FÍSICA

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- Al final de cada tema, 2h de tutoria per resoldre (tarda)

- Poció → avisar
- Link → info

- 4 practiques presencials, 1 rec (10% de la S) NO obligatòria
  0,75 p cadascuna, el quart, 0,25 p d'oral

practica oral → escollir una pràctica, i el màxim 5 min explicar-ho al prof (fer power)

también presentar en una cara de foli resum pràctica

N.A.C → mitjana 2 parcials

[NF = 0,9 A.C + 0,1 LAB]

Examen final

[NF = 0,9 F + 0,1 LAB]

2n Parcial

1 Problema transitori
10 tipus test

T1- Corrent Continua

$$q(t) = q_0 + \int_0^t a(t) \cdot dt$$

1) Objectius
2) realització
3) resultats
4) Conclusions

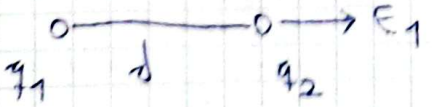
Forces elèctriques

- Dei d'Schrödinger → per explicar fenomens físics quàntics
- → dos tipus + i −, mesurats en Coulombs (C)

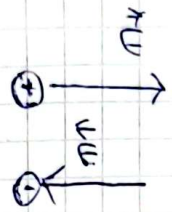
② $F = k \cdot \frac{|q_1 \cdot q_2|}{r^2}$ Coulomb, llei de Coulomb $k = 9 \cdot 10^9 \frac{N \cdot m^2}{C^2}$

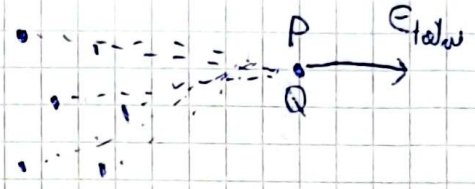
$\vec{E}_1$, camp elèctric creat per (q_1), llavors a $\vec{F} = \vec{E}_1 \cdot q_2$

$$E_1 = k \cdot \frac{q_1}{d^2}$$



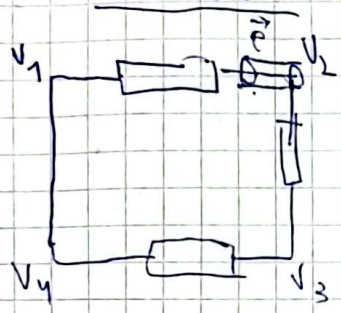
Escaneado con CamScanner





$\vec{F}_e = \vec{E}_{total} \cdot Q$

⊙ Cal camp elèctric total ($\vec{E}_{total}$) per calcular la $\vec{F}_e$ d'una càrrega $\underline{\underline{Q}}$ a la seva trajectòria

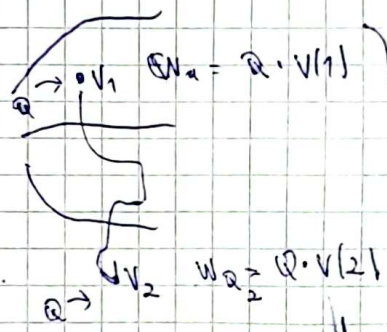


Intensitat → càrrega per segon $\left(\frac{C}{s}\right)$

Energia elèctrica → $\boxed{W_Q = Q \cdot V(P)}$ J

$V(P)$ → "potencial elèctric" al punt P creat per la resta de càrrega del universe

↳ $\frac{J}{C}$ o $\boxed{V}$



⊙ Quan càrrega a mou

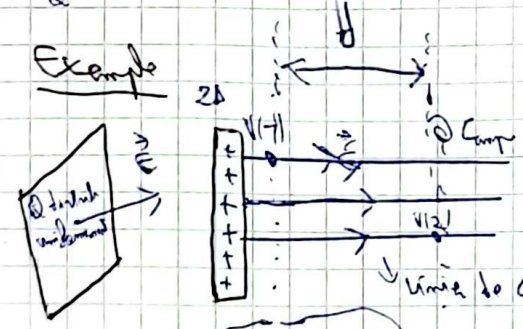
$\Delta W = W(1) - W(2)$ J $= Q(V_1) - Q(V_2) = \boxed{Q(\Delta V)}$

