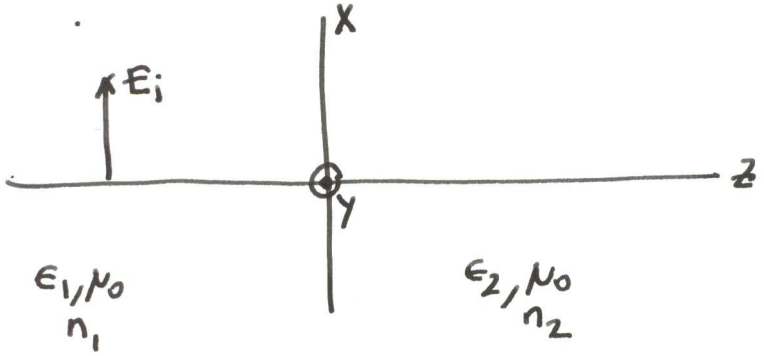
Phys 402
Spring 2010
QuEx - 4

Consider two semi-infinite, homogeneous, non-permeable dielectric media seperated by a plane boundary, as shown in the figure, (neglect dispersion and dissipation).
The refraction indices n_1, n_2 are real.

A plane wave $\vec{E}_i = E_{0i}\,\hat{x}\, e^{i(k_1 z - \omega t)}$ with propagation vector $\vec{k}_1 = k_1 \hat{z}$ is incident normally on the boundary.



i) Compute the reflected and transmitted waves $(\vec{E}_R, \vec{E}_T)$

ii) Compute the reflection and transmission coefficients R and T.
Check that unitarity is satisfied.

iii) $n_1 = 1$ air, $n_2 = 1.5$ glass. What is the numerical value of R?