Ph202H/212H
W09 Homework – Due Thursday January 29, 2009

1. Consider a container holding 1.00 mole of argon gas at 35.0°C and 1.22 atm pressure. The radius of a single argon atom, which is assumed to be spherical, is 0.710×10^{-10} m. What fraction of the volume of the container is actually occupied by the atoms?

Ans: 4.35×10^{-5}

2. A quantity of ideal gas at 12.0°C and a pressure of 108 kPa occupies a volume of 2.47 m^3. (a) How many molecules of the gas are present? (b) If the pressure is raised to 316 kPa and the temperature is raised to 31.0°C, how much volume will the gas occupy? Assume no gas leaks from the container.

Ans: (a) 6.78×10^{25} (b) 0.901 m^3

3. Two vessels of volumes 1.22 L and 3.18 L are connected by a thin tube of negligible volume. They contain krypton gas at the same temperature, 16.0°C, and the same pressure, 1.44 atm. The larger vessel is then heated to 108°C while the smaller one remains at 16.0°C. What is the final pressure in the vessels?

Ans: 1.74 atm