

CH22

12. | The currents through several segments of a wire object are shown in **Figure P22.12**. What are the magnitudes and directions of the currents I_B and I_C in segments B and C?

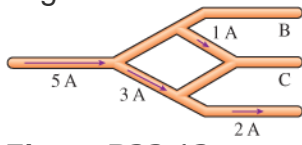


Figure P22.12

40. ||| An electric eel develops a potential difference of 450 V, driving a current of 0.80 A for a 1.0 ms pulse. For this pulse, find (a) the power, (b) the total energy, and (c) the total charge that flows.

46. ||| The hot dog cooker described in the chapter heats hot dogs by connecting them to 120 V household electricity. A typical hot dog has a mass of 60 g and a resistance of 150 Ω . How long will it take for the cooker to raise the temperature of the hot dog from 20°C to 80°C? The specific heat of a hot dog is approximately 2500 J/kg · K.

48. || The biochemistry that takes place inside cells depends on various elements, such as sodium, potassium, and calcium, that are dissolved in water as ions. These ions enter cells through narrow pores in the cell membrane known as *ion channels*. Each ion channel, which is formed from a specialized protein molecule, is selective for one type of ion. Measurements with microelectrodes have shown that a 0.30-nm-diameter potassium ion (K^+) channel carries a current of 1.8 pA. How many potassium ions pass through if the ion channel opens for 1.0 ms?