

# [The ideal gas questionnaire](https://assignbuster.com/the-ideal-gas-questionnaire/)

[Environment](https://assignbuster.com/essay-subjects/environment/), [Nature](https://assignbuster.com/essay-subjects/environment/nature/)

1. A sample of oxygen of mass 25. 0 g is confined in a vessel at 0°C and 1000. torr. Then 6. 00 g of hydrogen is pumped into the vessel at constant temperature. What will be the final pressure in the vessel (assuming only mixing with no reaction)?
2. A gaseous mixture contains 3. 23 g of chloroform, CHCl3, and 1. 22 g of methane, CH4. Assuming that both compounds remain as gases, what pressure is exerted by the mixture inside a 50. 0-mL metal container at 275°C? What pressure is contributed by the CHCl3?
3. A study of climbers who reached the summit of Mt. Everest without supplemental oxygen revealed that the partial pressures of O2 and CO2 in their lungs were 35 torrs and 7. 5 torrs, respectively. The barometric pressure at the summit was 253 torr. Assume that the lung gases are saturated with moisture at a body temperature of 37°C. Calculate the partial pressure of inert gas (mostly nitrogen) in the climbers’ lungs.
4. During a collision, automobile airbags are inflated by the N2 gas formed by the explosive decomposition of sodium azide, NaN3. 2NaN3 --> 2Na + 3N2. What mass of sodium azide would be needed to inflate a 25. 0-L bag to a pressure of 1. 40 atm at 25°C?
5. Calculate the volume of methane, CH4, measured at 300. K and 825 torr, that can be produced by the bacterial breakdown of 1. 10 kg of simple sugar. C6H12O6 --> 3CH4 + 3CO2
6. We burn 12. 50 L of ammonia in 20. 00 L of oxygen at 00. °C. What volume of nitric oxide, NO, gas can form? What volume of steam, H2O(g), is formed? Assume that all gases are at the same temperature and pressure and that the limiting reactant is used up. 4NH3 (g) + 5O2 (g) --> 4NO(g) + 6H2O(g)
7. A particular tank can safely hold gas up to a pressure of 44. 3 atm. When the tank contains 38. 1 g of N2 at 25°C, the gas exerts a pressure of 10. 1 atm. What is the highest temperature to which the gas sample can be heated safely?