

- 1) If a barometer is filled with Mercury, and it shows that the atmospheric pressure is 754 mmHg, what is the pressure in atmospheres?
- 2) You have three flasks at STP. Flask #1 has H₂O gas, Flask #2 has CO₂ gas, and Flask #3 has NH₃ gas. Which contain the largest number of molecules (#1, #2, #3, or all of them)? Which contains the largest number of atoms (#1, #2, #3, or all of them)?
- 3) Of the three flasks above in question #2, which flask has the molecules with the highest velocity?
- 4) A sample of gas is at constant pressure. The gas occupies 4.8 L when it is at a temperature of 26.2 °C. At what temperature will the volume of gas be 4.2 L?
- 5) Gaseous water is held in two separate containers at the same temperature and pressure. The volume of container #1 is 2.7 L and it contains 8.3 mol of the gas. The volume of container #2 is 5.9 L. How many moles of the water gas are in container #2?
- 6) Three 1.5 L flasks at 25 °C and 735 torr contain the gases CO₂ (flask #1), NO₂ (flask #2), and CH₄ (flask #3). In which flask are there 0.059 moles of gas (#1, #2, #3, all of them, or none of them)?
- 7) A sample of gas is heated from -37 °C to 24 °C, and the volume is increased from 1.5 L to 7.2 L. If the initial pressure is 0.25 atm, what is the final pressure?
- 8) A sample of chlorine gas has a volume of 8.1 L at 29 °C and 900 torr. How many chlorine molecules does it contain?
- 9) You fill a balloon with 3 moles of gas at 30 °C at a pressure of 1.5 atm. What is the volume of the balloon?
- 10) You have a 500 mL container with 60% H and 40% He at 27 °C and 2 atm of total pressure. If you heat the container to 100 °C what will the total pressure be?
- 11) Under what conditions would you have to put a real gas in order for it to behave the most ideal? (P, T, and n, high or low for each condition)
- 12) A 5.6 g piece of solid dry ice, CO₂, is allowed to turn to gas inside a container. The final volume of the balloon is 2 L at 310 K. What is the pressure of the gas inside the container?
- 13) It is found that a 400 mL sample of gas at STP has a mass of 2.8 g. What is the molar mass of the gas?

- 14) Zinc metal is added to HCl to make hydrogen gas. It is collected over a liquid whose vapor pressure at 25 °C is 20 torr. The volume of the gas mixture is 2.1 L and the total pressure is 0.95 atm. What is the partial pressure of the hydrogen gas in this mixture? How many moles of hydrogen gas are there?
- 15) If you increase the temperature of a gas from 50 °C to 100 °C, what would happen to the average kinetic energy of the gas molecules?
- 16) Consider the following unbalanced reaction: $\text{C}_2\text{H}_5\text{OH} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$ 3.4 g of ethanol reacts with oxygen. What is the total volume of gas in L after the reaction finishes, assuming that the reaction took place at 2 atm and 28 °C?
- 17) Write out and explain all of the assumptions of the kinetic molecular theory.
- 18) A sample of gas contains 2.5 mol of He and 6.2 mol of NO_2 and has a total pressure of 8.4 atm. What is the partial pressure of He? Of NO_2 ?