Gases   **Chapter 9**   Name: _____

2. What is the temperature of an 8.2-L sample of carbon monoxide, CO, at 435 torr if it occupies 13.3 L at 55 °C and 435 torr?

202.2 K or -71 °C

3. A 2.50-L volume of hydrogen measured at –196 °C is warmed to 145. °C. Calculate the volume of the gas at the higher temperature, assuming no change in pressure.

13.57 mL

4. A balloon inflated with three breaths of air has a volume of 2.1 L. At the same temperature and pressure, what is the volume of the balloon if five more same-sized breaths are added to the balloon?

5.6 L

5. A weather balloon contains 8.80 moles of helium at a pressure of 0.992 atm and a temperature of 20.0 °C at ground level. What is the volume of the balloon under these conditions?

213.1 L

6. A cylinder of medical oxygen has a volume of 25.4 L, and contains O_2 at a pressure of 125 atm and a temperature of 25 °C. What volume of O_2 does this correspond to at normal body conditions, that is, 1.00 atm and 37 °C?

3336.4 L

7. While resting, the average 70-kg human male consumes 14 L of pure O_2 per hour at 25 °C and 100 kPa. How many moles of O_2 are consumed by a 70 kg man while resting for 1.0 hour?

0.571 mol O_2

8. What is the molar mass of a gas if 0.281 g of the gas occupies a volume of 125 mL at a temperature 126 °C and a pressure of 777 torr?

72.1 g/mol

9. The density of a certain gaseous fluoride of phosphorus is 3.93 g/L at STP. Calculate the molar mass of this fluoride and determine its molecular formula.

87.98 g/mol

10. A mixture of 2.00 g of H_2, 1.00 g of N_2, and 0.820 g of Ar is stored in a closed container at STP. Find the volume of the container, assuming that the gases exhibit ideal behavior.

23.66 L

11. A sample of gas isolated from unrefined petroleum contains 90.0% CH_4, 8.9% C_2H_6, and 1.1% C_3H_8 at a total pressure of 3.34 atm. What is the partial pressure of each component of this gas? (The percentages given indicate the percent of the total pressure that is due to each component.)

CH_4 3.06 atm

C_2H_6 0.297 atm

C_3H_8 0.0367 atm

12. The chlorofluorocarbon CCl_2F_2 can be recycled into a different compound by reaction with hydrogen to produce $CH_2F_2(g)$, a compound useful in chemical manufacturing:

$CCl_2F_2(g) + 4H_2(g) \longrightarrow CH_2F_2(g) + 2HCl(g)$
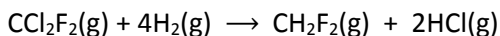
How many grams of H_2 are needed to react with 5.8 L of CCl_2F_2 at a pressure of 925 mm Hg and a temperature of 95 °C?

1.88 g H_2

13. A 2.50-L sample of a colorless gas at STP decomposed to give 2.50 L of N_2 and 1.25 L of O_2 at STP. What is the colorless gas?

N_2O

14. Heavy water, D_2O (molar mass = 20.03 g mol^{-1}), can be separated from ordinary water, H_2O (molar mass = 18.01), as a result of the difference in the relative rates of diffusion of the molecules in the gas phase. Calculate the relative rates of diffusion of H_2O and D_2O.

1.05:1

15. Which of the following gases diffuse more slowly than oxygen? F_2, Ne, N_2O, C_2H_2, NO, Cl_2, H_2S

16. For which of the following gases would be least likely to obey the ideal gas lab?

CO, CO_2, H_2, He, NH_3, SF_6?