Problem 26.61. Calculate the three currents $I_1$, $I_2$, and $I_3$ indicated in the circuit diagram shown in Fig. 26.65.

Problem 26.86. An R-C circuit has a time constant $RC$. (a) If the circuit is discharging, how long will it take for its stored energy to be reduced to $1/e$ of its initial value? (b) If it is charging, how long will it take for the stored energy to reach $1/e$ of its maximum value?

Problem 26.91. As shown in Fig. 26.83, a network of resistors of resistances $R_1$ and $R_2$ extends to infinity toward the right. Prove that the total resistance $R_T$ of the infinite network is equal to

$$R_T = R_1 + \sqrt{R_1^2 + 2R_1R_2}$$

(Hint: Since the network is infinite, the resistance of the network to the right of points c and d is also equal to $R_T$.)

Problem 27.22. In an experiment with cosmic rays, a vertical beam of particles that have charge of magnitude $3e$ and mass $12$ times the proton mass enters a uniform horizontal magnetic field of $0.250$ T and is bent in a semicircle of diameter $95.0$ cm, as shown in Fig. 27.47. (a) Find the speed of the particles and the sign of their charge. (b) Is it reasonable to ignore the gravity force on the particles? (c) How does the speed of the particles as they enter the field compare to their speed as they exit the field?

Problem 27.30. A particle with initial velocity $v_0 = 5.85 \cdot 10^3 \text{ m/s} \hat{j}$ enters a region of uniform electric and magnetic fields. The magnetic field in the region is $B = -(1.35 \ T) \hat{k}$. Calculate the magnitude and direction of the electric field in the region if the particle is to pass through undeflected, for a particle of charge (a) $+0.640 \text{ nC}$ and (b) $-0.640 \text{ nC}$. You can ignore the weight of the particle.

Problem 27.35. A long wire carrying $4.50 A$ of current makes two $90^\circ$ bends, as shown in Fig. 27.49. The bent part of the wire passes through a uniform $0.240 \ T$ magnetic field directed as shown in the figure and confined to a limited region of space. Find the magnitude and direction of the force that the magnetic field exerts on the wire.