Wavelength, Frequency, and Energy

Be sure to use the appropriate significant figures, and make sure you _include units_!

h = 6.626 x 10 $^{-34}$ J·s

1. What is the wavelength of electromagnetic radiation with a frequency of 6.00 x10^9 Hz?

   5.0 x 10^{-2} m   or   0.050 m   or   5.0 cm

2. What is the frequency of the light from a laser that emits light of wavelength 840 nm?

   3.6 x 10^{14} Hz   or   360 THz

3. Your favorite radio station broadcasts at 105.9 MHz. What is the wavelength of this radio signal?

   2.8 m

4. You get an x-ray with a wavelength of 6.0 x10^{-10} m. What is the frequency of this x-ray?

   5.0 x 10^{17} Hz

5. What is the speed of an ultraviolet ray of wavelength 2.25 nm with a frequency of 1.33 x10^{17} Hz?

   2.99 x 10^8 m/s (by calculation)   or   3.0 x 10^8 m/s (by definition)

6. How much energy does a photon of EM radiation with a frequency of 5.0×10^{12} Hz have?

3.3×10^{-21} J

7. In your flame test experiment, one of the chemicals emitted light of wavelength 720 nm. What is the frequency of this light?

4.2×10^{14} Hz   or   420 THz

8. How much energy does a photon of light emitted in problem #7 have?

2.8×10^{-19} J

9. What is the energy of a photon of ultraviolet light with a wavelength of 1.18×10^{-8} m?

1.7×10^{-17} J

10. What is the frequency of a photon of EM radiation that has an energy of 8.75×10^{-25} J?

1.32×10^{9} Hz   or   1.32 GHz