NCERT-12.8.7

EE23BTECH11005 - Ambati Krishna Kaustubh

Question

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

Solution:

$$\frac{E_0}{B_0} = c \tag{1}$$

$$E_0 = c * B_0 \tag{2}$$

$$E_0 = 153V - m \tag{3}$$

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

TABLE 1
Parameter Table

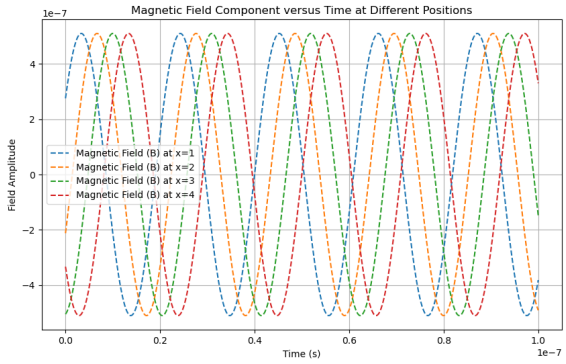

Fig. 1. Graph of Magnetic Field vs Time

Consider the general equation of Electric Field and Magnetic field

$$E = E_0 \sin(\omega t - kx) \tag{4}$$

$$B = B_0 \sin(\omega t - kx) \tag{5}$$

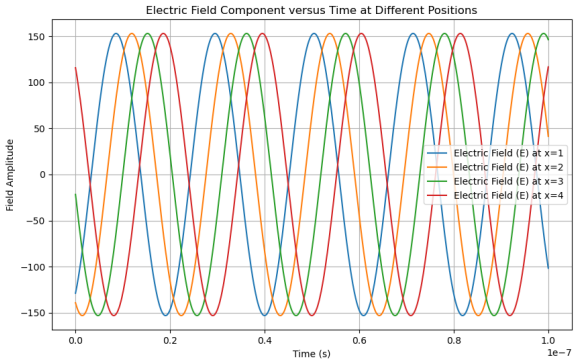

Fig. 2. Graph of Electric Field vs Time