Voltatge/tensió

si tenim $\vec{E} \Rightarrow V$

$\Leftarrow$

Exemple



⊙ Camp elèctric no varia amb la distància en la placa, Q és constant

↳ línies de camp, $\vec{E}$ segueix sent el mateix

⊙ $\boxed{\Delta V = E d}$

⊙ $\boxed{W = Q \cdot V_{total}}$

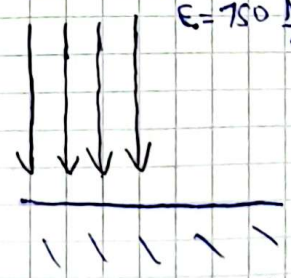
$\Delta W = Q(V(1) - V(2))$

$\boxed{\Delta W = Q \, \Delta V}$

$\boxed{P = \frac{\Delta W}{\Delta t}}$ W (watts)

(energia / temps)

P2



$E = 750 \frac{N}{C}$ - Calcula ΔV a 270 m i a 420 m

Quin té el potencial més alt?

En dos d V més alt

$\Delta V_1 = 750 \cdot 420 = \boxed{4{,}05 \cdot 10^4 \text{ V}}$

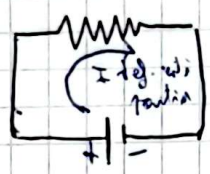
$\Delta V_2 = 750 \cdot 270 = \boxed{6{,}15 \cdot 10^4 \text{ V}}$

$V(1) - V(2) = Ed$

$\Delta V = E \cdot d = 750 \cdot |270 - 420| = \boxed{22500 \text{ V}}$

Escaneado con CamScanner

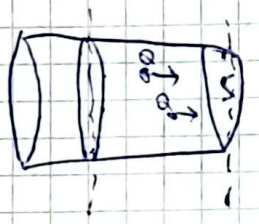
Circuits



— recordar! = trobar intensitat $\frac{Q}{t}$ (A)

$$I = \frac{\Delta q}{\Delta t} \, (A)$$

$v \cdot \Delta t$



$$I = \frac{\text{càrrega}}{\text{temps}} = \frac{\text{densitat} \cdot \text{volum} \cdot q}{\Delta t} = \frac{n \cdot \overbrace{v \cdot \Delta t \cdot S}^{\text{volum total}} \cdot q}{\Delta t} = n q v \cdot S$$

v, velocitat mitjana

$$I = n q v \cdot S$$

n: densitat

② d'intensitat $j = \frac{I}{S} \left(\frac{A}{m^2}\right)$

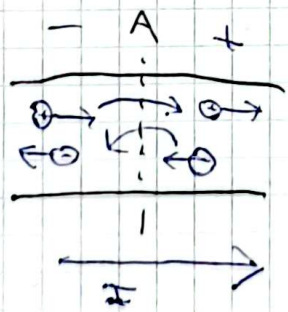
(P5) Bateria de cotxe = 12V (diferencial de potencial), subministra una càrrega de 160 A·h.

- Energia emmagatzemada? $\Delta W = Q \cdot \Delta V$
- Quant de temps pot subministrar una llum de 150W $P = \frac{\Delta W}{\Delta t}$

$$160 \frac{C}{s} \cdot h = \frac{160 \cdot 3600 \, s}{1 \, s} = 5{,}76 \cdot 10^5 \, C$$

$$\Delta W = Q \cdot \Delta V = 5{,}76 \cdot 10^5 \cdot 12 = 6{,}91 \cdot 10^6 \, J$$

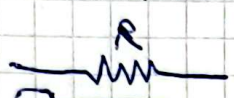
Treball $P = \frac{\Delta W}{\Delta t}$ $\quad \Delta t = \frac{6{,}91 \cdot 10^6}{150} = 46080 \, s$



