CE 37200: Environmental Impact Assessment

Homework 2
Chapter 4
Due: Feb. 25

1) Suppose air at a given location contains, by mole fraction, 75% N_2, 20% O_2, 4% H_2O (g), and 1% Ar.
(a) What is the formula weight?
(b) How much volume does 1 kg of this air occupy at 90°F and 1 atm?

2) Estimate the density of a 50-50 (by mass) mixture of water and sandy soil.

3) Estimate (to within 5%) (a) the mass of the earth's atmosphere; (b) the mass of CO_2 in the atmosphere if the CO_2 concentration averages 400 ppmv. Your answers should use the fact that the weight of air per unit surface area is equal to the surface pressure.

4) Estimate the molarity of acetic acid, $C_2H_4O_2$, in vinegar that contains 5% (by mass) acetic acid.