

CHAPTER 4	Combined Gas Law (1) Answer Key	BLM 4.1.1A
ANSWER KEY		

$$1. \quad \frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$V_2 = \frac{P_1 V_1 T_2}{T_1 P_2}$$

$$V_2 = \frac{(100.8 \text{ kPa})(4.2 \text{ L})(248.15 \text{ K})}{(271.15 \text{ K})(103.0 \text{ kPa})}$$

$$V_2 = 3.8 \text{ L}$$

The balloons will decrease in volume.

$$2. \quad V_1 = (6.0 \text{ L})(80\%)$$

$$V_1 = 4.8 \text{ L}$$

$$T_1 = 37.8^\circ \text{C (body temperature)}$$

$$T_1 = 310.95 \text{ K}$$

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$V_2 = \frac{P_1 V_1 T_2}{T_1 P_2}$$

$$V_2 = \frac{(106.5 \text{ kPa})(4.8 \text{ L})(292.15 \text{ K})}{(310.95 \text{ K})(102.0 \text{ kPa})}$$

$$V_2 = 4.7 \text{ L}$$

$$3. \quad \text{(a)} \quad \frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$P_2 = \frac{P_1 V_1 T_2}{T_1 V_2}$$

$$P_2 = \frac{(101.325 \text{ kPa})(500 \text{ mL})(1273 \text{ K})}{(373 \text{ K})(60 \text{ mL})}$$

$$P_2 = 2.9 \times 10^3 \text{ kPa}$$

$$\text{(b)} \quad \frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$V_2 = \frac{P_1 V_1 T_2}{T_1 P_2}$$

$$V_2 = \frac{(3600 \text{ kPa})(60 \text{ mL})(298.15 \text{ K})}{(1273 \text{ K})(100 \text{ kPa})}$$

$$V_2 = 5.1 \times 10^2 \text{ mL}$$

CHAPTER 4	Combined Gas Law (1) Answer Key (continued)	BLM 4.1.1A
ANSWER KEY		

4.

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$T_2 = \frac{T_1 P_2 V_2}{P_1 V_1}$$

$$T_2 = \frac{(295.15 \text{ K})(1700 \text{ kPa})(20 \text{ L})}{(1200 \text{ kPa})(20 \text{ L})}$$

$$T_2 = 418 \text{ K or } 1.4 \times 10^2 \text{ }^\circ\text{C}$$

5.

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$P_2 = \frac{P_1 V_1 T_2}{T_1 V_2}$$

$$P_2 = \frac{(101.325 \text{ kPa})(5.5 \text{ L})(303.15 \text{ K})}{(273.15 \text{ K})(5.5 \text{ L})}$$

$$P_2 = 1.1 \times 10^2 \text{ kPa}$$