Phys. Science Chapter 3     Gas Law Problems

(Do not write on this sheet) Show the set up in the equation for each problem

**Combined Gas Law:** combines Boyle’s and Charles’s laws into a single equation.

\[ \frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2} \]

*P = pressure measured in kPa (kilo pascals)*

*V = volume measured L (liters)*

*T = temperature measured in °K (degrees kelvin)*

**Problems:**

1. A gas has a volume of 3.0 L at a pressure of 30 kPa. What happens to the volume when the pressure is increased to 110 kPa? The temperature does not change.

2. Gas stored in a tank at 270°K has a pressure of 320 kPa. The maximum safe pressure for this tank is 775 kPa. At what temperature will the tank reach this pressure?

3. At 283°K the gas in a cylinder has a volume of 0.350 L. The gas is allowed to expand to 0.295 L. What must the final temperature be for the pressure of remain constant?

4. A gas in a cylinder has a pressure of 225 kPa at a volume of 4.00 L. The volume is reduced to .75 L. The temperature does not change. Find the new pressure of the gas.

5. A gas has a pressure of 320 kPa at a volume of 4.80 L. What happens to the pressure when the volume is increased to 5.90 L? The temperature does not change.

6. A gas has a pressure of 170 kPa at a temperature of 290°K. At what temperature will the gas have a pressure of 270 kPa? The volume does not change.

7. At 20°C, a gas has a pressure of 130 kPa. The gas is cooled until the pressure decreases to 100 kPa. If the volume remains constant, what will the final temperature be in °K? (Hint: Celsius is 273 less than kelvin. So add 273 to the kevin temp. to get celsius.)

8. A gas in a cylinder has a pressure of 350 kPa, at a volume of 15.5 L. What happens to the pressure when the volume is decreased to 9.6 L? The temperature does not change.

9. A gas has a pressure of 75 kPa at a temperature of 120°K. At what temperature will the gas have a pressure of 125 kPa? The volume does not change.

10. At 175°K, a gas has a pressure of 120 kPa. The gas is warmed until the pressure increases to 230 kPa. If the volume remains constant, what will the final temperature be in kelvins? In Celsius? (Hint: Celsius is 273 less than kelvin. So subtract 273 to the kevin temp. to get celsius.)

11. A gas has a pressure of 115 kPa at a volume of 215 L. What happens to the pressure when the volume decreases to 105 L? The temperature does not change.

12. A gas has a pressure of 90 kPa at a temperature of 421°K. At what temperature will the gas have a pressure of 40 kPa? The volume does not change.

13. At 365°K, a gas has a pressure of 84 kPa. The gas is heated until the pressure increases to 135 kPa. If the volume remains constant, what will the final temperature be in kelvins?

14. A gas has a pressure of 455 kPa at a volume of 11.0 L. What happens to the pressure when the volume is decreased to 6.0 L? The temperature does not change.

15. At 47°K, a gas has a pressure of 2.7 kPa. The gas is heated until the pressure climbs to 88.5 kPa. If the volume remains constant, what will the final temperature be in degrees kelvin?