Worksheet 1.3

Numbers of particles

Use the A_r values in Data sheet 7 (Periodic Table) to answer questions 1 and 2.

1 a How many moles of atoms are there in 1.00 mol of each of the following molecules?
   i HNO_3
   ii C_3H_8
   iii $HClO_4$
   iv C_8H_{18} [4]
 b How many moles of Ca^{2+} ions are there in 10.0 mol of $CaCl_2$? [1]
 c How many moles of Cl^- ions are there in 3.00 mol of $CaCl_2$? [1]
 d How many moles of OH^- ions are there in 0.0500 mol of $Al(OH)_3$? [1]

2 a How many grams of carbon are there in 0.500 mol of C_3H_8? [2]
 b How many grams of carbon are there in 0.100 mol of C_8H_{18}? [2]
 c How many grams of nitrogen are there in 2.00 mol of HNO_3? [2]
 d How many grams of oxygen are there in 2.00 mol of HNO_3? [2]

Use the value of the Avogadro constant, L, from Data sheet 1 to answer the following questions.

3 a How many **molecules** are there in each of the following?
   i 0.100 mol of C_3H_8 [1]
   ii 5.00 mol of HNO_3 [1]
   iii 0.0100 mol of C_8H_{18} [1]
 b How many **atoms** are there in each of the following?
   i 0.100 mol of C_3H_8 [1]
   ii 5.00 mol of HNO_3 [1]
   iii 0.0100 mol of C_8H_{18} [1]
 c How many **ions** are there in each of the following?
   i 10.0 mol of $CaCl_2$ [2]
   ii 0.0500 mol of $Al(OH)_3$ [2]