

Homework #14
(Density; Ideal Gases)
CHEM 11 (S 2016, LAC)
(Due Tuesday, June 7)

In the problems below, remember to show your work. Correct answers by themselves are not worth any points. Use the correct conversion factor approach in dealing with various units as we learned in the first weeks of this course. And don't forget to have the correct number of significant digits in your answers.

1. A contractor has ordered a slab of marble 2.40 m X 1.20 m X 1.80 cm. If the density of the marble is 2711 kg/m^3 , what is the mass of this slab?
2. If a simple barometer is made using olive oil, with a density of 911 kg/m^3 , how tall will the column of oil be if the air pressure is 0.95 atm?
3. A tank of oxygen gas has a volume of 0.0542 m^3 under a maximum pressure of 165 atm and a temperature of 18.5° C . How many moles of oxygen are in the tank?
4. If the same tank of oxygen with the same volume of gas is now taken outside on a warm day and its temperature reaches 37.5° C , what will be the pressure of the gas in the tank, in atm?
5. What is the average speed (v_{rms}) of propane gas molecules (C_3H_8) at 122 kPa and 45° C ?
6. Assume a child's balloon can be approximated as a sphere with a diameter of 26 cm at a pressure of 820 mm of Hg and at 22° C . How many moles of air are in the balloon?
7. If the balloon in #4 is gently heated to 32 C while that the pressure and amount of air in the balloon remain the same, what will be the final radius of the balloon?