Current, Resistance

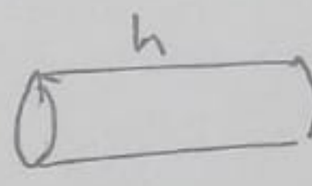
① $R = \rho \frac{l}{A}$ $l \rightarrow$ length, $A \rightarrow$ area, $\rho \rightarrow$ resistivity

② $i = \frac{Q}{t}$ $i \rightarrow$ current, t - time, $Q \rightarrow$ amount of charge

③ $R = \rho \frac{l}{A}$ for stretching l increases and diameter decreases

$l / \pi (d/2)^2$

④ $R_A = \rho \frac{l_A}{A_A}$; $R_B = \rho \frac{l_B}{A_B}$



$\pi r^2 h = $ volume.

$r_A^2 h_A = r_B^2 h_B$

Since same volume, $l / \pi r^2$ ratio same.

⑤ $i = nqv_d A$ $v_d = \frac{i}{nqA}$

⑥ Power, $= IV$

⑦ $\mathcal{E} = IR - Ir$; $P = I\mathcal{E}$

⑧, ⑨, ⑩ follow the lecture slides / text book

⑪ $q = q_0 e^{-t/\tau_c} \rightarrow$ discharging capacitor.

$q = \frac{2}{3} q_0$

⑫ Energy in capacitor, $U = \frac{q^2}{2C}$; now, $q = q_0 e^{-t/\tau_c}$

$U(t) = U_0 e^{-2t/\tau_c} \rightarrow U = 0.9 U_0$