

GASES AND THEIR PROPERTIES - LECTURE NOTES

Homework Answers (solutions to the homework) (the 3's) - Craig

PRACTICE PROBLEMS:

6. A sample of gas occupies a volume of 100.0 cm^3 at a temperature of 200.0 K . What volume would this gas occupy at a temperature of 150.0 K ? The pressure and amount of gas do not change.

Answer:

$$V_1 = 100.0 \text{ cm}^3$$

$$T_1 = 200.0 \text{ K}$$

$$V_2 = ?$$

$$T_2 = 150.0 \text{ K}$$

$$\frac{V_1}{T_1} = \frac{V_2}{T_2} \quad \text{OR} \quad \frac{T_1}{V_1} = \frac{T_2}{V_2}$$

USE \curvearrowright

$$\cancel{\frac{V_1}{T_1}} = \frac{V_2}{\cancel{T_2}} \rightsquigarrow \frac{T_2 V_1}{T_1} = V_2 = \frac{(150.0 \text{ K})(100.0 \text{ cm}^3)}{200.0 \text{ K}} = \boxed{75.0 \text{ cm}^3}$$

7. If a sample of gas occupies a volume of 0.325 liters at a temperature of 30°C , what temperature will the gas be if the volume changed to 200 mL ? The pressure and amount of gas do not change.

Answer:

$$V_1 = 325 \text{ cm}^3$$

$$T_1 = 30^\circ \text{C} + 273 = 303 \text{ K}$$

$$V_2 = 200. \text{ cm}^3$$

$$T_2 = ?$$

$$\frac{V_1}{T_1} = \frac{V_2}{T_2} \quad \text{OR} \quad \frac{T_1}{V_1} = \frac{T_2}{V_2}$$

FROM THESE "OPTIONS" FOR EQUATIONS, CHOOSE THE EQUATION THAT HAS THE VARIABLE "ON TOP" (THAT YOU ARE SOLVING FOR)

USE \curvearrowright

$$\cancel{\frac{T_1}{V_1}} = \frac{T_2}{\cancel{V_2}} \rightsquigarrow \frac{V_2 T_1}{V_1} = T_2 = \frac{(200. \text{ cm}^3)(303 \text{ K})}{325 \text{ cm}^3} = \boxed{186 \text{ K}}$$