**Text homework for week of 8/29-9/2**

**(answers to odd numbered problems are at back of text)**

1. **Page 55 problem 42**

**(p = # protons, n= number of neutrons, e = # electrons**

**C-14=> p+ n = 14, where p = 6 so 6+n=14=> n=8. Since p =6 and isotope is neutral, e= 6.**

**C-12=> p +n =12 where p = 6 so 6+ n =12 => n=6. Since p =6 and isotope is neutral, e= 6.**

1. **Page 55 problem 43**
2. **Page 55 problem 45**
3. **Page 55 problem 46a-c**

**46a) p=27 is Cobalt (Co) . Since n= 31, the mass number for this isotope of Co is p+n=27+31=58**

**58Co**

**27**

**46b) B bas a proton count of 5. Since the mass number (A) = 10, 10 = p +n = 5+ n=>n=5**

**10B**

**5**

**46c) Z=12 means Mg. Since A= 23 we write:**

**23Mg**

**12**

1. **Page 55 problem 51**

**6a) What is the prime idea underlying the classical theory of light ?**

**Ans. Light is a wave whose energy is proportional to the wave amplitude**

**6b) What experiment showed that the above theory was not correct ?**

**Ans. Photoelectric effect**

**6c) Summarize the main effect observed in the photoelectric effect**

**The minimum energy required to eject an electron from a metal surface under vacuum was found to be independent of light intensity until a specific `threshold’ frequency of light was attained. This meant that amplitude (intensity) was not a good model for light energy, thus undermining the notion that light was strictly a wave.**

**6d) Planck’s equation, E=hν, represents the energy of a light `photon’. Qualitatively explain the `photon’ model of light .**

**Essentially, the photon can be thought of as a sort of massless bullet of energy (a quanta) whose energy E= hν, can be thought of as a reflection of a `compression spring tension’ stored up in the photon. Like a wave, the closer the spring is forced together (lower wavelength; higher frequency) the more energy it will release if it is absorbed and the `tension’ is released. Thus, the photon contains wavelike properties (the spring), but also `mass’ like properties since it is acting like a small bullet when it `collides’ with matter.**

1. **List three big ideas contained in Bohr’s model of the H atom**
2. **Notion of electronic motion in discrete `quantum’ leaps**
3. **Notion of energy levels of electrons as existing at fixed values**
4. **States of atom can be described in terms of integers (quantum numbers)**
5. **List three `triumphs’ of the Bohr atom**
6. **Correctly predicted the emission spectrum of H (and the Sun)**
7. **Correctly predicted the radius of the ground state of electron in H**
8. **Explained away the dilemma of why protons and electrons don’t recombine in the atom (quantization)**
9. **Page 103, problem 39**
10. **Page 103 problem 41**