

The filaments in a toaster have a resistance of  $270 \Omega$ . If the toaster is plugged into a  $120 \text{ V}$  outlet,

- a) How much current will flow through the circuit?
- b) How much power will the toaster use?
- c) How many electrons flow through the toaster in one minute?

$$a) V = IR$$

$$I = \frac{V}{R} = \frac{120V}{270\Omega} = 0.44 A$$

$$b) P = IV = (0.44 A)(120V) = 53 W$$

$$c) I = \frac{q}{t} \quad q = I \cdot t = (0.44 A)(60s)$$

$$= 26.67 C$$

$$26.67 C \times \frac{1 e^-}{1.6 \times 10^{-19} C} = 1.7 \times 10^{20} e^-$$