Chapter 26 – Current and Resistance

1. During the 4.0 min a 5.0 A current is set up in a wire, how many (a) coulombs and (b) electrons pass through any cross section across the wire's width?

2. A charged belt, 50 cm wide, travels at 30 m/sec between a source of charge and a sphere. The belt carries hared into the sphere at a rate corresponding to 100 μA. Compute the surface charge density on the belt.

21. A wire with a resistance of 6.0Ω is drawn out through a die so that its new length is three times its original length. Find the resistance of the longer wire, assuming that the resistivity and density of the material are unchanged.

43. A 100W light bulb is plugged into a standard 120 V outlet. (a) How much does it cost per 31-day month to leave the light turned on continuously? Assume electrical energy costs US$0.06/kW•hr. (b) What is the resistance of the bulb? (c) What is the current in the bulb?

79. (a) At what temperature would the resistance of a copper conductor be double its resistance at 20.0 ^{0}C? (Use 20.0 ^{0}C as the reference point in the equation of $\rho - \rho_0 = \rho_0\alpha(T - T_0)$; compare your answer with the Fig. 26-10.) (b) Does this same "doubling temperature" hold for all copper conductors, regardless of shape of size?

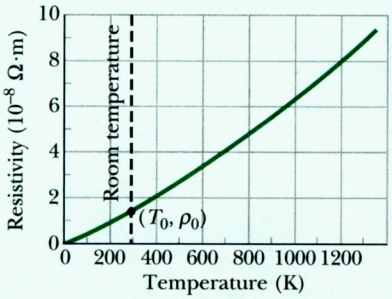

Fig. 26-10 The resistivity of copper as a function of temperature. The dot on the curve marks a convenient reference point at temperature $T_0 = 293$ K and resistivity $\rho_0 = 1.69 \times 10^{-8}\ \Omega \cdot$ m.