

### **Worksheet #3—Stoichiometry**

**Directions:** Solve the following stoichiometry problems. Assume all gases are at STP. Don't forget to write out your balanced chemical equation. Make sure to show ALL work to receive FULL CREDIT!

1. Calculate the number of moles of oxygen required to react completely with 14.8 mol Al in the following equation:  $4\text{Al}_{(s)} + 3\text{O}_{2(g)} \rightarrow 2\text{Al}_2\text{O}_{3(s)}$

$$\frac{14.8 \text{ moles Al}}{4 \text{ mole Al}} \times \frac{3 \text{ moles of O}_2}{1 \text{ mole Al}} = \underline{11.1 \text{ mol O}_2}$$

3. If 20.0g grams of zinc react with excess hydrochloric acid, how many grams of zinc chloride ( $\text{ZnCl}_2$ ) are produced?



$$\frac{20 \text{ g Zn}}{65 \text{ g Zn}} \times \frac{1 \text{ mol Zn}}{1 \text{ mole Zn}} \times \frac{1 \text{ mole ZnCl}_2}{1 \text{ mole Zn}} \times \frac{136 \text{ g ZnCl}_2}{1 \text{ mol ZnCl}_2}$$

$$= \underline{41.8 \text{ g ZnCl}_2}$$

5. How many grams of copper are required to replace 4.00 grams of silver nitrate which are dissolved in water?



$$\frac{4.0 \text{ g AgNO}_3}{170 \text{ g AgNO}_3} \times \frac{1 \text{ mol AgNO}_3}{170 \text{ g AgNO}_3} \times \frac{1 \text{ mole Cu}}{2 \text{ mol AgNO}_3} \times \frac{63.5 \text{ g Cu}}{1 \text{ mole Cu}}$$

2. Calculate the moles of oxygen produced from the decomposition of 0.61 moles of potassium chlorate ( $\text{KClO}_3$ ).



$$\frac{0.61 \text{ moles KClO}_3}{2 \text{ mole KClO}_3} \times \frac{3 \text{ moles of O}_2}{1 \text{ mole KClO}_3} =$$

$$\underline{0.915 \text{ mol O}_2}$$

4. How many grams of chlorine gas must be reacted with excess sodium iodide (NaI) if 10.0 grams of sodium chloride (NaCl) are needed



$$\frac{10 \text{ g NaCl}}{58.5 \text{ g NaCl}} \times \frac{1 \text{ mol NaCl}}{58.5 \text{ g NaCl}} \times \frac{1 \text{ mol Cl}_2}{2 \text{ mol NaCl}} \times \frac{71 \text{ g Cl}_2}{1 \text{ mol Cl}_2}$$

$$= \underline{6.07 \text{ g Cl}_2}$$

6. How many moles of hydrogen gas are needed to react with 15.1 g chlorine gas to produce hydrogen chloride gas?



$$\frac{15.1 \text{ g Cl}_2}{71 \text{ g Cl}_2} \times \frac{1 \text{ mol Cl}_2}{71 \text{ g Cl}_2} \times \frac{1 \text{ mole H}_2}{1 \text{ mole Cl}_2}$$

$$= \underline{0.21 \text{ moles H}_2}$$

# Mhr Grade 12 Chemistry Practice Problems Answers

**M Mosston**



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*Chemistry, Student Solutions Manual* James E. Brady, Joel W. Russell, John R. Holum, 2000-01-26 The images on the cover call attention to the relationship between macro observations and the intimate structure of chemical substances and the changes both chemical and physical that they undergo

Fireworks One of the ingredients is phosphorus a molecular form of which is believed to consist of linked tetrahedra of phosphorus atoms The chemical reaction of phosphorus with oxygen is partly responsible for the spectacular show of light

Carbon The element is found in several forms including the familiar diamond and another recently discovered sooty substance that consists of soccer ball shaped molecules often referred to as buckeyballs Diamond is not the most stable form of carbon and is created from other forms of carbon at high temperatures and pressures deep within the earth

Acetylene torch Cutting steel is possible because of the intense heat generated by the chemical reaction of acetylene with oxygen a reaction between molecules of  $C_2H_2$  and  $O_2$  to give  $CO_2$  and  $H_2O$

Hot air balloon The air that helps it rise is heated by the combustion of molecules of propane each composed of three carbon and eight hydrogen atoms

Stormy weather The evaporation of water serves to store energy provided by the sun Subsequent condensation of the water vapor releases this energy and is the basis of all the weather systems on our planet

**Problems and Solutions for General Chemistry and College Chemistry, Sixth Editions by Nebergall, Holtzclaw, and Robinson** Frederick K. Ault, 1980

**The Answer Key: A Comprehensive Explanation of Problem Solving Methods for General Chemistry Success (Volume One) (First Edition** Rachel Turoscy, 2018-08-09

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