



SN: _____, Name: _____

P27.21 (a) $\rho = \rho_0 [1 + \alpha(T - T_0)] = (2.82 \times 10^{-8} \Omega \cdot \text{m}) [1 + 3.90 \times 10^{-3} (30.0^\circ)] = \boxed{3.15 \times 10^{-8} \Omega \cdot \text{m}}$

(b) $J = \frac{E}{\rho} = \frac{0.200 \text{ V/m}}{3.15 \times 10^{-8} \Omega \cdot \text{m}} = \boxed{6.35 \times 10^6 \text{ A/m}^2}$

(c) $I = JA = J \left(\frac{\pi d^2}{4} \right) = (6.35 \times 10^6 \text{ A/m}^2) \left[\frac{\pi (1.00 \times 10^{-4} \text{ m})^2}{4} \right] = \boxed{49.9 \text{ mA}}$

(d) $n = \frac{6.02 \times 10^{23} \text{ electrons}}{[26.98 \text{ g} / (2.70 \times 10^6 \text{ g/m}^3)]} = 6.02 \times 10^{28} \text{ electrons/m}^3$

$v_d = \frac{J}{ne} = \frac{(6.35 \times 10^6 \text{ A/m}^2)}{(6.02 \times 10^{28} \text{ electrons/m}^3)(1.60 \times 10^{-19} \text{ C})} = \boxed{659 \text{ } \mu\text{m/s}}$

(e) $\Delta V = E\ell = (0.200 \text{ V/m})(2.00 \text{ m}) = \boxed{0.400 \text{ V}}$

P29.39 $B = \frac{nqt(\Delta V_H)}{I} = \frac{(8.46 \times 10^{28} \text{ m}^{-3})(1.60 \times 10^{-19} \text{ C})(5.00 \times 10^{-3} \text{ m})(5.10 \times 10^{-12} \text{ V})}{8.00 \text{ A}}$

$B = 4.31 \times 10^{-5} \text{ T} = \boxed{43.1 \mu\text{T}}$