

## Answer on Question 66561, Physics, Optics

### Question:

Calculate the wavelength of the electromagnetic radiation with frequency  $3 \cdot 10^{14} \text{ Hz}$ . What is the type of radiation (Gamma rays, Visible, IR etc.)?

### Solution:

For the electromagnetic waves, frequency has an inverse relationship to the wavelength  $\lambda$ :

$$f = \frac{c}{\lambda}$$

here,  $f$  is frequency,  $c$  is the speed of light in vacuum and  $\lambda$  is the wavelength.

So, from this formula we can find the wavelength  $\lambda$ :

$$\lambda = \frac{c}{f} = \frac{3.0 \cdot 10^8 \frac{m}{s}}{3.0 \cdot 10^{14} \text{ Hz}} = 1.0 \cdot 10^{-6} \text{ m} = 1.0 \mu\text{m} = 1000 \text{ nm}.$$

If we look at the electromagnetic spectrum scale, we can see that the radiation with the calculated wavelength  $\lambda = 1000 \text{ nm}$  corresponds to the infrared radiation (from  $700 \text{ nm}$  to  $1000000 \text{ nm}$ ).

### Answer:

$\lambda = 1000 \text{ nm}$ , infrared radiation.

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