73. (a) Use of Eq. 37-22 for the limit-wavelengths ($\lambda_1 = 700$ nm and $\lambda_2 = 550$ nm) leads to the condition

$$m_1\lambda_1 \geq m_2\lambda_2$$

for $m_1 + 1 = m_2$ (the low end of a high-order spectrum is what is overlapping with the high end of the next-lower-order spectrum). Assuming equality in the above equation, we can solve for "m_1" (realizing it might not be an integer) and obtain $m_1 \approx 4$ where we have rounded *up*. It is the fourth order spectrum that is the lowest-order spectrum to overlap with the next higher spectrum.

(b) The problem specifies $d = 1/200$ using the mm unit, and we note there are no refraction angles greater than 90°. We concentrate on the largest wavelength $\lambda = 700$ nm $= 7 \times 10^{-4}$ mm and solve Eq. 37-22 for "$m_{\max}$" (realizing it might not be an integer):

$$m_{\max} = \frac{d \sin 90°}{\lambda} = \frac{1}{(200)\,(7 \times 10^{-4})} \approx 7$$

where we have rounded down. There are no values of m (for the appearance of the full spectrum) greater than $m = 7$.