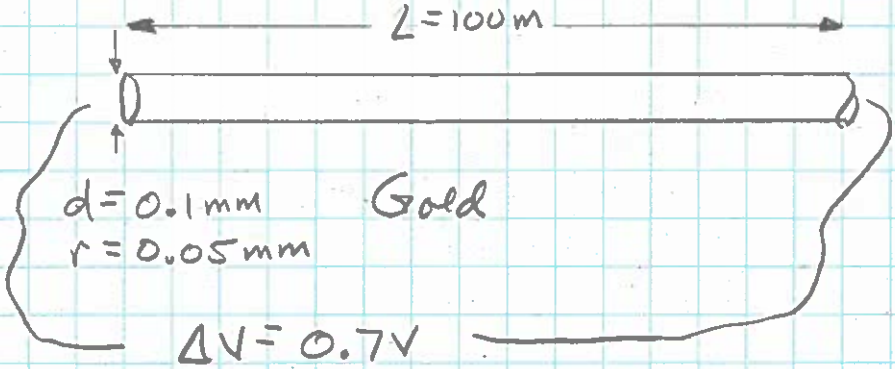

Resistance: $R = \frac{\rho L}{A} = \frac{\rho L}{\pi r^2}$

for Gold, $\rho = 2.44 \times 10^{-8}\ \Omega \cdot m$

So, $R = 305.6\ \Omega$

Now:

$$I = \frac{1}{R}\Delta V = 0.00229\ A$$

$$= 2.29\ mA$$