

Solution

1. Express the following quantities in Engineering Notation with metric prefixes, and 3 significant digits:

(a) 12,500 W

(a) =

12.5 kW

(b) 0.0041 A

(b) =

4.10 mA

(c) 39,000 Ω

(c) =

39.0 k Ω

(d) 0.000065 V

(d) =

65.0 μ V

(e) 4.72×10^{-8} J

(e) =

47.2 nJ

2. A 14V battery is rated for 10Ah. Assuming the voltage does not change appreciably during discharge:

- (a) If you want the battery to last at least 12 hours, what is the smallest resistance that can be connected to the battery?

Resistance =

16.8 Ω

- (b) If instead you attach a 28 Ω resistor, how much power would it consume and how long would the fully charged battery last?

Power =

7.00W

Time =

20.0 hrs

3. Your Colorado Springs Utilities energy bill is \$250 for last month (31 days) with an energy consumption of 4,800 kWh.

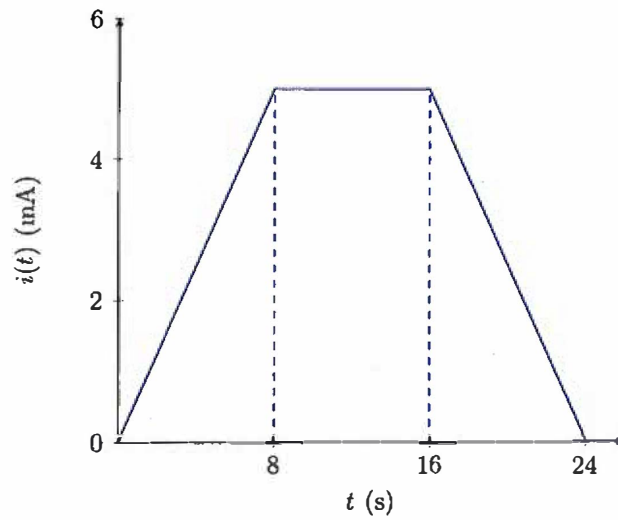
(a) What is the cost of energy at your location (¢/kWh) and what is your average power draw (kW)?

$$\text{Cost} = \boxed{5.21 \text{ ¢/kWh}} \quad \text{Power} = \boxed{6.45 \text{ kW}}$$

- (b) If 240V is supplied to your house, estimate the average current draw from the utility.

$$\text{Current} = \boxed{26.88 \text{ A}}$$

4. Given the following current waveform, determine how much charge in Coulombs has accumulated at 24 seconds (assume the current is zero for all negative time).



Charge =

80 mC