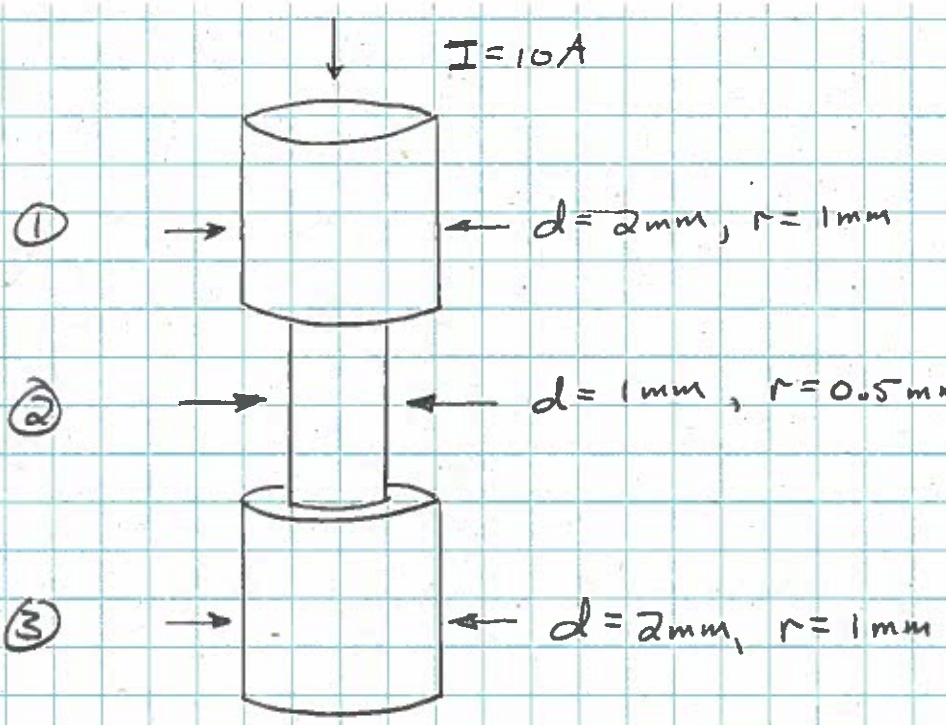

a.) Cons. of Current $\Rightarrow I_1 = I_2 = I_3 = 10\ A$

b.) $J = I/A = I/\pi r^2$

$J_1 = J_3 = 3.183 \times 10^6 \frac{A}{m^2}$; $J_2 = 1.273 \times 10^7 \frac{A}{m}$

c.) $J = \sigma E$ $\quad \sigma = 3.5 \times 10^7\ \Omega^{-1} m^{-1}$ for Al.

$E_1 = E_3 = \frac{J_1}{\sigma} = 0.0909\ V/m$

$E_2 = \frac{J_2}{\sigma} = 0.3637\ V/m$

d.) $J = n_e e v_d \Rightarrow v_d = \frac{J}{n_e e}$ $\quad n_e = 18 \times 10^{28}\ m^{-3}$ for Al

$v_{d_1} = v_{d_3} = 1.105 \times 10^{-4}\ m/s$

$v_{d_2} = 4.420 \times 10^{-4}\ m/s$

e.) $I = \dot{\gamma} e \Rightarrow \dot{\gamma} = \frac{I}{e} = 6.25 \times 10^{19}\ s^{-1}$

for all section.