

Series N° 5

**Exercise 1:** Complete the following table:

Value n	Value l	Value m	Number of atomic stations	Representation of atomic stations by quantum chambers	Maximum number of electrons
1					
2					
3					
4					

Based on the table:

- Give the relationship between the value of n and the number of electrons.
- Give the relationship between the value of n and the number of atomic stations.

**Exercise 2:**

- 1-Define the quantitative numbers for the stations:  $\psi_{5f}$ ;  $\psi_{4d}$ ;  $\psi_{6s}$ ;  $\psi_{5p}$
- 2-What are the correct wave functions for the following:  $\Psi_{444}$ ,  $\Psi_{320}$ ,  $\Psi_{43}$ ,  $\Psi_{700}$ ,  $\Psi_{2111}$ ,  $\Psi_{620}$ ,  $\Psi_{535}$

**Exercise 3:**

- 1-Using the Klichkovsky rule, arrange the following atomic stations in order of increasing energy: 1S, 2S, 2P, 3S, 3P, 3d, 4S, 4P, 4d, 4f, 5S, 5P, 6S.
- 2-Write the electronic distribution of the following elements:  $_{15}\text{P}$ ;  $_{29}\text{Cu}$ ;  $_{58}\text{Ce}$ ;  $_{80}\text{Hg}$ ;  $_{90}\text{Th}$ .
- 3-For the previous elements, give the number of Core Electrons, Number of Valence Electrons, Chemical Group, period, and Family {Metal or Non-Metal}.

**Exercise 4:**

- 1-Element  ${}_Z\text{X}$  is from the fourth (4) period and group V<sub>B</sub>; calculate the atomic number of this element.
- 2-Identify the elements that have fewer than 18 electrons and have two unpaired electrons in their fundamental state. Which of these elements are from the  ${}_4\text{Be}$  period and the  ${}_{32}\text{Ge}$  group?
- 3- Element Y has 6 electrons in the external shell with wave function  $\psi_{51}$   
Write the electron distribution for this element in its fundamental state and then deduce its atomic number Z.

**Exercise 5:**

- The elements A, B, C, D, E, and F have the following atomic numbers, respectively: 2, 10, 18, 36, 54, 86
- 1-Assign each element the ionization energy from the following values: 13.59ev, 24.58ev, 10.75ev, 12.13ev, 21.5ev, 15.7ev.
  - 2-Arrange these elements in increasing order of atomic radius.

**Exercise 6:**

- 1-Arrange the following elements in order of increasing electro-negativity.  
 ${}_{35}\text{Br}$ ;  ${}_{47}\text{Ag}$ ;  ${}_{38}\text{Sr}$
- 2-Arrange them in order of increasing ionization energy.
- 3- Which of the above elements contains a lone electron with the quantum numbers (l=0, m=0)
- 4-Which of the above elements contains a lone electron with the quantum numbers (l=2, m=+2)
- 5-Identify which of these elements is from the alkaline earth metal family.