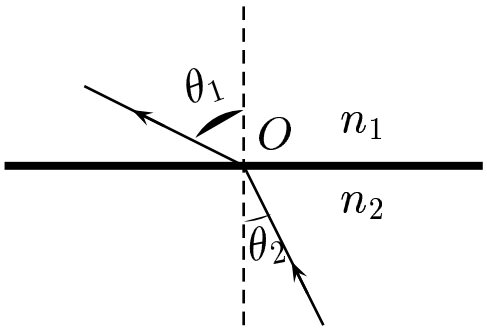
Given: Consider the incidence of a light ray from a denser medium with refraction index n_2 to a lighter medium with refraction index $n_1,,n_2 > n_1$. At $\theta_2 = \theta_c$, where θ_c is the critical angle, $\theta_1 = 90^\circ$.



The range of the total reflection angle θ_2 is

A) $0 < \theta_2 < \theta_c$.

B) $\theta_c < \theta_2 < 90^\circ$.

C) $0 < \theta_2 < 90^\circ$.

D) can't be determined.

The Snell's law says that $n_1 \sin\theta_1 = n_2 \sin\theta_2$. At the critical angle, $\sin\theta_c = \frac{n_1}{n_2}\sin 90^\circ = \frac{n_1}{n_2}$. If $\theta_2 > \theta_c$,$\sin\theta_1 = \frac{n_2}{n_1}\sin\theta_2 = \frac{\sin\theta_2}{\sin\theta_c}$. So θ_1 cannot be real, i.e. there is no refracted ray in medium 1. Thus in the region $\theta_c < \theta_2 < 90^\circ$ the ray in medium 2 is totally reflected.

Answer **B**.

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