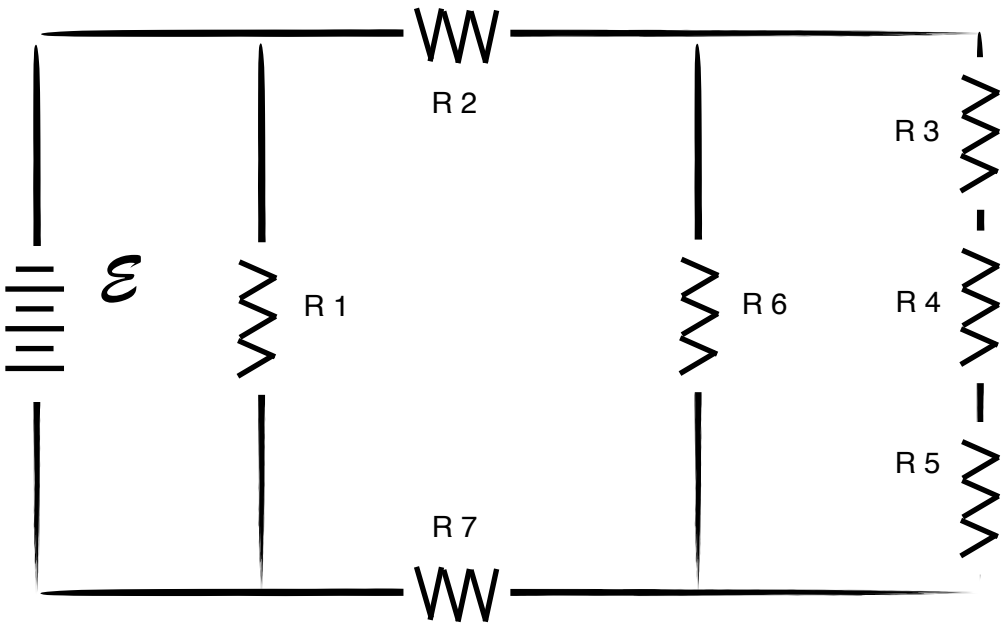
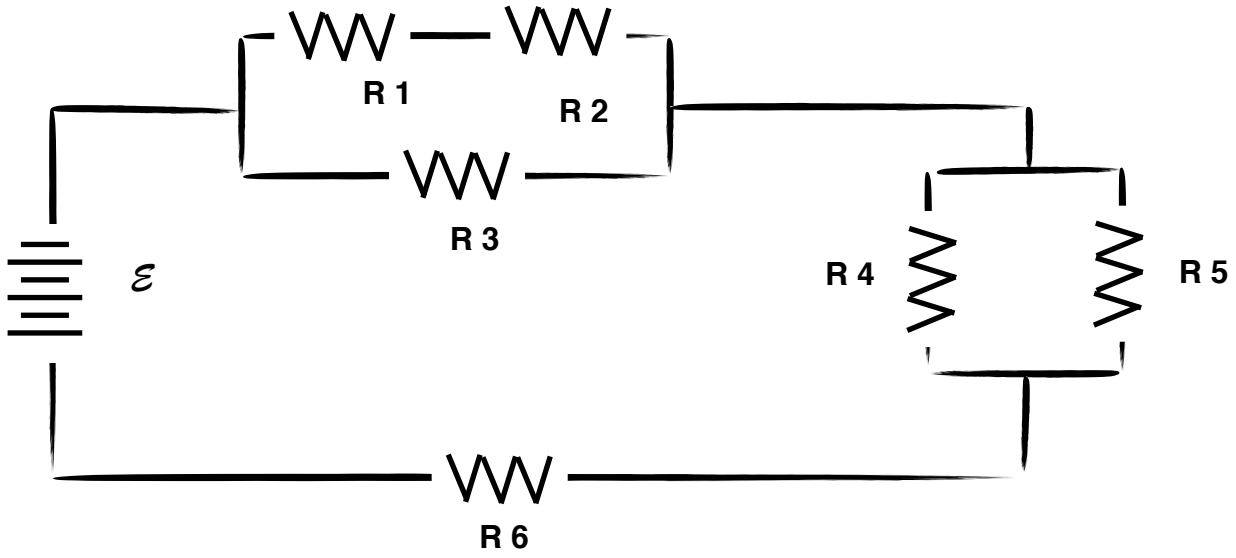
