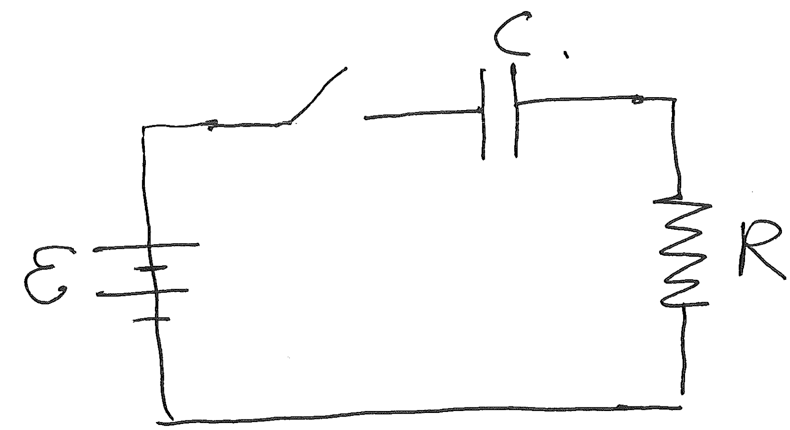


$$Q = Q_\infty\left(1 - e^{-t/RC}\right)$$

$$= C\mathcal{E}\left(1 - e^{-t/RC}\right).$$

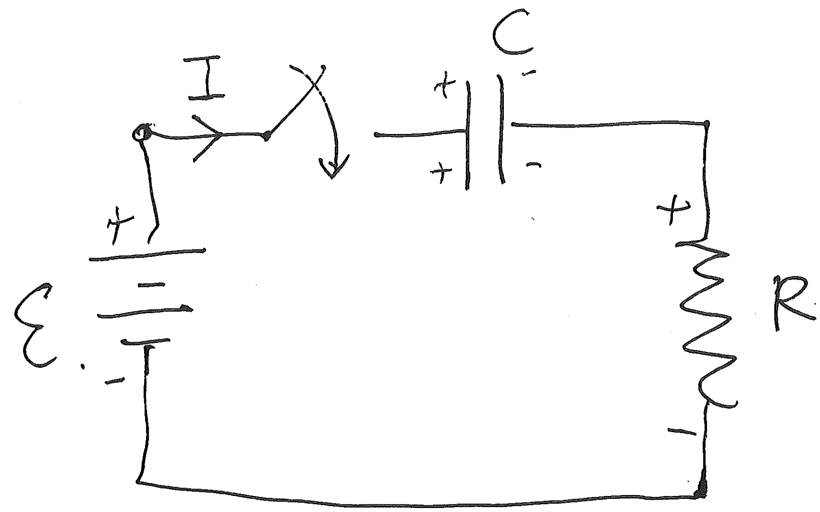
$$I = \frac{dQ}{dt} = \cancel{C\mathcal{E}} \; C\mathcal{E}\left(\frac{+1}{RC}\right) e^{-t/RC}.$$

$$= \frac{\mathcal{E}}{R} e^{-t/RC}.$$

$$I = I_0 e^{-t/RC} = \frac{\mathcal{E}}{R} e^{-t/RC}.$$

Power dissipated in R $= I^2 R = \left(\frac{\mathcal{E}}{R} e^{-t/RC}\right)^2 \cdot R.$

$$= \frac{\mathcal{E}^2}{R} e^{-2t/RC}$$



$$-\frac{Q}{C} - IR + \mathcal{E} = 0.$$

$$\boxed{I = +\frac{dQ}{dt}}$$ ← Sign of I and dQ.

