HW6-2 Soln)

Find the De Broglie wavelength first:

$$\lambda_{\rm dB} = \frac{\rm h}{\rm mv} = \frac{6.63 \times 10^{-34}}{0.005(400)} = 3.32 \times 10^{-34} \,\rm m$$

From diffraction of light through a single slit,

$$\theta = \frac{m\lambda_{DB}}{b}.$$

This gives the angle from the central maximum to the mth zero. Since we want from side to side for the central peak,

$$\theta_{\text{full width}} = 2 \frac{m\lambda_{\text{DB}}}{b} = 2 \frac{(1)(3.32 \times 10^{-34})}{1.2} = \frac{5.6 \times 10^{-34}}{5.6 \times 10^{-34}}$$
 radians