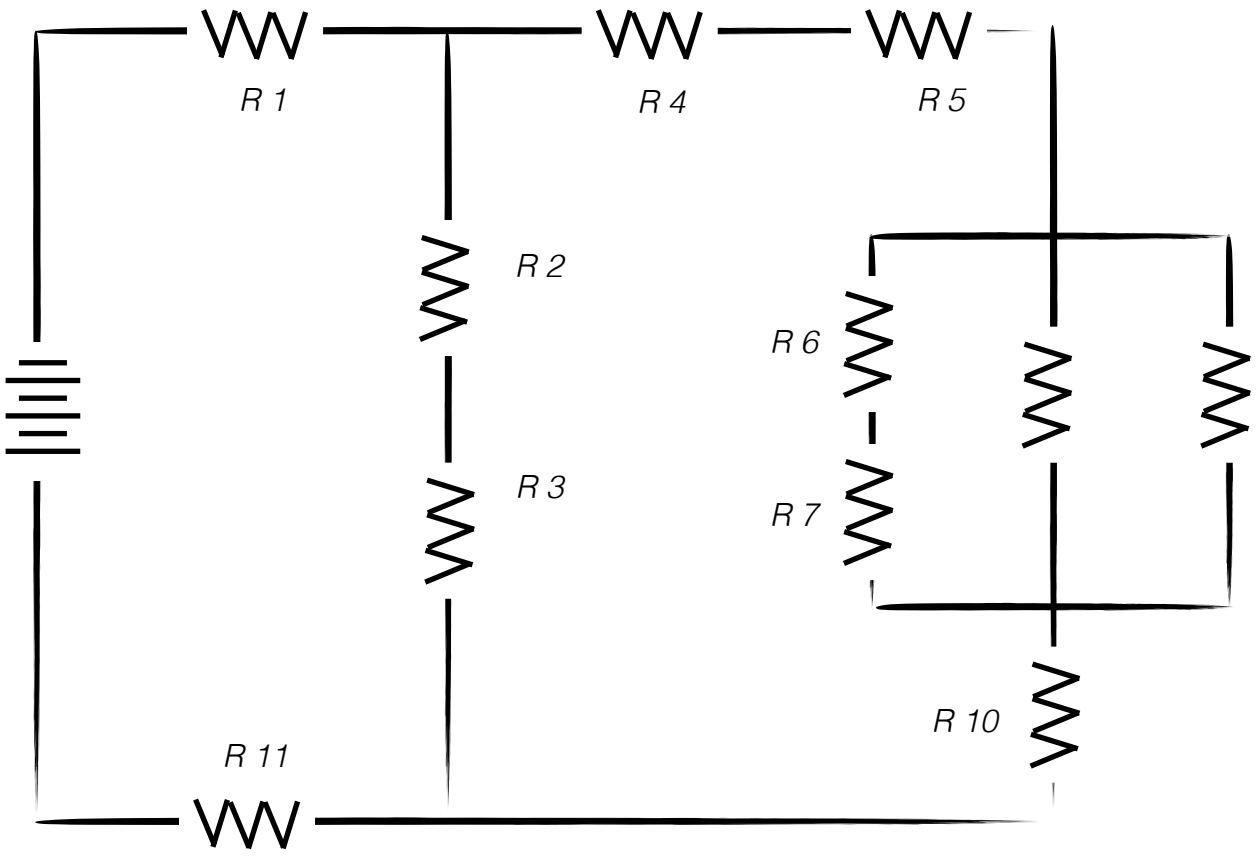


