Mohamed Khider University of Biskra
Faculty of Natural and Life Sciences, Earth and Universe Sciences

TCSNV Department **Academic year: 2026/2027**
1st year LMD **Subject: Chemistry -S1-**

Applied exercises series No. 1

(Generality)

Exercise 1:

$$^{A}_{Z}X^{q}$$

1. Numerical indications in the three positions A, Z and q can be given to the symbol X of an element. What exactly does each of them mean?

2. Give the numbers of protons, electrons and neutrons of the different elements:

$$^{59}_{28}Ni\ ,\quad ^{127}_{53}I^{-}\ ,\quad ^{27}_{13}Al^{3+}\ ,\quad ^{9}_{4}Be$$

3. Calculate the mass of the Beryllium atom in grams and atomic mass units (a.u.m.).
We give: $m_p=1.67\ 10^{-27}$; $m_N=1.67\ 10^{-27}$; $m_e = 9.11\ 10^{-31}$ (en Kg).

Exercise 2:

1. Calculate the charge of $^{A}_{Z}X^{q}$ an iron core (Fe, A=56, Z=26)

2. An atom has the symbol $^{A}_{z}X$ its nucleus has a charge equal to $1.12\ 10^{-18}$ C and it has 7 neutrons.

Determine A and Z.

Exercise 3:

1. Four nuclides A, B, C and D have nuclei made up as shown below:

	A	B	C	D
Protons number	21	22	22	20
Neutrons number	26	25	27	27
Masses number	47	47	49	47

Are there isotopes among these four nuclides?

2. Magnesium is a mixture of the following three isotopes: ^{24}Mg (78.99%); ^{25}Mg(?); ^{26}Mg (11.01%).

a. Calculate the abundance of the second isotope.

b. Calculate the average relative atomic mass (isotope average) of magnesium.

Mohamed Khider University of Biskra
Faculty of Natural and Life Sciences, Earth and Universe Sciences

TCSNV Department **Academic year: 2026/2027**
1st year LMD **Subject: Chemistry -S1-**

Applied exercises series No. 2

(Electronic configuration of atoms)

Exercise 1:

Consider one of the electrons of an atom characterized by the principal quantum number n=3.

1. Indicate the possible values of the other quantum numbers of this electron.

2. How many atomic orbital and electrons are associated with n=3?

Exercise 2:

Are the following triples of quantum numbers possible or not for the same electron?

1/ n= 3, l=0, m=0 ; **2/** n= 2, l=2, m=0 ; **3/** n= 0, l=0, m=0 ;

4/ n=2, l=1, m=-1 ; **5/** n= 3, l=1, m=-2

Exercise 3:

The nuclear fusion reaction below revealed a new chemical species $^{A}_{Z}X$:

$$^{86}_{36}\mathbf{Kr} + {}^{208}_{82}\mathbf{Pb} \rightarrow {}^{A}_{Z}\mathbf{X} + {}^{1}_{0}\mathbf{n}$$

1. Identify this element (A and Z).

2. Predict its electronic structure.

3. What are the elements belonging to the same group as X called?

4. Give the electronic configurations of all these elements.

Exercise 4:

We consider the following atoms and ions:

$_{17}Cl$, $_{19}K$, $_{26}Fe$, $_{28}Ni$, $_{29}Cu$, $_{35}Br$, $_{40}Zr$, $_{42}Mo$, Fe^{2+}, Cl^{-}

1. Give the electronic configuration of atoms and ions by presenting the valence electrons using the vacant boxes.

2. Locate these elements in the periodic table (give the block, period and group).