

1. Assuming normal incidence what fraction of light (in terms of energy) is reflected at the boundary between
 - a. air ($n=1.5$) and glass ($n=1.55$)
 - b. air ($n=1$) and water ($n=1.33$)
2. Starting with the boundary conditions on E and H, find the reflection and transmission coefficients in terms of the angle of incidence (θ_i) for the polarization which has the magnetic field in the plane of incidence, and the electric field out of the plane of incidence and hence tangential to the boundary.
3. Light is incident on a boundary between two media of refractive indices n_A and n_B with its magnetic field in the plane of incidence. Show that $R+T=1$ as required by conservation of energy. R and T are the fraction of the light which is reflected and transmitted respectively, both defined in terms of the z-component of the Poynting vector.