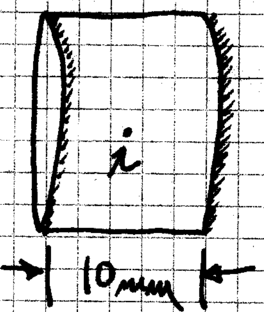
Ch 12 Knoll 3RD Example Problems

12.2



$$\mathcal{E} = \frac{V}{d} \quad \& \quad \mathcal{E}\mu = v \leftrightarrow \mathcal{E} = \frac{v}{\mu}$$

take v_{sat} from fig 11.2 $\sim 8 \times 10^6$ cm/sec

μ_e from Table 11.1 $3.6 \times 10^4 \frac{cm^2}{V sec}$

$$\frac{V}{d} = \frac{v}{\mu} \rightarrow V = (1\ cm)\frac{8 \times 10^6\ cm/sec}{3.6 \times 10^4\ cm^2/V\,sec} = 200\ V$$

want max transit time $= \frac{d}{v} = \frac{1\ cm}{8 \times 10^6\ cm/sec} = 1.25 \times 10^{-7}$ sec

if probability of loss is proportional to transit time
then we want lifetime > 1000 transit time
lifetime > 1×10^{-4} sec

12.6 $\epsilon^{STANDARD}_{NaI\ 3'' \times 3''} = 1.2 \times 10^{-3}$ [p 450]

$$R^{40cm}_{Ge} = \left[R^{25cm}_{NaI} \times 0.40\right] \times \overbrace{\frac{25^2}{40^2}}^{\text{distance change}}$$

$$= \left[150.K/sec \times 1.2 \times 10^{-3} \times 0.40\right] \times \left(25/40\right)^2 = 28.1\ /sec$$