

HOMEWORK PROBLEMS:

5a. What is the wavelength of light with a frequency of 8.55×10^{13} Hz?

Answer:

$$c = \lambda v ; \lambda = \frac{c}{v}$$

$$\lambda = \frac{3.00 \times 10^8 \frac{m}{sec}}{8.55 \times 10^{13} \frac{1}{sec}} = \frac{3.00 \times 10^8 m (sec)}{8.55 \times 10^{13} (sec)} = 3.51 \times 10^{-6} m$$

5b. A certain photon of light has a wavelength of 400 nm. What is the frequency of this light?

Answer:

$$\frac{400 \text{ nm}}{1 \times 10^9 \text{ nm}} \times \frac{1 \text{ m}}{1 \times 10^9 \text{ nm}} = 4.00 \times 10^{-7} \text{ m}$$

$$c = \lambda v ; v = \frac{c}{\lambda}$$

$$v = \frac{3.00 \times 10^8 \frac{m}{sec}}{4.00 \times 10^{-7} \text{ m}} = \frac{3.00 \times 10^8 \text{ m}}{4.00 \times 10^{-7} \text{ m} (sec)} = 7.50 \times 10^{14} \frac{1}{sec}$$

5c. A certain photon of light has a wavelength of 3.33×10^8 m. What is the frequency of this light?

Answer:

$$c = \lambda v ; v = \frac{c}{\lambda}$$

$$v = \frac{3.00 \times 10^8 \frac{m}{sec}}{3.33 \times 10^8 \text{ m}} = \frac{3.00 \times 10^8 \text{ m}}{3.33 \times 10^8 \text{ m} (sec)} = 0.901 \frac{1}{sec}$$