must calculate its molar mass. It is known that the tank has a capacity of 90.0 L and weighs 39.2 kg when empty. You find its current mass to be 50.5 kg. The gauge shows a pressure of 1780 kPa when the temperature is 18°C. What is the molar mass of the gas in the cylinder?

296. What is the pressure inside a tank that has a volume of 1.20×10^3 L and contains 12.0 kg of HCl gas at a temperature of 18°C?

297. What pressure in kPa is exerted at a temperature of 20.°C by compressed neon gas that has a density of 2.70 g/L?

298. A tank with a volume of 658 mL contains 1.50 g of neon gas. The maximum safe pressure that the tank can withstand is 4.50×10^2 kPa. At what temperature will the tank have that pressure?

299. The atmospheric pressure on Mars is about 6.75 millibars (1 bar = 100 kPa = 0.9869 atm), and the nighttime temperature can be about −75°C on the same day that the daytime temperature goes up to −8°C. What volume would a bag containing 1.00 g of H_2 gas have at both the daytime and nighttime temperatures?

300. What is the pressure in kPa of 3.95 mol of Cl_2 gas if it is compressed in a cylinder with a volume of 850. mL at a temperature of 15°C?

301. What volume in mL will 0.00660 mol of hydrogen gas occupy at a pressure of 0.907 atm and a temperature of 9°C?

302. What volume will 8.47 kg of sulfur dioxide gas occupy at a pressure of 89.4 kPa and a temperature of 40.°C?

303. A cylinder contains 908 g of compressed helium. It is to be used to inflate a balloon to a final pressure of 128.3 kPa at a temperature of 2°C. What will the volume of the balloon be under these conditions?

304. The density of dry air at 27°C and 100.0 kPa is 1.162 g/L. Use this information to calculate the molar mass of air (calculate as if air were a pure substance).

Stoichiometry of Gases: Chap. 11, Sec. 3

305. In one method of manufacturing nitric acid, ammonia is oxidized to nitrogen monoxide and water:

$$4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O(l)$$

What volume of oxygen will be used in a reaction of 2800 L of NH_3? What volume of NO will be produced? All volumes are measured under the same conditions.

306. Fluorine gas reacts violently with water to produce hydrogen fluoride and ozone according to the following equation:

$$3F_2(g) + 3H_2O(l) \rightarrow 6HF(g) + O_3(g)$$

What volumes of O_3 and HF gas would be produced by the complete reaction of 3.60×10^4 mL of fluorine gas? All gases are measured under the same conditions.

307. A sample of ethanol burns in O_2 to form CO_2 and H_2O according to the following equation:

$$C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$$

If the combustion uses 55.8 mL of oxygen measured at 2.26 atm and 40.°C, what volume of CO_2 is produced when measured at STP?

308. Dinitrogen pentoxide decomposes into nitrogen dioxide and oxygen. If 5.00 L of N_2O_5 reacts at STP, what volume of NO_2 is produced when measured at 64.5°C and 1.76 atm?

309. Complete the table below using the following equation, which represents a reaction that produces aluminum chloride:

$$2Al(s) + 3Cl_2(g) \rightarrow 2AlCl_3(s)$$

Mass Al	*Volume Cl_2*	*Conditions*	*Mass $AlCl_3$*
a. excess	? L	STP	7.15 g
b. 19.4 g	? L	STP	NA
c. 1.559 kg	? L	20.°C and 0.945 atm	NA
d. excess	920. L	STP	? g
e. ? g	1.049 mL	37°C and 5.00 atm	NA
f. 500.00 kg	? m^3	15°C and 83.0 kPa	NA

Mixed Review

310. The industrial production of ammonia proceeds according to the following equation:

$$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$$

a. What volume of nitrogen at STP is needed to react with 57.0 mL of hydrogen measured at STP?
b. What volume of NH_3 at STP can be produced from the complete reaction of 6.39×10^4 L of hydrogen?
c. If 20.0 mol of nitrogen is available, what volume of NH_3 at STP can be produced?
d. What volume of H_2 at STP will be needed to produce 800. L of ammonia, measured at 55°C and 0.900 atm?

311. Propane burns according to the following equation:

$$C_3H_8(g) + 5O_2(g) \rightarrow 3CO_2(g) + 4H_2O(g)$$

a. What volume of water vapor measured at 250.°C and 1.00 atm is produced when 3.0 L of propane at STP is burned?
b. What volume of oxygen at 20.°C and 102.6 kPa is used if 640. L of CO_2 is produced? The CO_2 is also measured at 20.°C and 102.6 kPa.
c. If 465 mL of oxygen at STP is used in the reaction, what volume of CO_2, measured at 37°C and 0.973 atm, is produced?
d. When 2.50 L of C_3H_8 at STP burns, what total volume of gaseous products is formed? The volume of the products is measured at 175°C and 1.14 atm.