**Boyle’s, Charles, and Gay-Lussac’s Laws**

**Day 1 Practice Problems**

**Instructions:**

1. **Tell me which law we are using.**
2. **Write what our 3 givens are.**
3. **Write the formula.**
4. **Plug in the numbers (your givens) with UNITS.**
5. **Solve, including proper units.**

P1V1 = P2 V2 P = pressure (atm) V = volume (liter, L) T = temperature (kelvin, K)

T1  T2

atm = 760 torr = 760mm Hg = 101.325 kPa

*Boyle’s Law: Temperature is constant*

*Charles’ Law: Pressure is constant* Temperature K = Kelvin C = Celsius

*Gay-Lussac’s Law: Volume is constant* K = ˚C + 273˚ C = K – 273

1. The volume of a gas at 3.5 atm is 300mL. If the pressure is increased to 5 atm, what will be the new volume?

Law being used: \_\_*Boyle*\_\_\_\_\_\_ **FORMULA WORK ANSWER**

Given 1:\_\_P1 = 3.5 atm\_\_\_ P1 V1 = P2V2 P1 V1 = P2V2 V2 = 210 mL

(3.5 atm) (300 ml) = (5 atm) V2

Given 2:\_\_V1 = 300mL\_\_\_\_ 1050 = (V2) (5 atm)

Given 3:\_\_P2 = 5 atm\_\_\_\_\_

1. The pressure of a sample of helium in a 1.0L container is 0.98 atm. What is the new pressure if the sample is placed in a 2.0 L container?

Law being used: \_\_\_\_\_\_\_\_\_\_\_ **FORMULA WORK ANSWER**

Given 1:\_\_\_\_\_\_\_\_\_\_

Given 2:\_\_\_\_\_\_\_\_\_\_

Given 3:\_\_\_\_\_\_\_\_\_\_

1. A sample of gas has a pressure of 4.5 atm and a temperature of 325 K. What will be the new pressure if the temperature is raised to 500K?

Law being used: \_\_\_\_\_\_\_\_\_\_\_ **FORMULA WORK ANSWER**

Given 1:\_\_\_\_\_\_\_\_\_\_

Given 2:\_\_\_\_\_\_\_\_\_\_

Given 3:\_\_\_\_\_\_\_\_\_\_

1. The temperature of a 3.0L sample of gas is lowered from 350K to 275K. What will be the resulting volume of the gas?

Law being used: \_\_\_\_\_\_\_\_\_\_\_ **FORMULA WORK ANSWER**

Given 1:\_\_\_\_\_\_\_\_\_\_

Given 2:\_\_\_\_\_\_\_\_\_\_

Given 3:\_\_\_\_\_\_\_\_\_\_

1. A sample of neon gas occupies 0.22 L at 0.860 atm. What will be its volume at 0.0384 atm of pressure?

Law being used: \_\_\_\_\_\_\_\_\_\_\_ **FORMULA WORK ANSWER**

Given 1:\_\_\_\_\_\_\_\_\_\_

Given 2:\_\_\_\_\_\_\_\_\_\_

Given 3:\_\_\_\_\_\_\_\_\_\_

1. A gas at 314 K occupies a volume of 0.67 L. At what Kelvin temperature will the volume increase to 1.12 L?

Law being used: \_\_\_\_\_\_\_\_\_\_\_ **FORMULA WORK ANSWER**

Given 1:\_\_\_\_\_\_\_\_\_\_

Given 2:\_\_\_\_\_\_\_\_\_\_

Given 3:\_\_\_\_\_\_\_\_\_\_

1. If it takes 0.5 L of oxygen gas kept in a cylinder under pressure to fill an evacuated 4.0L vessel in which the pressure is 0.98 atm, what was the initial pressure of the gas in the cylinder?

Law being used: \_\_\_\_\_\_\_\_\_\_\_ **FORMULA WORK ANSWER**

Given 1:\_\_\_\_\_\_\_\_\_\_

Given 2:\_\_\_\_\_\_\_\_\_\_

Given 3:\_\_\_\_\_\_\_\_\_\_

1. The volume of a 300K sample of gas is raised from 3.0L to 4.5L. What will be the new temperature of the gas?

Law being used: \_\_\_\_\_\_\_\_\_\_\_ **FORMULA WORK ANSWER**

Given 1:\_\_\_\_\_\_\_\_\_\_

Given 2:\_\_\_\_\_\_\_\_\_\_

Given 3:\_\_\_\_\_\_\_\_\_\_

1. A sample of gas has a pressure of 2.0 atm and a temperature of 400K. What will be the new temperature if the pressure is increased to 4.0 atm?

Law being used: \_\_\_\_\_\_\_\_\_\_\_ **FORMULA WORK ANSWER**

Given 1:\_\_\_\_\_\_\_\_\_\_

Given 2:\_\_\_\_\_\_\_\_\_\_

Given 3:\_\_\_\_\_\_\_\_\_\_