METU Electrical-Electronics Engineering Department, 2020-2021 Fall Semester

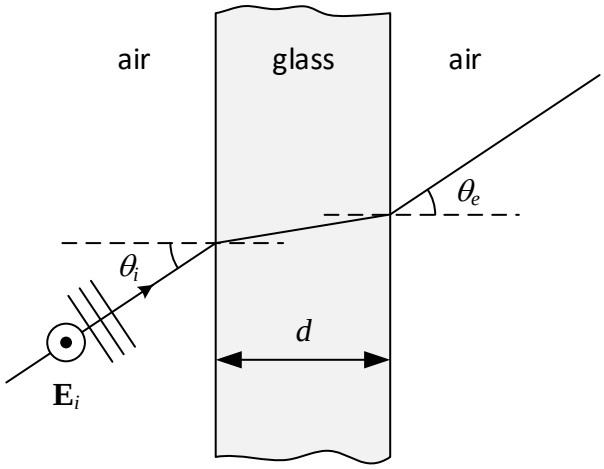
EE303 Homework #7

Due Date/Time: *December 21, 2020 Monday, 1:00 pm*

Question 1) A uniform plane wave is incident onto a planar slab of glass from air region as shown in the figure below. The glass has a relative permittivity of $\epsilon_r = 2.1$. The slab has a thickness of d.

a) Determine the exit angle, θ_e, as a function of the incidence angle, θ_i, and the slab thickness, d.

b) Determine the <u>total</u> power reflected and transmitted (to the second air region) relative to power incident on the slab.



Question 2) A uniform plane wave propagating in lossless medium 1 with parameters ϵ_1, and μ_1 is incident on the interface with lossless medium 2 with parameters ϵ_2, and μ_2. The critical angle for total reflection is 60^{o} and the Brewster angle of no reflection occurs at 30^{o} for parallel polarization. Determine the <u>total</u> reflected and transmitted powers relative to the incident power if the wave is incident normally on the boundary.

Question 3) (Reading Assignment)

Write the transmission line parameters (distributed parameters, R, L, G, and C) of a Two-Wire transmission line in terms of physical parameters of the line.