

Name: KEY

PHYSICS 2220 - QUIZ #10 - SPRING 2009

1. Light of wavelength 558 nm is incident on a narrow slit. On a screen 2.5 m away, the distance between the second diffraction minimum and the central maximum is 1.8 cm.
- a. Calculate the angle of diffraction θ of the fourth maximum.

$$\tan \theta = \frac{0.018 \text{ m}}{2.5 \text{ m}} = 7.2 \times 10^{-3}$$

$$\Rightarrow \boxed{\theta = 0.413^\circ}$$

- b. Find the width of the slit.

$$a \sin \theta = m \lambda \quad \text{with } m = 2$$
$$a = \frac{2 \lambda}{\sin \theta} = \frac{2 (558 \times 10^{-9} \text{ m})}{\sin (0.413^\circ)}$$

$$\boxed{a = 1.55 \times 10^{-4} \text{ m}}$$