

PHYS 306 Spring 2010
Wave Motion and Electromagnetic Radiation

Homework Assignment

HW#7

Assignment Date: Mar. 23, 2010

Due Date: Mar. 30, 2010

1. In Young's double-hole experiment, a thin mica sheet ($n=1.5$) is introduced in the path of the one of the beams. If the central fringe gets shifted by 0.5 cm, calculate the thickness of the mica sheet. Assume $d = 0.1$ cm and $D = 100$ cm.
2. In Young's double-hole experiment, interference fringes are formed using sodium light which predominantly comprises two wavelengths (5890 and 5896 Å). Find the location on the screen (or the distance from the fringe center) where the fringe pattern will disappear. Assume $d=0.05$ cm and $D=100$ cm.
3. In Young's double-hole experiment, calculate I/I_{\max} where I represents the intensity at a point where the path difference is
 - (1) 0
 - (2) $\lambda/5$
 - (3) $\lambda/2$
 - (4) 3λ
4. Consider a nonreflecting film of refractive index 1.38. Assume that its thickness is 9×10^{-6} cm. Calculate the wavelength (in the visible region) for which the film will be nonreflecting.