Answer on Question 65472, Physics, Electric Circuits

Question:

My office is pretty cold. I run a space heater, which has a resistance of 15Ω and runs off the wall outlet which supplies a voltage of 120 V. If the heater runs for one hour a day for six weeks, what is the net cost of the electricity that it uses? Assume that the cost of electricity is \$0.13 per *kWh*.

Solution:

Let's first calculate the power used by the space heater:

$$P = \frac{V^2}{R} = \frac{(120 V)^2}{15 \Omega} = 960 W = 0.96 kW.$$

Then, we can calculate the energy used by the space heater which are switched one hour per day:

$$E = Pt = 0.96 \ kW \cdot 1 \ \frac{h}{day} = 0.96 \ \frac{kWh}{day}.$$

Finally, we can find the net cost of the electricity that it uses:

$$Net \ Cost = E \cdot Days \cdot Rate = 0.96 \ \frac{kWh}{day} \cdot 6 \cdot 7 \ days \cdot 0.13 \ \frac{\$}{kWh} = \$5.24.$$

Answer:

Net Cost = \$5.24.

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