Gas Laws Review

1. Synthetic diamonds can be manufactured at pressures of 6.00×10^4 atm. If we took 2.00 L of gas at 1.00 atm and compressed it to a pressure of 6.00×10^4 atm, what would the volume of that gas be?

2. Submarines need to be extremely strong to withstand the extremely high pressure of water pushing down on them. An experimental research submarine with a volume of 15,000 L has an internal pressure of 1.2 atm. If the pressure of the ocean breaks the submarine forming a bubble with a pressure of 250 atm pushing on it, how big will that bubble be?

3. The temperature inside my refrigerator is about 4 ºC. If I place a balloon in my fridge that initially has a temperature of 22 ºC and a volume of 0.5 L, what will be the volume of the balloon when it is fully cooled by my refrigerator?

4. A soda bottle is flexible enough that the volume of the bottle can change even without opening it. If you have an empty soda bottle (volume of 2 L) at room temperature (20 ºC), what will the new volume be if you put it in your freezer (-4 ºC)?

5. Aerosol cans carry warnings on their labels that say not to incinerate (burn) them or store the cans above a certain temperature. The gas in a used aerosol can is at a pressure of 103 kPa at 25 °C. If the can is thrown onto a fire, what will the pressure be when the temperature reaches 928 °C?

6. A 30.0 L sample of nitrogen inside a rigid, metal container at 20.0 °C is placed inside an oven whose temperature is 50.0 °C. The pressure inside the container at 20.0°C was at 3.00atm. What is the pressure of the nitrogen after its temperature is increased?

7. A gas that has a volume of 28 L, a temperature of 45 ºC, and an unknown pressure has its volume increased to 34 L and its temperature decreased to 35 ºC. If I measure the pressure after the change to be 2.0 atm, what was the original pressure of the gas?

8. A gas has a temperature of 14 ºC, and a volume of 4.5 L. If the temperature is raised to 29ºC and the pressure is not changed, what is the new volume of the gas?