

SL & HL Questions on the mole and Avogadro's constant

1. Deduce the total number of atoms and molecules in:
 - i. one molecule of methane.
 - ii. one mole of methane.
 - iii. 1.605 g of methane.

2. What is the mass of:
 - i. One mole of sodium chloride, NaCl?
 - ii. 2.00×10^{-2} mol of glucose, $C_6H_{12}O_6$?
 - iii. 3.62 mol of magnesium oxide, MgO?

3. What is the mass of:
 - i. 6.02×10^{23} atoms of sulfur, S?
 - ii. 3.01×10^{22} iron(II) ions, Fe^{2+} ?
 - iii. 1.204×10^{24} molecules of water, H_2O ?

4. What amount (in mol) is present in:
 - i. 100 g of calcium carbonate, $CaCO_3$?
 - ii. 132 g of carbon dioxide, CO_2 ?
 - iii. 2.497 g of copper(II) sulfate pentahydrate, $CuSO_4 \cdot 5H_2O$?

5. How many atoms are present in:
 - i. 6.41 g of sulfur dioxide, SO_2 ?
 - ii. 262.6 g of xenon, Xe?
 - iii. 3.603 g of aspirin, $C_9H_8O_4$?

6. Deduce the number of nitrogen atoms in:
 - i. 5.00×10^{-3} mol of ammonia, NH_3 .
 - ii. 14.01 g of nitrogen gas, N_2 .
 - iii. 4.601 g of nitrogen dioxide, NO_2 .