Dougherty Valley HS AP Chemistry
Gas Laws – Charles's Law

WORKSHEET #3

Name: **KEY** Date: Period: Seat #:

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

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}; \quad K = °C + 273$$

Solve the following problems (assuming constant pressure). Assume all number are 3 significant figures.

A sample of nitrogen occupies a volume of 250 mL at 25°C. What volume will it occupy at 95°C? 309 ml

$$\frac{250\ \text{ml}}{298\ \text{K}} = \frac{\text{V}_2}{393\ \text{K}}; = 309\ \text{ml}$$

Oxygen gas is at a temperature of 40°C when it occupies a volume of 2.30 Liters. To what temperature should it be raised to occupy a volume of 6.50 Liters? 885 K/612°C

$$\frac{2.30\ \text{L}}{338\ \text{K}} = \frac{6.50\ \text{L}}{\text{T}_2}; = 885\text{K} / 612°\text{C}$$

Hydrogen gas was cooled from 150°C to 50°C. Its new volume is 75.0 mL. What was its original volume? 98.2 mL

$$\frac{V_1}{448\ k} = \frac{75.0\ mL}{348\ K}; = 98.2\ mL$$

Chlorine gas occupies a volume of 25.0 mL at 300 K. What volume will it occupy at 600 K? 50.0 mL

$$\frac{25.0\ mL}{300.\ K} = \frac{V_2}{600\ K}; = 50\ mL$$

A sample of neon gas at 50°C and a volume of 2.50 Liters is cooled to 25°C. What is the new volume? 2.31 L

$$\frac{2.50\ L}{348\ K} = \frac{V_2}{298\ K}; = 2.31\ L$$