PHYS 554 Advanced Optics

1a) A student misaligns an n=1.5 Fresnel rhomb. Instead of the incident light being polarized at 45° to the plane of incidence, it is polarized at 60° to the plane of incidence. Describe (quantitatively) the output polarization. (Review Chapter 14, matrix treatment of polarization!)

b) Dr. T visits the lab, and notices the error. He corrects it, but unfortunately in so doing he changes the internal angle from the desired 53° to 63°. Describe (quantitatively) the resulting output polarization. (You may neglect the effects of the entrance and exit faces of the rhomb.)

c) By changing the incident polarization plane, is it possible to obtain circularly polarized light with the 63° internal reflection angle?

d) Is it possible to design a "Fresnel prism" using any transparent material in which ONE internal reflection converts linearly polarized light into circularly polarized light?

Pedrotti[3] Chapter 23 Problems 15, 18, 20, 21.