

46. 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 acetone 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. This is the same as Eq. 36-34 which was developed for the opposite situation (constructive interference) regarding a thin film surrounded on both sides by air (a very different context than the one in this problem). By analogy, we expect Eq. 36-35 to apply in this problem to reflection *maxima*. A more careful analysis such as that given in §36-7 bears this out. Thus, using Eq. 36-35 with  $n_2 = 1.25$  and  $\lambda = 700 \text{ nm}$  yields

$$L = 0, 280 \text{ nm}, 560 \text{ nm}, 840 \text{ nm}, 1120 \text{ nm}, \dots$$

for the first several  $m$  values. And the equation shown above (equivalent to Eq. 36-34) gives, with  $\lambda = 600 \text{ nm}$ ,

$$L = 120 \text{ nm}, 360 \text{ nm}, 600 \text{ nm}, 840 \text{ nm}, 1080 \text{ nm}, \dots$$

for the first several  $m$  values. The lowest number these lists have in common is  $L = 840 \text{ nm}$ .