

593.

**Problem 43.19 (RHK)**

*A layer of water ( $n = 1.33$ ) 20 mm thick floats on layer of carbon tetrachloride ( $n = 1.46$ ) 41 mm thick. We have to estimate the apparent depth of the water surface from the bottom of the layer of the carbon tetrachloride, when viewed at near normal incidence.*

**Solution:**

We will use the result of **Problem 592** that the apparent depth of a medium of refractive index  $n$  when viewed at near normal incidence is

$$d_{app} = \frac{d}{n}.$$

Applying this result to the problem, we note that

$$\begin{aligned} d_{app} &= \frac{d_1}{n_1} + \frac{d_2}{n_2} \\ &= \left( \frac{20}{1.33} + \frac{41}{1.46} \right) \text{ mm} \\ &= 43 \text{ mm.} \end{aligned}$$