

PART 2: Electrons, Light, Electron Configuration, and Periodic Trends

This is part 2 of the Common Assessment Review Package. It reinforces the concepts you learned after we took our first test. These concepts include: Light, Electron Configuration and Periodic Trends.

You can find these concepts on the Weebly site or, in your textbooks:

	Honors	CP
Text	Prentice Hall CHEMISTRY, Wilbraham, Staley, Matta, Waterman	WORLD OF CHEMISTRY, Zumdahl
Electrons and Light	Chapter 5	Chapter 11
Electron Configuration	Chapter 5	Chapter 11
Periodic Trends	Chapter 6	Chapter 11

Electron Configuration:

1. Explain Hund's Rule in your own words. Use complete sentences.

Within a sublevel, place 1 e<sup>-</sup> per orbital with the same spin before pairing them. "Empty Seat Rule"

2. Explain the Pauli Exclusion Principle in your own words. Use complete sentences.

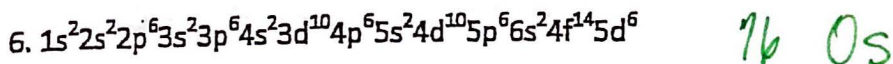
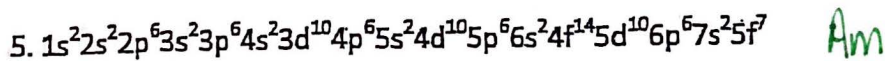
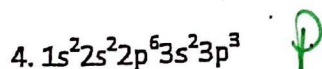
Each orbital can hold only TWO electrons with opposite spins



3. Explain Aufbau's Principle in your own words. Use complete sentences.

Electrons fill the lowest energy sublevel available.  
You cannot skip any sublevels

Which element is represented by the following?

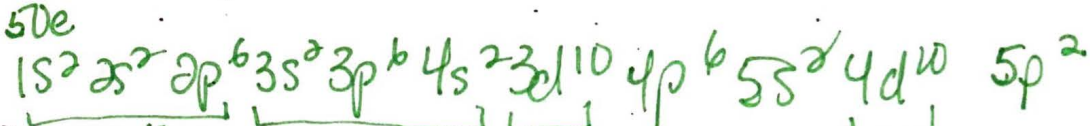


Write the complete configuration for the following elements:

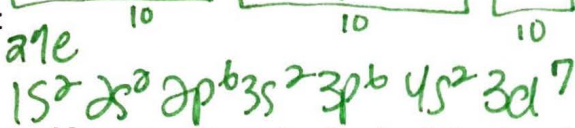
7. Boron



8. Tin



9. Cobalt



Write the noble gas configuration for the following elements:

10. Lead



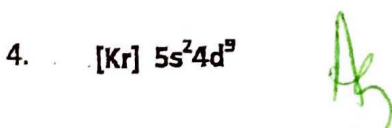
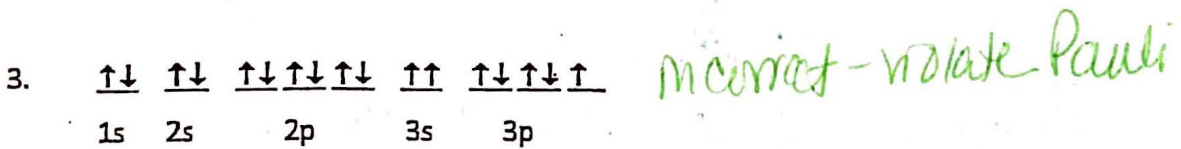
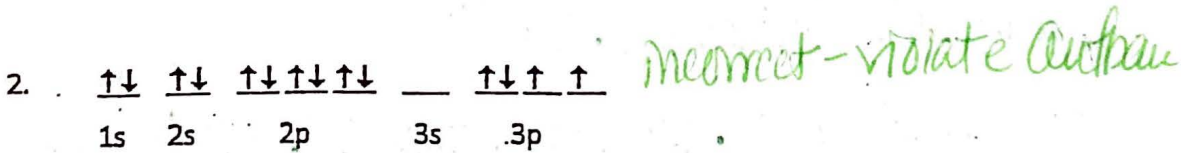
11. Uranium



12. Xenon



Identify if the diagram or configuration is incorrect. If it is, explain why. If it is correct, identify the element.



