3-25 a. $V = 15.81$ V, $P = 500$ mW, $I = ?$
b. $P = 100$ mW, $V = 50$ V, $I = ?$
c. $V = 75$ mV, $I = 2$ mA, $P = ?$
d. $P = 20$ mW, $I = 100\ \mu$A, $V = ?$

3-26 How much current do each of the following lightbulbs draw from the 120-V power line?
a. 60-W bulb
b. 75-W bulb
c. 100-W bulb
d. 300-W bulb

3-27 How much is the output voltage of a power supply if it supplies 75 W of power while delivering a current of 5 A?

3-28 How much power is consumed by a 12-V incandescent lamp if it draws 150 mA of current when lit?

3-29 How much will it cost to operate a 1500-W quartz heater for 48 h if the cost of electricity is 7¢/kWh?

3-30 How much does it cost to light a 300-W lightbulb for 30 days if the cost of electricity is 7¢/kWh?

3-31 How much will it cost to run an electric motor for 10 days if the motor draws 15 A of current from the 240-V power line? The cost of electricity is 7.5¢/kWh.

SECTION 3–8 POWER DISSIPATION IN RESISTANCE

In Probs. 3-32 to 3-38, solve for the power, P, dissipated by the resistance, R.

3-32 a. $I = 1$ A, $R = 100\ \Omega$, $P = ?$
b. $I = 20$ mA, $R = 1$ kΩ, $P = ?$
c. $V = 5$ V, $R = 150\ \Omega$, $P = ?$
d. $V = 22.36$ V, $R = 1$ kΩ, $P = ?$

3-33 a. $I = 300\ \mu$A, $R = 22$ kΩ, $P = ?$
b. $I = 50$ mA, $R = 270\ \Omega$, $P = ?$
c. $V = 70$ V, $R = 200$ kΩ, $P = ?$
d. $V = 8$ V, $R = 50\ \Omega$, $P = ?$

3-34 a. $I = 40$ mA, $R = 10$ kΩ, $P = ?$
b. $I = 3.33$ A, $R = 20\ \Omega$, $P = ?$
c. $V = 100$ mV, $R = 10\ \Omega$, $P = ?$
d. $V = 1$ kV, $R = 10$ MΩ, $P = ?$

3-35 How much power is dissipated by a 5.6-kΩ resistor whose current is 9.45 mA?

3-36 How much power is dissipated by a 50-Ω load if the voltage across the load is 100 V?

3-37 How much power is dissipated by a 600-Ω load if the voltage across the load is 36 V?

3-38 How much power is dissipated by an 8-Ω load if the current in the load is 200 mA?

SECTION 3–9 POWER FORMULAS

In Probs. 3-39 to 3-51, solve for the unknowns listed.

3-39 a. $P = 250$ mW, $R = 10$ kΩ, $I = ?$
b. $P = 100$ W, $V = 120$ V, $R = ?$
c. $P = 125$ mW, $I = 20$ mA, $R = ?$
d. $P = 1$ kW, $R = 50\ \Omega$, $V = ?$

3-40 a. $P = 500\ \mu$W, $V = 10$ V, $R = ?$
b. $P = 150$ mW, $I = 25$ mA, $R = ?$
c. $P = 300$ W, $R = 100\ \Omega$, $V = ?$
d. $P = 500$ mW, $R = 3.3$ kΩ, $I = ?$

3-41 a. $P = 50$ W, $R = 40\ \Omega$, $V = ?$
b. $P = 2$ W, $R = 2$ kΩ, $V = ?$
c. $P = 50$ mW, $V = 500$ V, $I = ?$
d. $P = 50$ mW, $R = 312.5$ kΩ, $I = ?$

3-42 Calculate the maximum current that a 1-kΩ, 1-W carbon resistor can safely handle without exceeding its power rating.

3-43 Calculate the maximum current that a 22-kΩ, 1/8-W resistor can safely handle without exceeding its power rating.

3-44 What is the hot resistance of a 60-W, 120-V lightbulb?

3-45 A 50-Ω load dissipates 200 W of power. How much voltage is across the load?

3-46 Calculate the maximum voltage that a 390-Ω, 1/2-W resistor can safely handle without exceeding its power rating.

3-47 What is the resistance of a device that dissipates 1.2 kW of power when its current is 10 A?

3-48 How much current does a 960-W coffeemaker draw from the 120-V power line?

3-49 How much voltage is across a resistor if it dissipates 2 W of power when the current is 40 mA?

3-50 If a 4-Ω speaker dissipates 15 W of power, how much voltage is across the speaker?

3-51 What is the resistance of a 20-W, 12-V halogen lamp?

SECTION 3–10 CHOOSING A RESISTOR FOR A CIRCUIT

In Probs. 3-52 to 3-60, determine the required resistance and appropriate wattage rating of a carbon-film resistor for the specific requirements listed. For all problems, assume that the following wattage ratings are available: 1/8 W, 1/4 W, 1/2 W, 1 W, and 2 W. (Assume the maximum working voltage ratings listed on page 93.)

3-52 Required values of V and I are 54 V and 2 mA.

3-53 Required values of V and I are 12 V and 10 mA.

3-54 Required values of V and I are 390 V and 1 mA.

3-55 Required values of V and I are 36 V and 18 mA.

3-56 Required values of V and I are 340 V and 500 μA.