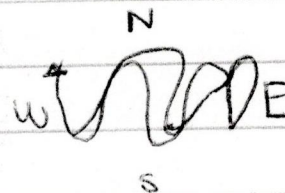


1. In an EM wave traveling west, the B field oscillates up and down vertically and has a frequency of 85 kHz and an rms strength of  $7.5 \times 10^{-19}$  T. (Assume the wave <sup>light</sup> travels in free space).

- What is the frequency of the electric field?
- What's the <sup>rms</sup> strength of the electric field?
- What's the direction of its oscillation?



Known

$$f_E = ?$$

$$E_{rms} = ?$$

$$f_0 = 85 \text{ kHz}$$

$$B_{rms} = 7.15 \times 10^{-19} \text{ T}$$

Formulas

$$c = \frac{E_{rms}}{B_{rms}}$$

$$c = 3 \times 10^8 \text{ m/s}$$

b.  $E_{rms} = ?$

a. frequency of E and B are the same.

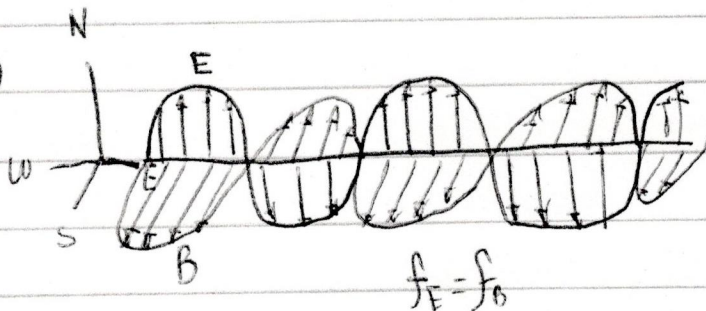
$$c = \frac{E_{rms}}{B_{rms}}$$

$$f_E = 7.5 \times 10^{-19} \text{ T}$$

$$E_{rms} = c B_{rms}$$

$$E_{rms} = (3 \times 10^8 \text{ m/s})(7.15 \times 10^{-19} \text{ T})$$

$$E_{rms} = 2.15 \frac{\text{V}}{\text{m}}$$



c. The electric field oscillates along the horizontal north-south line.