Week 5 Worksheet

Chem 11100-2: Section 33

Oct. 26, 2021

Remarks: The following information might be useful

1. $R = 8.314 \frac{J}{\text{mol} \cdot K} = 0.08206 \frac{L \cdot \text{atm}}{\text{mol} \cdot K}$

2. 1 atm = 101.325 kPa = 760 mm Hg

3. For Cl_2, $a = 6.49 \frac{L^2 \cdot \text{atm}}{\text{mol} \cdot K}$ and $b = 0.0562 \frac{L}{\text{mol}}$

Problem 1: A gas is at an initial pressure of 1.2 atm, volume of 2.3 L, and temperature of 200K. If the pressure is raised to 150 kPa and the temperature is raised to 10C, what will be the new volume of the gas?

Problem 2: How many grams of O_2 (g) must be placed in a 300 mL container in order to exert a pressure of 2.00 atmospheres at 25 C?

Problem 3: What is the total p in kPa of the following mixture of gases at 25.0C in a 2.50 L container: 2.50 g Ne, 2.50 g H_2, and 2.50 g CO_2?

Problem 4: Identify the diatomic gas that has a density of 1.249 g/L at STP.

Problem 5: If 3.4 g CS_2 reacts with 7.2 g O_2, what volume of SO_2 (g) will form at STP? (*The following may not be balanced*)

$$CS_2 \, (l) + O_2(g) \longrightarrow CO_2 \, (aq) + SO_2 \, (g)$$
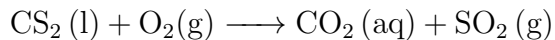
Problem 6: Assume that Cl_2 (g) does not act ideally. At what temperature (in C) does 1.50 g Cl_2 (g) have a volume of 1.0 L at a pressure of 700 mm Hg?