

Problem 1 (2.5 points)

In a nonmagnetic, lossy dielectric medium, a 400 MHz plane wave is characterized by the magnetic field phasor:

$$\tilde{\mathbf{H}} = (\hat{\mathbf{x}} - j4\hat{\mathbf{z}}) e^{-0.05y} e^{-j10y}$$

Obtain time-domain expressions for: the electric and magnetic field vectors.

- the electric field vector (1 points)
- the magnetic field vector (1 points)
- Determine the polarization of the wave (0.5 point)

(Free space permittivity: $\epsilon_0 = 8.85 \times 10^{-12}$ F/m, free space permeability: $\mu_0 = 4\pi \times 10^{-7}$ H/m)

Problem 2 (1.5 points)

A lossless 100Ω transmission line of $3\lambda/8$ in length is terminated in an unknown load impedance. The input impedance Z_{in} is measured to be $60 + j80$, determine the load impedance.