

Preparation Assignments

Due April 18, 2002

A plane wave is propagating in the $+x$ direction inside lossless plexiglass. The wave has a frequency of 10 MHz and a $+z$ -directed electric field amplitude of 1 V/m. Determine the velocity, v_p , wavelength, λ , and impedance, η .

Express the electric field and magnetic field in phasor form. They must be vectors.

What is the time average Poynting Vector?

Due April 22, 2002

Repeat the previous problem, except now the medium is dry soil and you need to find the attenuation constant as well.

How far will the wave travel to reach 3dB (half power) loss?

Due April 24, 2002

The wave in the first problem reaches a plexiglass/air boundary at normal incidence with the wave coming from the plexiglass side. What is the reflection coefficient, Γ , and the transmission coefficient, τ .

Express the transmitted electric and magnetic field in phasor form. Be careful, some of the terms in the expression are region dependent.