	V	I	R	P
R1			**90**	
R2			**24**	
R3			**3**	
R4			**4**	
R5			**5**	
R6			**12**	
R7			**30**	
T	**180**			

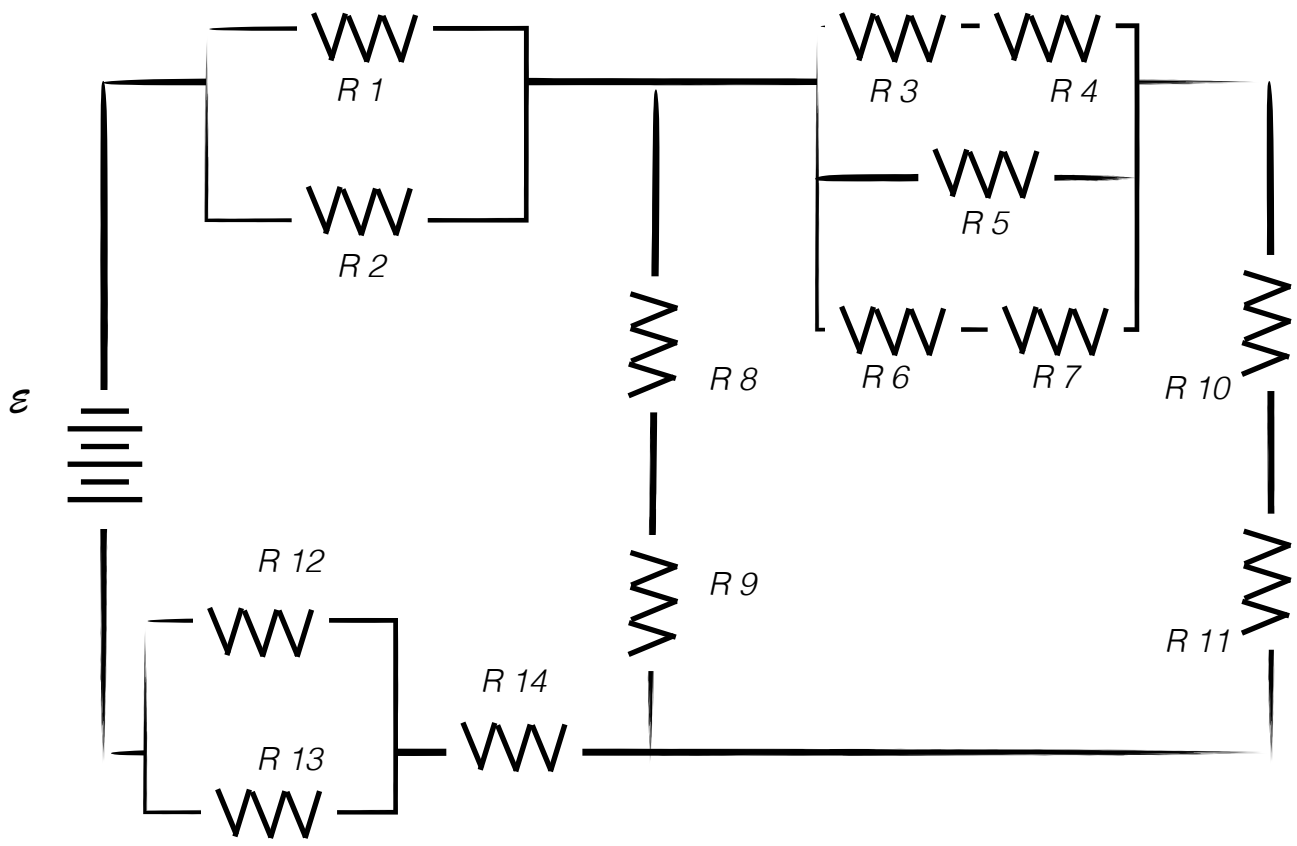


	V	I	R	P
R1			**8**	
R2			**16**	
R3			**24**	
R4			**30**	
R5			**20**	
R6			**6**	
T	**150**			

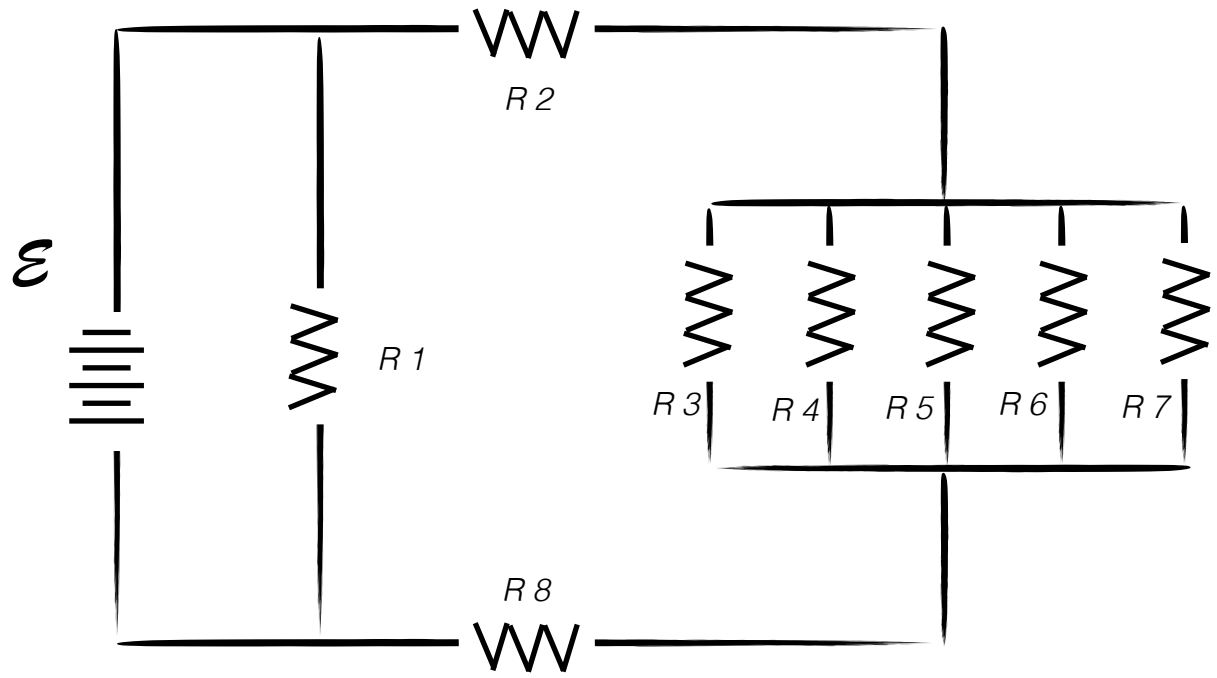