$$-\frac{Q}{C} - R\frac{dQ}{dt} + \mathcal{E} = 0.$$

$$\Rightarrow \quad R\frac{dQ}{dt} = \mathcal{E} - \frac{Q}{C}$$

$$\Rightarrow \quad R\frac{dQ}{dt} = \frac{\mathcal{E}C - Q}{C}.$$

$$\Rightarrow \quad RC\,dQ = (\mathcal{E}C - Q)\,dt$$

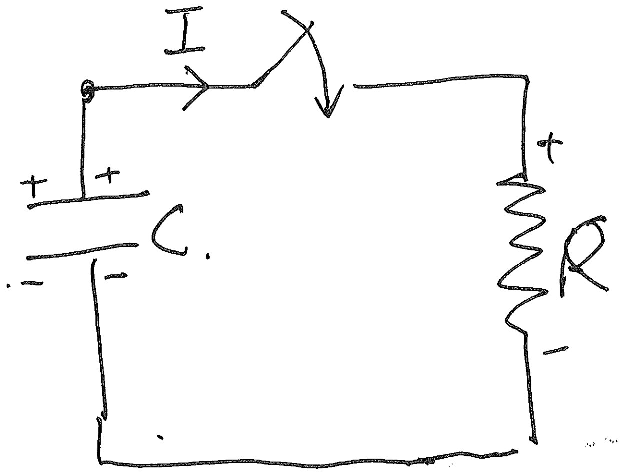
$$\Rightarrow \int \frac{dQ}{\mathcal{E}C - Q} = \int \frac{dt}{RC}.$$

$$\Rightarrow -\ln(\mathcal{E}C - Q) = \frac{t}{RC}$$

Use initial condition $Q = 0$ at $t = 0$.

