Answer on Question #85661, Physics / Electromagnetism

Question:

Write the plane wave form for the z-component of the electric field vector of an electromagnetic wave of wavelength 10 cm and field strength 200 Vm^(-1).The wave is propagating in the positive x-direction

Solution:

The wave frequency $\nu = \frac{c}{\lambda} = 3 \cdot 10^9 (Hz)$, so in accordance with wave equation we can write

$$E_z = E_m \sin(2\pi\nu t - 2\pi \frac{x}{\lambda}) = 200 \sin 6.28(3 \cdot 10^9 t - 10x)(\frac{V}{m})$$

The answer:

$$E_z = 200 \sin 6.28(3 \cdot 10^9 t - 10x) \text{ V/m.}$$