

Honors Chemistry Chapter 11 Gas Laws Worksheet

1. Analysis of a gaseous chlorofluorocarbon,  $\text{CCl}_x\text{F}_y$ , shows it contains 11.79% C and 69.57% Cl. In another experiment you find that 0.107 grams of the compound fills a 458 mL flask at  $25^\circ\text{C}$  with a pressure of 21.3 mm Hg.
  - a. Find the number of moles in the sample. [0.000524 mol]
  - b. Find the molar mass of the chlorofluorocarbon. [204 g/mol]
  - c. (Challenge) Find the molecular formula of the compound. [ $\text{C}_2\text{Cl}_4\text{F}_2$ ]
2. At what temperature will a gas be at if you allow it to expand from an original 456 mL at  $65^\circ\text{C}$  to 3.4 L? [ $2247^\circ\text{C}$  or  $2200^\circ\text{C}$ ]
3. Hydrogen is collected over water when the atmospheric pressure is 103.0 kPa and the temperature is  $21.0^\circ\text{C}$ . When the gas is adjusted to atmospheric pressure the volume is 25.0 mL. What is the volume of the dry gas at STP? [23.0 mL]
4. What is the pressure of a gas if you compressed the gas from its original 500. mL at 698 mmHg to a volume of 302 mL? [1155 mmHg or 1160 mmHg]
5. A propane tank has a pressure of 2326 mm Hg when its temperature is  $15.6^\circ\text{C}$ . What is the pressure inside the tank when the temperature is  $20.^\circ\text{C}$ ? [2361 mm Hg or 2400 mm Hg]
6. A child has a toy balloon with a volume of 1.80 liters. The temperature of the balloon when it was filled was  $20.0^\circ\text{C}$  and the pressure was 102.3 kPa. If the child were to let go of the balloon and it rose 3 kilometers into the sky where the pressure is 0.667 atm and the temperature is  $-10.0^\circ\text{C}$ , what would the new volume of the balloon be? [2.4 L]
7. It is not safe to put aerosol canisters in a campfire, because the pressure inside the canister gets very high and they can explode. If I have a 1.0 liter canister that holds 56.0 grams of  $\text{N}_2$  gas, and the campfire temperature is  $1400^\circ\text{C}$ , what is the pressure, in atm, inside the canister? [274 atm or 270 atm]
8. A 125.0 mL flask is filled with nitrogen as it is collected over water at a pressure of 99.4 kPa and a temperature of  $50.0^\circ\text{C}$ . If the gas is heated to  $60.0^\circ\text{C}$ , what is the pressure of the dry gas? [89.8 kPa]
9. A bag of potato chips is packaged at sea level (1.00 atm) and has a volume of 315 mL. If this bag of chips is transported to Denver (0.775 atm), what will the new volume of the bag be? [406 mL]
10. Carbon dioxide is produced from the endothermic decomposition of calcium carbonate. The 23.6 mL of gas have a temperature of  $73.0^\circ\text{C}$ . When the gas cools to room temperature,  $22.0^\circ\text{C}$ , what is the volume of the gas? [20.1 mL]