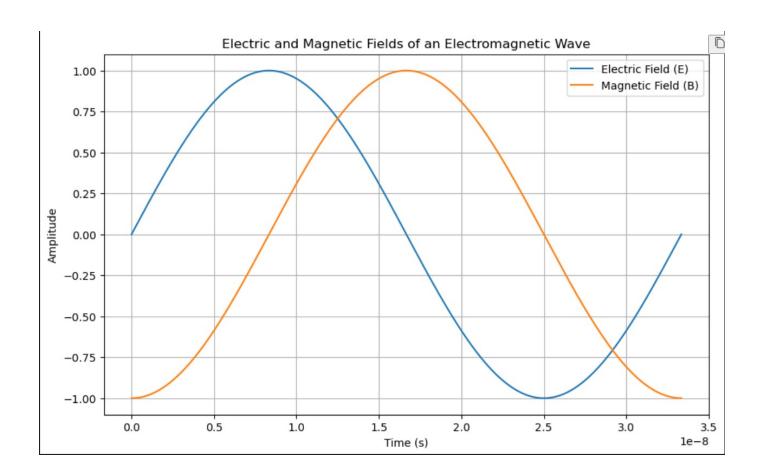
**Question:** A plane electromagnetic wave travels in vacuum along the z-direction. What can you say about the directions of its electric ( $\mathbf{E}$ ) and magnetic ( $\mathbf{B}$ ) field vectors? If the frequency of the wave is 30 MHz, what can you say about its wavelength? **Solution:** 

Symbol	Description	Value
С	Speed of light in vacuum	$3 \times 10^8$ m/s
f	Frequency of the electromagnetic wave	30 MHz
λ	Wavelength of the electromagnetic wave	?

TABLE I Input Parameters



a) A plane electromagnetic wave travels in vacuum along the z-direction. The electric ( $\mathbf{E}$ ) and magnetic ( $\mathbf{B}$ ) field vectors are perpendicular to each other move in x and y direction respectively and they are perpendicular to each other

b) The relationship between frequency (f), wavelength  $(\lambda)$ , and the speed of light (c) is given by the formula:

$$\lambda = \frac{c}{f} \tag{1}$$

$$\lambda = \frac{3 \times 10^8 \text{ m/s}}{30 \times 10^6 \text{ Hz}} \tag{2}$$

$$= 10 \,\mathrm{m}$$
 (3)