

## IDEAL GAS LAW WORKSHEET

### SET 1:

**Problem #1:** Determine the volume of occupied by 2.34 grams of carbon dioxide gas at STP.

**Problem #2:** A sample of argon gas at STP occupies 56.2 liters. Determine the number of moles of argon and the mass in the sample.

**Problem #3:** At what temperature will 0.654 moles of neon gas occupy 12.30 liters at 1.95 atmospheres?

**Problem #4:** A 30.6 g sample of gas occupies 22.414 L at STP. What is the molecular weight of this gas?

**Problem #5:** A 40.0 g gas sample occupies 11.2 L at STP. Find the molecular weight of this gas.

**Problem #6:** A 12.0 g sample of gas occupies 19.2 L at STP. What is the molecular weight of this gas?

**Problem #7:** 96.0 g. of a gas occupies 48.0 L at 700.0 mm Hg and 20.0 °C. What is its molecular weight?

**Problem #8:** 20.83 g of a gas occupies 4.167 L at 79.97 kPa at 30.0 °C. What is its molecular weight?

**Problem #9:** What is the value of and units on R? What is R called ("A letter" is not the correct answer!)?

**Problem #10:** 5.600 g of solid CO<sub>2</sub> is put in an empty sealed 4.00 L container at a temperature of 300 K. When all the solid CO<sub>2</sub> becomes gas, what will be the pressure in the container?

### SET 2

**Problem #1:** How many moles of gas are contained in 890.0 mL at 21.0 °C and 750.0 mm Hg pressure?

**Problem #2:** 1.09 g of H<sub>2</sub> is contained in a 2.00 L container at 20.0 °C. What is the pressure in this container in mmHg?

**Problem #3:** Calculate the volume 3.00 moles of a gas will occupy at 24.0 °C and 762.4 mm Hg.

**Problem #4:** How many moles of gas would be present in a gas trapped within a 100.0 mL vessel at 25.0 °C at a pressure of 2.50 atmospheres?

**Problem #5:** How many moles of a gas would be present in a gas trapped within a 37.0 liter vessel at 80.00 °C at a pressure of 2.50 atm?

**Problem #6:** What volume will 1.27 moles of helium gas occupy at STP?

[Video: Ideal Gas Law II](#) A problem like #6 just above.

**Problem #7:** At what pressure would 0.150 mole of nitrogen gas at 23.0 °C occupy 8.90 L?

**Problem #8:** What volume would 32.0 g of NO<sub>2</sub> gas occupy at 3.12 atm and 18.0 °C?

**Problem #9:** How many moles of gas are contained in a 50.0 L cylinder at a pressure of 100.0 atm and a temperature of 35.0 °C? If the gas weighs 79.14 g, what is its molecular weight?

[Video: Ideal Gas Law I](#) A problem like #9 just above.

**Problem #10:** An amount of an ideal gas at 290.9 K has a volume of 17.05 L at a pressure of 1.40 atm. What is the pressure of this gas sample when the volume is halved and the absolute temperature is multiplied by four?

**Problem #11:** A balloon has a mass of 0.5 g when completely deflated. When it is filled with an unknown gas, the mass increases to 1.7 g. You notice on the canister of the unknown gas that it occupies a volume of 0.4478 L at a temperature of 50 °C. You note the temperature in the room is 25 °C. Identify the gas.

**Problem #12:** A 10.20 g sample of a gas has a volume of 5.25 L at 23.0 °C and 751 mmHg. If 2.30 g of the same gas is added to this constant 5.25 L volume and the temperature raised to 67.0 degrees Celsius, what is the new gas pressure?

**Problem #13:** A gas consisting of only carbon and hydrogen has an empirical formula of CH<sub>2</sub>. The gas has a density of 1.65 g/L at 27.0 °C and 734.0 torr. Determine the molar mass and molecular formula of the gas.

**Problem #14:** 13.9 grams of an unknown gas is placed in a 5.00 L container. It has an initial pressure at 58.6 kPa and initial temperature at 60.0 °C. What is the name of this gas?

**Problem #15:** A 19.5 L flask at 15 °C contains a mixture of three gases: N<sub>2</sub> (2.50 mol), He (0.38 mol), and Ne (1.34 mol). Calculate the partial pressure of neon gas in the mixture.

Solutions can be found at <http://www.chemteam.info/GasLaw/WS1-Ideal.html>