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Determining Number of Protons, Neutrons, and **Electrons Practice**

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Electromagnetic Spectrum Problem Set

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a) What is the wavelength of the light?	10
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	A CD player uses light of frequency 3.85 x 10 ¹⁴ Hz to read the information on the disc.

- What portion of the electromagnetic spectrum does this wavelength correspond to? What is the energy of one photon of this light?
- A sodium-vapor street light emits a yellow light at wavelength 589 nm

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- a) What is the frequency of this wavelength?b) What is the energy change of the sodium atom involved in this emission?
- After absorbing x-rays of wavelength 53.7 nm, helium atoms emit light at wavelength 501.6 nm.

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- 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
- What is the frequency of the light emitted from the helium atom? What is the energy of one photon of this light?

- 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.

- Calculate the frequency of light emitted when each of the following energy transitions occurs in the hydrogen atom:
- a) n=3 → n=2 b) n=4 → n=1 c) n=2 → 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 → n=4 b) n=3 → n=6 c) n=3 → n=5
- <u>@</u> 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 co	nfiguration notation of the following elements:
1. Calcium (Ca)	
2. Silicon (Si)	
3. Zirconium (Zr)	
4. Barium (Ba)	
5. Francium (Fr)	
Write the orbital not	ation (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 n 1. Sulfur (S)	otation of the following elements:
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]2s² 2p², 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:	
6. Argon – Noble Gas Notation:	
7. Potassium – Noble Gas Notation:	
8. Helium – Noble Gas Notation:	
9. Magnesium – Noble Gas Notation:	
10 Sulfur – Noble Gas Notation:	Valence Electrons: