

100. (a) The condition (in Eq. 34-44) required in the critical angle calculation is  $\theta_3 = 90^\circ$ . Thus (with  $\theta_2 = \theta_c$ , which we don't compute here),

$$n_1 \sin \theta_1 = n_2 \sin \theta_2 = n_3 \sin \theta_3$$

leads to  $\theta_1 = \theta = \sin^{-1} n_3/n_1 = 54.3^\circ$ .

- (b) Reducing  $\theta$  leads to a reduction of  $\theta_2$  so that it becomes less than the critical angle; therefore, there will be some transmission of light into material 3.