For this problem, also solve for the total energy dissipated per minute of operation

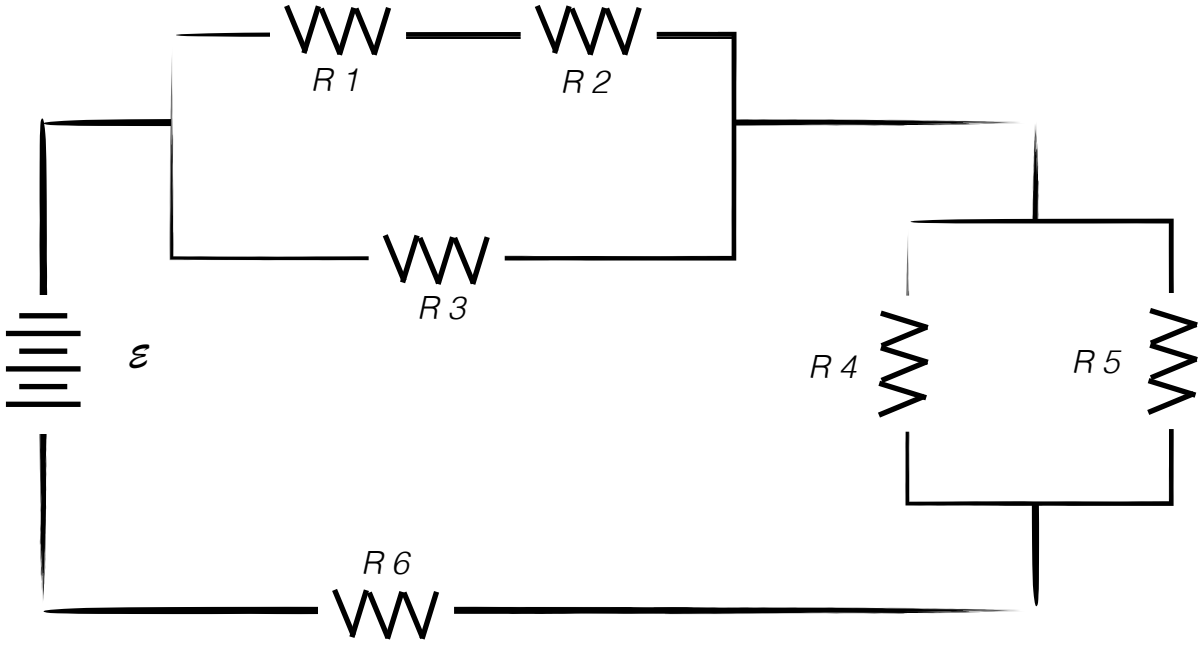
	V	I	R	P	E (60s)
R1			**25**		
R2			**15**		
R3			**45**		
R4			**5**		
R5			**7**		
R6			**10**		
R7			**20**		
R8			**30**		
R9			**30**		
R10			**8**		
R11			**15**		
T	**180**				



