80. (a) Since $n_2 > n_3$, this case has no π-phase shift, and the condition for constructive interference is $m\lambda = 2Ln_2$. We solve for L:

$$L = \frac{m\lambda}{2n_2} = \frac{m(525\,\text{nm})}{2(1.55)} = (169\,\text{nm})m \ .$$

For the minimum value of L, let $m = 1$ to obtain $L_{\text{min}} = 169\,\text{nm}$.

(b) The light of wavelength λ (other than 525 nm) that would also be preferentially transmitted satisfies $m'\lambda = 2n_2L$, or

$$\lambda = \frac{2n_2L}{m'} = \frac{2(1.55)(169\,\text{nm})}{m'} = \frac{525\,\text{nm}}{m'} \ .$$

Here $m' = 2, 3, 4, \ldots$ (note that $m' = 1$ corresponds to the $\lambda = 525\,\text{nm}$ light, so it should not be included here). Since the minimum value of m' is 2, one can easily verify that no m' will give a value of λ which falls into the visible light range. So no other parts of the visible spectrum will be preferentially transmitted. They are, in fact, reflected.

(c) For a sharp reduction of transmission let

$$\lambda = \frac{2n_2L}{m' + 1/2} = \frac{525\,\text{nm}}{m' + 1/2} \ ,$$

where $m' = 0, 1, 2, 3, \cdots$. In the visible light range $m' = 1$ and $\lambda = 350\,\text{nm}$. This corresponds to the blue-violet light.