

**Homework #12**  
**(Concept of the mole)**  
**CHEM 11 (S 2016, LAC)**  
(Due Thursday, May 19)

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. If a gas sample consists of  $4.67 \times 10^{22}$  molecules, how many moles is this?
2. What is the mass of one molecule of carbon monoxide? Give your answers in u and kg to five significant digits.
3. How many moles of sodium atoms are in a 255-g sample of the metal?
4. Find the molar mass of dinitrogen monoxide ( $\text{N}_2\text{O}$ ), commonly called nitrous oxide or laughing gas, and then find the number of molecules in 1.00 L of this gas at STP
5. A sample of an unknown liquid compound decomposes into 42.40 g of oxygen and 2.67 g of hydrogen gases. What is its empirical formula? If it has a molar mass of 34.015 g, what is the compounds actual formula?