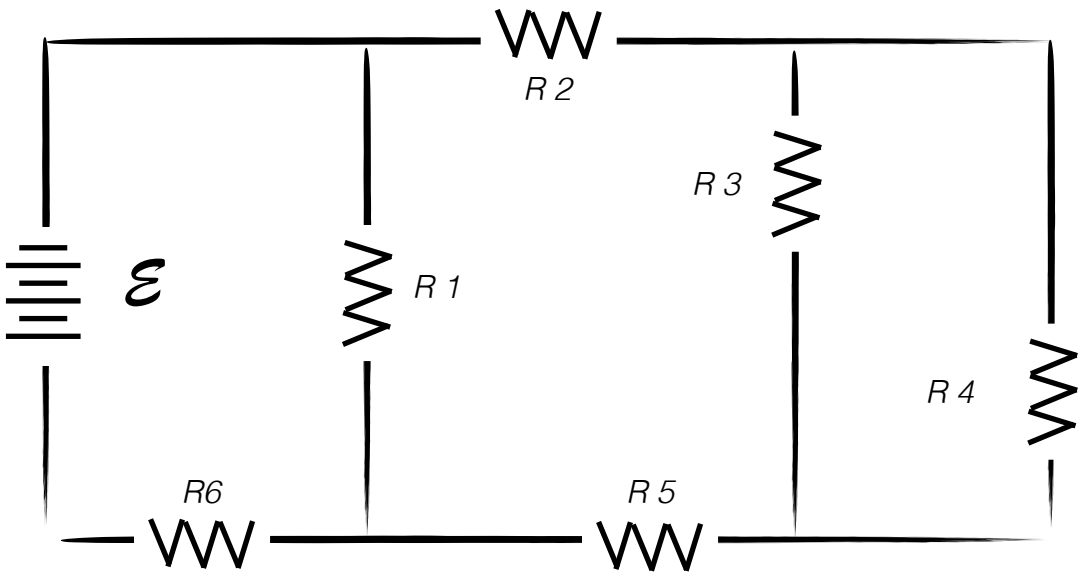
	V	I	R	P
R1			**10**	
R2			**10**	
R3			**5**	
R4			**10**	
R5			**15**	
R6			**8**	
R7			**7**	
R8			**20**	
R9			**40**	
R10			**10**	
R11			**15**	
R12			**12**	
R13			**60**	
R14			**5**	
T	**240**			



	V	I	R	P
R1		**5**		
R2	**75**			
R3			**50**	
R4		**1**		
R5	**50**			
R6		**1**		
R7			**50**	
R8		**5**		
T	**150**			



	V	I	R
R1	**3.5**		
R2			**5**
R3		**1.5**	
R4	**4.0**		
R5		**1.0**	
R6			**2**
T		**2.0**	



	V	I	R	P
R1		**8**		
R2		**2**		
R3	**10**			
R4			**10**	
R5			**9**	
R6			**0.375**	
T	**43.75**			

And, from your text;
Chapter 18; 1, 5, 7, 12, 13, 21, 26, 29, 31, 33

- ✤ 1. (I) A current of 1.30 A flows in a wire. How many electrons are flowing past any point in the wire per second?
- ✤ 5. (I) What voltage will produce 0.25 A of current through a 3800 Ω resistor?
- ✤ 7. (II) An electric clothes dryer has a heating element with a resistance of 9.6 Ω.
  - (a) What is the current in the element when it is connected to 240 V?
  - (b) How much charge passes through the element in 50 min?
- ✤ 12. (I) What is the diameter of a 1.00-m length of tungsten wire whose resistance is 0.32 Ω?
- ✤ 13. (I) What is the resistance of a 3.5-m length of copper wire1.5 mm in diameter?
- ✤ 21. (II) A rectangular solid made of carbon has sides of lengths 1.0 cm, 2.0 cm, and 4.0 cm, lying along the x, y, and z axes, respectively (Fig. 18-35). Assume the resistivity is $\rho = 3.0 \times 10^{-5}\ \Omega \cdot m$. Determine the resistance for current that passes through the solid in;
  - (a) the x direction,
  - (b) the y direction, and
  - (c) the z direction.

