1) a) Calculate the frequency, $\nu$, and the energy (in eV) per photon for electromagnetic radiation with a wavelength of 500 nm.
   b) express the units in terms of wavenumbers (cm$^{-1}$)
   c) What ‘color’ is this radiation?
   d) What is a general formula for finding the energy in eV of a photon whose wavelength we know in units of nm?
   e) How much momentum does this 500 nm-wavelength photon have?
   f) What speed would an electron have to travel to have the same momentum as this photon?

2) Suppose that a 100W source radiates 600 nm light uniformly in all directions. The human eye is remarkably sensitive. Assume that a person can detect see this light if only 20 photons per second enter a dark-adapted eye (pupil diameter of 7 mm). How far from the source can the light be seen under these conditions? What color is this light?

3) Solve the differential equation: $\frac{d^2 x}{dt^2} + \omega^2 x(t) = 0$

   For the time $t=0$ initial (boundary) conditions $x(0)=A, \ x'(0)=v_0$