

NCERT-12.8.7

EE23BTECH11005 - Ambati Krishna Kaustubh

QUESTION

The amplitude of the magnetic part of a harmonic electromagnetic wave is $B_0 = 510\text{nT}$. What is the amplitude of the electric part of the electromagnetic wave.

Solution:

$$\frac{E_0}{B_0} = c \quad (1)$$

$$E_0 = c * B_0 \quad (2)$$

$$E_0 = 153\text{V-m} \quad (3)$$

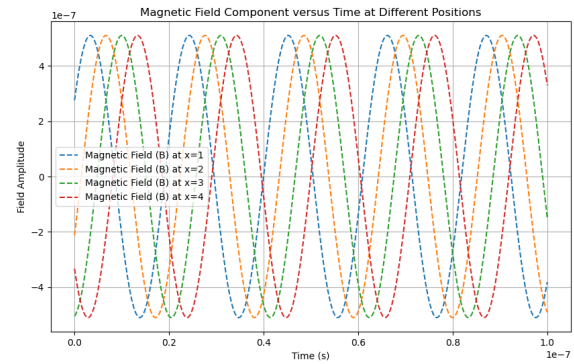


Fig. 1. Graph of Magnetic Field vs Time

Parameter	Description	Value
B_0	Amplitude of the Electric Field	510nT
c	Speed of Electro Magnetic Wave	$3 \times 10^8 \text{ms}^{-1}$
E_0	amplitude of the Electric Field	153V-m

TABLE 1
PARAMETER TABLE

Consider the general equation of Electric Field and Magnetic field

$$E = E_0 \sin(\omega t - kx) \quad (4)$$

$$B = B_0 \sin(\omega t - kx) \quad (5)$$

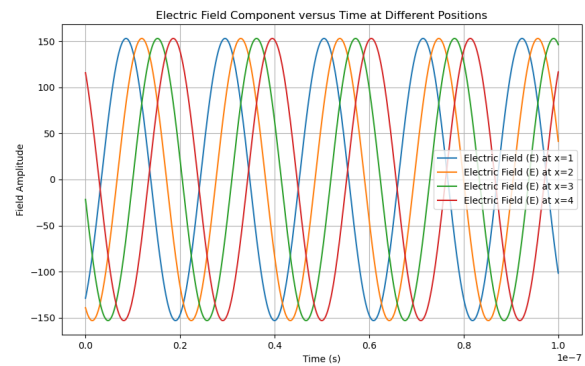


Fig. 2. Graph of Electric Field vs Time