

Name :

Date :

# BASIC STOICHIOMETRY

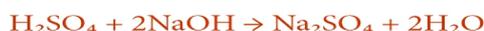
Answer the following basic stoichiometry questions by applying mole ratios, molar masses, and conversion factors. Show your work clearly.

- 1** How many grams of hydrogen gas ( $\text{H}_2$ ) are produced when 4.00 moles of water ( $\text{H}_2\text{O}$ ) are electrolyzed? (Molar mass of  $\text{H}_2 = 2.02 \text{ g/mol}$ )



$$4.00 \text{ mol H}_2\text{O} \times (2 \text{ mol H}_2 / 2 \text{ mol H}_2\text{O}) \times 2.02 \text{ g/mol} = \mathbf{8.08 \text{ g H}_2}$$

- 2** What mass of sodium hydroxide ( $\text{NaOH}$ ) is required to completely react with 0.500 moles of sulfuric acid ( $\text{H}_2\text{SO}_4$ )? (Molar mass of  $\text{NaOH} = 40.00 \text{ g/mol}$ )



$$0.500 \text{ mol H}_2\text{SO}_4 \times (2 \text{ mol NaOH} / 1 \text{ mol H}_2\text{SO}_4) \times 40.00 \text{ g/mol} = \mathbf{40.00 \text{ g NaOH}}$$

- 3** How many moles of carbon dioxide ( $\text{CO}_2$ ) are produced when 88.0 grams of propane ( $\text{C}_3\text{H}_8$ ) combust completely? (Molar mass of  $\text{C}_3\text{H}_8 = 44.1 \text{ g/mol}$ )



$$88.0 \text{ g C}_3\text{H}_8 \div 44.1 \text{ g/mol} = 2.00 \text{ mol C}_3\text{H}_8$$

$$2.00 \text{ mol C}_3\text{H}_8 \times (3 \text{ mol CO}_2 / 1 \text{ mol C}_3\text{H}_8) = \mathbf{6.00 \text{ mol CO}_2}$$

- 4** What volume of oxygen gas ( $\text{O}_2$ ) at STP is needed to completely react with 3.00 moles of methane ( $\text{CH}_4$ )? (1 mole of gas at STP = 22.4 L)



$$3.00 \text{ mol CH}_4 \times (2 \text{ mol O}_2 / 1 \text{ mol CH}_4) \times 22.4 \text{ L/mol} = \mathbf{134.4 \text{ L O}_2}$$

- 5** What volume of 0.500 M  $\text{HCl}$  is required to neutralize 25.0 mL of 0.300 M  $\text{NaOH}$ ?



$$M_1V_1 = M_2V_2$$

$$(0.500 \text{ M}) \times V_1 = (0.300 \text{ M}) \times (25.0 \text{ mL})$$

$$V_1 = (0.300 \times 25.0) / 0.500$$

$$V_1 = 15.0 \text{ mL}$$

$$\mathbf{15.0 \text{ mL of HCl}}$$