Answer the following questions by circling the correct element.

1. Which is less electronegative? Na **Rb**
2. Which has the smallest radius? **Mo** Zr
3. Which has the lower electronegativity? Ge **Sn**
4. Which has the higher ionization energy? **Be** Ba
5. Which is less electronegative? I **Cd**
6. Which has the larger radius? **W** Cr

## Electromagnetic Spectrum

2. What is the relationship between wavelength and frequency?

$$c = f\lambda$$

as  $f \uparrow \Rightarrow \lambda \downarrow$   
as  $f \downarrow \Rightarrow \lambda \uparrow$

3. What is frequency? What are the units?

Hz  
# of wave crests that pass a point in space per second

4. What is the order of colors from longest wavelength to shortest?

ROYGBIV

5. Which waves have less energy than visible light?

Radio Microwaves Infrared

6. What is the order of colors from highest frequency to lowest frequency?

VIBGYOR

7. What is the relationship between frequency and energy?

$$E = hf$$

8. In each case, which waves have the higher frequency?

- A) Microwaves or **Infrared**      B) **Ultraviolet** or Radio      C) X rays or **Gamma**

9. In each case, which waves have shorter wavelengths?

- A) **Microwaves** or Radio      B) Infrared or **Ultraviolet**      C) **X rays** or Visible light

10. In each case, which has the higher energy?

- A) Infrared or **Ultraviolet**      B) **Green** or Yellow      C) X-ray or **Gamma**

## Trends

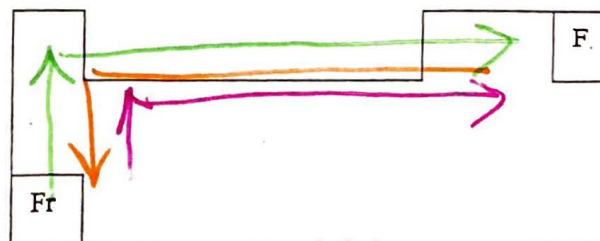
- E 1. Which element has the largest number of electrons in its valence shell?  
A. As B. K C. S D. Fr E. F
- C 2. Which of the following has the smallest atomic radius?  
A. Br B. N C. F D. Cl E. S
- E 3. Order the elements S, Cl, and F in terms of increasing ionization energy.  
A. F, Cl, S B. Cl, F, S C. F, S, Cl D. S, F, Cl E. S, Cl, F
- B 4. An electron is most easily removed from which of the following atoms?  
a. Mg b. Na C. Al D. S

Explain your reasoning for number 4:

lowest ionization energy

- E 5. Which of the following atoms has the highest ionization energy?  
A. Si B. Na C. Mg D. P E. Cl
- D 6. When moving down a group (family) in the periodic table, the number of valence electrons  
D. remains constant E. doubles with each move
- d 7. Shielding will have the greatest effect on which of these atoms?  
a. Lithium b. Fluorine c. Potassium d. Tin
- d 8. Which atom will most likely gain electrons from a different atom?  
a. Iodine b. Bromine c. Chlorine d. Fluorine
- B 9. Which choice will be TRUE about atomic radii?  
a. Adding electrons makes the atom's radii smaller.  
b. Increasing the number of protons in the nucleus makes the radii smaller.  
c. Increasing energy levels makes the atom's radii smaller.

Draw arrows that indicate the direction that each trend (ionization energy and electronegativity) increases and atomic radius on the periodic table.



ionization E  
atomic radius  
Electronegativity