**Chapter 28. Direct-Current Circuits**

St. ID: , Name:

1. Calculate the power delivered to each resistor in the circuit shown in Figure P27.13.

Ans: P1= 4.00W, P2=14.2W, P3=1.33W, P4=28.4W

**Figure P27.13**

1. Four resistors are connected to a battery as shown in Figure P27.15. (a) Determine the potential difference across each resistor in terms of ε. (b) Determine the current in each resistor in terms of *I.* (c) **What If?** If *R*3 is increased, explain what happens to the current in each of the resistors. (d) In the limit that *R*3→∞, what are the new values of the current in each resistor in terms of *I*, the original current in the battery?

Ans: (a) ∆V1= ***ε***/3, ∆V2= 2***ε***/9, ∆V3= 4***ε***/9, ∆V4= 2***ε***/3

(b) I1=I, I2=I/3, I3=I/3, I4=2I/3

(c) I1 increases andI1, I2,and I3 decrease

(d) I1=3I/4, I2=0, I3=0, I4=3I/4

**Figure P27.15**

1. The resistance between terminals *a* and *b* in Figure P27.36 is 75.0 V. If the resistors labeled *R* have the same value, determine *R.*

Ans: R=55.0Ω

**Figure P27.36**

1. A power supply has an open-circuit voltage of 40.0 V and an internal resistance of 2.00 V. It is used to charge two storage batteries connected in series, each having an emf of 6.00 V and internal resistance of 0.300 V. If the charging current is to be 4.00 A, (a) what additional resistance should be added in series? At what rate does the internal energy increase in (b) the supply, (c) in the batteries, and (d) in the added series resistance? (e) At what rate does the chemical energy increase in the batteries?

Ans: (a) R=4.40Ω (b) P=32.0W (c) P=9.60W (d) P=9.60W (e) P=48.0W