Ans: $Q = C\mathcal{E}\left(1 - e^{-t/RC}\right).$

$Q = Q_0$ at $t=0$

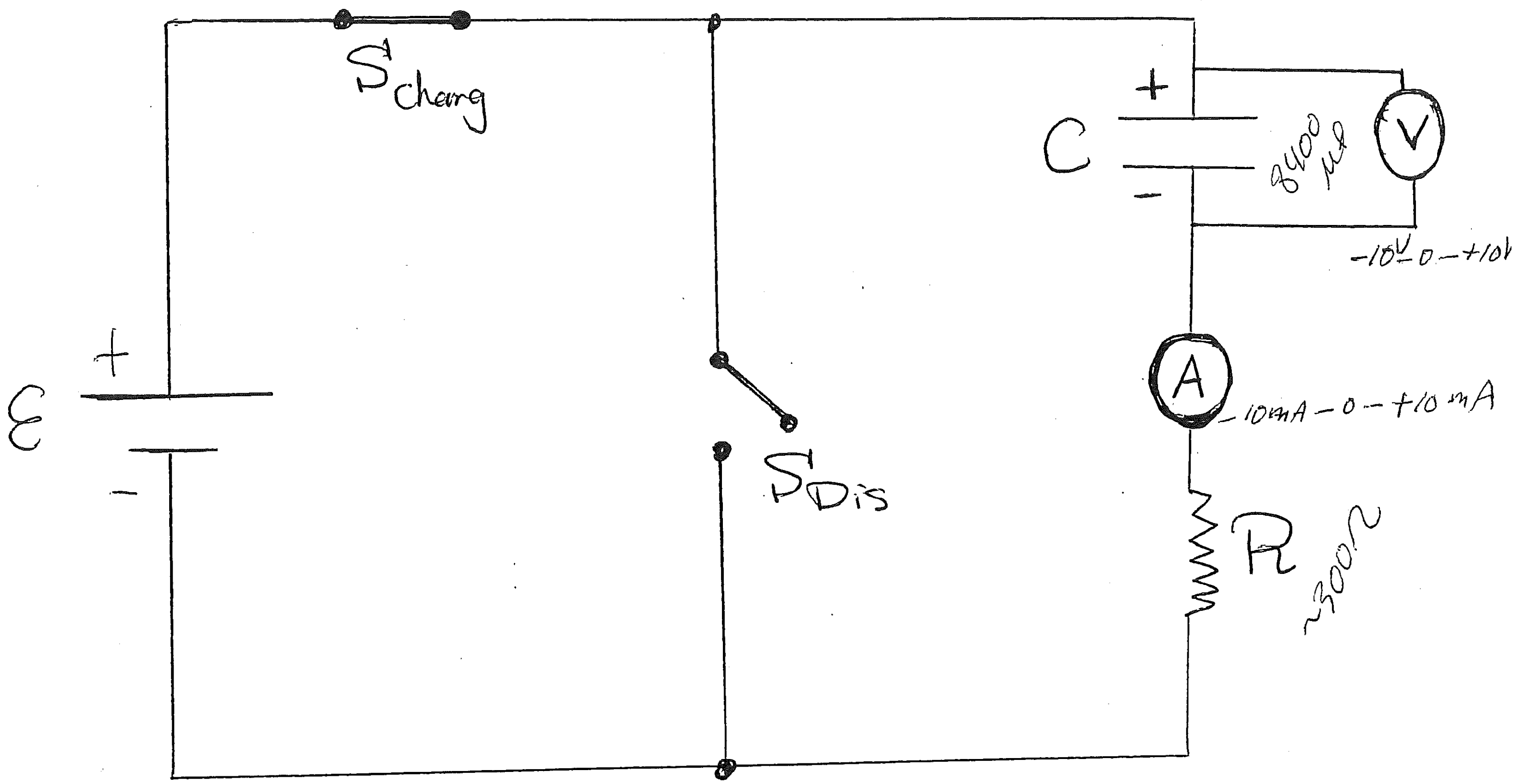


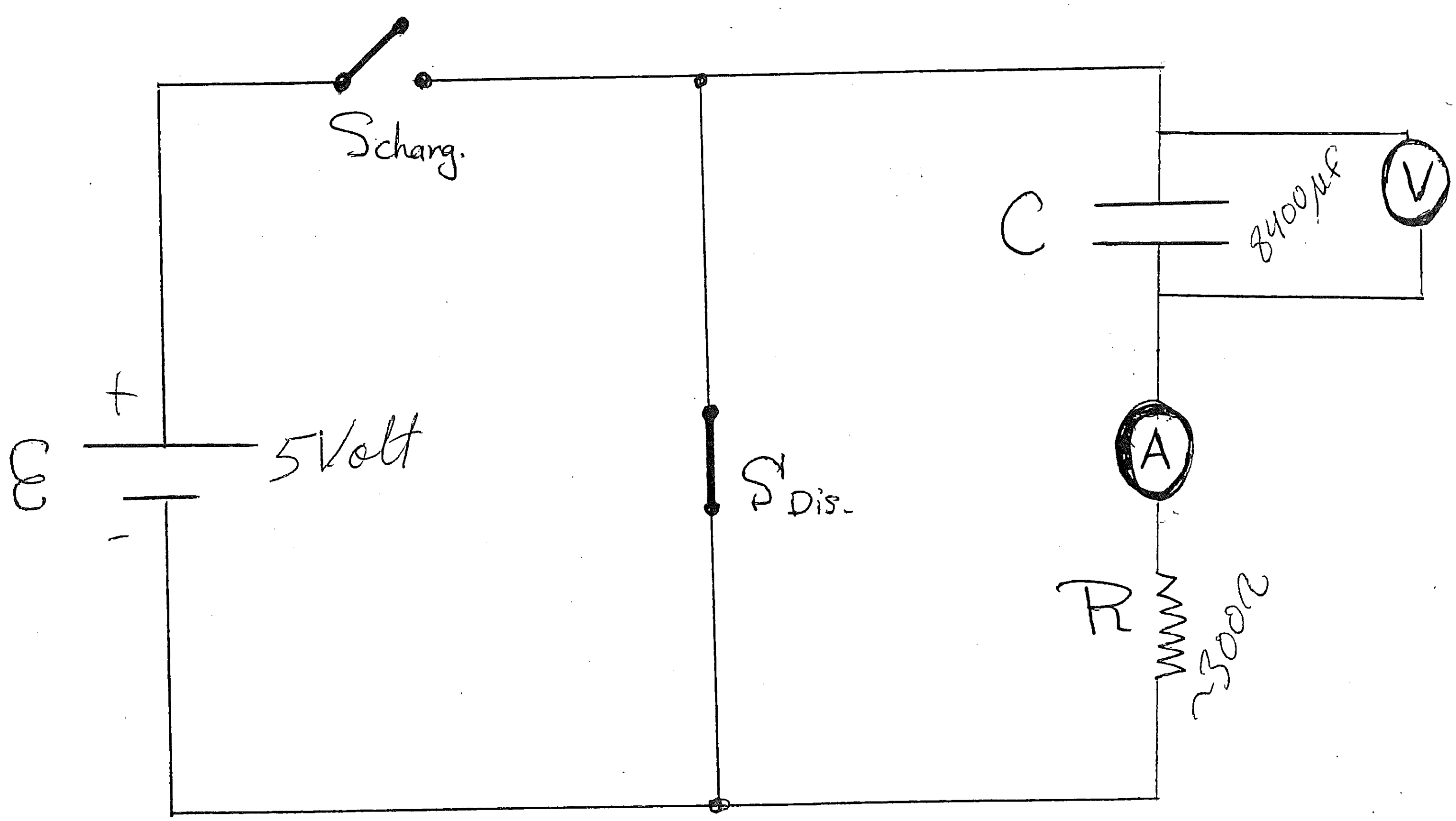
$$-IR + \frac{Q}{C} = 0.$$

$$\boxed{I = -\frac{dQ}{dt}}$$

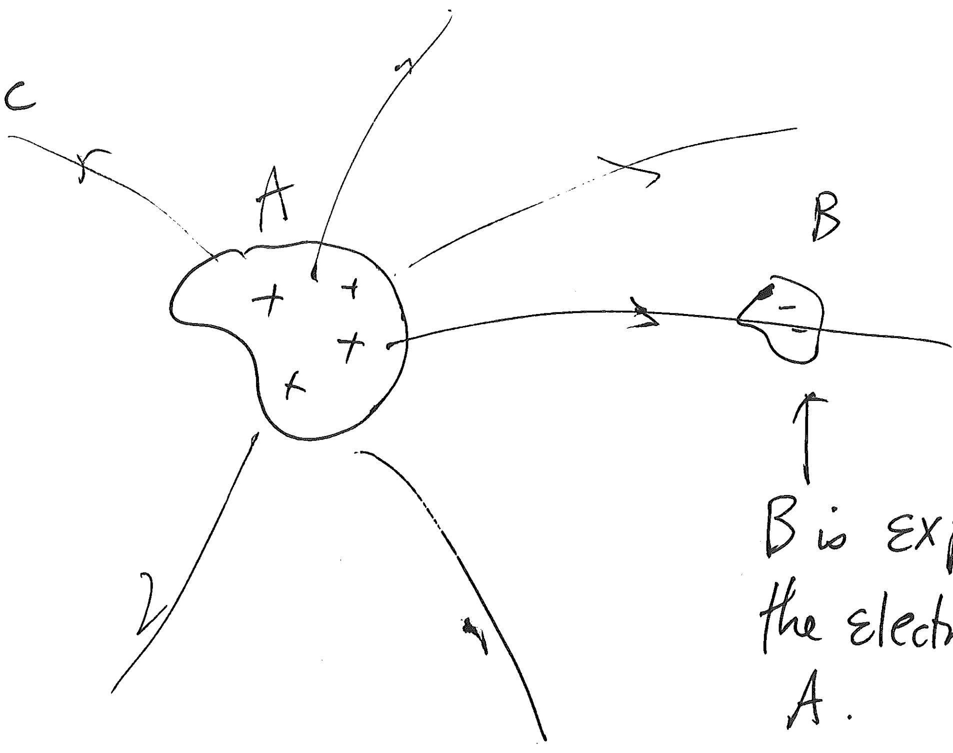
