \text{ g MgCl}_2}{1 \text{ mol MgCl}_2} = 175 \text{ g MgCl}_2$$

- c. How many moles of hydrogen gas are produced when 3.0 moles of magnesium react?

$$? \text{ mol H}_2 = 3.0 \text{ mol Mg} \times \frac{1 \text{ mol H}_2}{1 \text{ mol Mg}} = 3.0 \text{ mol H}_2$$



- a. How many moles of oxygen react with 0.23 moles of NH_3 ?

$$? \text{ mol O}_2 = 0.23 \text{ mol NH}_3 \times \frac{3 \text{ mol O}_2}{4 \text{ mol NH}_3} = 0.17 \text{ mol O}_2$$

- b. How many grams of water will be produced if 0.55 moles of oxygen react?

$$? \text{ g H}_2\text{O} = 0.55 \text{ mol O}_2 \times \frac{6 \text{ mol H}_2\text{O}}{3 \text{ mol O}_2} \times \frac{18.0 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = 20. \text{ g H}_2\text{O}$$

- c. How many moles of nitrogen gas will be produced if 12.6 grams of ammonia react?

$$? \text{ mol N}_2 = 12.6 \text{ g NH}_3 \times \frac{1 \text{ mol NH}_3}{17.0 \text{ g NH}_3} \times \frac{2 \text{ mol N}_2}{4 \text{ mol NH}_3} = 0.371 \text{ mol N}_2$$