

CHAPTER 4	Dalton's Law of Partial Pressures Answer Key	BLM 4.2.6A
ANSWER KEY		

$$\begin{array}{lll}
 1. & P_{\text{N}_2} = (0.42)(250 \text{ kPa}) & P_{\text{O}_2} = (0.25)(250 \text{ kPa}) & P_{\text{CO}_2} = (0.33)(250 \text{ kPa}) \\
 & P_{\text{N}_2} = 1.0 \times 10^2 \text{ kPa} & P_{\text{O}_2} = 62 \text{ kPa} & P_{\text{CO}_2} = 82 \text{ kPa}
 \end{array}$$

$$\begin{array}{lll}
 2. & \frac{7 \text{ mol O}_2}{6 \text{ mol N}_2} = \frac{90 \text{ kPa}}{P_{\text{N}_2}} & \frac{7 \text{ mol O}_2}{12 \text{ mol CO}} = \frac{90 \text{ kPa}}{P_{\text{CO}}} & \frac{7 \text{ mol O}_2}{10 \text{ mol H}_2\text{O}} = \frac{90 \text{ kPa}}{P_{\text{H}_2\text{O}}} \\
 & P_{\text{N}_2} = 77 \text{ kPa} & P_{\text{CO}} = 1.5 \times 10^2 \text{ kPa} & P_{\text{H}_2\text{O}} = 1.3 \times 10^2 \text{ kPa}
 \end{array}$$

$$\begin{aligned}
 P_{\text{total}} &= P_{\text{O}_2} + P_{\text{N}_2} + P_{\text{CO}} + P_{\text{H}_2\text{O}} \\
 P_{\text{total}} &= 90 \text{ kPa} + 77 \text{ kPa} + 154 \text{ kPa} + 129 \text{ kPa} \\
 P_{\text{total}} &= 4.5 \times 10^2 \text{ kPa}
 \end{aligned}$$

$$3. \text{ (a) } P_{\text{H}_2\text{O}} \text{ at } 21^\circ\text{C} = 2.49 \text{ kPa}$$

$$\begin{aligned}
 P_{\text{CO}_2} &= P_{\text{total}} - P_{\text{H}_2\text{O}} \\
 P_{\text{CO}_2} &= 101.5 \text{ kPa} - 2.49 \text{ kPa} \\
 P_{\text{CO}_2} &= 99.0 \text{ kPa}
 \end{aligned}$$

$$\text{(b) } V = (250 \text{ mL}) \left(\frac{1 \text{ L}}{1000 \text{ mL}} \right) = 0.250 \text{ L}$$

$$T = 21^\circ\text{C} + 273.15 = 294.15 \text{ K}$$

$$PV = nRT$$

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

$$n = \frac{(99.0 \text{ kPa})(0.250 \text{ L})}{\left(8.314 \frac{\text{kPa} \cdot \text{L}}{\text{mol} \cdot \text{K}} \right) (294.15 \text{ K})}$$

$$n = 1.0 \times 10^{-2} \text{ mol CO}_2(\text{g})$$