

92. (a) In the notation of this problem, Eq. 34-47 becomes

$$\theta_c = \sin^{-1} \frac{n_3}{n_2}$$

which yields $n_3 = 1.39$ for $\theta_c = \phi = 60^\circ$.

- (b) Applying Eq. 34-44 law to the interface between material 1 and material 2, we have

$$n_2 \sin 30^\circ = n_1 \sin \theta$$

which yields $\theta = 28.1^\circ$.

- (c) Decreasing θ will increase ϕ and thus cause the ray to strike the interface (between materials 2 and 3) at an angle larger than θ_c . Therefore, no transmission of light into material 3 can occur.