

Autoevaluation TEST N°1 (Topics 1-3)

Family name and name _____

Important: Write your name before beginning the test. No additional material will be provided. Books, class notes are not allowed. Calculators are allowed. Use margins for drafts or calculus. **Mark with a cross the correct answer in the box at your left when you are completely sure. No crossings out and no additional comments are allowed. Correct answers mark as +1. Errors mark -0.1. Blanks mark as 0. The final score can not be less than 0.** There is only one correct answer in each question.

1.- Consider a nuclide of mass m_x composed of N neutrons (m_N) and Z protons (m_Z). Which of the following statements is correct:

	$m_x = m_N + m_Z$
X	$m_x < m_N + m_Z$
	$m_x > m_N + m_Z$
	$m_x - m_N - m_Z$ is the binding energy per nucleon

2.- Which of the following statements is false:

	Only three quantum numbers are needed to define the orbital of an electron (n, l, m_l).
	The energy of an electronic orbital is determined by only two quantum numbers (n, l).
X	Magnetic quantum number, m_l , defines the shape and orientation of orbitals.
	Spin quantum number describes the electron magnetic field when it rotates about its own axis.

3.- Write in decreasing order the radius of the following atoms and ions: K, K^+ , Mg, Al, Al^{3+} .

	$Al > Mg > K > K^+ > Al^{3+}$
X	$K > Mg > Al > K^+ > Al^{3+}$
	$Al^{3+} > K^+ > Mg > K > Al$
	$Al > K > Mg > K^+ > Al^{3+}$

4.- Which of the following compounds has more polar bonds and which is more polar? CH_4 , CCl_4 , CF_4 , CH_3Cl

	CCl_4 : highest bond polarity and CF_4 : highest polarity.
	CH_3Cl : highest bond polarity and CCl_4 : highest polarity.
X	CF_4 : highest bond polarity and CH_3Cl : highest polarity.
	CF_4 : highest bond polarity and CF_4 : highest polarity.

5.- Which of the following statements is false.

	A Gy is the absorption of one joule of ionizing radiation by one kilogram of matter
X	A Bq is the number of joules per second emitted by a radioactive nuclide
	A Ci is about $4 \cdot 10^{10}$ Bq
	An acceptable dose level is in the range of a rad

6.- Write the Lewis structure of ozone (O₃) ?

7.- SO₂ and H₂O molecules are both angular but bond angle in the former is 119° and 109° in the later. Could you explain why?

	Because sulfur has larger radius than oxygen
	Because of the hydrogen bonds in water molecule
X	Because sulfur has only one lone pair of electrons while oxygen has two
	Because oxygen has only one lone pair of electrons while sulfur has two

8.- Let us call x the axis that contains the two nucleus of a diatomic molecule. Which of the following is true?

X	The bonding MO formed by combination of two p _y has one nodal plane
	The antibonding MO formed by combination of two s has two nodal planes
	The bonding π _x has one nodal plane
	The overlapping between two p _x has cylindrical symmetry

9.- Which of the following molecules presents the highest paramagnetism? Li₂, B₂, N₂, Ne₂⁺

	Li ₂
X	B ₂
	N ₂
	Ne ₂ ⁺