

IDEAL GAS LAW

Remember: 1 atm = 101.3 kPa $R = 8.314 \text{ dm}^3 \cdot \text{kPa/mol} \cdot \text{K}$

- 1) Define each of the three main variables for a gas.

- 2) If temperature is increased while volume is held constant, what will happen to the pressure of a gas?

- 3) If the temperature is held constant while the pressure on a gas is increased, what will happen to the volume?

- 4) If volume and temperature are held constant, what will happen to the pressure when more gas is added to the container?

Ideal Gas Law:

5) Write the Ideal Gas Law. What units does each part of the law need to have? (Hint: Look at the units of R, the constant)

6) 2.3 moles of hydrogen gas are in a 250. cm^3 container. If the pressure in the container is 140 kPa, what is the temperature of the gas?

7) A 1.5 dm^3 container has a pressure of 1.2×10^5 Pa at a temperature of 25 °C. How many moles of gas are in the container?

8) If 0.57 grams of carbon dioxide is placed in a 250 cm^3 container at 40 °C, what will be the pressure of the container?

9) 3.4 grams of oxygen gas is mixed with 5.6 grams of hydrogen gas in a 3.5 dm^3 container at 256 K. What is the total pressure in the container?

Combined Gas Laws:

10) Write out the combined gas law used when any of the big three variables are changing in a gas problem.

11) While temperature MUST be in Kelvin for these problems, the units for volume and pressure don't matter. Why is this?

12) A gas in a rigid, metal container at $38 \text{ }^\circ\text{C}$ and 134 kPa is cooled to $25 \text{ }^\circ\text{C}$. What is the pressure in the cooled container?

13) The pressure of a 1.0 dm^3 flexible container is decreased from 1.5 atm to .85 atm while the temperature is held constant. What is the new volume of the container?

14) If a sample of gas in a 0.55 dm^3 balloon is heated from 135 K to 255 K while pressure is kept at 105 kPa, what will happen to the volume of the balloon?

15) A 1.4 dm^3 sample of NO gas at $23 \text{ }^\circ\text{C}$ and $1.1 \times 10^5 \text{ Pa}$ is heat to $45 \text{ }^\circ\text{C}$ while the volume increases to 1.6 dm^3 . What is the new pressure of the gas?