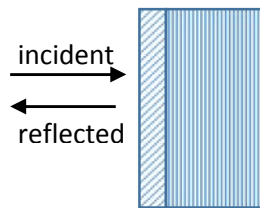Physics 611, Fall 2014

Problem set #2 (due September 30)

1. Jackson 7.6
2. Jackson 7.8
3. A linearly polarized monochromatic plane wave falls normally from vacuum to a semi-infinite slab of transparent material of refractive index n_2. A uniform layer of thickness d made of another transparent material with refractive index n_1 is placed on the boundary. Find the resulting reflection coefficient R (i.e. the fraction of the incident intensity that is reflected back to vacuum), and determine at what conditions the reflection disappears (this is how the anti-reflection coatings work). The wavelength of the radiation in vacuum is λ_0.

4. Determine the complex vector amplitude of a plane electromagnetic field for each set of Stokes parameters given below. In each case please state if polarization is linear, circular or elliptical, and sketch how it looks like.
   a. $S_0=3$, $S_1=2$, $S_2=-2$, $S_3=1$
   b. $S_0=5$, $S_1=-3$, $S_2=0$, $S_3=4$
   c. $S_0=25$, $S_1=24$, $S_2=-7$, $S_3=0$
5. Jackson 7.22
6. Jackson 7.23