CHARLES' LAW

Name _____

‍les' Law states that the volume of a gas varies directly with the Kelvin temperature, assuming that pressure is constant. We use the following formulas:

$$\frac{V_1}{T_1} = \frac{V_2}{T_2} \quad \text{or} \quad V_1 \times T_2 = V_2 \times T_1$$
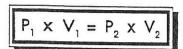
$$K = {}^\circ C + 273$$

Solve the following problems assuming a constant pressure.

1. A sample of nitrogen occupies a volume of 250 mL at 25° C. What volume will it occupy at 95° C?

   _____

2. Oxygen gas is at a temperature of 40° C when it occupies a volume of 2.3 liters. To what temperature should it be raised to occupy a volume of 6.5 liters?

   _____

3. Hydrogen gas was cooled from $1\bar{5}0^\circ$ C to $5\bar{0}^\circ$ C. Its new volume is 75 mL. What was its original volume?

   _____

4. Chlorine gas occupies a volume of 25 mL at $3\bar{0}0$ K. What volume will it occupy at 600 K?

   _____

5. A sample of neon gas at $5\bar{0}^\circ$ C and a volume of 2.5 liters is cooled to 25° C. What is the new volume?

   _____

6. Fluorine gas at $30\bar{0}$ K occupies a volume of $50\bar{0}$ mL. To what temperature should it be lowered to bring the volume to $30\bar{0}$ mL?

   _____

7. Helium occupies a volume of 3.8 liters at -45° C. What volume will it occupy at 45° C?

   _____

8. A sample of argon gas is cooled and its volume went from $38\bar{0}$ mL to $25\bar{0}$ mL. If its final temperature was -55° C, what was its original temperature?

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BOYLE'S LAW

Name _____

Boyle's Law states that the volume of a gas varies inversely with its pressure if temper
is held constant. (If one goes up, the other goes down.) We use the formula:

$$P_1 \times V_1 = P_2 \times V_2$$

1 atm
760 mm Hg
760 torr   @ sea level
101.3 kPa

Solve the following problems (assuming constant temperature).

1. A sample of oxygen gas occupies a volume of 250. mL at 740. torr pressure. What volume will it occupy at 800. torr pressure?

   _____

2. A sample of carbon dioxide occupies a volume of 3.50 liters at 125 kPa pressure. What pressure would the gas exert if the volume was decreased to 2.00 liters?

   _____

3. A 2.0 liter container of nitrogen had a pressure of 3.2 atm. What volume would be necessary to decrease the pressure to 1.0 atm?

   _____

4. Ammonia gas occupies a volume of 450. mL at a pressure of 720. mm Hg. What volume will it occupy at standard pressure?

   _____

5. A 175 mL sample of neon had its pressure changed from 75 kPa to 150 kPa. What is its new volume?

   _____

6. A sample of hydrogen at 1.5 atm had its pressure decreased to 0.50 atm producing a new volume of 750 mL. What was its original volume?

   _____

7. Chlorine gas occupies a volume of 1.2 liters at 720 torr pressure. What volume will it occupy at 1 atm pressure?

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8. Fluorine gas exerts a pressure of 900. torr. When the pressure is changed to 1.50 atm, its volume is 250. mL. What was the original volume?

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