**Particle Nature of Light Practice Problems**

1. (a) What is the energy in Joules that is associated with a wavelength of 10.8 mm?

(b) What is the energy in Joules associated with a frequency of 101.1 MHz?

(c) For what frequency of radiation will a mole of photons have energy 24.7 kJ?

1. An AM radio station broadcasts at 1010 kHz, and an FM radio station broadcasts at 98.3 MHz. Calculate and compare the energy of the photons emitted by these radio stations.
2. The energy from radiation can rupture chemical bonds. A minimum energy of 941 kJ/mol is required to break the nitrogen-nitrogen triple bond. What is the longest wavelength that has this energy?
3. A steller object is emitting radiation at a wavelength of 3.55 mm. If a detector is capturing 3.2 x 108 photons per second at this wavelength, what is the total energy of the photons detected in one hour?
4. (a) What is the frequency associated with a photon with an energy of 4.41 x 10-19 J?

(b) What is the wavelength of this radiation?