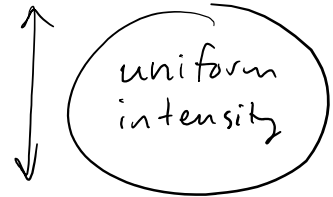


Current 20mA

$$\Delta V_{LED} = 2V$$

5cm circle



Find intensity.

Approach #1

Calculate electrical power consumed.

$$\text{Power} = (\text{current}) \times (\text{voltage})$$

100% efficient conversion to light

Approach #2

Calculate rate that photons come out

$$\frac{\# \text{ photons}}{\Delta t} = \frac{\# \text{ Electrons}}{\Delta t}$$

$$= \frac{\text{current}}{e}$$

Then calculate energy of each photon.

$$E_{ph} = e \Delta V_{LED}$$

Rate that energy is emitted

$$\frac{(\text{current})}{e} \times \Delta V_{LED}$$

$$= (\text{current}) \Delta V_{LED}$$

$$\text{Intensity} = \frac{(\text{current}) \Delta V_{\text{LED}}}{\pi (2.5 \text{ cm})^2} = \frac{(20 \times 10^{-3} \text{ A}) (2 \text{ V})}{3 \times 6 \text{ cm}^2}$$
$$\approx \frac{40 \text{ mW}}{20 \text{ cm}^2} = 2 \frac{\text{mW}}{\text{cm}^2}$$