Honors Physics Electric Circuits HW, part 2 (Homework)

1.
A 9.90-V battery delivers 106 mA when connected to a 61.0-Ω load. Determine the internal resistance of the battery.

2.
An 15 Ω resistor and a 9.0 Ω resistor are connected in series across an 15 V battery.
(a) Find the current through each resistor and the voltage drop across each resistor.
Currents
Voltage Drops
(b) Repeat part (a) for the situation in which the resistors are connected in parallel across the 15 V battery.
Currents
Voltage Drops

3.
A 9.3-Ω resistor and a 5.6-Ω resistor are connected in series with a power supply.
(a) The voltage drop across the 5.6-Ω resistor is measured to be 10 V. Find the voltage output of the power supply.
(b) The two resistors are connected in parallel across a power supply, and the current through the 9.3-Ω resistor is found to be 0.25 A. Find the voltage setting of the power supply.

4.
What is the equivalent resistance of the combination between points *a* and *b* in Figure P18.7? Note that one end of the vertical resistor is left free.
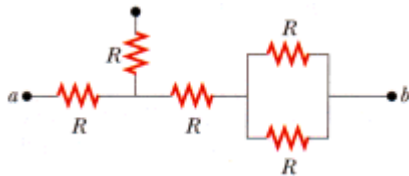

Figure P18.7.

5.

(a) Find the equivalent resistance of the circuit in Figure P18.9.
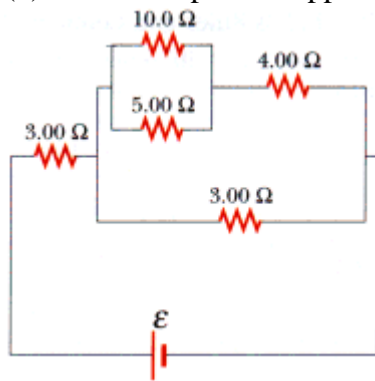(b) If the total power supplied to the circuit is 3.00 W, find the emf of the battery.

Figure P18.9.

6.
The resistance between terminals a and b in Figure P18.13 is 85 Ω. If the resistors labeled R have the same value, determine R.
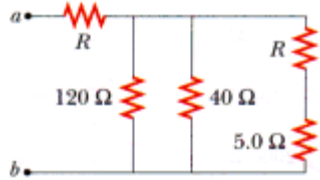

Figure P18.13

7.
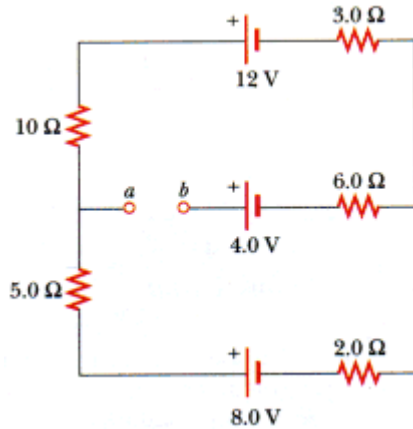Determine the potential difference, ΔV_{ab}, for the circuit in Figure P18.15.

Figure P18.15.

8.
In the circuit of Figure P18.17, the current I_1 is 3 A while the values of $\mathcal{E}$ and R are unknown. What are the currents I_2 and I_3?
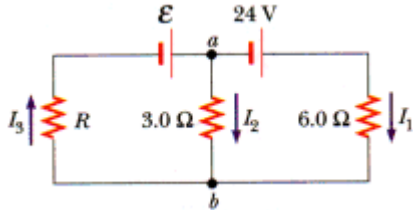

Figure P18.17.

9.

In the circuit shown in Figure P18.17, the current I_1 is 3 A and $R = 15\ \Omega$. What is the emf, $\mathcal{E}$, of the unknown battery?
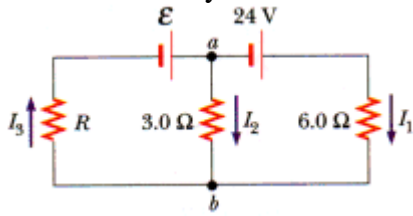

Figure P18.17

10.

Two 1.70-V batteries--with their positive terminals in the same direction--are inserted in series into the barrel of a flashlight. One battery has an internal resistance of $0.290\ \Omega$, the other an internal resistance of $0.159\ \Omega$. When the switch is closed, a current of 0.600 A passes through the lamp. (See the note in Problem 8.)

(a) What is the lamp's resistance?

(b) What fraction of the power dissipated is dissipated in the batteries?

11.

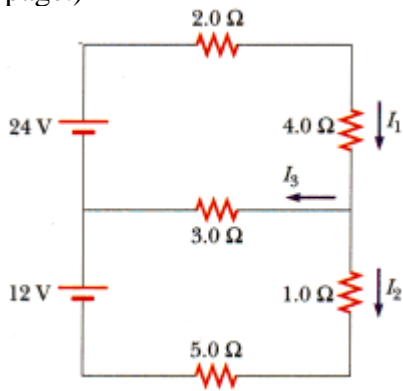Calculate each of the unknown currents I_1, I_2, and I_3 for the circuit of Figure P18.23. (Figure next page.)

Figure P18.23.