

P #F

Ch 27 - Worksheet

$$\lambda = .500 \text{ nm} = .500 \times 10^{-9} \text{ m}$$

$$L = 20.0 \text{ cm} = .200 \text{ m}$$

$$x_1 = 2.10 \text{ cm} = .0210 \text{ m} \quad (\text{for single slit, } x_1 \text{ is distance to destructive interference})$$

$$m = 1$$

$$x_m = \frac{m \cdot \lambda \cdot L}{d} \quad (.0210 \text{ m}) = \frac{(1) \cdot \lambda \cdot (.200 \text{ m})}{(.500 \times 10^{-9} \text{ m})}$$

$$\lambda = 5.25 \times 10^{-11} \text{ m}$$

$$\lambda = \frac{h}{m \cdot v} \quad (5.25 \times 10^{-11} \text{ m}) = \frac{(6.63 \times 10^{-34} \text{ J} \cdot \text{s})}{(9.11 \times 10^{-31} \text{ kg}) \cdot v}$$

$$v = 1.39 \times 10^7 \text{ m/s}$$

$$KE = \frac{1}{2} \cdot m \cdot v^2 = \frac{1}{2} (9.11 \times 10^{-31} \text{ kg}) (1.39 \times 10^7 \text{ m/s})^2$$

$$\boxed{KE = 8.7 \times 10^{-17} \text{ J}}$$