EXTRA PRACTICE: Unit 2 Name:_____ Date:_____ Pd:_____

Determining Number of Protons, Neutrons, and Electrons Practice

Symbol	Charge	Mass #	Protons	Neutrons	Electrons
Mg		25			9
Zn	-2	65			
Rn	+2			138	
Ra				137	89
Sm				87	64
Bk		251			97
B	+2	8			
Ra	+3			137	
Lu				103	71
Dy				98	69
Am	+1	243			
Sn		118			52
Tb	+1			94	
S				17	17
H				0	1
Zr		90			39
No	+3			150	
S				17	15
Fm	0	258			
At	-3			128	
Zr		92			38
Cu				34	26
Ta		181			76

Electromagnetic Spectrum Problem Set

1) A CD player uses light of frequency 3.85×10^{14} Hz to read the information on the disc.
   a) What is the wavelength of the light?
   b) What portion of the electromagnetic spectrum does this wavelength correspond to?
   c) What is the energy of one photon of this light?

2) A sodium-vapor street light emits a yellow light at wavelength 589 nm.
   a) What is the frequency of this wavelength?
   b) What is the energy change of the sodium atom involved in this emission?

3) After absorbing x-rays of wavelength 53.7 nm, helium atoms emit light at wavelength 501.6 nm.
   a) What is the frequency of the x-ray radiation?
   b) What is the energy of one photon of the x-ray radiation?
   c) What portion of the electromagnetic spectrum does the light emitted from the helium atom correspond to?
   d) What is the frequency of the light emitted from the helium atom?
   e) What is the energy of one photon of this light?

4) When an electron in a hydrogen atom falls from the third energy level to the second, a photon of wavelength 656 nm is emitted.
   a) What is the frequency of this photon?
   b) What is the energy of this photon?

5) When an electron in a hydrogen atom falls from the fourth energy level to the second, a photon of wavelength 486 nm is emitted.
   a) What is the frequency of this photon?
   b) What is the energy of this photon?
   c) Explain the energy difference between this photon and the photon in Problem 6b.

6) Calculate the frequency of light emitted when each of the following energy transitions occurs in the hydrogen atom:
   a) $n = 3 \rightarrow n = 2$
   b) $n = 4 \rightarrow n = 1$
   c) $n = 2 \rightarrow n = 1$

7) Calculate the frequency of light that is absorbed when each of the following transitions occurs in the hydrogen atom:
   a) $n = 3 \rightarrow n = 4$
   b) $n = 3 \rightarrow n = 6$
   c) $n = 3 \rightarrow n = 5$

8) What wavelength of light must be absorbed by a hydrogen atom in order to raise it from the ground state to the third energy level? What is the energy of this light?

Write the electron configuration notation of the following elements:

1. Calcium (Ca) _____

2. Silicon (Si) _____

3. Zirconium (Zr) _____

4. Barium (Ba) _____

5. Francium (Fr) _____

Write the orbital notation (orbital diagram) of the following elements:

1. Boron (B) _____

2. Cobalt (Co) _____

3. Copper (Cu) _____

4. Chromium (Cr) _____

5. Aluminum (Al) _____

Write the noble gas notation of the following elements:

1. Sulfur (S) _____

2. Fluorine (F) _____

3. Bromine (Br) _____

4. Tellurium (Te) _____

5. Iodine (I) _____

6. Astatine (At) _____

7. Antimony (Sb) _____

8. Yttrium (Y) _____

9. Tungsten (W) _____

10. Rubidium (Rb) _____

Review: The valence electrons are the electrons in the outermost principle energy level ***(n).*** They are always the outermost ***"s"*** or ***"s and p"*** sub-shells. Since the maximum number of electrons possible in the " s " and " p " sub-shells is eight, there can be no more than eight valence electrons.

Directions: Write the element's Noble Gas Notation electron configuration, and determine its number of valence electrons (# of electrons in the "outermost" shell).

Example: **Carbon:** Noble Gas Notation electron configuration: $[He]2s^2\ 2p^2$, therefore Carbon has 4 valence electrons.

1. Fluorine – Noble Gas Notation: _____ Valence Electrons: _____

2. Phosphorus – Noble Gas Notation: _____ Valence Electrons: _____

3. Calcium – Noble Gas Notation: _____ Valence Electrons: _____

4. Nitrogen – Noble Gas Notation: _____ Valence Electrons: _____

5. Iron – Noble Gas Notation: _____ Valence Electrons: _____

6. Argon – Noble Gas Notation: _____ Valence Electrons: _____

7. Potassium – Noble Gas Notation: _____ Valence Electrons: _____

8. Helium – Noble Gas Notation: _____ Valence Electrons: _____

9. Magnesium – Noble Gas Notation: _____ Valence Electrons: _____

10. Sulfur – Noble Gas Notation: _____ Valence Electrons: _____