

Announced Quiz 3, CHEM105H

Please show all work and full explanation to receive any credit

- Quantum numbers: answer these questions and **list the four quantum numbers for each electron:**
 - How many electrons in an atom can have $n = 3$ **and** $l = 3$?

 - How many electrons in an atom can have $n=2$ **and** $l = 1$?

- For an electron (mass = 9.109×10^{-31} kg) in a one-dimensional box that has a length of 6.5 Angstroms (1 Angstrom = 10^{-10} m), calculate the energy lost (in Joules) when the electron falls from the fourth lowest kinetic energy level to the second lowest kinetic energy level.

- Using a noble gas core format, write the electron configuration for each of the following:
 - Fe^{2+}
 - Cu
 - As
 - O

- Compare--by ranking from highest to lowest--the electron affinities of argon, sulfur, and chlorine atoms. Define what electron affinity is and clearly explain, in underlying scientific principles using Coulomb's Law, the very specific reasons for these differences.

- Compare the 2nd ionization energy of potassium and calcium atoms. Clearly explain why they are different using the specific and appropriate underlying physical principles.

- Extra credit: Calculate the velocity of a 3s electron in an He^+ ion.