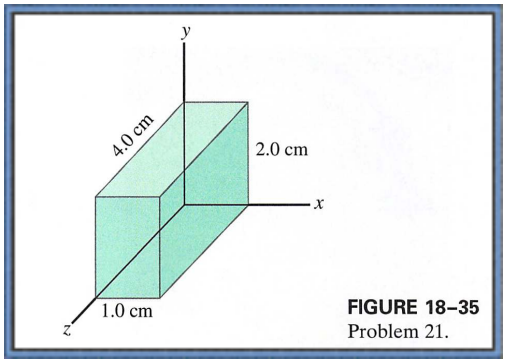


FIGURE 18–35
Problem 21.

- ✤ 26. (I) The heating element of an electric oven is designed to produce 3.3 kW of heat when connected to a 240V source. What must be the resistance of the element?
- ✤ 29. (I) (a) Determine the resistance of, and current through, a 75-W lightbulb connected to its proper source voltage of 120 V
  - (b) Repeat for a 440-W bulb.
- ✤ 31. (II) A 120-V hair dryer has two settings: 850 W and 1250 W
  - (a) At which setting do you expect the resistance to be higher?
  - After making a guess, determine the resistance at (b) the lower setting;
  - and (c) the higher setting.
- ✤ 33. (II) How many kWh of energy does a 550-W toaster use in the morning if it is in operation for a total of 15 min?
  - At a cost of 9.0 cents/kWh, estimate how much this would add to your monthly electric energy bill if you made toast four mornings per week.

Chapter 19; 5, 7, 11, 19, 25, 29

- ✤ 5. (I) Four 240 Ω lightbulbs are connected in series. What is the total resistance of the circuit? What is their resistance if they are connected in parallel?
- ✤ 7. (I) A 650-Ω and a 2200-Ω resistor are connected in series with a 12-V battery. What is the voltage across the 2200-Ω resistor?
- ✤ 11. (II) Three 240-Ω resistors can be connected together in four different ways, making combinations of series and/or parallel circuits. What are these four ways, and what is the net resistance in each case?
- ✤ 19. (III) Consider the network of resistors shown in Fig. 19-40. Answer qualitatively:
  - (a) What happens to the voltage across each resistor when the switch S is closed
  - (b) What happens to the current through each when the switch is closed?
  - (c) What happens to the power output of the battery when the switch is closed?

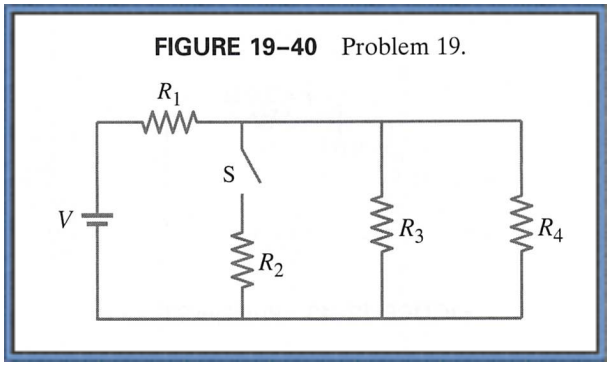


FIGURE 19–40 Problem 19.

  - (d) Let $R_1 = R_2 = R_3 = R_4 = 125\ \Omega$ and V = 22.0 V. Determine the current through each resistor before and after closing the switch. Are your qualitative predictions confirmed?

✤ 25. (II) (a) What is the potential difference between points a and d in Fig. 19-45 (same circuit as Fig. 19-13, Example 19-8)

- (b) what is the terminal voltage of each battery? (from b-d, or g-e)

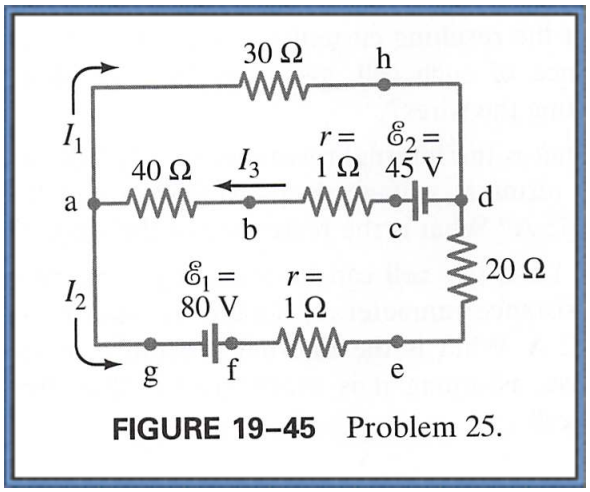


FIGURE 19–45 Problem 25.

