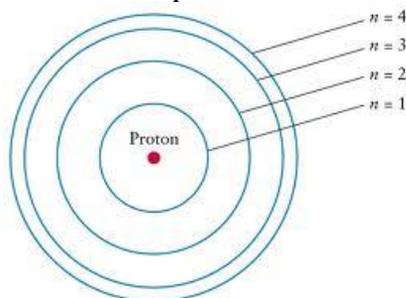


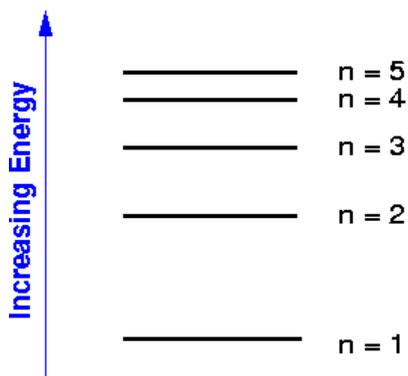
Things that Glow - Glowing Things Review

This worksheet is your homework set for Quantum Mechanics. Please make sure you answer each question as directed. Do YOUR best.

- Define the following terms:
 - Ground State Electron –
 - Excited State Electron –
 - Photon –
- Describe how the energy differences between the higher energy levels of an atom compare to the energy differences between the lower energy levels of the atom? Use the Bohr model shown below to help with this answer.

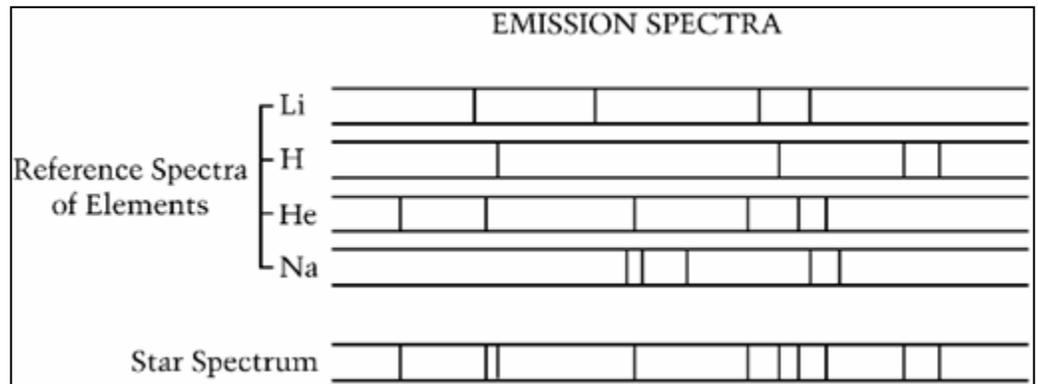


- The diagram below is a representation of the energy levels 1 through 5 on a hydrogen atom. Use arrows to do parts a-d.
 - An electron in energy level 1 going to energy level 4. Label this A.
 - The same electron going to a lower energy level. Label this B.
 - Where in this process (A or B) does the emission of light occur?
 - Use dashed arrows to show ALL the possible transitions an electron can make if it starts at energy level one.



- Use the diagram above to explain why you see a SPECTRUM of light colors emitted from an excited atom.
- Why does each element give off a different spectrum?

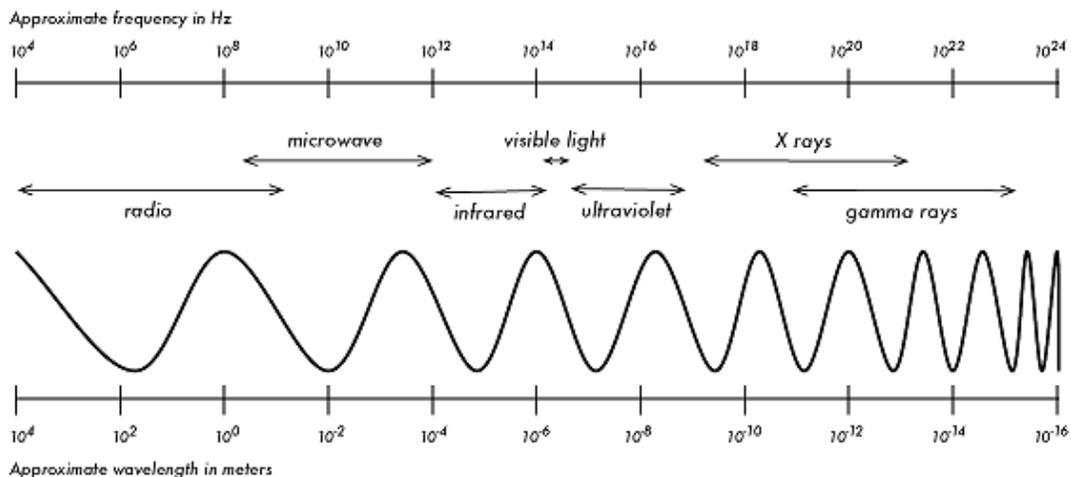
12. What you see here are emission spectra for four different elements. Examine the lines of the spectra and determine which elements are in the mixture.



- Claim:
- Evidence (Cite the data to show how you came to this claim.)
- Reasoning (Explain the concept of emission spectra and how to use it to identify the elements present in a mixture.)
- When does the emission of light seen on the spectrum occur for the electron?
- Based on the emission spectra of the four elements above, elements do not have the same emission spectra. Why are they different?

13. Which quantum leap would be associated with the greatest energy of emitted light?
 $n = 1$ to $n = 4$ OR $n = 4$ to $n = 1$ OR $n = 4$ to $n = 2$ Sketch each leap to support your claim.

Electromagnetic Spectrum:



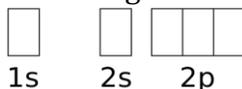
14. Study the electromagnetic spectrum. You need to know the order of the wave types, the relationship between frequency and wavelength, and the relative energy of the waves. Label the side of the image which has: high frequency, low frequency, short wavelength, long wavelength, high energy, low energy.

15. Summarize Aufbau's Filling Order rule in ONE sentence.

16. Summarize Pauli's Exclusion Principle in ONE sentence.

17. Summarize Hund's Rule in ONE sentence.

18. Fill in the diagram below following the filling order rules for ground state Oxygen, O.



19. Draw a picture of what all S and all P sublevels look like regardless of energy level. Also state the shape of each.

20. Write the electron configurations for the following atoms and ions:

a. Ar

b. P⁻³

c. K⁺¹

d. Co

21. Write an abbreviated (aka: Noble gas or kernel) configuration for the following elements:

a. Silicon (Si)

b. Cesium (Cs)

c. Manganese (Mn)

22. Identify the elements with the following electron configurations:

a. $1s^2 2s^2 2p^6 3s^2$

b. $[\text{Kr}]5s^1$

23. Write the complete electron configuration for a neutral element having an atomic number of 26.

24. List at least 3 classifications for the element Br.

