**ATOC 3500/CHEM 3151**

**Problem 10**

In class we learned that light of different energies (i.e., wavelengths) can do different things to molecules. In particular, short wavelengths, like ultraviolet, X-rays, and gamma rays can break molecules apart. When a single photon of light breaks a molecular bond, we call the process “photolysis.”

Soon we will be looking into the formation of stratospheric ozone and photochemical (urban) smog. These are processes that require energy from the Sun to initiate a series of reactions that produce chemical compounds that are normally unstable in the atmosphere. Many of these compounds are toxic, or they affect air quality and visibility. Thus, they are the focus of policies and regulations designed to reduce their impacts.

In this problem, we will carry calculate the wavelength of light that contains a particular amount of energy. In a future problem, we will see whether photons of particular wavelengths contain enough energy to break molecular bonds.

Problem: When a certain compound containing the cesium ion is heated, it gives off a colored flame. The photos that are emitted each have an amount of energy equal to 4.3 x 10-19 Joules.

Use the Planck-Einstein relation (E = h) to determine the wavelength that is emitted by the cesium flame.

See http://www.pveducation.org/pvcdrom/properties-of-sunlight/energy-of-photon