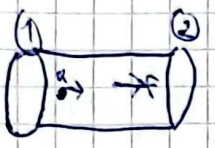
- Dos tipus de càrregues +/− intensitat neta és zero de transitòria
- Sempre I, dependeixen resistències
- Circuit tancat, $\Delta V = 0$, ~~[illegible]~~ $= 0$
  $\Delta V = \Delta V_{12} + \Delta V_{23} \dots = 0$

$\Delta V_{12} \Rightarrow f(I)$ } característica tensió intensitat de l'element

- Resistència:



$\Delta V = RI$



- $V_{(1)} - V_{(2)} = E \cdot l$

hipòtesi, $I \propto E$ ← proporcional

$(j) = E$

$j = \alpha E$ → conductivitat del cable

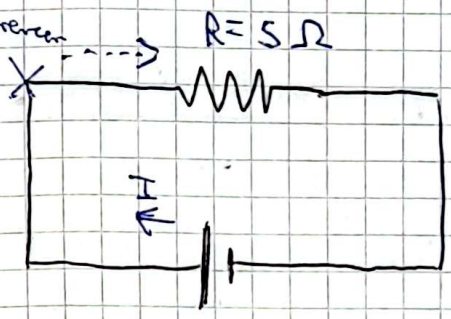
$E = \frac{1}{\alpha} \cdot \frac{l}{1} \cdot I$ → $\Delta V = RI$

- Pila:

$\mathcal{E} = 4{,}5\,V$

$\Delta V = \mathcal{E}$

Corrent



$E = 10\,V$

1- Definir el sentit de I

2- Recorrer circuit

3- Calcular ΔV

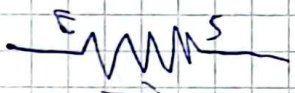
$\Delta V = RI$

↓

$V_{sortida} - V_{entrada}$

$V_{sortida} - V_{entrada} = -RI$

* Si fo i sentit I ocorren igual, sigue $\boxed{-}$



Si lo fan com sempre,

$V_S - V_E = +\mathcal{E}$

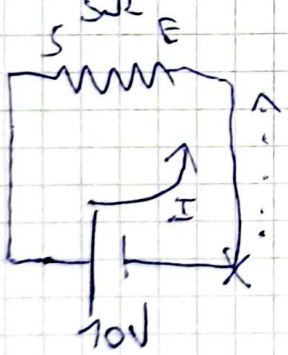
i

$V_S - V_E = -RI$

$-5 \cdot I + 10 = 0$

resistència pila corrent final

$I = \frac{10}{5} = \boxed{2A}$



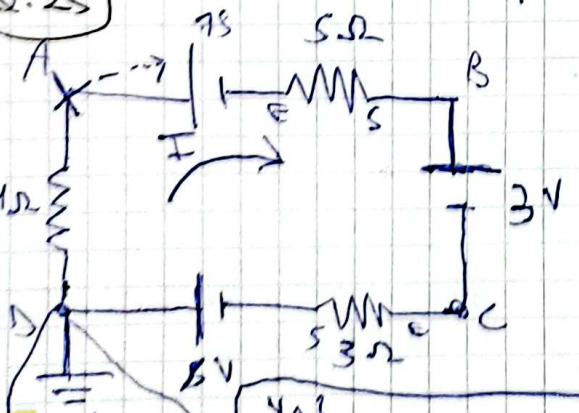
$0 = -5I - 10$

$I = \frac{10}{-5} = -2A$

El corrent va al revés

Q.25

I?



