Gas Laws Problems

Sample Problems:

l. Boyle's Law:

A sample of gas occupies 45.2 mL at 720 mmHg. What is the volume at 760 mmHg?

2. Charles's Law:

A sample of gas occupies 30 mL at 5oC. What volume will the sample occupy at -50 oC?

1. Gay - Lussac's Law:

The gas in an aerosol can is at a pressure of 3.00 atm at 25oC. What would the gas pressure in the can be at 52oC?



1. Combined Gas Law:

A sample of oxygen gas has of volume of 205 mL when its temperature is 220C and its pressure is 30.8 kPa What volume will it occupy at STP? 

Problems for you to try:

1. A sample of gas occupies 2.50 L at 1.15 atm of pressure. What is the volume at standard atmospheric pressure?

1. A sample of gas occupies 75.0 mL at 725.0 mmHg at 180C: Calculate volume at 800.0 mmHg and 298
2. What will the new volume be of a 1.75 L sample of gas cooled from 250C to OOC at constant pressure?
3. A 500.0 mL sample of gas at 760 mmHg is compressed to 100.0 mL What is the new pressure?
4. A 10.0 L sample of gas at 3000˚C is to be cooled at constant pressure until it reaches half its original volume. At what Kelvin temperature will this sample reach half of its original volume?
5. A sample of gas occupies 8.25 L at STP. What will its volume become at 735 mmHg and 200C?
6. A 5.0 L sample of gas at 200C is to be heated at constant pressure until it reaches a volume of 8.0 L. To what Kelvin temperature must this sample be heated?
7. A sample of oxygen with an initial temperature of 50.00C and a volume of 105 L is cooled to -25.0 C. The new pressure is 105.4 kPa and the new volume is 55.0 L What is the initial pressure of the sample?
8. A sample of chlorine gas has a pressure of 7.25 kPa at 20.0˚C. What will its pressure be at 60.0˚C if its volume remains constant? Convert this pressure to atm.
9. Is it possible for a balloon with an initial of 200.0 kPa to naturally expand to four times its initial volume when the temperature remains constant and atmospheric pressure is 101.3 kPa? Justify your answer.