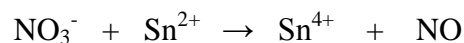


1. Balance the following Redox reaction occurring in acidic solution. (3 pts)



2. What is the pressure in a 10.0 L cylinder filled with 0.448 mol of nitrogen gas at 315 K?  
(3 pts)

$$R = 0.0821 \text{ Latm/molK}$$

Use the Ideal Gas Law:  $PV = nRT$

$$P = \frac{nRT}{V} = \frac{(0.448 \text{ mol}) \left(0.0821 \frac{\text{L atm}}{\text{mol K}}\right) (315 \text{ K})}{10.0 \text{ L}} = 1.16 \text{ atm}$$

3. A gas mixture contains 1.25 g N<sub>2</sub> and 0.85g O<sub>2</sub> in a 1.55 L container at 18 °C. Calculate the mole fraction and partial pressure of each gas in the mixture. (4 pts)

$$T = 18 + 273 = 291 \text{ K} \quad \text{Total moles} = n_T = 0.0446 \text{ mol} + 0.0266 \text{ mol} = 0.0712 \text{ mol}$$

$$1.25 \text{ g N}_2 \times \frac{1 \text{ mol}}{28 \text{ g}} = 0.0446 \text{ mol N}_2 ; \quad \chi_{\text{N}_2} = \frac{0.0446}{0.0712} = 0.63$$

$$0.85 \text{ g O}_2 \times \frac{1 \text{ mol}}{32 \text{ g}} = 0.0266 \text{ mol O}_2 ; \quad \chi_{\text{O}_2} = \frac{0.0266}{0.0712} = 0.37$$

$$P_{\text{N}_2} = \frac{n_{\text{N}_2}RT}{V} = \frac{(0.0446 \text{ mol}) \left(0.0821 \frac{\text{L atm}}{\text{mol K}}\right) (291 \text{ K})}{1.55 \text{ L}} = 0.687 \text{ atm}$$

$$P_{\text{O}_2} = \frac{n_{\text{O}_2}RT}{V} = \frac{(0.0266 \text{ mol}) \left(0.0821 \frac{\text{L atm}}{\text{mol K}}\right) (291 \text{ K})}{1.55 \text{ L}} = 0.409 \text{ atm}$$