

Ch. 10 Prob. 86

$$\Delta t = 0.250 \text{ s}$$

$$\bar{P} = 0.500 \text{ W}$$

$$\bar{V} = 3.00 \text{ V}$$

a) Find energy dissipated

$$P = \frac{\Delta E}{\Delta t} \rightarrow \Delta E = P \cdot \Delta t = (0.500 \text{ W})(0.250 \text{ s})$$

$$\Delta E = 0.125 \text{ J}$$

b) Find amount of charge that moves.

$$P = I \cdot V \rightarrow I = \frac{P}{V} = \frac{0.500 \text{ W}}{3.00 \text{ V}} = 0.167 \text{ A}$$

$$\text{but } I = \frac{\Delta Q}{\Delta t} \rightarrow \Delta Q = I \Delta t = (0.167 \text{ A})(0.250 \text{ s})$$

$$\Delta Q = 0.0418 \text{ C}$$

$$c) C = \frac{\Delta Q}{\Delta V} = \frac{0.0418 \text{ C}}{3.00 \text{ V}} = 0.0139 \text{ F}$$

$$C = 13.9 \text{ mF}$$

d) Find the resistance of the lamp.

$$V = I \cdot R \rightarrow R = \frac{V}{I} = \frac{3.00 \text{ V}}{0.167 \text{ A}} = 17.96 \Omega$$

$$R = 18 \Omega$$