

1. The condition for a minimum of a single-slit diffraction pattern is

$$a \sin \theta = m\lambda$$

where  $a$  is the slit width,  $\lambda$  is the wavelength, and  $m$  is an integer. The angle  $\theta$  is measured from the forward direction, so for the situation described in the problem, it is  $0.60^\circ$  for  $m = 1$ . Thus

$$a = \frac{m\lambda}{\sin \theta} = \frac{633 \times 10^{-9} \text{ m}}{\sin 0.60^\circ} = 6.04 \times 10^{-5} \text{ m} .$$