

## Opti 380A – Intermediate Optics Lab I – Fall 2009

### Post-Lab Questions for Lab 6: Linear Polarization

Post-lab questions are due at the beginning of lecture on the Monday following your lab.

- 1.) Polarized sunglasses consist of two sheet polarizers, one for each eye. If reflections from shiny surfaces, like pool water, are blocked by the glasses, in what orientation are the polarizers (parallel to the horizon or perpendicular to it)? Why?
  
- 2.) Consider two crossed polarizers, one passing polarization oriented in the horizontal direction and one passing polarization in the vertical direction. The polarizers are placed sequentially with an unpolarized light beam incident on the first polarizer. No light is transmitted through the second polarizer in this configuration. A third polarizer is now placed between the first two. The third polarizer can rotate in its plane around the beam axis. What is the transmission of this system as a function of  $\theta$ , the angle of the third polarizer's transmission axis with respect to the vertical direction? You may derive an equation or reason the answer and illustrate with vector diagrams. In both cases, draw a plot of transmission versus  $\theta$ , where  $\theta$  is between  $0^\circ$  and  $360^\circ$ .
  
- 3.) A  $\lambda = 532\text{nm}$  laser beam is incident upon a glass/air interface with refractive index 1.517. The laser beam illuminates the interface from within the glass. Plot the ratio of power reflected from the interface to power incident on the interface versus angle for  $p$  and  $s$  polarizations. ( $0^\circ \leq \theta \leq 90^\circ$ ).