$V_D - V_C = -3I + 6 = 3 + 6 = \boxed{9\,V}$

$V_B = 4 - 15 - 5I = -6\,V$

$0 = -15 - 5I - 3 - 3I + 8 - 4I$

$0 = -12 - 12I$

$\frac{12}{-12} = I$

$-1\,A = I$

$V_B - V_A = ?$

$A \to B$

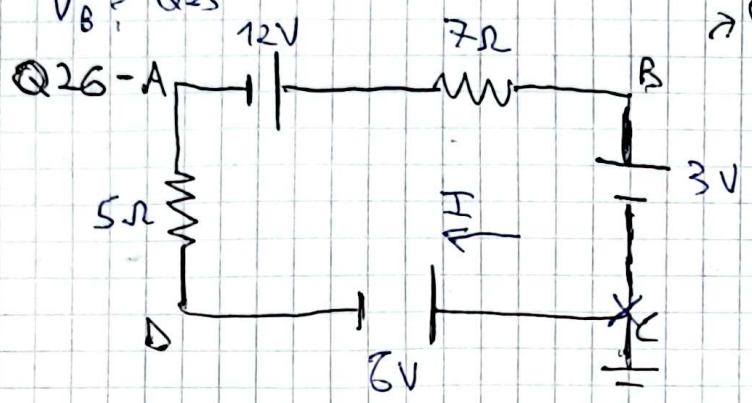
$V_B - V_A = -15 - 5I = \boxed{-10\,V}$

V_A?

Vamos hasta punto con $V = 0V$ fin del punto A

Escaneado con CamScanner

V_B? Q25



→ Circuit senzill (una malla)

$0 = -6 - 5I + 12 - 7I - 3$

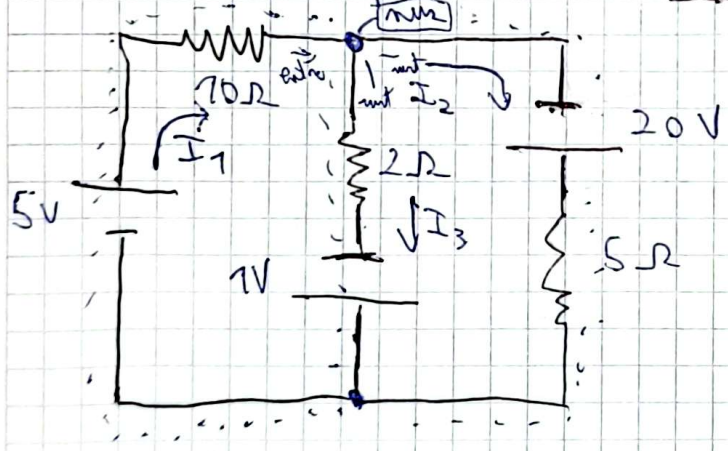
$-3 = -12I$

$I = \frac{-3}{-12} = 0{,}25A$

$V_A = -6 - 5I = -6 - 5 \cdot 0{,}25 = -7{,}25\ V$

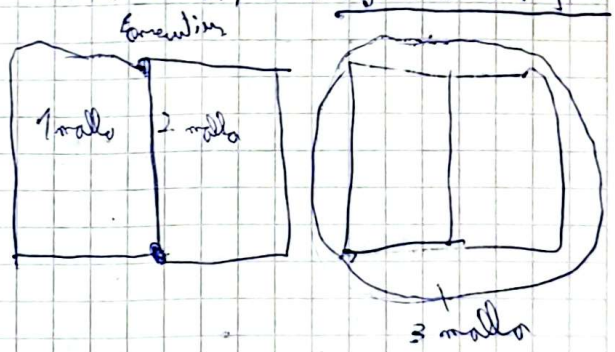
*mirar Corrents, algun resistor R

Circuits de més d'una malla ⇒ Regles de Kirchhoff



Resistor ? ⇒ intensitat

Entre nusos, hi ha diferents branques



3 branques, 2 nusos

⊙ Cada branca té diferents intensitats, al nus distribuïx la I

1- Definir sentit positiu per cada branca

2- Tenim 3 incògnites (3 intensitats)

*1a Regla (Conservació de la càrrega elèc.): Conservació de la càrrega, en cada nus la $\boxed{\text{intensitat d'entrada} = \text{intensitat sortida}}$ $I_1 + I_2 + I_3 \Rightarrow \boxed{I_3 = I_1 - I_2}$

