DR. ALI EL-RAYYES **HW # 6**

STUDENT ID: SR.#:

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1. Calculate the wavelength of light emitted when the electron in a hydrogen atom undergoes a transition from an n = 6 to an n = 3 orbital.
   A. 5.47×10^{-7} m B. 1.82×10^{-19} m
   C. 1.09×10^{-6} m D. 2.24×10^{14} m
2. When light impinges on aluminum metal, no electrons are emitted if the wavelength of light is longer than 295 nm. What will the kinetic energy of an ejected electron be if 200 nm wavelength light is used?
   A. 3.20×10^{-19} J B. 3.20×10^{-28} J
   C. 6.29×10^{-34} J D. 6.29×10^{19} J

3. How many electrons can exist in the subshell with n = 2 and l = 3?

   A. 2 B. 14 C. 10 D. 0, there is no such subshell.

4. Arrange the following subshells in order of increasing energy.
   3p 3d 4s 4p
   A. 3p < 3d < 4s < 4p
   B. 3p < 4s < 3d < 4p
   C. 3p < 4s < 4p < 3d
   D. 4p < 4s < 3d < 3p

5. How many unpaired electrons are in a ground state nitrogen atom?
   A. 1 B. 2 C. 3 D. 5

6. In a many electron atom, the energy of the electron depends on which quantum numbers?
   A. n
   B. n and l
   C. n and l and m_l
   D. n and l and m_l and m_s

7. The possible values of the magnetic quantum number (ml) of a 4f electron are
   A. -1, 0, +1 B. -2, -1, 0, +1, +2
   C. 0, +1, +2, +3 D. -3, -2, -1, 0, +1, +2, +3

8. Which of the following are isoelectronic with Cl^-?

   A. Ar, S B. Ar, K^+ C. F^-, Br^- D. P^-, S

9. Arrange the following in order of increasing size : F, F-, O2-
   A. One cannot compare sizes of atoms and ions.
   B. $F^- < F < O^{2-}$
   C. $O^{2-} < F^- < F$
   D. $F < F^- < O^2$

10. Electron affinity is
   A. the energy required to add an electron to a gaseous atom in its ground state.
   B. the energy required to remove an electron from a ground state gaseous atom.
   C. the energy change (positive or negative) associated with the addition of an electron to a gaseous atom in its ground state.
   D. always negative.

11. Arrange the following in order of increasing first ionization energies

Cl, Al, Mg, P, Si, S

   A. Mg < Al < Si < P < S < Cl
   B. Cl < S < P < Si < Al < Mg
   C. Al < Mg < Si < S < P < Cl
   D. Cl < P < S < Si < Mg < Al

12. The electron configuration for the Fe^{3+} cation is
   A. $[Ar]4s^23d^6$ B. $[Ar]4s^23d^3$ C. $[Ar]3d^5$ D. $[Ar]4s^23d^9$

13. Noble gases are exceptionally stable and chemically unreactive because:
   A. They have a closed electron shell configuration.
   B. They are all gases.
   C. They are descendents of royalty.
   D. They have an even number of electrons.

14. Important information provided by the principal quantum number, *n*, is that it

   A. tells you how many neutrons there are in the nucleus.

   B. tells you exactly how many electrons a particular element has.

   C. provides information on the maximum number of unpaired electrons a particular element has.

   D. provides information about the energy of the atom and the average

      distance of the electron from the nucleus.