EE4441 Pre-req Quiz, Spring 2010

All units are mks and are considered part of the answer. Show your work for full credit.

1. Consider the electromagnetic wave in vacuum:

\[ \vec{E} = \hat{z} E_0 e^{i(kx + 6 \times 10^9 t)} \]

(a) Which direction is the wave traveling?

\(-x\)-direction

(b) What polarization does it have?

\(\hat{z}\), linear

(c) What is the frequency of the wave?

\[ \omega = 6 \times 10^9 \quad ; \quad f = \frac{6 \times 10^9}{2\pi} \quad [\text{Hz}] \quad = \frac{9.55 \times 10^8 \text{ Hz}}{2\pi} \]

(d) What is the wavelength?

\[ \lambda = \frac{c}{f} = \frac{3 \times 10^8}{6 \times 10^9} \quad [(\text{m})] \]

\[ = 0.5 \; \text{m} \]