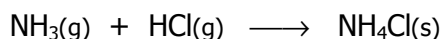


Extra Problems – Unit 5

1. A large flask (of unknown volume) is filled with air until the pressure reaches 3.6 atm. The flask is then attached to a second evacuated flask of known volume, and the air from the first flask is allowed to expand into the second flask. The final pressure of the air (in both flasks) is 2.6 atm, and the volume of the second flask is 5.21 L. Calculate the volume, in liters, of the first flask.
2. Suppose 30.0 mL of N₂ gas at 27°C and 645 mm Hg pressure is added to a 40.0 mL container that already contains He at 37°C and 765 mm Hg. If the resulting mixture is brought to 32°C, what is the total pressure, in mm Hg, of the mixture? (Molar masses: N₂ = 28.01, He = 4.003)
3. A 0.581 g sample of a gaseous compound containing only carbon and hydrogen contains 0.480 g of carbon and 0.101 g of hydrogen. At STP, 33.6 mL of the gas has a mass of 0.0869 g. What is the molecular formula of the compound? (Molar masses: C = 12.01, H = 1.008)
4. The elemental analysis of a certain compound is 24.3% C, 4.1% H, and 71.6% Cl by mass. If 0.132 g of compound vapor occupies 41.4 mL at 741 mm Hg and 96°C, what are the molar mass and molecular formula of the compound? (Molar masses: C = 12.01, H = 1.008, Cl = 35.45)
5. Ammonia gas reacts with hydrogen chloride gas according to the equation



If 7.00 g of NH₃ are reacted with 12.0 g of HCl in a 1.00 L container at 25°C, what will be the final pressure, in atmospheres, in the reaction container?

(Molar masses: NH₃ = 17.03, HCl = 36.46, NH₄Cl = 53.49)