

Closed book. No calculators are to be used for this quiz.
Quiz duration: 10 minutes

Name:

Student ID:

Signature:

Laser light of wavelength 500.0 nm illuminates two identical slits, producing an interference pattern on a screen 90.0 cm from the slits. The bright bands are 1.00 cm apart, and the third bright bands on either side of the central maximum are missing in the pattern. Find the width and the separation of the two slits.

Section 1h

Quiz 5

15 March 2013

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Quiz duration: 10 minutes

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(a) What is the wavelength of light that is diffracted in the first order through an angle of 13.5° by a transmission grating having 5000 slits/cm ?

(b) At what angle is second-order diffraction observed? Assume normal incidence.

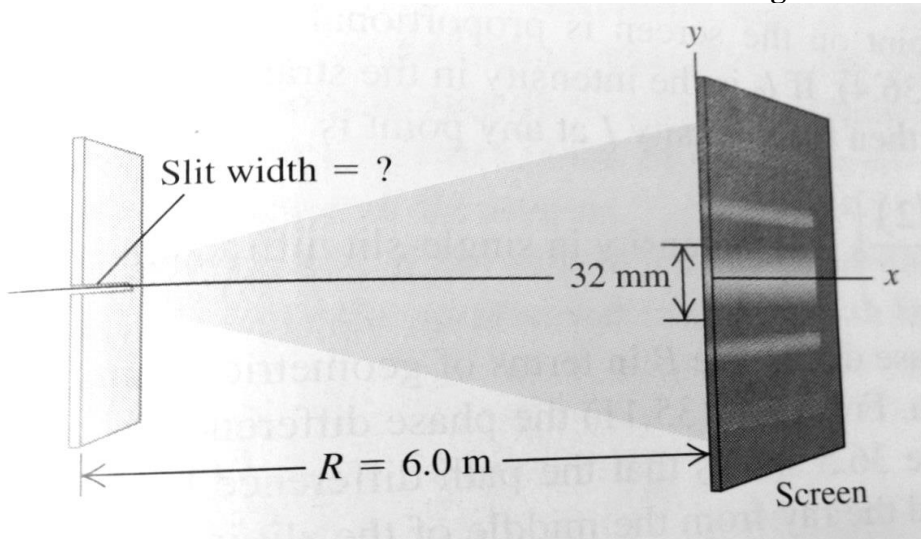
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You pass 633 nm laser light through a narrow slit and observe the diffraction pattern on a screen 6.0 m away. You find that the distance on the screen between the centers of the first minima outside the central bright fringe is 32 mm. How wide is the slit?

PHYS 206:

KOÇ UNIVERSITY
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Spring Semester 2013

Section 1j

Quiz 5

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Name:

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In a single slit diffraction experiment, the amplitude of the electric field of the diffraction pattern observed on the screen is given as $E_p = E_0 \frac{\sin(\beta/2)}{\beta/2}$. where $\beta = \frac{2\pi}{\lambda} a \sin(\theta)$, a corresponds to slit width.

- a) Plot this electric field amplitude as a function of θ . Indicate the positions of the local maxima and the positions where electric field amplitude is 0.
- b) Plot the intensity of light detected on the screen as a function of θ . Indicate the positions of the local maxima and the positions where intensity is 0.

PHYS 206:

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Spring Semester 2013

Section 1k

Quiz 5

15 March 2013

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Name:

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The wavelengths of the visible spectrum are approximately 400 nm (violet) to 700 nm (red). Find the angular width of the first-order visible spectrum produced by a plane grating with 600 slits per millimeter when white light falls normally on the grating.

PHYS 206:

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Spring Semester 2013

Section 11

Quiz 5

15 March 2013

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Quiz duration: 10 minutes

Name:

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Red light of wavelength 633 nm from a helium–neon laser passes through a slit 0.350mm wide. The diffraction pattern is observed on a screen 3.00 m away. Define the width of a bright fringe as the distance between the minima on either side.

(a) What is the width of the central bright fringe?

(b) What is the width of the first bright fringe on either side of the central one?