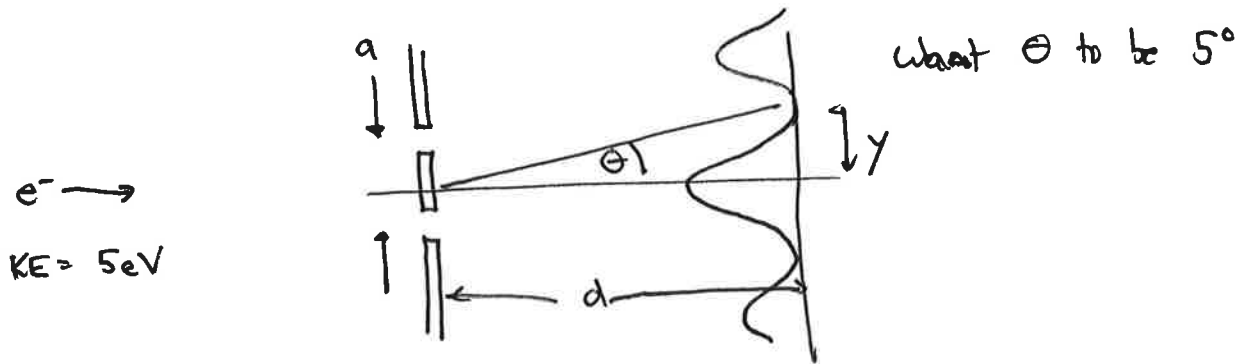


TL 5-22

(Double slit expt)



- Find slit spacing  $a$  so that first minimum occur at  $\theta = 5^\circ$

- Maxima occur at locations given by

$$n\lambda = a \sin \theta_n$$

- Minima occur at  $(n + \frac{1}{2})\lambda = a \sin \theta_n$

a) So we want  $a = \frac{\lambda}{2 \sin \theta}$

- $\lambda$  is given by  $KE = \frac{p^2}{2m} = \frac{h^2}{2m\lambda^2}$

$$\frac{1}{\lambda} = \frac{\sqrt{2mKE}}{h} = 0.5$$

$$\lambda = 0.55 \text{ nm}$$

thus  $a = 3.15 \text{ nm}$

- b) Since  $\tan \theta = \frac{y}{d}$ , we want  $d = \frac{y}{\tan \theta} = \frac{5 \text{ cm}}{\tan 5^\circ}$

$$d = 11.43 \text{ cm}$$