

40. The situation is analogous to that treated in Sample Problem 36-5, in the sense that the incident light is in a low index medium, the thin film of oil has somewhat higher $n = n_2$, and the last layer (the glass plate) has the highest refractive index. To see very little or no reflection, according to the Sample Problem, the condition

$$2L = \left(m + \frac{1}{2}\right) \frac{\lambda}{n_2} \quad \text{where } m = 0, 1, 2, \dots$$

must hold. With $\lambda = 500 \text{ nm}$ and $n_2 = 1.30$, the possible answers for L are

$$L = 96 \text{ nm}, 288 \text{ nm}, 481 \text{ nm}, 673 \text{ nm}, 865 \text{ nm}, \dots$$

And, with $\lambda = 700 \text{ nm}$ and the same value of n_2 , the possible answers for L are

$$L = 135 \text{ nm}, 404 \text{ nm}, 673 \text{ nm}, 942 \text{ nm}, \dots$$

The lowest number these lists have in common is $L = 673 \text{ nm}$.