

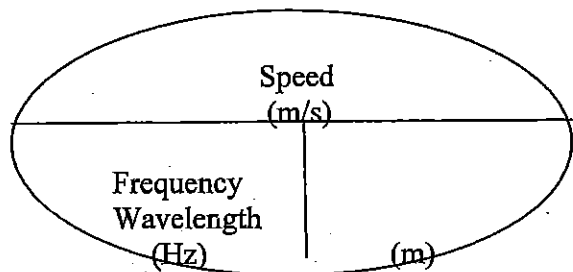
Speed / Frequency / Wavelength

Equation: Speed of all Electromagnetic Spectrum Waves (c) = 3.0×10^8 m/s

Speed (m/s) = Frequency x Wavelength

Frequency (Hz) = Speed \div Wavelength

Wavelength (m) = Speed \div Frequency



1. Violet light has a wavelength of 4.10×10^{-12} m. What is the frequency?

2. Green light has a frequency of 6.01×10^{14} Hz. What is the wavelength?

3. What is the wavelength (in meters) of the electromagnetic carrier wave transmitted by The Sports Fan radio station at a frequency of 640 kHz? (Hint: convert kHz into Hz by multiplying by 10^3 .)

4. Calculate the wavelength of radiation with a frequency of 8.0×10^{14} Hz.

5. What is the wavelength of light with a frequency of 7.66×10^{14} Hz?

6. A helium laser emits light with a wavelength of 633 nm. What is the frequency of the light?

7. What is the wavelength of X-rays having a frequency of 4.80×10^{17} Hz?

8. An FM radio station broadcasts at a frequency of 107.9 MHz. What is the wavelength of the radio signal?
 (Hint: First, convert Mega Hertz [MHz] into Hertz by multiplying by 10^6)

9. If the limits of human hearing are 20 Hz. to 20,000 Hz, what are the sound wavelengths that are associated with both of these two extremes, assuming the speed of sound is 345 m/s.
 Frequency = 20 Hz : Wavelength =

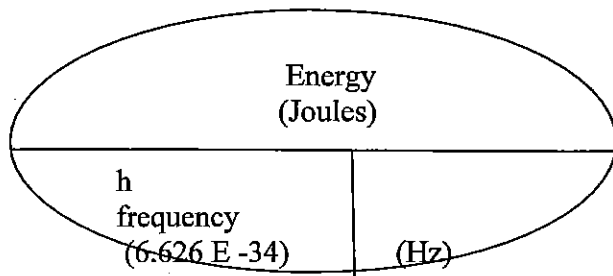
 Frequency = 20,000 Hz : Wavelength =

Energy / Frequency / Wavelength

$$\text{Energy (J)} = h \times \text{Frequency}$$

$$h \text{ (Planck's Constant)} = 6.626 \times 10^{-34} \text{ J} \cdot \text{s}$$

$$\text{Energy} = h \times (c \div \text{wavelength})$$



9. Calculate the energy of a photon of radiation with a frequency of 8.5×10^{14} Hz.
10. Calculate the energy of a gamma ray photon whose frequency is 5.02×10^{20} Hz?
11. Calculate the energy of a photon of radiation with a wavelength of 6.4×10^{-7} m.
12. What is the energy of light whose wavelength is 4.06×10^{-11} m?

General Knowledge.

15. Rank these parts of the electromagnetic spectrum from lowest energy (1) to highest (7):

Gamma Infrared Microwave Radio Visible Ultraviolet X-ray

- Rank these parts of the electromagnetic spectrum from lowest frequency (a) to highest (g):

Gamma Infrared Microwave Radio Visible Ultraviolet X-ray

- Rank these parts of the electromagnetic spectrum from shortest wavelength (A) to longest (G):

Gamma Infrared Microwave Radio Visible Ultraviolet X-ray