$$\cancel{-I} + R\frac{dQ}{dt} + \frac{Q}{C} = 0. \leftarrow$$

Charging & Discharging in RC cct.



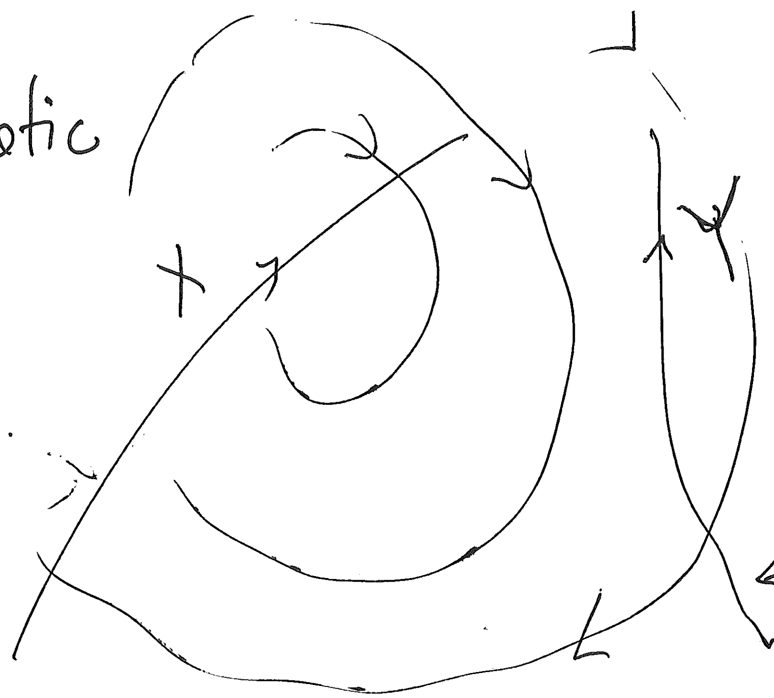


Electric



B is experiencing the electric field of A.

Magnetic



Current Y is experiencing the magnetic field of X.