Astronomy 1102/1104 16 February, 2009
Exercise 6—Due in section from 23 February

Name: _____

Electromagnetic Radiation

Section: _____

1. A wave has a wavelength of 2 m and a frequency of 4 Hz. How fast is it propagating?

2. An infrared photon has a wavelength 3000 times the wavelength of an x-ray photon. Which carries more energy? What is the ratio of the energies?

3. A 300 K blackbody (which is you), emits more energy at a wavelength of 10 μm than any other wavelength. At what wavelength would the emission of a 3000 K blackbody peak?

4. Two spherical blackbodies are heated to the same temperature, but one has three times the radius of the other. How much more luminous is the larger blackbody?

5. A newly discovered Kuiper Belt Object is 36 AU from the Sun, has a temperature of 50 K, and a diameter of 200 km (radius 100 km), while a newly discovered Scattered Disk object at 144 AU has a temperature of 25 K and a diameter of 800 km (radius 400 km). Assuming that they are blackbodies, which is more luminous?