

Series N° 01

Exercise 01:

1. How many atoms are there in each of following:

(a) 52 moles of Ar, (b) 3.75 moles of silver, (c) 48g of Mg, (d) 158 kg of phosphorus.

2. What is the amount, in moles, of each of the following?

(a) 449 g of potassium, (b) 11.8 g of Ar, (c) 2.16×10^{24} atoms of Fe (d) 10.2×10^{30} molecules of O_2

3. What is the mass of each of the following?

(a) 1.9×10^{24} atoms of Pb (in g), (b) 4.87×10^{25} atoms of Zn (in kg), (c) 2.33×10^{20} atoms of oxygen (in mg)

Data: Molar mass: (Ar= 39.95g/mol; Ag =107.87g/mol; Mg= 24.31g/mol; K= 39.09g/mol; P= 30.97g/mol; Fe= 55.84g/mol; Pb =207.02g/mol; Zn= 65.38g/mol; O= 16g/mol).

Exercise 02:

1. A bottle containing a solution of sulfuric acid H_2SO_4 with a mass of 72% and a volumetric mass $\rho = 1.64 \text{ g/cm}^3$. Calculate for this solution:

a- molarity (C)

b- molality (m)

c- normality (N)

2. What is the volume of water that should be added to 100 mL of previous acid to obtain a solution of sulfuric acid with $\rho = 1.18 \text{ g/cm}^3$ volumetric mass and 20% mass.

Data: Molar mass: (H= 1g/mol; O= 16g/mol; S= 32.06g/mol)

Exercise 03:

We have a sodium hydroxide solution with a concentration of 80% and a density of 1.46,
-Calculate the volume needed to prepare 200 mL of this solution with a concentration of 8M?

Exercise 04:

Calculate the mass percent of oxygen, hydrogen, and carbon in the following compounds:
 H_2O_2 , H_2O , H_2CO_3

Data: Molar mass: (H= 1.008g/mol; O= 15.999g/mol; C= 12.011g/mol)

Exercise 05:

The mass of a proton, neutron, and electron is given as follows: $m_p = 1,6723842 \times 10^{-24} \text{ g}$;
 $m_n = 1,6746887 \times 10^{-24} \text{ g}$; $m_e = 9,109534 \times 10^{-28} \text{ g}$

1. What is an atomic mass unit?
2. Find the numerical value of **a.m.u** in grams in the same way as the mass of atomic objects.
3. Calculate the mass of the proton, neutron, and electron in **a.m.u** rounded up 10^{-4}

Exercise 06:

53.8 g of anhydrous calcium chloride (CaCl_2) dissolves in 100 g of water at 18°C . The density of the resulting solution is 1.342 g/ml.

Express the concentration of the calcium chloride solution in:
 molarity, molality, molar fraction, and mass percentage.

Data: Molare mass: (Cl= 35,5 g/mol; Ca= 40 g/mol)

Exercise 07:

Numerical indications can be applied to the X symbol of an element in the three positions A, Z and q. ${}^A_ZX^q$ What does each of them mean?

Complete the table:

Nucléide	Numéro atomique	Nombre de masse	Nombre de protons	Nombre de neutrons	Nombre des électrons
${}^{121}_{51}\text{Sb}$					
Ga	31	69			
W		184	74		
${}^{16}_8\text{S}$				16	
${}^{24}_{12}\text{Mg}^{2+}$					
${}^{35}_{17}\text{Cl}^-$					