✤ 29. (II) Determine the magnitudes and directions of the currents in each resistor shown in Fig. 19-48. The batteries have emfs; E_1 = 9.0 V and E_2 = 12.0 V and the resistors have values; R_1 = 25Ω, R_2 = 18Ω, and R_3 = 35Ω.

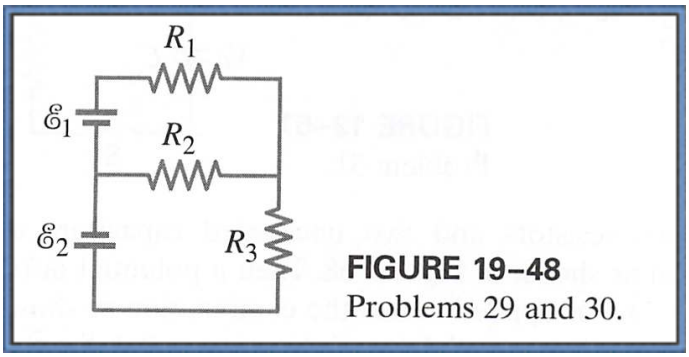


FIGURE 19–48
Problems 29 and 30.

And, from your text;
Chapter 18; 1, 5, 7, 12, 13, 21, 26, 29, 31, 33

- 1. (I) A current of 1.30 A flows in a wire. How many electrons are flowing past any point in the wire per second? **8.13e18 electrons/s**
- 5. (I) What voltage will produce 0.25 A of current through a 3800 Ω resistor? **950 V**
- 7. (II) An electric clothes dryer has a heating element with a resistance of 9.6 Ω.
  - (a) What is the current in the element when it is connected to 240 V? **25 A**
  - (b) How much charge passes through the element in 50 min? **7.5e4C**
- 12. (I) What is the diameter of a 1.00-m length of tungsten wire whose resistance is 0.32 Ω? **4.7e-4 m**
- 13. (I) What is the resistance of a 3.5-m length of copper wire1.5 mm in diameter? **3.3e-2 Ω**
- 21. (II) A rectangular solid made of carbon has sides of lengths 1.0 cm, 2.0 cm, and 4.0 cm, lying along the x, y, and z axes, respectively (Fig. 18-35). Assume the resistivity is $\rho = 3.0 \times 10^{-5}\ \Omega \cdot m$. Determine the resistance for current that passes through the solid in;
  - (a) the x direction, **3.8e-4 Ω**
  - (b) the y direction, **1.5e-3 Ω**
  - (c) the z direction **6.0e-3 Ω**

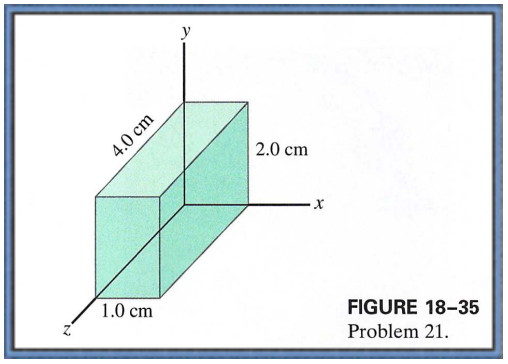


FIGURE 18–35
Problem 21.

- 26. (I) The heating element of an electric oven is designed to produce 3.3 kW of heat when connected to a 240V source. What must be the resistance of the element? **17 Ω**
- 29. (I) (a) Determine the resistance of, and current through, a 75-W lightbulb connected to its proper source voltage of 120 V **190Ω 0.63A**
  - (b) Repeat for a 440-W bulb. **33 Ω 3.7A**
- 31. (II) A 120-V hair dryer has two settings: 850 W and 1250 W
  - (a) At which setting do you expect the resistance to be higher?
  - After making a guess, determine the resistance at (b) the lower setting;
  - and (c) the higher setting. **850 W - 17 Ω 1250 W - 12 Ω**
- 33. (II) How many kWh of energy does a 550-W toaster use in the morning if it is in operation for a total of 15 min? **0.14 kWh**
  - At a cost of 9.0 cents/kWh, estimate how much this would add to your monthly electric energy bill if you made toast four mornings per week.

