Name: _____ **Date:** _____

Stoichiometric Limiting Reagents: A 10th Grade Chemistry Ace

Students calculate theoretical yields and identify limiting reactants through complex, multi-step chemical scenarios requiring advanced dimensional analysis.

---

1. A sample of 25.0g of Silver Nitrate reacts with excess Copper to produce Silver and Copper (II) Nitrate. If the actual yield of Silver collected is 14.5g, what is the percent yield of this reaction?

A. 91.2%
B. 83.6%
C. 95.5%
D. 78.4%

2. When balancing the combustion of Octane (C_8H_{18}), the stoichiometric coefficient for Oxygen gas (O_2) in the simplest whole-number ratio is _____.

A. 12.5
B. 25
C. 13
D. 18

3. In a reaction where 10.0g of Reactant A (molar mass 50g/mol) reacts with 10.0g of Reactant B (molar mass 100g/mol) in a 1:1 molar ratio, Reactant B is the limiting reagent.

A. True
B. False

4. Which of the following contains the greatest number of individual atoms?

A. 1.0 mole of Phosphorus (P_4)
B. 2.0 moles of Ammonia (NH_3)
C. 3.0 moles of Chlorine gas (Cl_2)
D. 1.5 moles of Glucose ($C_6H_{12}O_6$)

5. Determine the mass of Iron (III) Oxide formed when 28.0g of Iron reacts completely with excess Oxygen. The molar mass of Fe is 55.8g/mol and Fe_2O_3 is 159.7g/mol. (Use $4Fe + 3O_2 \rightarrow 2Fe_2O_3$)

A. 40.0 g
B. 80.1 g
C. 20.0 g
D. 55.8 g

6. During the synthesis of Aspirin ($C_9H_8O_4$), a chemist calculates that 5.00g should be produced, but only 3.85g is recovered. What is the most likely reason the percentage yield is not 100%?

A. The reaction reached a state of dynamic equilibrium.
B. The limiting reactant was used in excess.

Name: _____ **Date:** _____

C. The actual yield was greater than the theoretical yield.
D. The molar mass of Aspirin was calculated incorrectly.

7. The molar volume of any gas at STP (Standard Temperature and Pressure) is approximately 22.4 Liters per mole, regardless of the chemical identity of the gas.

A. True
B. False

8. An unknown hydrate Copper(II) Sulfate ($CuSO_4 \cdot nH_2O$) has a mass of 2.50g. After heating to remove water, the anhydrous salt weighs 1.60g. Determine the value of 'n'.

A. 2
B. 3
C. 5
D. 7

9. What is the concentration (Molarity) of a solution prepared by dissolving 5.85g of Sodium Chloride (NaCl) in enough water to make 500 mL of solution?

A. 0.1 M
B. 0.2 M
C. 0.5 M
D. 1.0 M

10. In the reaction $2Al + 3Cl_2 \rightarrow 2AlCl_3$, the mass of Aluminum used must always equal the mass of Chlorine used to satisfy the Law of Conservation of Mass.

A. True
B. False