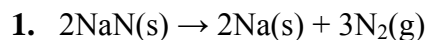


CHAPTER 7	Gas Stoichiometry Problems Answer Key	BLM 7.2.7A
ANSWER KEY		



$$\text{(a)} \quad n_{\text{N}_2} = 4.76 \text{ mol NaN}_3 \times \frac{3 \text{ mol N}_2}{2 \text{ mol NaN}_3} = 7.14 \text{ mol N}_2\text{(g)}$$

$$\text{(b)} \quad n_{\text{N}_2} = 117 \text{ g NaN}_3 \times \frac{\text{mol}}{65.02 \text{ g}} \text{NaN}_3 \times \frac{3 \text{ mol N}_2}{2 \text{ mol NaN}_3} = 2.6991 \text{ mol N}_2\text{(g)}$$

$$PV = nRT$$

$$V = \frac{nRT}{P}$$

$$V_{\text{N}_2} = \frac{(2.6991 \text{ mol}) \left(8.314 \frac{\text{kPa} \cdot \text{L}}{\text{mol} \cdot \text{K}} \right) (273.15 + 20.2^\circ \text{C})}{101.2 \text{ kPa}}$$

$$V_{\text{N}_2} = 65.0 \text{ L N}_2\text{(g)}$$

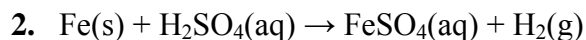
$$\text{(c)} \quad PV = nRT$$

$$n = \frac{PV}{RT}$$

$$n_{\text{N}_2} = \frac{(132.0 \text{ kPa})(10.5 \text{ L})}{\left(8.314 \frac{\text{kPa} \cdot \text{L}}{\text{mol} \cdot \text{K}} \right) (273.15 + 25.0^\circ \text{C})}$$

$$n_{\text{N}_2} = 0.55914 \text{ mol N}_2\text{(g)}$$

$$m_{\text{Na}} = 0.55914 \text{ mol N}_2 \times \frac{2 \text{ mol Na}}{3 \text{ mol N}_2} \times 22.99 \frac{\text{g}}{\text{mol}} \text{Na} = 8.57 \text{ g Na(s)}$$



$$\text{(a)} \quad n_{\text{H}_2} = 4.35 \text{ mol Fe} \times \frac{1 \text{ mol H}_2}{1 \text{ mol Fe}} = 4.35 \text{ mol Fe(s)}$$

CHAPTER 7	Gas Stoichiometry Problems Answer Key (continued)	BLM 7.2.7A
ANSWER KEY		

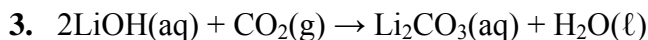
$$(b) n_{H_2} = 40.0 \text{ g Fe} \times \frac{1 \text{ mol}}{55.85 \text{ g}} \text{ Fe} \times \frac{1 \text{ mol H}_2}{1 \text{ mol Fe}} = 0.71620 \text{ mol H}_2(\text{g})$$

$$PV = nRT$$

$$V = \frac{nRT}{P}$$

$$V_{H_2} = \frac{(0.71620 \text{ mol}) \left(8.314 \frac{\text{kPa} \cdot \text{L}}{\text{mol} \cdot \text{K}} \right) (273.15 + 18.0^\circ \text{C})}{100.3 \text{ kPa}}$$

$$V_{H_2} = 17.3 \text{ L H}_2(\text{g})$$



$$PV = nRT$$

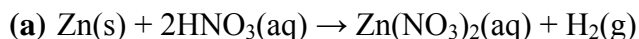
$$n = \frac{PV}{RT}$$

$$n_{\text{CO}_2} = \frac{(95.0 \text{ kPa})(25.0 \text{ L})}{\left(8.314 \frac{\text{kPa} \cdot \text{L}}{\text{mol} \cdot \text{K}} \right) (273.15 + 28.3^\circ \text{C})}$$

$$n_{\text{CO}_2} = 0.94763 \text{ mol CO}_2(\text{g})$$

$$m_{\text{Li}_2\text{CO}_3} = 0.94763 \text{ mol CO}_2 \times \frac{1 \text{ mol Li}_2\text{CO}_3}{1 \text{ mol CO}_2} \times 73.89 \frac{\text{g}}{\text{mol}} \text{ Li}_2\text{CO}_3 = 70.0 \text{ g Li}_2\text{CO}_3(\text{aq})$$

4.



(b) $PV = nRT$

$$n = \frac{PV}{RT}$$

$$n_{H_2} = \frac{(85.0 \text{ kPa})(37.0 \text{ L})}{\left(8.314 \frac{\text{kPa} \cdot \text{L}}{\text{mol} \cdot \text{K}} \right) (273.15 + 20.0^\circ \text{C})}$$

$$n_{H_2} = 1.2904 \text{ mol H}_2(\text{g})$$

$$m_{\text{Zn}} = 1.2904 \text{ mol H}_2 \times \frac{1 \text{ mol Zn}}{1 \text{ mol H}_2} \times 65.41 \frac{\text{g}}{\text{mol}} \text{ Zn} = 84.4 \text{ g Zn}(\text{s})$$