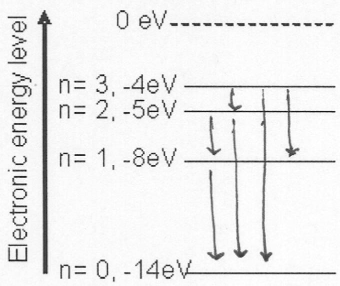
PHYS 225 – Spring 2010

HW #1

Due at the beginning of class on Friday Feb. 5

1. Atomic spectra are really useful because they tell us what energies electrons are allowed to have within atoms.

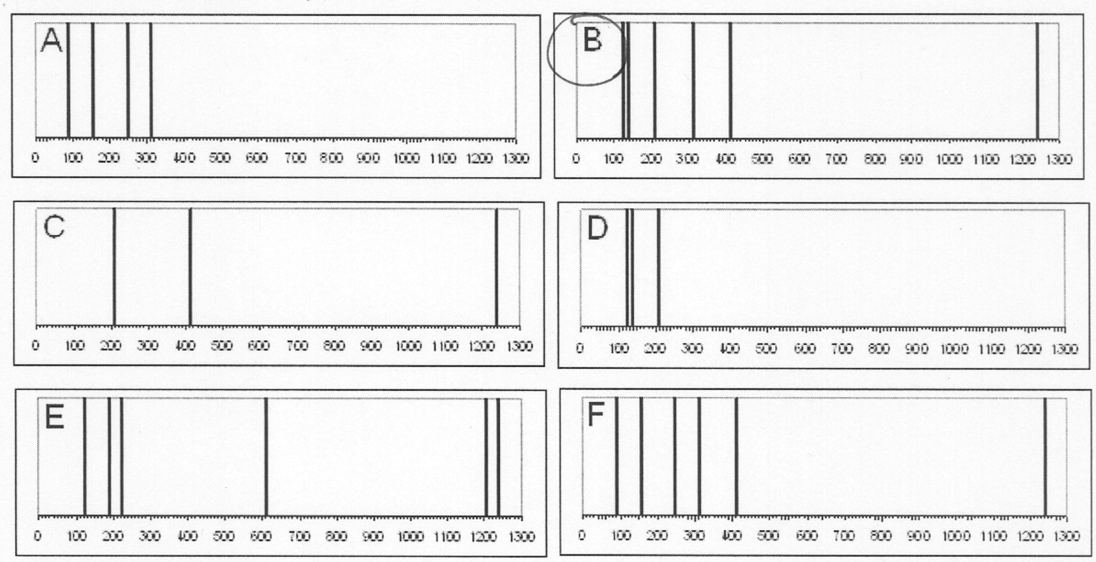
$\lambda = hc/\Delta E = 1240 \text{ eV}\cdot\text{nm} / \Delta E$



n_i	n_j	ΔE	λ
1	0	6 eV	207nm
2	0	9eV	138nm
3	0	10eV	124nm
2	1	3eV	413nm
3	1	4eV	310nm
3	2	1eV	1240nm

⇒ atomic spectra (B)

a. Which of the atomic spectra below includes all the emission lines you might expect from the above electronic energy level diagram?
The x-axis represents wavelengths in nanometers.
Remember that $\Delta E = hc/\lambda$, and note that $hc = 1240$ eV nm.



b. What is the ionization energy of this atom (in eV)? Assume this atom has only one electron.

14 eV, the energy needed to remove the electron from the ground state.