

PHYS 306 Spring 2010
Wave Motion and Electromagnetic Radiation

Homework Assignment

HW#8

Assignment Date: Mar. 30, 2010

Due Date: Apr. 06, 2010

1. In the Newton rings arrangement, the radius of curvature of the curved side of the planeconvex lens is 100 cm. For $\lambda = 6 \times 10^{-5}$ cm, what will be the radii of the 9th and 10th bright rings? (Q15.4 in CH15)
2. In the Newton's rings arrangement, the radius of curvature of the curved surface is 50 cm. The radii of the 9th and 16th dark rings are 0.18 cm and 0.2235 cm. Calculate the wavelength. [Hint: The use of Eq. (66) will give wrong results, why?] (Q15.5 in CH15)
3. In the Michelson interferometer arrangement, if one of the mirrors is moved by a distance 0.08 mm, 250 fringes cross the field of view. Calculate the wavelength? (Q15.9 in CH15)
4. In the Michelson interferometer experiment, assuming $\lambda = 5 \times 10^{-5}$ cm and $d = 5 \times 10^{-3}$ cm, find the values of angle θ and fringe order m for the first, second and third bright rings from the center?
5. Show that, for multiple reflections in a plane parallel film, the transmittivity T of the film is given by

$$T = \frac{1}{1 + F \sin^2 \frac{\delta}{2}}$$

Hint: refer to Ch16.2 or the class note.