

GASES AND THEIR PROPERTIES - LECTURE NOTES

Homework Answers (solutions to the homework) (the 4's) – Craig

PRACTICE PROBLEMS:

8. A sample of gas has a volume of 100.0 cm^3 when the pressure is at 150.0 kPa . What is the volume of this gas when the pressure is increased to 200.0 kPa ? The temperature and amount of gas remain constant.

Answer:

$$\begin{aligned}
 V_1 &= 100.0 \text{ cm}^3 \\
 P_1 &= 150.0 \text{ kPa} \\
 V_2 &= ? \\
 P_2 &= 200.0 \text{ kPa}
 \end{aligned}$$

$$\begin{aligned}
 P_1 V_1 &= P_2 V_2 \quad \rightsquigarrow \quad \frac{P_1 V_1}{P_2} = V_2 \\
 V_2 &= \frac{P_1 V_1}{P_2} = \frac{(150.0 \text{ kPa})(100.0 \text{ cm}^3)}{200.0 \text{ kPa}} =
 \end{aligned}$$

$$V_2 = 75.0 \text{ cm}^3$$

9. A sample of gas has a volume of 330 milliliters when the pressure is 760 mm Hg, What is the final pressure (in atmospheres of pressure) when the volume is changed to 5.50 liters?

Answer:

$$V_1 = \frac{330 \text{ mL}}{1000 \text{ mL}} = 0.330 \text{ L}$$

$$P_1 = \frac{760 \text{ mm Hg}}{7.501 \text{ mmHg}} \times \frac{1 \text{ kPa}}{101.325 \text{ kPa}} = 1 \text{ ATM}$$

$$V_2 = 5.50 \text{ L}$$

$$P_2 = ?$$

$$P_1 V_1 = P_2 V_2 \quad \rightsquigarrow \quad \frac{P_1 V_1}{V_2} = P_2$$

$$P_2 = \frac{P_1 V_1}{V_2} = \frac{(1 \text{ ATM})(0.330 \text{ L})}{5.50 \text{ L}} = 0.06 \text{ ATM}$$