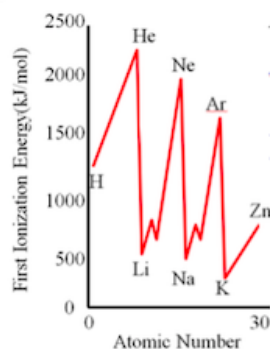


Unit 1.5/1.6

Atomic Structure & Electron Configuration

- The following pertain to the element potassium (K).
 - Write the equation for the first ionization of potassium.
 - Draw the shell model that represents the potassium atom.
 - Identify the electron that has the lowest ionization energy in the shell model that you drew.
 - Use Coulomb's Law to explain why this electron has the lowest ionization energy.
 - Use the 'shielding effect' to explain why this electron has the lowest ionization energy.
- Why is the first ionization energy for lithium less than that of neon? (Discuss both atoms in your response.)

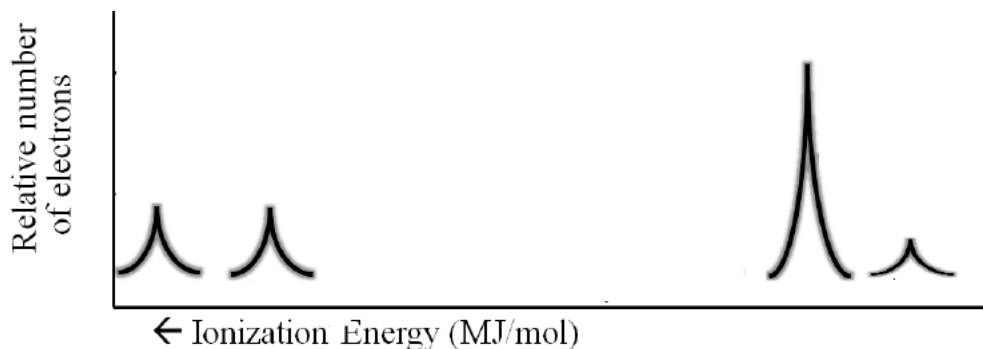


- What is the ground state electron configuration for the following atoms or ions? (Long form)
 - Manganese (Mn)
 - Iodine ion (I^-)
 - Calcium ion (Ca^{2+})
 - Zinc ion (Zn^{2+})
 - Copper
 - Cobalt
- What is the ground state electron configuration for the following atoms or ions? (Short form)
 - Palladium (Pd)
 - Lead (Pb)
 - Plutonium

Name: _____

Date: _____

5. The following questions pertain to the photoelectronic spectrum below.



- (a) Identify the element that would produce the above spectrum. _____
- (b) Label each peak with numbers and letters that indicate its associated shell and subshell.
- (c) Indicated the number of electrons that are contained within each sublevel on the PES.
- (d) Which subshell contains the highest energy electron(s)? Justify your answer.
- (e) Which subshell contains the lowest energy electron(s)? Justify your answer.
6. PES data indicates that the ionization energy for an electron in the 2s orbital of calcium is 42.7 MJ/mol and the ionization energy for an electron in the 3s orbital of calcium is only 4.65 MJ/mol. Provide an explanation that accounts for this data.

Name: _____

Date: _____

7. Does the PES below suggest a need to refine the shell model of the atom? If so, is there another model that provides a better explanation of this data. Justify your answers.

