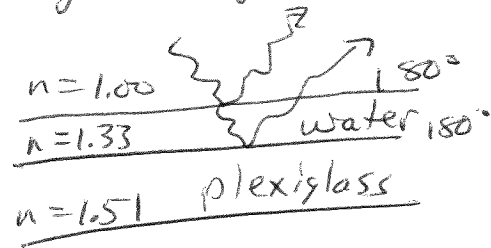


### Ch. 3 Prob. 44

Find the 3 smallest non-zero thicknesses that give constructive interference with green light.

The top surface reflection gives a  $180^\circ$  phase shift.

The bottom surface reflection gives a  $180^\circ$  phase shift.



The  $2^{\text{nd}}$  wave needs to travel one wavelength to give constructive interference.

$$\Delta l = \lambda \cdot m \quad \text{and} \quad \Delta l = 2tn$$

$$\text{so } \lambda \cdot m = 2tn$$

Solve for the smallest thickness ( $m=1$ )

$$\lambda = 2tn \rightarrow t_1 = \frac{\lambda}{2n} = \frac{520 \text{ nm}}{2(1.33)}$$

$$t_1 = 195 \text{ nm}$$

$$t_2 = 2t_1 = 2(195 \text{ nm})$$

$$t_2 = 390 \text{ nm}$$

$$t_3 = 3t_1 = 3(195 \text{ nm})$$

$$= 585 \text{ nm}$$