Name:_____

Combined Gas Law Worksheet

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2} \quad \text{or} \quad P_1V_1T_2 = P_2V_2T_1$$

1. **Helium in a 100 mL container at a pressure of 66.6 kPa is transferred to a container with a volume of 250 mL. What is the new pressure if no change in temperature occurs? What is the new pressure if the temperature changes from 210°K to 151°K?**

2. **What will have to happen to the temperature of a sample of methane if 1000 mL at 98.6 kPa and 25°C is given a pressure of 108.5 kPa and a volume of 900 mL?**

3. **A gas has a volume of 225 mL at 75°C and 175 kPa. What will be its volume at a temperature of 20°C and a pressure of 1.0×10^5 kPa?**

4. **A gas is heated to 180°K and a pressure of 180 kPa. If the container expands to hold a volume of 800 mL, what was the volume of the gas, (in litres), at a temperature of 520°K and 120 kPa pressure?**

5. **A 200 mL sample of gas is collected at 50 kPa and a temperature of 271°K. What volume would this gas occupy at 100 kPa and a temperautre of 14°K?**

6. **Find the new volumes at STP (273 K and 101.3 kPa)**
   (a) 24.6 L at 25°C and 10 atm **(b) 150000 mm^3 at 100 K and 75.00 kPa**

7. **A certain sample of gas has a volume of 0.452 L measured at 187 K and 0.620 atm. What is its volume at 1 atm and 45K?**

8. **Natural gas is usually stored in large underground reservoirs or in above ground tanks. Suppose that a supply of natural gas is stored in an underground reservoir of volume 8.0 X 10^5 m^3 at a pressure of 360 kPa and a temperature of 160K. How many above ground tanks of volume 2.7 X 10^4 m^3 at a temperature of 6°C could be filled with the gas at a pressure of 120 kPa?**

9. **The human lung has an average temperature of 301K. If one inhales Alaskan air at 1 atm and 220K and then holds it, to what pressure will the air in the lungs rise? (The bursting strength of the human lung is over 2 atm. Will they burst?)**

10. **A cylindrical coffee can is welded shut at 293K at sea level. Its height is 20 cm and its radius is 15 cm. If the bursting strength of it's "tin" plate is 3.75 atm, to what temperature may it be heated before bursting?**