PHYS 704 - Test 1.

- 1. [10 points] A plane wave is incident on an interface of two dielectrics at an angle θ_i with the normal to the interface. If the wave is polarized perpendicular to the plane of incidence, work out the reflection and transmission ratios of the electric field amplitudes.

- 2. [10 points] A TM wave in a rectangular waveguide propagates along the z-direction and has

$$E_z = E_0 \sin\left(\frac{m\pi x}{a}\right) \sin\left(\frac{n\pi y}{b}\right)$$

Find the remaining components of the electric and magnetic fields. Derive any equations you may need from Maxwell's equations.