$$= \left(0.6 \text{ x } 10^{-8}\right) - (-150)\ \frac{\left[\left(0.6 \text{ x } 10^{-8}\right) - \left(1.25 \text{ x } 10^{-8}\right)\right](\Omega\text{ - m})}{-150°\text{C} - (-50°\text{C})}$$

$$= 1.58 \text{ x } 10^{-8}\ (\Omega\text{-m})$$

(b) For this part of the problem, we want to calculate *A* from Equation 18.11

$$\rho_i = Ac_i\,(1 - c_i)$$

In Figure 18.8, curves are plotted for three c_i values (0.0112, 0.0216, and 0.0332). Let us find *A* for each of these c_i's by taking a ρ_{total} from each curve at some temperature (say 0°C) and then subtracting out ρ_i for pure copper at this same temperature (which is 1.7 x 10^{-8} Ω-m). Below is tabulated values of *A* determined from these three c_i values, and other data that were used in the computations.

c_i	$1 - c_i$	ρ_{total} (Ω-m)	ρ_i (Ω-m)	*A* (Ω-m)
0.0112	0.989	3.0 x 10^{-8}	1.3 x 10^{-8}	1.17 x 10^{-6}
0.0216	0.978	4.2 x 10^{-8}	2.5 x 10^{-8}	1.18 x 10^{-6}
0.0332	0.967	5.5 x 10^{-8}	3.8 x 10^{-8}	1.18 x 10^{-6}

The average of these three *A* values is 1.18 x 10^{-6} (Ω-m).

(c) We use the results of parts (a) and (b) to estimate the electrical resistivity of copper containing 2.50 at% Ni (c_i = 0.025) at120°C. The total resistivity is just

$$\rho_{total} = \rho_t + \rho_i$$

Or incorporating the expressions for ρ_t and ρ_i from Equations 18.10 and 18.11, and the values of ρ_0, *a*, and *A* determined above, leads to

$$\rho_{total} = (\rho_0 + aT) + Ac_i\,(1 - c_i)$$

$$= \left\{1.58 \text{ x } 10^{-8}\ (\Omega\text{ - m}) + \left[6.5 \text{ x } 10^{-11}\ (\Omega\text{ - m})/°\text{C}\right](120°\text{C})\right\}$$
$$+ \left\{\left[1.18 \text{ x } 10^{-6}\ (\Omega\text{ - m})\right](0.0250)\,(1 - 0.0250)\right\}$$

$$= 5.24 \text{ x } 10^{-8}\ (\Omega\text{-m})$$