(220)

disc

$$Q = Q_0 e^{-t/\tau}$$

$$\tau = RC$$

$$I = -\frac{Q_0}{\tau} e^{-t/\tau}$$

$$C = \frac{Q}{V} \Rightarrow V = \frac{Q}{C}$$

$$V = \frac{Q_0}{C} e^{-t/\tau}$$

charg

$$V = \varepsilon(1 - e^{-t/\tau})$$

$$Q = C\varepsilon(1 - e^{-t/\tau})$$

$$I = \frac{C\varepsilon}{\tau} e^{-t/\tau}$$

$$Q_0 e^{-t/\tau} = Q \qquad \tau = RC$$

How long $Q = \frac{1}{2} Q_0$?

$$\frac{1}{2} = \frac{Q}{Q_0} = e^{-t_{1/2}/\tau}$$

$$\ln\left(\frac{1}{2}\right) = \ln(1) - \ln(2) = -\frac{t_{1/2}}{\tau}$$

$$\Rightarrow \ln(2) = \frac{t_{1/2}}{\tau}$$

$$t_{1/2} = \tau \ln(2)$$

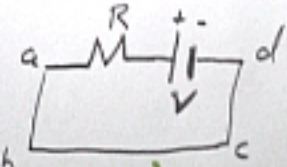
$U = QV$

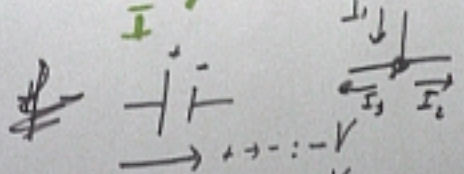
$$P = \frac{\Delta U}{\Delta t} = V \frac{\Delta Q}{\Delta t} = IV$$

$$P = IV = I^2 R = \frac{V}{R}$$

$\Sigma V_i = 0$ Energy Conserved

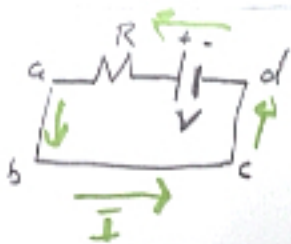
$\Sigma I_i = 0$ Charge conserved

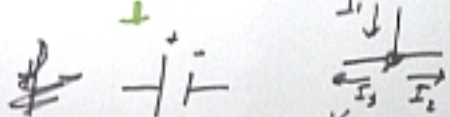




Energy conserved

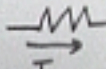
$\Sigma I_c = 0$ Charge conserved





$\longrightarrow$ + → − : $-V$

$\longrightarrow$ Path $-$ → + : $+V$



$-IR$, $+IR$

$(abcda)$: $0+0+0+(+V)-IR=0$

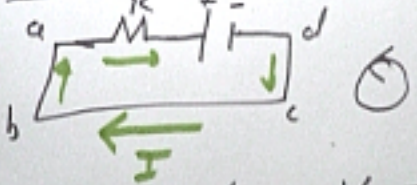
$V - IR = 0$

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

(abcda): 0+0+0+(+V)−IR=0

$V - IR = 0$

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

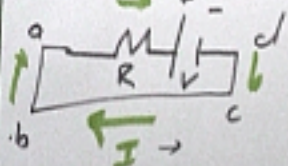


(abcda): $+V + IR = 0$

$I = -\frac{V}{R}$ opp dir

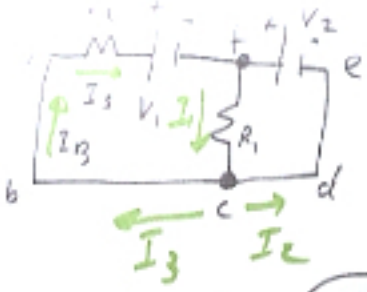
$(adcba): +IR - V = 0$

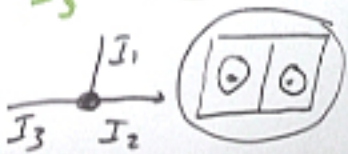
$I = \frac{V}{R}$



$(adcba): -IR - V = 0$

$I = -\frac{V}{R}$?

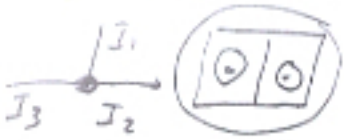




(a b c f a): $+I_1R_1 + V_1 + I_3R_2 = 0$

(f c d e f): $-I_1R_1 + V_2 = 0$

@C: $+I_1 - I_2 - I_3 = 0$



(a b c f a): $+I_1R_1 + V_1 + I_3R_2 = 0$

$I_1R_1 = V_2 \Rightarrow I_1 = \frac{V_2}{R_1}$

$\frac{V_2}{R_1}R_1 + V_1 + I_3R_2 = 0 \rightarrow$

$I_3 = -\frac{(V_1+V_2)}{R_2}$

~~$I_1 = I_2 + I_3$~~ $I_2 = I_1 - I_3$

$I_2 = \frac{V_2}{R_1} + \frac{(V_1+V_2)}{R_2}$

$P = I_1^2R_1 + I_3^2R_2$

$R_1 : 10$, $R_2 : 20$