

ANSWER KEY

Name _____

PREDICTING PRODUCTS OF CHEMICAL REACTIONS

Predict the products of the reactions below. Then, write the balanced equation and classify the reaction.

- magnesium bromide + chlorine anionic single replacement
 $MgBr_2 + Cl_2 \rightarrow MgCl_2 + Br_2$
- aluminum + iron (III) oxide cationic single replacement
 $Al + Fe_2O_3 \rightarrow Fe + Al_2O_3$
- silver nitrate + zinc chloride double replacement
 $2AgNO_3 + ZnCl_2 \rightarrow 2AgCl + Zn(NO_3)_2$
- hydrogen peroxide (catalyzed by manganese dioxide) decomposition
 $2H_2O_2 \xrightarrow{MnO_2} 2H_2O + O_2$
- zinc + hydrochloric acid cationic single replacement
 $Zn + 2HCl \rightarrow ZnCl_2 + H_2$
- sulfuric acid + sodium hydroxide double replacement (neutralization)
 $H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2H_2O$
- sodium + hydrogen synthesis
 $2Na + H_2 \rightarrow 2NaH$
- acetic acid + copper cationic single replacement
 $CH_3COOH + Cu \rightarrow \text{no reaction}$
 (or $HC_2H_3O_2$)

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STOICHIOMETRY: VOLUME-VOLUME PROBLEMS

- $N_2 + 3H_2 \rightarrow 2NH_3$
 What volume of hydrogen is necessary to react with five liters of nitrogen to produce ammonia? (Assume constant temperature and pressure.)
15 liters
- What volume of ammonia is produced in the reaction in Problem 1?
10 liters
- $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$
 If 20 liters of oxygen are consumed in the above reaction, how many liters of carbon dioxide are produced?
12 liters
- $2H_2O \rightarrow 2H_2 + O_2$
 If 30 mL of hydrogen are produced in the above reaction, how many milliliters of oxygen are produced?
15 mL
- $2CO + O_2 \rightarrow 2CO_2$
 How many liters of carbon dioxide are produced if 75 liters of carbon monoxide are burned in oxygen? How many liters of oxygen are necessary?
75 L, 37.5 L

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STOICHIOMETRY: MOLE-MOLE PROBLEMS

- $N_2 + 3H_2 \rightarrow 2NH_3$
 How many moles of hydrogen are needed to completely react with two moles of nitrogen?
6 moles
- $2KClO_3 \rightarrow 2KCl + 3O_2$
 How many moles of oxygen are produced by the decomposition of six moles of potassium chlorate?
9 moles
- $Zn + 2HCl \rightarrow ZnCl_2 + H_2$
 How many moles of hydrogen are produced from the reaction of three moles of zinc with an excess of hydrochloric acid?
3 moles
- $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$
 How many moles of oxygen are necessary to react completely with four moles of propane (C_3H_8)?
20 moles
- $K_3PO_4 + Al(NO_3)_3 \rightarrow 3KNO_3 + AlPO_4$
 How many moles of potassium nitrate are produced when two moles of potassium phosphate react with two moles of aluminum nitrate?
6 moles

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STOICHIOMETRY: MASS-MASS PROBLEMS

- $2KClO_3 \rightarrow 2KCl + 3O_2$
 How many grams of potassium chloride are produced if 25 g of potassium chlorate decompose?
15 g
- $N_2 + 3H_2 \rightarrow 2NH_3$
 How many grams of hydrogen are necessary to react completely with 50.0 g of nitrogen in the above reaction?
10.7 g
- How many grams of ammonia are produced in the reaction in Problem 2?
60.7 g
- $2AgNO_3 + BaCl_2 \rightarrow 2AgCl + Ba(NO_3)_2$
 How many grams of silver chloride are produced from 5.0 g of silver nitrate reacting with an excess of barium chloride?
4.2 g
- How much barium chloride is necessary to react with the silver nitrate in Problem 4?
3.1 g

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