

Chemistry final exam Structure of matter

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 ₂ SO 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

In the label of a commercial solution flask of nitric acid HNO₃, 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 15mol.L⁻¹.
- 2- determine the volume V₀ (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 3

For each statement, indicate TRUE or FALSE:

- 1- The diameter of an atom is equal to the diameter of its nucleus.....
- 2- The electron of an aluminium atom is different from the electron of a zinc atom.....
- 3- A metal has electrons.....
- 4- Between the nucleus and the electrons there is a gas.....
- 5- The centre of the atom carries a positive charge
- 6- The number of protons in an atom is called the mass number.....

Exercise 4

The mass of all the electrons in the iron atom is 2,366.10⁻²⁹ kg.

- 1- Knowing that one electron has a mass of 9,1.10⁻³¹ kg, how many electrons does an iron atom have?
- 2- What is the number of positive charges carried by the nucleus of the iron atom?

- 3- Deduce the atomic number of the iron atom. The mass of an iron atom is $9,3 \cdot 10^{-26}$ kg.
- 4- Calculate the number of iron atoms that make up an iron nail of 2,5 g.