

Name: _____

Period: _____

Unit 10: Stoichiometry Funsheets

Part A: Balanced Chemical Equations- Balance the following chemical equations.

- 1) _____ Al + _____ Cl₂ → _____ AlCl₃
- 2) _____ Mg(ClO)₂ → _____ MgCl₂ + _____ O₂
- 3) _____ FeCl₃ + _____ LiOH → _____ Fe(OH)₃ + _____ LiCl
- 4) _____ Na + _____ O₂ → _____ Na₂O
- 5) _____ KBr + _____ F₂ → _____ KF + _____ Br₂
- 6) _____ Al + _____ H₂SO₄ → _____ Al₂(SO₄)₃ + _____ H₂
- 7) _____ Cr(OH)₃ → _____ Cr₂O₃ + _____ H₂O
- 8) _____ Li + _____ H₂O → _____ LiOH + _____ H₂
- 9) _____ Pb(NO₃)₂ + _____ NaBr → _____ PbBr₂ + _____ NaNO₃
- 10) _____ Fe₂(CO₃)₃ → _____ Fe₂O₃ + _____ CO₂
- 11) _____ P + _____ Fe₂O₃ → _____ P₄O₁₀ + _____ Fe
- 12) _____ C₄H₈ + _____ O₂ → _____ CO₂ + _____ H₂O
- 13) _____ C₄H₁₀ + _____ O₂ → _____ CO₂ + _____ H₂O
- 14) _____ Ti(OH)₄ + _____ CaS → _____ TiS₂ + _____ Ca(OH)₂
- 15) _____ Mg + _____ H₃PO₃ → _____ H₂ + _____ Mg₃(PO₃)₂

Part B: Mass and Moles-

Convert the following to moles

- 1) 235.0 g NaNO₃
- 2) 130.0 g Al₂(SO₄)₃
- 3) 50.0 g Fe(OH)₃
- 4) 75.0 g Fe₂(CO₃)₃
- 5) 196.0 g H₂SO₄

Convert the following to mass

- 6) 2.0 moles of C₄H₈
- 7) 1.5 moles of Pb(NO₃)₂
- 8) 0.25 moles of Fe₂O₃
- 9) 5.0 moles of LiCl
- 10) 6.1 moles of KBr

Part C: Mole Ratios-

In equation 1 from Part A, what is the mole ratio of...

- 1) Al to Cl₂
- 2) Cl₂ to Al
- 3) Cl₂ to AlCl₃
- 4) Al to AlCl₃

In equation 9 from Part A, what is the mole ratio of...

- 5) Pb(NO₃)₂ to NaBr
- 6) NaBr to PbBr₂
- 7) PbBr₂ to NaNO₃
- 8) NaNO₃ to Pb(NO₃)₂

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Part D: Stoichiometry Problems: *(refer to your list of equations in Part A)*

- 1) In reaction 1, how many moles of AlCl_3 can be made from 4.5 mole of Al?
- 2) In reaction 1, how moles of Cl_2 are needed to produce 3.0 moles of AlCl_3 ?
- 3) In reaction 1, how moles of Al are needed to react with 7.5 moles of Cl_2 ?
- 4) In reaction 4, how many moles of O_2 are needed to react with 5 moles of Na?
- 5) In reaction 5, how many moles of Br_2 are produced from 8 moles of KBr?
- 6) In reaction 10, how many moles of CO_2 can be produced if 7.5 moles of Fe_2O_3 are made?
- 7) In reaction 11, if 5.0 moles of P begin the reaction, how many moles of Fe can be produced?
- 8) In reaction 11, how many moles of Fe_2O_3 will react if the reaction begins with 0.53 moles of P?
- 9) In reaction 12, how many moles of O_2 are needed to produce 3.0 moles of CO_2 ?
- 10) In reaction 12, if 112.0 grams of C_4H_8 begin the reaction, how many moles of O_2 will be needed to completely react?
- 11) In reaction 12, if 112.0 grams of C_4H_8 begin the reaction, how many moles of CO_2 will be formed?
- 12) In reaction 5, if 0.23 moles of KBr are used, how many grams of KF can be made?
- 13) In reaction 5, if 50.0 moles of KBr are used, how many grams of F_2 will be needed to completely react with KBr?
- 14) In reaction 8, if 3 moles of Li are used, how many grams of H_2 will be formed?
- 15) In reaction 8, if 3 moles of Li are used, how many grams of H_2O will also react?

