Review

$c = \lambda\nu$

$E = h\nu = \frac{hc}{\lambda}$

$\Delta E = R_H(\frac{1}{n_i^2} - \frac{1}{n_f^2})$

$\lambda = \frac{h}{mu}$

$1nm = 1x10^{-9}m$

$1A = 1x10^{-10}m$

$R_H = 2.18x10^{-18}J$

$h = 6.63x10^{-34}J \cdot s$

$1ev = 1.6x10^{-19}J$

$c = 3x10^8 m/s$

1. Find the frequency of light with a wavelength of 300 Å
2. Find the energy, in ev, of light with
   a. Frequency of $4x10^{15}$ Hz
   b. Wavelength of 3 m
3. Find the wavelength in nm of light with an energy of 200 kJ/mol.
4. The O=O bond has an energy of 495 kJ/mol. What wavelength of light (in nm) is needed to break this bond?
5. How much energy is required to remove an electron from the 2nd shell of hydrogen?
6. If an electron in hydrogen drops from n=6 to n=3, find the wavelength of light emitted in nm.
7. Find the wavelength of each of the following if moving at 100 m/s
   a. Proton whose mass is $1.67x10^{-27}$kg
   b. Baseball whose mass is 250 g
8. Fill in the table

	# protons	# neutrons	# electrons
Cl-37			
^{14}C			
Al^{+3}			

9. Name the -1 ion whose electron configuration is
   $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6$
10. Write the electron configuration (no shortcut) for
    a. Bi
    b. Mg
    c. Cr^{+2}
11. Write the electron configuration (with shortcut) for
    a. Ba
    b. Zr
    c. Si

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12. Write the complete orbital diagram for
    a. Be
    b. Na
    c. P
13. Which of the following is not ground state?
    a. $1s^1$
    b. $1s^2 2s^1 2p^6$
    c. $1s^2 2s^2 2p^6 3s^2 3p^3$
14. Which of the following represents an excited state for an uncharged atom of boron?
    a. $1s^2 2s^2 2p^1$
    b. $1s^2 2s^1 2p^6$
    c. $2s^2 2p^3$
15. How many valence electrons are there in an atom with the electron configuration $[Kr]5s^1 4d^{10}$?
16. Which in each pair has a larger atomic radius?
    a. S^{-2} Cl^{-1}
    b. Mg^{+2} Na^{+1}
    c. C Si
    d. F^{-1} Cl^{-1}
    e. Mn^{+2} Mn^{+4}
    f. H He
17. What alkaline metal is the largest?
18. What halogen is the smallest?
19. Which period 4 element
    a. Is smallest in radius?
    b. Is smallest in mass?
    c. Has lowest ionization energy?
    d. Has highest electron affinity?
    e. Is least reactive?
    f. Is most metallic?
20. Br^{-1} is isoelectronic with what +2 ion?
21. What element will Cl react most strongly with?
22. Match the following elements with their ionization energy data

Mg Al Na K Ar

	IE_1	IE_2	IE_3	IE_4
A	550	780	900	1800
B	2000	2500	3600	4200
C	400	1200	1500	1900
D	300	1400	1550	2000
E	600	820	1900	2200

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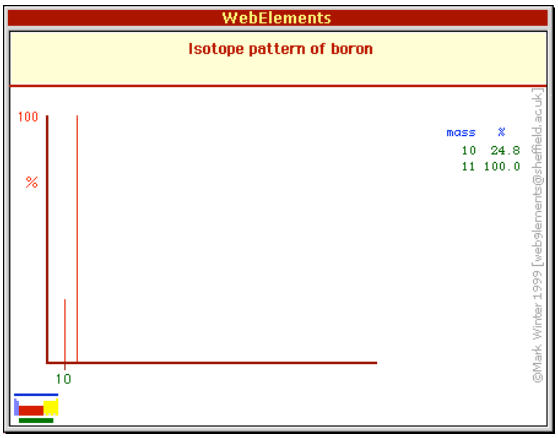
23. Why is the first ionization energy of francium lower than that of potassium?
24. Why is the first ionization energy of magnesium lower than that of aluminum?
25. Why is the first ionization energy of sodium lower than that of magnesium?
26. Based on the mass spectrum for boron, calculate the average atomic mass.



27. The following graph includes the PES for Scandium
    a. Label the peaks according to shell and subshell
    b. How would the plot change when scandium forms a +2 ion?
    c. A +3 ion?