Flame Test

Dominant Color	**Approximate Wavelength (in nm)***
Red	701
Red-Orange	622
Orange	609
Orange-Yellow	597
Yellow	587
Yellow-Green	577
Green	535
Green-Blue	492
Blue	474
Blue-Violet	455
Violet	423

***Wavelength values here are given for the mid-range of the color indicated.**

1. Observe and record the color emitted by each ion.
2. Using the provided table, determine the wavelength of the emitted light.
3. Calculate the frequency of the light.
4. List the observed elements in order from shortest to longest wavelength.
5. List the observed elements in order from lowest to highest frequency.
6. What is the relationship between wavelength and frequency?
7. What is the relationship between energy and frequency?

Atomic Structure #2

1. What is the electron configuration of Einsteinium? Is it paramagnetic or diamagnetic?
2. What is the atomic orbital notation of Mercury? Is it paramagnetic or diamagnetic?
3. What are the four quantum numbers for the last electron put into the mercury atom?
4. If $n = 4$, what are the possible values of l? what are the possible values of m_l
5. Would the following set of quantum numbers be possible? Why or why not?
   a. $n = 2$, $l = 0$, $m_l = +1$ *b.* $n = 5$, $l = 3$, $m_l = -3$ *c.* $n = 4$, $l = 4$, $m_l = -4$
   d. $n = 0$, $l = 0$, $m_l = 0$ *e.* $n = 4$, $l = 3$, $m_l = -4$ *f.* $n = 3$, $l = 2$, $m_l = +1$
6. Calculate the wavelength, in nanometers, of the electromagnetic radiation emitted by a hydrogen atom when its electron drops form the n=6 energy level to n=3 energy level. What series (Lyman, Balmer, Paschen) is this emission line in and how do you know? ($1m=1*10^9nm$)
7. Between which two energy levels of a hydrogen atom must an electron fall to account for a spectral line at 486.1 nm?
8. Draw a sketch of a periodic table labeling everything you know about it (include things like metals nonmetals, metalloids, halogens, noble gases, transition metals, inner-transition metals, Lanthanide series, Actinide series, representative elements, alkali, alkaline earth, – get the pic?)
9. Which of the following elements has the largest atomic radius, ionization energy, electron affinity & electronegativity? (give an explanation for each of your choices)
   a. Cl b. Ca c. K d. P