Name _____

Date _____ hour _____

Charles's Law

- solve the following problems using Charles's Law

$T_1V_2 = T_2V_1$ Or $T_1/T_2 = V_1/V_2$

1. T1 = 25 °C T2 = 35 °C
   V1 = 10 ml V2 = ____ ml

2. T1 = 25 °C T2 = 35 °C
   V1 = ____ ml V2 = 40 ml

3. T1 = 55 °C T2 = ____ °C
   V1 = 60 ml V2 = 60 ml

4. T1 = ____ °C T2 = 150 °C
   V1 = 70 ml V2 = 75 ml

5. T1 = 225 °C V1 = 8.0 L
   T2 = 350 °C V2 = ____ L

6. T1 = 350 °C V2 = 1.8 L
   T2 = 225 °C V1 = _____ L

7. Let's say that Mr. T takes a stroll in his car this morning & the temp. outside is 19°F. The volume of one of his car tires is about 15 Liters. He notices that the tire appears to be flat, but when he bought the tire yesterday it was much larger in volume (20 Liters). What was the temp. yesterday afternoon? What happened to the tire?

CHARLES' LAW

Name _____

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

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

$$K = °C + 273$$

Convert all temps to Kelvin before solving. (For this page only)

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 150° C to 50° C. Its new volume is 75 mL. What was its original volume?

_____

4. Chlorine gas occupies a volume of 25 mL at 300 K. What volume will it occupy at 600 K?

_____

5. A sample of neon gas at 50° C and a volume of 2.5 liters is cooled to 25° C. What is the new volume?

_____

6. Fluorine gas at 300 K occupies a volume of 500 mL. To what temperature should it be lowered to bring the volume to 300 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 380 mL to 250 mL. If its final temperature was -55° C, what was its original temperature?

_____

Chem 1: Gay-Lussac's Law Worksheet

1. Write the equation for Gay Lussac's Law. Define the symbols used.

2. What two gas law variables are constant in Gay-Lussac's Law?

3. A rigid container has an initial pressure of 1.50 atm at 21°C. What will the pressure be if the temperature is increased to 121°C?

4. The pressure inside a container is 770 mmHg at a temperature of 57°C. What would the pressure be at 75°C?

5. A rigid container is at a temperature of 112°C. When heated to 224°C, the pressure was 288 kPa. What was the initial pressure?

6. Use Gay-Lussac's Law to explain why you should never throw a pressurized aerosol container into a fire. A fire's temperature is approximately 400°C.