Answers to the practice problem set

1) Calculate the frequency of a photon as an electron jumps from n= 3 to n=1
   a. Energy for n= 3 = -2.42 x 10^{-19} J
   b. Energy for n= 2 = -5.44 x 10^{-19} J
   c. Frequency of the photon = f = 4.64 x 10^{14} vibrations/sec or Hz

2) Calculate the kinetic energy of a proton of wavelength corresponding to red light
   a. Red light wavelength = \lambda = 6.6 \times 10^{-7} m
   b. Mass of proton = m = 1.6 \times 10^{-27} kg
   c. Velocity of proton = v = 0.602 m/s
   d. KE = 3.02 \times 10^{-28} J

3) Calculate the decay constant for isotope of half life of 20 years
   a. Decay constant = k = 1.1 \times 10^{-9} disintegrations/sec

4) Calculate the time required for 50 g of the isotope to decay to 10 g
   a. t = 46 years

5) Radioactive decay
   a. Alpha Decay of \^\text{14}_6C=\^\text{10}_4B+\^\text{4}_2He
   b. Beta Decay of \^\text{14}_6C=\^\text{14}_7N+\^\text{0}_\text{e}

6) Electronic Configuration of Calcium
   a. Calcium has 20 electrons
   b. 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2

7) Time for revolution of a comet at a distance of 30 A.U is
   a. 164.3 earth years