Ideal Gas Law Practice Worksheet

Solve the following problems using the ideal gas law:

1) How many moles of gas does it take to occupy 120 liters at a pressure of 2.3 atmospheres and a temperature of 340 K?

2) If I have a 50 liter container that holds 45 moles of gas at a temperature of 200° C, what is the pressure inside the container?

3) It is not safe to put aerosol canisters in a campfire, because the pressure inside the canisters gets very high and they can explode. If I have a 1.0 liter canister that holds 2 moles of gas, and the campfire temperature is 1400° C, what is the pressure inside the canister?

4) How many moles of gas are in a 30 liter scuba canister if the temperature of the canister is 300 K and the pressure is 200 atmospheres?

5) I have a balloon that can hold 100 liters of air. If I blow up this balloon with 3 moles of oxygen gas at a pressure of 1 atmosphere, what is the temperature of the balloon?

Solutions to the Ideal gas law practice worksheet:

The ideal gas law states that $PV = nRT$, where P is the pressure of a gas, V is the volume of the gas, n is the number of moles of gas present, R is the ideal gas constant, and T is the temperature of the gas in Kelvins.

Common mistakes:

- Students express T in degrees celsius, rather than Kelvins. This can cause huge problems, especially when the temperature is below freezing.
- Students use the wrong value of R. You need to make sure that you have the right value of R for the units you're using. In this worksheet, R = 0.08206 L·atm/mol·K – some people prefer using units of KPa rather than atmospheres, resulting in huge errors if the wrong R is used.

1) 9.89 moles

2) 34.9 atm

3) 274.5 atm

4) 243.7 moles

5) 406.2 K (133.2° C – a very hot day to blow up balloons!)