Séries N° 1

Exercise 1

1. **Specify whether the following products are an element, compound, heterogenous mixture, or homogenous mixture.**

1- Air,   6- Parfum,
2- The Ground,   7-Fruit Yogurt,
3- Azote (N_2),   8- Gasoline / Car Oil,
4- Sulfuric Acid (H_2so_4),   9- Concrete,
5- Tap Water,   10- White Sugar,

2. For each of the following statements, indicate whether it is a physical or chemical phenomenon (transformation) :

1- The melting of ice   6-The bleaching of a pair of jeans by bleach
2- Dissolution of table salt in water   7- Sugar caramelization
3-Toast a slice of bread
4-Cutting a sheet of cardboard.
5- Melt chocolate

Exercise 2

Concider the following table :

Matter	Melting Temperature (°C)	Boiling point (°C)
water : H_2O	0	100
Sodium chloride: NaCl	+ 801	+ 1465
Butane : C_4H_{10}	-138	-1

1. In what state is :

a) water at (- 30°C) and at (+ 120°C)

b) sodium chloride at (1600 °C) and at (25°C)

c) butane at (-134°C)

2. Calculate the molar mass of each matter .

Data : **H** 1g/mol ; **O** 16g/mol ; **Na** 23g/mol ; **Cl** 35,5 g/mol ; **C** 12g/mol ;

Exercise 3

1. How many moles are there in: 4 g of NaOH ; 30 mL H_2SO_4 (d= 1,83); 100 µg of $KMnO_4$; 2,75 10^{32} atoms of iron (Fe).
2. Which sample is the most iron-rich: 2 g of $Fe_2(SO_4)_3$ and 5,30 x 10^{21} atoms of iron.
3. Which sample contains the least moles of atoms : [25 g of carbone or 2,49 10^{22} atoms of Au (or)]
4. Calculate in **g** and in **Kg** the corresponding mass at 1 u.m.a.

Data molair mass (g/mol): C (12) ; Na (23) ; O (16) ; S (32) ; K (39) ; Mn(55) ; Fe(56) ; Cl (35,5)

Exercise 4

For 1mL of water calculate

  a- The corresponding mass of water   b- The number of moles of oxygène
  c- The number of moles of hydrogene ~~atoms~~   d- The number of moles of ~~molecule of~~ water
  e- The number of moles of water   f- The number of hydrogen atoms
  g- The number of oxygen atoms

Data : ρ (H_2O) = 1 g/cm^3 ; M (H_2O) =18 g/mol ; le nombre d'Avogadro= 6.023 10^{23}mole^{-1}.

Exercise 5

a-Calculate the molarity of solution A preparated by dissolving 4,2 g of NaOH in distilled water to obtain 350 ml of this solution.

b-what is the volume of distilled water added to the solution A to obtain solution B at 0,25 M.

Exercise 6

Solution of nitric acid :

On a commercial solution flask of nitric acid HNO_3, we find: mass percentage : 68,0 % ; Density : d=1,41 ; Molar mass : M = 63,0 g.mol^{-1}.

1. demonstrate that the molar concentration of nitric acid in this commercial solution is 15 mol.L^{-1}.
2. determine the volume V_0 (mL) of commercial solution that needs to be taken to prepare V = 500 mL of nitric acid solution of concentration C = 1,0 mol.L^{-1}.
3. Name this process

Exercise 7

bleach :

Bleach is an aqueous solution containing Na^+ and hypochlorite $C\ell O^-$ ions. The molar masse of $C\ell O^-$ ions is M = 51,5 g/mol. The molar concentration of hypochlorite ion in bleach= 0,75 mol/L
1.what chemical species makes up the solvent ?
2. what chemical species makes up the solute ?
3. Calculate the mass of $C\ell O^-$ ions in one liter of bleach
4. Deduce the massic concentration of $C\ell O^-$ ions in bleach.
From this bleach we want to prepare 100mL of subsolution S' twice less concentrated.
a. what will be the concentration of S' ?
b. Calculate the volume of soluion S that needs to be taken to prepare solution S'

Exercise 8
We have a solution of acetic acid with a density aqual to 1.14 and purity equal to 99.8%
  a- What volume does 100g of this acid ocupy ?
  b- What is the solution's molarity ?

Data : M(CH_3COOH) = 60 g/mol