

Problem 17.38

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b.) A color TV uses 2.5 amps at 120 volts. How long to consume the energy calculated in part a?

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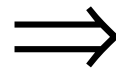
a.) How much energy is consumed in 1 hour?

Power identifies how much work per unit time an element uses. That means:

$$\begin{aligned}P &= \frac{W}{t} \\ \Rightarrow W &= Pt \\ \Rightarrow &= (90 \text{ joules/sec})(3600 \text{ sec/hr}) \\ \Rightarrow &= 3.24 \times 10^5 \text{ joules/hr}\end{aligned}$$

b.) A color TV uses 2.5 amps at 120 volts. How long to consume the energy calculated in part a?

$$\begin{aligned}P &= i V \\ &= (2.5 \text{ A})(120 \text{ v}) \\ &= 300 \text{ watts}\end{aligned}$$



$$\begin{aligned}P &= \frac{W}{t} \\ \Rightarrow t &= \frac{W}{P} \\ \Rightarrow &= \frac{3.24 \times 10^5 \text{ joule}}{300 \text{ watts}} \\ \Rightarrow &= 1080 \text{ seconds} \\ \Rightarrow &= 18 \text{ minutes}\end{aligned}$$