

Quiz 7.1 – Gas Laws

Name: Key

Problem 1 (1 point)

A gas occupies 2.50 L at 0.95 atm of pressure and a temperature of 274.5 K. After a change in P , V , and T the new volume is 5.45 L and the new pressure is 0.67 atm. What is the new temperature?

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2} \quad \frac{0.95 \text{ atm} \cdot 2.50 \text{ L}}{274.5 \text{ K}} = \frac{0.67 \text{ atm} \cdot 5.45 \text{ L}}{T_2}$$

$$T_2 = 422 \text{ K}$$

Problem 2 (2 points)

A gas occupies 1.75 L at 1.24 atm of pressure and a temperature of 12.4°C. After a change in P , V , and T the new volume is 1.38 L and the new temperature is 53.5°C. What is the new pressure?

$$\frac{1.24 \text{ atm} \cdot 1.75 \text{ L}}{285.55 \text{ K}} = \frac{P_2 \cdot 1.38 \text{ L}}{326.65 \text{ K}}$$

$$P_2 = 1.80 \text{ atm}$$

Problem 3 (2 points)

How many moles of gas are in each of the two gas samples from Problem 1 and Problem 2

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

$$n_1 = \frac{0.95 \text{ atm} \cdot 2.50 \text{ L}}{0.08206 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}} \cdot 274.5 \text{ K}} = 0.105 \text{ moles}$$

$$n_2 = \frac{1.24 \text{ atm} \cdot 1.75 \text{ L}}{0.08206 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}} \cdot 285.55 \text{ K}} = 0.0926 \text{ moles}$$