

PHYS 306 Spring 2010
Wave Motion and Electromagnetic Radiation

Homework Assignment

HW#10

Assignment Date: Apr. 13, 2010

Due Date: Apr. 20, 2010

1. A circular aperture of radius 0.01 cm is placed in front of a convex lens of focal length of 25 cm and illuminated by a parallel beam of light of wavelength 5×10^{-5} cm. Calculate the radius of the first dark ring (Q18.5). 1.

2. Consider a set of two slits each of width $b = 5 \times 10^{-2}$ cm and separated by a distance $d = 0.1$ cm, illuminated by a monochromatic light of wavelength 6.328×10^{-5} cm. If a convex lens of focal length 10 cm is placed beyond the double slit arrangement, calculate (adapted from Q18.7)
 - (1) the first diffraction minimum
 - (2) the first interference minimum inside the first diffraction fringe
 - (3) the first interference maximum inside the first diffraction fringe.

3. Calculate the resolving power in the second order spectrum of a 1 inch grating having 15,000 lines. (Q18.14)