

High School Chemistry: Stoichiometry & Mole Ratio Calculations



Name: _____ Date: _____

Part A: Stoichiometric Calculations. Solve each quantitative chemical problem using balanced reaction ratios.

1. Consider the balanced synthesis of water: $2 \text{H}_2 + \text{O}_2 \rightarrow 2 \text{H}_2\text{O}$. How many moles of H_2O are produced when 4.0 moles of O_2 react completely with excess hydrogen gas?

- A. 2.0 moles H_2O
- B. 4.0 moles H_2O
- C. 8.0 moles H_2O
- D. 16.0 moles H_2O

2. What is the molar mass of Calcium Carbonate (CaCO_3), given atomic masses: $\text{Ca} = 40.08 \text{ g/mol}$, $\text{C} = 12.01 \text{ g/mol}$, $\text{O} = 16.00 \text{ g/mol}$?

- A. 68.09 g/mol
- B. 100.09 g/mol
- C. 116.09 g/mol
- D. 84.09 g/mol

3. In an experiment, the calculated theoretical yield of Aspirin is 25.0 grams. However, the student synthesizes and recovers an actual yield of 20.0 grams in the laboratory. What is the percent yield of the reaction?

- A. 125%
- B. 80%
- C. 75%
- D. 5%

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Part B: Stoichiometric Pathway Roadmap. Match each chemical calculation step with its operational definition.

Sort these items: Grams of Known Substance -> Moles of Known; Divide by Molar Mass (g/mol) of the given reactant; Moles of Known -> Moles of Desired Unknown; Multiply by the Mole Ratio from balanced reaction coefficients; Moles of Desired Unknown -> Grams of Product; Multiply by Molar Mass (g/mol) of the synthesized compound

Calculation Step	Conversion Factor / Operation