

Name: _____ Date: _____ Period: _____

Gas Laws Worksheet: Boyle, Charles, and Combined Gas Laws

Boyle's Law Problems:

$$P_1V_1 = P_2V_2$$

$$1 \text{ atm} = 760.0 \text{ mm Hg} = 101.3 \text{ kPa} = 760.0 \text{ torr}$$

1. If 22.5 L of nitrogen at 748 mm Hg are compressed to 725 mm Hg at constant temperature. What is the new volume?
2. A gas with a volume of 4.0L at a pressure of 205kPa is allowed to expand to a volume of 12.0L. What is the pressure in the container if the temperature remains constant?
3. What pressure is required to compress 196.0 liters of air at 1.00 atmosphere into a cylinder whose volume is 26.0 liters?

Charles' Law Problems:

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$1 \text{ atm} = 760.0 \text{ mm Hg} = 101.3 \text{ kPa} = 760.0 \text{ torr}$$

4. Calculate the decrease in temperature when 6.00 L at 20.0 °C is compressed to 4.00 L.

Name: _____ Date: _____ Period: _____

- A container containing 5.00 L of a gas is collected at 100 K and then allowed to expand to 20.0 L. What must the new temperature be in order to maintain the same pressure (as required by Charles' Law)?
- If 15.0 liters of neon at 25.0 °C is allowed to expand to 45.0 liters, what must the new temperature be to maintain constant pressure?

Combined Gas Law Problems:

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

atm = 760.0 mm Hg = 101.3 kPa = 760 .0 torr

- A gas balloon has a volume of 106.0 liters when the temperature is 45.0 °C and the pressure is 740.0 mm of mercury. What will its volume be at 20.0 °C and 780 .0 mm of mercury pressure?
- If 10.0 liters of oxygen at STP are heated to 512 °C, what will be the new volume of gas if the pressure is also increased to 1520.0 mm of mercury?
- A gas is heated from 263.0 K to 298.0 K and the volume is increased from 24.0 liters to 35.0 liters by moving a large piston within a cylinder. If the original pressure was 1.00 atm, what would the final pressure be?