Read 13.3

H.W 7 Due today

H.W 8 Available

Office hours 11:30 - 12:30 today

Problem: Suppose one trillion electrons flow past a point in one half second. What is the current?

$N_e = 1 \times 10^{12}$ electrons

$t = 0.5\,s$

$q_e = 1.6 \times 10^{-19}\,C$ want I

$q = It$ $\quad I = \frac{q}{t}$

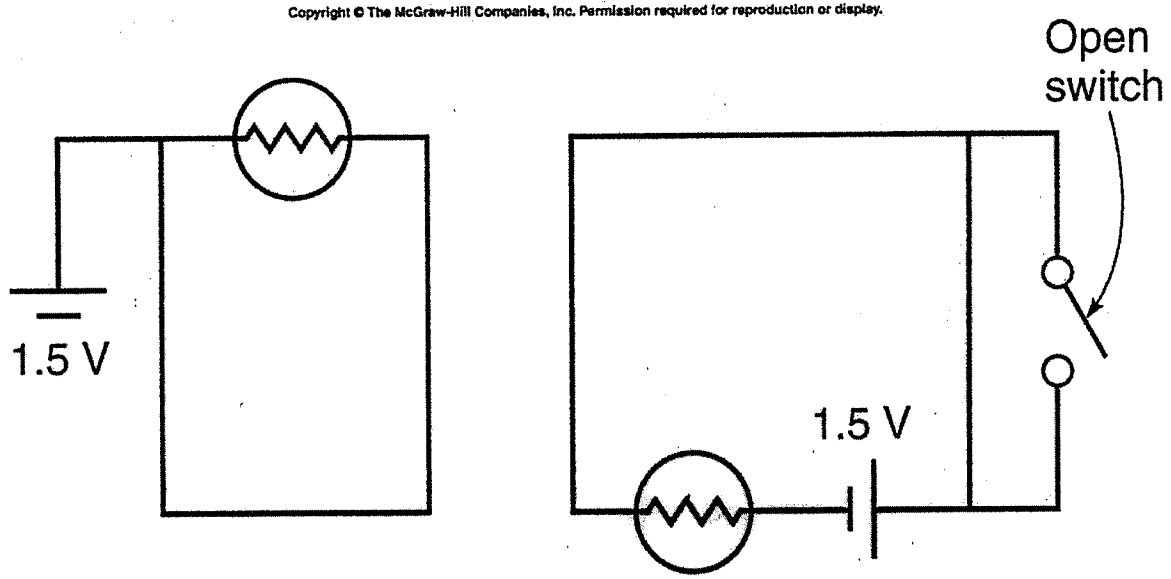
$$I = \frac{N_e q_e}{t} = \frac{(1 \times 10^{12}\,e^-)(1.6 \times 10^{-19}\,C)}{0.5\,s}$$

$$I = 3.2 \times 10^{-7}\,A = \underline{32\,\mu A}$$

Interactive Question

B

Will the light bulb in either circuit go on?



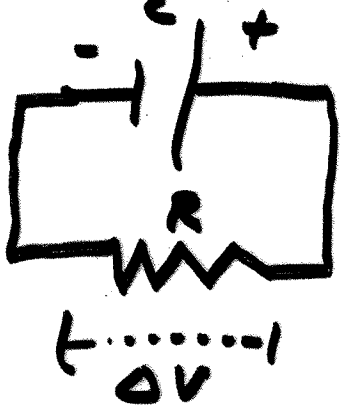
(A) (B)

A) Yes, circuit A only
B) Yes, circuit B only
C) Yes, both circuits
D) No, neither circuit

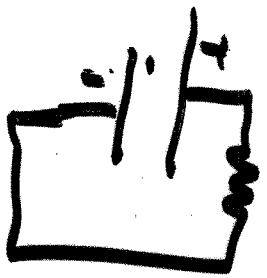
Problem: One twelve volt battery is connected to a 80 Ω resistor. What is the current through the resistor?

$\mathcal{E} = 12\,V$

$R = 80\,\Omega$



want I



loop rule

$\mathcal{E} = \Delta V$

OHM's Law

$\Delta V = IR = \mathcal{E}$

$$I = \frac{\mathcal{E}}{R} = \frac{12\,V}{80\,\Omega} = .15\,A$$

Problem: A hair dryer draws 13 A when plugged into a 120 V line. What is the resistance of the hair dryer?

$\mathcal{E} = 120\,V$

want R

$I = 13\,A$

$\mathcal{E} = IR$

$R = \frac{\mathcal{E}}{I} = \frac{120\,V}{13\,A} = 9.2\,\Omega$