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Part E: Mass to Mass- Answer the following questions. Include balanced chemical equation and *SHOW ALL WORK*.

- 1) Lithium perchlorate decomposes to produce lithium chloride and oxygen gas. How many grams of oxygen can be produced if 100.0 g of lithium perchlorate decompose at STP?
- 2) Hydrogen gas and chlorine gas combine to form hydrochloric acid. If 43g of hydrochloric acid are produced, how many grams of hydrogen gas was used?
- 3) When 0.46 g of antimony (III) oxide reacts with carbon to produce antimony metal and carbon monoxide gas, determine the mass of antimony metal produced.
- 4) How many grams of carbon monoxide must react with oxygen to produce 10.0g of carbon dioxide?
- 5) When hydrogen peroxide decomposes, it produces liquid water and oxygen gas. What mass of hydrogen peroxide must decompose to produce 0.77g of liquid water?
- 6) When lithium nitride reacts with water, lithium hydroxide and ammonia gas (NH_3) are produced. Determine the mass of lithium hydroxide produced when 0.38 g of lithium nitride reacts with water.
- 7) Sodium iodide reacts with chlorine gas to produce iodine gas and sodium chloride in a single replacement reaction. What mass of sodium chloride is produced from 0.29 g of sodium iodide?

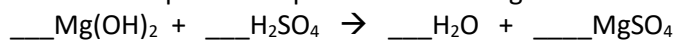
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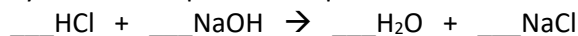
Part F: Limiting Reactant- Answer the following questions. Include a balanced chemical equation and SHOW ALL WORK.

- 1) Identify the limiting reactant when 1.22g of oxygen gas reacts with 1.05g of hydrogen gas to produce liquid water. $\underline{\quad}\text{O}_2 + \underline{\quad}\text{H}_2 \rightarrow \underline{\quad}\text{H}_2\text{O}$

- 2) Identify the limiting reactant when 5.87g of magnesium hydroxide reacts with 12.84g of hydrosulfuric acid to produce liquid water and magnesium sulfate.



- 3) Identify the limiting reactant when 7.81g of hydrochloric acid reacts with 5.24g of sodium hydroxide and produces liquid water and sodium chloride.



- 4) Identify the limiting reactant when 43.25g of calcium carbide (CaC_2) reacts with 33.71g of liquid water to produce calcium hydroxide and acetylene (C_2H_2).



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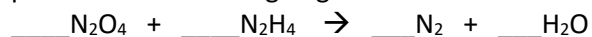
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- 5) Identify the limiting reactant when 4.687g of sulfur tetrafluoride reacts with 6.281g of diiodine pentoxide to produce iodine pentafluoride and sulfur dioxide.

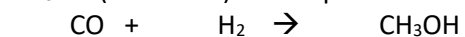


- 6) Identify the limiting reactant when 19.9 g of CuO are exposed to 2.02 g of H₂ to produce copper metal and water. $\underline{\hspace{1cm}} \text{CuO} + \underline{\hspace{1cm}} \text{H}_2 \rightarrow \underline{\hspace{1cm}} \text{Cu} + \underline{\hspace{1cm}} \text{H}_2\text{O}$

- 7) If 41.6g of dinitrogen tetraoxide reacts with 20.8g of dinitrogen tetrahydride, the products will be nitrogen gas and water. What mass of water will be produced?



- 8) If 16.8g of carbon monoxide is mixed under high pressure with 1.78g of hydrogen, CH₃OH (methanol) will be produced? How many grams of methanol will be produced?



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Part H: Vocabulary

- 1) What is a mole?

- 2) What is stoichiometry?

- 3) What is the first step to all stoichiometry problems?

- 4) What is the mole ratio?

- 5) Where does the mole ration come from?

- 6) Why are **balanced** chemical equations important in stoichiometry?

- 7) What is a limiting reactant?

- 8) What is an excess reactant?

- 9) How do you determine the limiting reactant?

- 10) What is theoretical yield?

- 11) How is the theoretical yield determined?

- 12) What is actual yield?

- 13) How is actual yield determined?

- 14) What is percent yield?

- 15) What is the formula for percent yield?