

1. What is the difference between electrical energy and electrical power?
2. What is the current in a 75 W light bulb that is plugged into 120 V household outlet?
3. The aircraft carrier USS *Nimitz* (Figure 4) is powered by two nuclear reactors. In addition to propelling the carrier, the reactors drive eight turbines that generate 8 MW of electrical power for the carrier. How much energy do the eight turbines generate in 15 s?



Figure 4

4. A stun gun (Figure 5) can deliver a nonlethal current of 2 mA at 400 kV to subdue attackers. What is the power of a stun gun?



Figure 5

5. A 35 W bulb of an automobile headlight has a current of 2.82 A going through it. Determine the voltage of the bulb.

6. Figure 6 shows a circuit diagram of a light bulb connected to a 1.5 V cell. With the switch closed, the power of the light bulb is 0.4 W. What is the current in the light bulb?

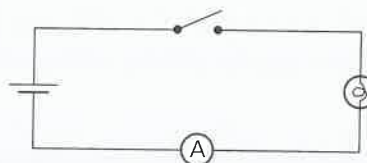


Figure 6

7. A microwave oven has a current of 4.6 A. How much electrical energy does it use in 45 s? (Hint: A microwave is plugged into a wall outlet.)
8. What are the units of each term in the right-hand side of the electrical energy equation, $\Delta E = VI\Delta t$?
9. The voltage (V_T) applied to the circuit shown in Figure 7 is 9 V. The ammeter reads 60 mA, and the voltmeter reads 6 V.
 - (a) What is the power of R_2 ?
 - (b) What is the power of R_3 ?

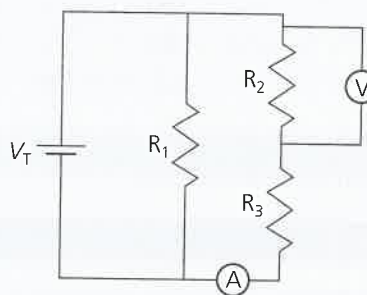


Figure 7

10. The power rating for R_1 in Figure 7 is 0.5 W, which means that the resistor cannot exceed this value without overheating. What is the maximum current that can go through R_1 ?
11. A $100\ \Omega$ resistor is connected to a 6 V energy source for three minutes.
 - (a) How much energy did the power source deliver to the resistor?
 - (b) How much electrical energy did the resistor convert into heat energy?