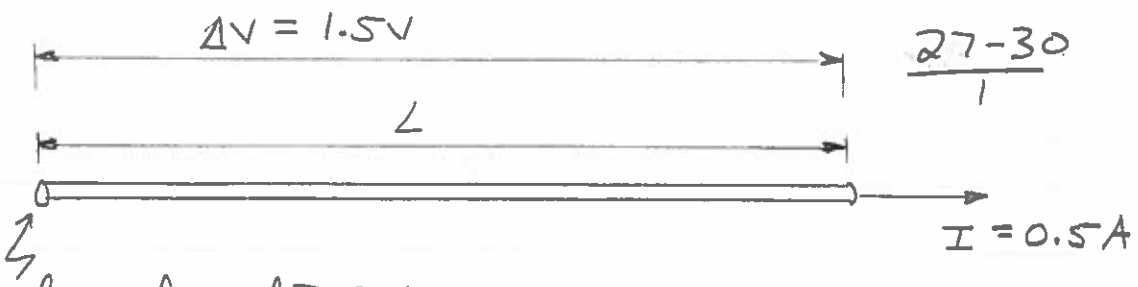

27-30
1

$$I = \frac{\Delta V}{R}$$

and

$$R = \frac{\rho L}{A} = \frac{\rho L}{\pi (\frac{d}{2})^2}$$

where $\rho = 2.6 \times 10^{-8}\ \Omega \cdot m$

So:

$$I = \frac{\Delta V \, \pi (d/2)^2}{\rho L}$$

and,

$$L = \frac{\Delta V \pi d^2}{4 \rho I} = 30.29\ m$$

b.) $R = \frac{\rho L}{A} \Rightarrow L \to \frac{L}{2} \Rightarrow R \to \frac{R}{2}$

and

$$I = \frac{\Delta V}{R} \Rightarrow \underline{I \to 2I}$$

i.e. increases by factor of 2

or,

$$\underline{I = 1.0A}$$