Chapter 19; 5, 7, 11, 19, 25, 29

- 5. (I) Four 240 Ω lightbulbs are connected in series. What is the total resistance of the circuit? What is their resistance if they are connected in parallel? **960 Ω 60 Ω**
- 7. (I) A 650-Ω and a 2200-Ω resistor are connected in series with a 12-V battery. What is the voltage across the 2200-Ω resistor? **9.3V**
- 11. (II) Three 240-Ω resistors can be connected together in four different ways, making combinations of series and/or parallel circuits. What are these four ways, and what is the net resistance in each case?
- 19. (III) Consider the network of resistors shown in Fig. 19-40. Answer qualitatively:
  - (a) What happens to the voltage across each resistor when the switch S is closed
  - (b) What happens to the current through each when the switch is closed?
  - (c) What happens to the power output of the battery when the switch is closed?

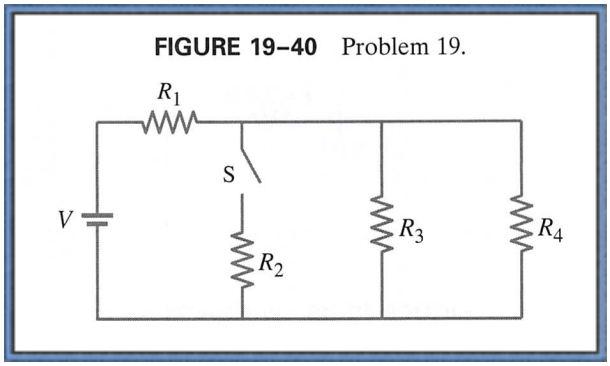


FIGURE 19–40 Problem 19.

  - (d) Let $R_1 = R_2 = R_3 = R_4 = 125\ \Omega$ and V = 22.0 V. Determine the current through each resistor before and after closing the switch. Are your qualitative predictions confirmed?

✤ 25. (II) (a) What is the potential difference between points a and d in Fig. 19-45 (same circuit as Fig. 19-13, Example 19-8)

- (b) what is the terminal voltage of each battery? (from b-d, or g-e)

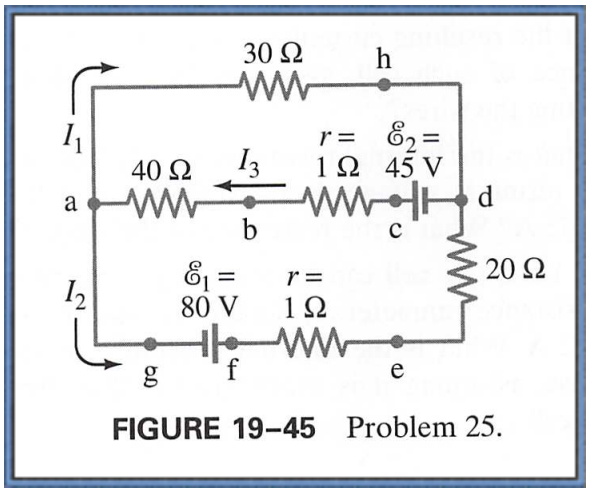


FIGURE 19–45 Problem 25.

✤ 29. (II) Determine the magnitudes and directions of the currents in each resistor shown in Fig. 19-48. The batteries have emfs; E_1 = 9.0 V and E_2 = 12.0 V and the resistors have values; R_1 = 25Ω, R_2 = 18Ω, and R_3 = 35Ω.

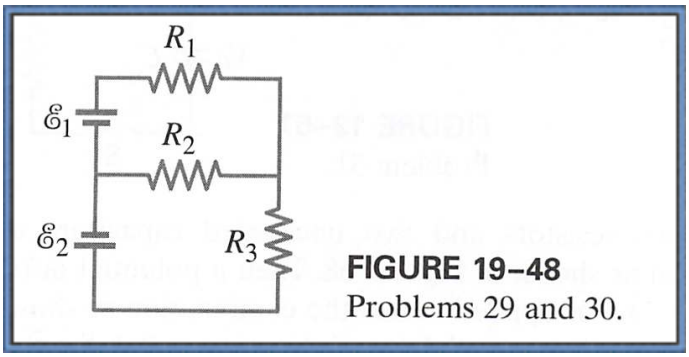


FIGURE 19–48
Problems 29 and 30.