

Gas Laws – Supplemental Worksheet

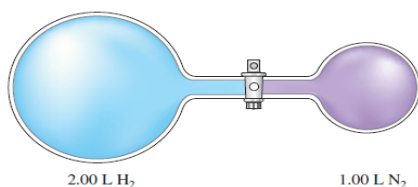
1 atm = 760 mm Hg = 760 torr = 101,325 Pa Molar volume of an ideal gas is 22.42 L at STP.

1. Given $h = 5.24$ cm in a sealed-tube manometer, calculate the pressure in the flask in torr, pascals, and atmospheres.

2. Several volume measurements were made at various pressures using 1.0 mol of NH_3 gas at a temperature of 0°C . Which law is being observed? Calculate the law constant for NH_3 at various pressures.

Experiment	Pressure (atm)	Volume (L)
1	0.1300	172.1
2	0.2500	89.28
3	0.3000	74.35
4	0.5000	44.49
5	0.7500	29.55
6	1.000	22.08

3. Consider the flask diagramed below with the following pressures 492 torr for H_2 and 0.376 atm for N_2 . What are the final partial pressures of H_2 and N_2 after the stopcock between the 2 flask is opened? (Assume the final volume is 3.00L) What is the total pressure in torr?



4. Explain absolute zero.

5. If 32.1 mL of NO_2 gas is completely converted to N_2O_4 gas under the same conditions, what volume will the N_2O_4 occupy? $2\text{NO}_2(\text{g}) \rightarrow \text{N}_2\text{O}_4(\text{g})$

6. A sample of H_2 has a volume of 9.37 L at a temperature of 0°C and pressure of 2.1 atm. Calculate the moles of H_2 present in the sample.

7. A 3.4 L sample of methane gas is heated from 9°C to 74°C at constant pressure. Calculate the new volume.

8. CaO is produced by thermal decomposition of CaCO_3 . Calculate the volume of CO_2 produced at STP from the decomposition of 129g of CaCO_3 .



9. A 3.598 g sample of manganese metal is reacted with excess HCl gas to produce 2.37 L of $\text{H}_2(\text{g})$ at 100°C and 0.834 atm and a manganese chloride compound (MnCl_x). What is the formula of the manganese chloride compound produced in the reaction?

10. A compound contains only nitrogen and hydrogen and is 87.4% nitrogen by mass. A gaseous sample of the compound has a density of 0.977 g/L at 710 torr and 373K. What is the molecular formula of the compound?