

Name :

Date :

STOICHIOMETRY CONVERSION

Solve the following stoichiometry conversion problems using the appropriate mole ratios, molar masses, and conversion factors. Ensure all units are clearly labeled.

1. Convert 25.0 grams of water (H₂O) to moles. (Molar mass of H₂O = 18.02 g/mol)

$$25.0 \text{ g H}_2\text{O} \div 18.02 \text{ g/mol} = \mathbf{1.39 \text{ mol H}_2\text{O}}$$

2. How many molecules are in 0.75 moles of carbon dioxide (CO₂)? (Avogadro's number = 6.022×10^{23} molecules/mol)

$$0.75 \text{ mol CO}_2 \times 6.022 \times 10^{23} \text{ molecules/mol} = \mathbf{4.52 \times 10^{23} \text{ molecules CO}_2}$$

3. Convert 3.00 moles of sodium chloride (NaCl) to grams. (Molar mass of NaCl = 58.44 g/mol)

$$3.00 \text{ mol NaCl} \times 58.44 \text{ g/mol} = \mathbf{175.32 \text{ g NaCl}}$$

4. How many moles of hydrogen gas (H₂) are produced when 50.0 grams of zinc react with excess hydrochloric acid? (Molar mass of Zn = 65.38 g/mol)



$$50.0 \text{ g Zn} \div 65.38 \text{ g/mol} = 0.764 \text{ mol Zn}$$

$$0.764 \text{ mol Zn} \times (1 \text{ mol H}_2 / 1 \text{ mol Zn}) = \mathbf{0.764 \text{ mol H}_2}$$

5. Convert 0.500 moles of oxygen gas (O₂) to liters at STP (Standard Temperature and Pressure, 22.4 L/mol).

$$0.500 \text{ mol O}_2 \times 22.4 \text{ L/mol} = \mathbf{11.2 \text{ L O}_2}$$

6. How many grams of carbon (C) are in 2.00 moles of carbon? (Molar mass of C = 12.01 g/mol)

$$2.00 \text{ mol C} \times 12.01 \text{ g/mol} = \mathbf{24.02 \text{ g C}}$$

7. Convert 150.0 grams of glucose (C₆H₁₂O₆) to moles. (Molar mass of C₆H₁₂O₆ = 180.16 g/mol)

$$150.0 \text{ g C}_6\text{H}_{12}\text{O}_6 \div 180.16 \text{ g/mol} = \mathbf{0.833 \text{ mol C}_6\text{H}_{12}\text{O}_6}$$