16. (a) $i = V/R = 23.0 \text{ V}/15.0 \times 10^{-3} \ \Omega = 1.53 \times 10^3 \text{ A}$.

(b) The cross-sectional area is $A = \pi r^2 = \frac{1}{4}\pi D^2$. Thus, the magnitude of the current density vector is

$$J = \frac{i}{A} = \frac{4i}{\pi D^2} = \frac{4(1.53 \times 10^{-3} \text{ A})}{\pi(6.00 \times 10^{-3} \text{ m})^2} = 5.41 \times 10^7 \text{ A}/\text{m}^2.$$

(c) The resistivity is

$$\rho = RA/L = (15.0 \times 10^{-3}\Omega)(\pi)(6.00 \times 10^3 \text{ m})^2/[4(4.00 \text{ m})] = 10.6 \times 10^{-8} \ \Omega \cdot \text{m}.$$

(d) The material is platinum.