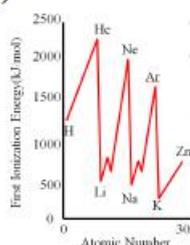


Atomic Structure and Properties
1.5 Atomic Structure and Electron Configuration
Worksheet

- 1) The following questions pertain to the element potassium.
 - a. Write the equation for the first ionization of potassium.
 - b. Draw the shell model that represents the potassium atom.
 - c. Identify the electron that has the lowest ionization energy in the shell model that you drew.
 - d. Use Coulomb's law to explain why this electron has the lowest ionization energy
 - e. Use the 'shielding effect' to explain why this electron has the lowest ionization energy.

- 2) Why is the first ionization energy for lithium less than that of neon? (Discuss both atoms in your response.)



- 3) What is the electron configuration for nitrogen in its ground state? (long form)
- 4) What is the electron configuration for manganese in its ground state? (long form)
- 5) What is the ground state electron configuration of the iodine ion, I⁻? (long form)
- 6) What is the ground state electron configuration of calcium ion, Ca²⁺? (long form)
- 7) What is the ground state electron configuration of arsenic? (long form)
- 8) What is the complete ground state electron configuration for Zn²⁺?
- 9) What is the ground state electron configuration of palladium? (short form)
- 10) What is the ground state electron configuration of lead? (short form)
- 11) What is the ground state electron configuration of rutherfordium? (short form)
- 12) What is the ground state electron configuration of plutonium? (short form)

- 13) Which of the following are isoelectronic?
- Ne and F^-
 - Ca^{2+} and Se^{2-}
 - N and F^-
 - I and Ba^{2+}
 - K^+ and Ca^{2+}
- 14) Draw an orbital diagram for sulfur in its ground state.
- 15) Draw an orbital diagram for iron in its ground state.
- 16) Draw the orbital diagram for calcium in its ground state.
- 17) Draw the orbital diagram for silicon in its ground state.
- 18) Draw an orbital diagram for carbon in its ground state.
- 19) Draw an orbital diagram for phosphorus in its ground state.
- 20) Draw an orbital diagram for selenium in its ground state.
- 21) On average, electrons from the 2s subshell of a element are further from the nucleus than electrons from the 2p subshell of an element; however, the energy required to remove an electron of an element from 2s is greater than that of 2p. Provide an explanation for this fact.