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. 3

(Periodic classification)

Exercise 1:

An element has less than 18 electrons and has 2 single electrons. What is this element, knowing that it belongs to the Lithium period ($_{3}$Li) and the Tellurium group ($_{52}$Te).

Exercise 2:

We have the elements: $_{55}$Cs, $_{37}$Rb, $_{48}$Cd and $_{51}$Sb

1. Indicate the block, period and group of each element
2. Locate all the elements on the periodic table.
3. Arrange them in order of decreasing atomic radius.

Exercise 3:

1. Arrange increasing order of the electro-negativity of the different atoms, justifying your answer: $_{19}$K, $_{26}$Fe, $_{30}$Zn and $_{37}$Rb

2. Consider the following elements: $_{11}$Na, $_{47}$Ag, $_{53}$I, $_{56}$Ba

Predict those that form cations or anions (ions). Justify your answer.

Exercise 4:

Classify in ascending order of first ionization energy, justifying your answer:

1. Alkalis: $_{11}$Na, $_{19}$K et $_{37}$Rb

2. Various atoms or ions: $_{8}$O, $_{10}$Ne, $_{11}Na^{+}$ et $_{11}$Na.

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Applied exercises series No. 4

(Chemical bonds)

Exercise 1:

Represent the following molecules using the Lewis diagram and indicate the nature of the bonds formed:

CO_2, H_2O_2, N_2O_4, SO_2, H_3PO_3, $HClO_4$, H_2SO_4, NO_2^-.

Exercise 2:

1. Give Lewis notation of the following molecules and ions:

H_3O^+, C_2H_6, SF_6, PCl_3, PCl_5, NCl_3.

2. Which of these compounds do not comply with the Octet rule?

3. Based on the electronic structures of sulphur and phosphorus atoms, explain the formation of SF_6 and PCl_5 molecules.

4. Predict for different phosphorus valences. Both PCl_3 and PCl_5 chlorides exist. Explain why only NCl_3 is known when NCl_5 does not exist.

Exercise 3:

Using the VSEPR method, specify the geometric shape of the following molecules: SiH_4, NH3, $BeCl_2$, and $COCl_2$.