Worksheet 2.3
Light as a Wave and Particle

BE SURE TO INCLUDE ALL WORK AND UNITS!

1. a. What is the wavelength of light with a frequency of 7.26×10^{14} Hz? What region of the EM spectrum would this lie in?

   b. What is the frequency of radiation with a wavelength of 442 nm. What region of the EM spectrum would this lie in?

   c. What is the energy of a photon with a frequency of 7.26×10^{14} Hz.

   d. What is the wavelength of a photon of energy 2.4×10^{-16}J? What region of the EM spectrum would this lie in?

2. The energy to break 1 mol of C-C bonds (that is 6.022×10^{23} C-C bonds) is 348 kJ/mol. What would be the minimum frequency of a photon that would break a single C-C bond? What region of the EM spectrum would this lie in?

3. Make an argument that light (electromagnetic radiation) is a wave.

   Claim: Light is a wave.

   Evidence:

   Reasoning:

4. Make an argument that light (electromagnetic radiation) is a particle.

   Claim: Light is a particle.

   Evidence:

   Reasoning:

Helpful Equations and Constants:

$E = h\nu$

$c = \lambda\nu$

$h = 6.626 \times 10^{-34}\ J \cdot s$

$c = 3.0 \times 10^{8}\ \frac{m}{s}$