P #26

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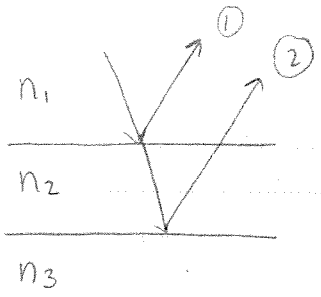
$n_1 = 1.00$
$n_2 = 1.38$
$n_3 = 1.66$

$\lambda_1 = 550\ nm = 550 \times 10^{-9}\ m$



$n_2 > n_1$, so Ray 1 is 180° out of phase

$n_3 > n_2$ so Ray 2 is 180° out of phase

Net result is 2 rays in phase

Find v in coating:

$$n_2 = \frac{c}{v_2} \qquad (1.38) = \frac{(3 \times 10^8\ m/s)}{v_2} \qquad v_2 = 2.17 \times 10^8\ m/s$$

Find λ in coating:

f is constant, so: $\frac{v_1}{\lambda_1} = \frac{v_2}{\lambda_2}$ $\frac{(3 \times 10^8\ m/s)}{(550 \times 10^{-9}\ m)} = \frac{(2.17 \times 10^8\ m/s)}{\lambda_2}$

$$\lambda_2 = 399\ nm$$

Find t:

For destructive int on in-phase rays: $m = 1/2, 1\,1/2 \ldots$

$$2 \cdot t = m \cdot \lambda_2$$

$$2 \cdot t = (1/2) \cdot (399\ nm)$$

$$\boxed{t = 100\ nm}$$