Q1.   A lecture demonstration involved a diffusion set up, pictured above, involving NH_3 gas and HCl gas. Where these gases meet, they react to form a cloud of NH_4Cl solid. If initially the NH_3 (g) and HCl (g) are 2.00 meter apart, at what distance from the HCl side (in m) would you expect NH_4Cl (s) to form? (Molecular weights: $NH_3 = 17.0$, $HCl = 36.5$)

| **0.811** | 0.636 | 1.47 | 0.215 | 0.853 |

Q2.   A 100 Liter vessel contains 1.00 mole of CO_2 and 1.00 mole of CO at 305 K. If the total pressure is 0.500 atmospheres, calculate the partial pressure of CO_2 in atmospheres.

| 0.500 | **0.250** | 1.00 | 0.750 | 0.100 |

Q3.   A gas diffuses 4.34 times faster than fluorine gas at the same temperature and pressure. The weight of a mole of the gas is_____g. MW $F_2 = 37.996$

| **2.02** | 4.34 | 1.42 | 1.008 | 1.903 |

Q4.   When active metals such as magnesium are immersed in acid solution, hydrogen gas is evolved. Calculate the volume of H_2(g) at 30.1°C and 0.85 atm that can be formed when 275 mL of 0.725 M HCl solution reacts with excess Mg to give hydrogen gas and aqueous magnesium chloride.

| 3.4×10^{-3} L | 2.2 L | **2.9 L** | 5.8 L | 11.7L |