

Physics II

Poynting Vector

Poynting vector $\vec{S} = \frac{\vec{E} \times \vec{B}}{\mu_0}$

Problem 1.- The value of the electric field of an electromagnetic wave is $\vec{E} = 9\hat{x} + 12\hat{y}$ in volts per meter, while the magnetic field is $\vec{B} = 5 \times 10^{-8} \hat{z}$ in tesla. Find the direction of the velocity of this wave and its instantaneous intensity.

Problem 2.- If a radio transmitter has a vertical antenna, should a receiver antenna (rod type) be vertical or horizontal to get the best reception? Why?

Problem 3.- When calculating the Poynting vector, what is the meaning of its magnitude and direction?

Problem 4.- A pulsed laser emits 0.135J of energy in a pulse that lasts 15ns and it is focused over an area of 2.25mm^2 . Calculate the amplitude of its magnetic and electric fields.