Quiz 1

Name:

Date: 28.02.2023

Question 1

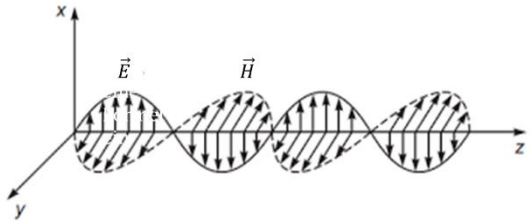
What can we say about the absorption spectrum of a green leaf in the visible range? Check one of the boxes.

☐ ~~Green is absorbed more than red and blue~~

× **Red and blue are absorbed more than green**

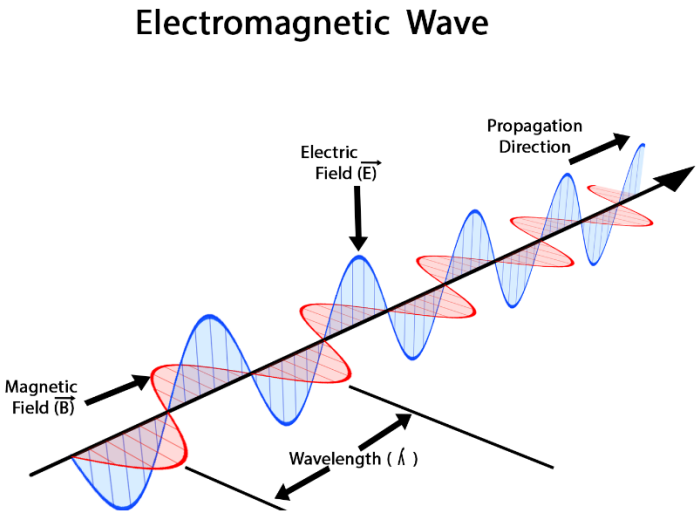
Question 2

The electric field vector of an electromagnetic wave can be written as $\vec{E} = \vec{E}_0 e^{i(k_z \cdot z - \omega t)}$. Is this wave travelling to the right (positive z direction) or to the left (negative z direction)?



Answer:

The wave propagates along Z in positive direction (to the right). It can be derived either from positive wave vector k (the term $ik_z \cdot z$ in the exponent defines the propagation in positive direction), or by Umov–Poynting vector $\mathbf{S} = \mathbf{E} \times \mathbf{H}$, that also defines the direction of wave propagation.



Question 3

Consider an electromagnetic wave with a given frequency in vacuum and in a condensed medium. In which case is the wavelength larger?

Answer:

The wavelength in the medium λ_n:

$$\lambda_n = \frac{\lambda_0}{n}$$

Where λ_0 is the wavelength in vacuum, n is the refractive index. Since $n > 1$, then $\lambda_n < \lambda_0$.