Exercises Series N°4

Exercise 1
Which of the following is a possible set of quantum numbers that describes an electron?
(a) $n = 3$, $\ell = 2$, $m = -3$, $S = -1/2$ (d) $n = 3$, $\ell = 1$, $m = -1$, $S = +1/2$
(b) $n = 0$, $\ell = 0$, $m = 0$, $S = +1/2$ (e) $n = 4$, $\ell = -3$, $m = -1$, $S = +1$
(c) $n = 4$, $\ell = 2$, $m = -1$, $S = 0$

Exercise 2
An element X belongs to the 4th period and sub-group A of the periodic table, and has a single electron in its ground state.
a) What are the possible configurations for this element?
b) Knowing that X belongs to the same group as $_9F$, give its electronic configuration and atomic number Z.

Exercise 3
Consider the elements A, B, C, D, and E.

element	A	B	C	D	E
period	6	5	5	4	4
group	II_A	II_A	II_B	VI_A	$VIII_A$

1. Give the electronic configuration for each element.
2. Give the quantum numbers of the single electrons of elements A and D.
3. Arrange the elements in ascending order of atomic radius and ionization energy.
4. Which of these elements is the most electronegative element and the most electropositive element?

Exercise 4
1. Establish the electronic configuration and specify the atomic number, period, group and sub-group of the following elements.
A: element whose last sub-shell is $4d^2$.
B: element of the 2nd period and has 6 valence electrons.
C: $_{30}Zn$.
D: Alkaline earth metal from the 5th period.

2. Assign the electronegativity value to these elements:
0,95   1,33   1,65   3,04

Exercise 5
1. Calculate the energy of the lithium atom ($_3Li$) and those of the Li^+, Li^{2+} and Li^{3+} ions in their ground states.
2. Deduce the different ionization energies.

		Electron "j"	
		1s	2s2p
Electron "i"	1s	0,31	0
	2s2p	0,85	0,35