Grade: 9

chemistry

First Exercise (7 pts) Isotopes

Most of the elements in nature have 2 or more isotopes.

Some isotopes of certain elements emit radiations, these isotopes are called radioactive and they are used in medicine especially in the diagnosis and treatment of cancer.

The natural isotopes are sufficiently stable to enter in chemical combination at long period of time.

Also, it's possible to obtain synthetic isotopes, but they have too short life compared to the natural isotopes.

The following table represents the relative abundance in % of 2 isotopes of chlorine.

Isotope	Cl-35	Cl-37
Relative abundance in %	75	Х

- 1- Pick up from the text a benefit of some isotopes.
- 2- Natural isotopes are more abundant than synthetic ones. Pick up from the paragraph the expression that justifies this statement.
- 3- Find the % of the relative abundance of Cl-37.
- 4- Transform the above table into a circular diagram.
- 5- Explain why the 2 isotopes of chlorine are placed in the same box in the periodic table.
- 6- Copy and complete the following table.

Isotope	Number of protons	Number of neutrons
Cl-35		
C1-37		20

- 7- The 2 isotopes of chlorine have the same nuclear charge. Explain why.
- 8- Calculate the number of mole that corresponds to 3.5 g of the most abundant isotope of chlorine.

Second Exercise (7.75 pts) The Periodic Table

Given the following extract of the periodic table.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	16 17 1	8

1 H	H													He		
Li														0	F	Ne
	Mg													S		Ar

Answer the following questions:

- 1- Classify the elements present in the table into metals and non-metals.
- 2- Determine the atomic number of the element oxygen.
- 3- Give the name of 2 noble gases, and explain their stability.
- 4- Deduce the Lewis dot symbol of F and S.
- 5- Write the Lewis dot structure of the molecule SF_2 .
- 6- a- Write the electron configuration of the second alkali metal.
 - b- Deduce its atomic number.

Third exercise (5.25 pts) A Compound: the Dichloromethane

Dichloromethane is a compound with the formula CH_2Cl_2 , which is used as a solvent. It can be used also to decaffeinate coffee and tea.

Given: The Lewis dot structure of dichloromethane, and the following table.



- 1- Extract from the paragraph the use of dichloromethane in food industry.
- 2- Choose among the following electron configurations, the one that corresponds to chlorine. Explain by referring to the given.
 - a- $K^2 L^8 M^4$ b- $K^2 L^8 M^7$ c- $K^2 L^7$
- 3- Deduce the number of valence electron of the carbon atom.
- 4- Explain how dichloromethane molecule is formed mentioning the type of bonds between the different atoms it has.