*2a regla (Conservació energia): $\boxed{\Delta V = 0 \text{ en circuit tancat}}$ $I_1 + I_2 + I_3 = 0 \Rightarrow \boxed{I_3 = -I_1 - I_2}$ (les 2 entren al nus)

Escaneado con CamScanner

MALLAS

I_3

$0 = +5 - 10I_1 - 2I_1 - I_2 + 1$

$0 = 20 - 5I_2 - 1 + 2(I_1 - I_2) = 0$

- Sempre 1 vez mesh
- Fer fins int: lista per tota la branquer

$$\begin{cases} -12I_1 + 2I_2 = -6 \\ -12I_1 - 7I_2 = -19 \end{cases} \cdot 6$$

$-40I_2 = -120$

$I_2 = 3\,A$

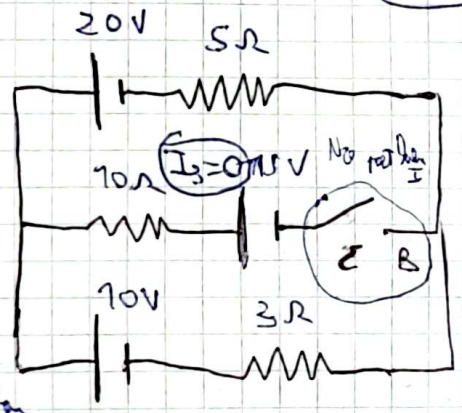
$I_1 = \frac{-19 + 7 \cdot 3}{2} = 1\,A$

$I_3 = I_1 - I_2$

$I_3 = -2\,A$

* Examen = tres coses per temes de formulari

P12

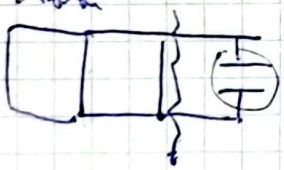


a) $V_C - V_B$ Branca 2

b) Intensitat per E_2 amb l'interruptor tancat

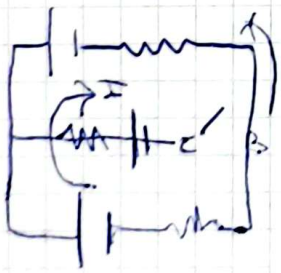
Com no passa I_C no fluix branca, llavors a una malla

3 malles



Condensador, per tant $I = 0$

a)



$-20 - 5I - 3I + 10 = 0$

$I = -1{,}25\,A$

!!!

$I' = 10 \cdot 0 - 15$

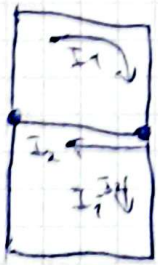
$V_C - V_B = +5I + 20 + I'$

(Final) (Inicial)

(per convenció)

$V_C - V_B = 1{,}25\,V$

b)



$I_2 = 0{,}100\,A$ *Pendiente

$I_1 = I_2 + I_3$

$I_2 = I_1 - I_3$

$$\begin{cases} -20 - 5I_1 + 15 - 10I_2 = 0 \\ -20 - 5I_1 - 3(I_1 - I_2) + 10 = 0 \end{cases}$$

$\Downarrow$

$$\begin{cases} -5 - 5I_1 - 10I_2 = 0 \\ -10 - 8I_1 + 3I_2 = 0 \end{cases}$$

$-1 - I_1 - 2I_2 = 0$

$I_1 = -1 - 2I_2$

$-10 - 8(-1 - 2I_2) + 3I_2 = 0$

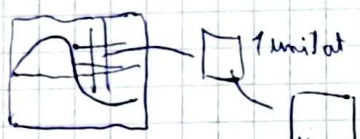
$-2 + 16I_2 + 3I_2 = 0$

$I_2 = \frac{2}{19} =$

Escaneado con CamScanner

Pràctica d'llum: 2 exercicis previs

1n



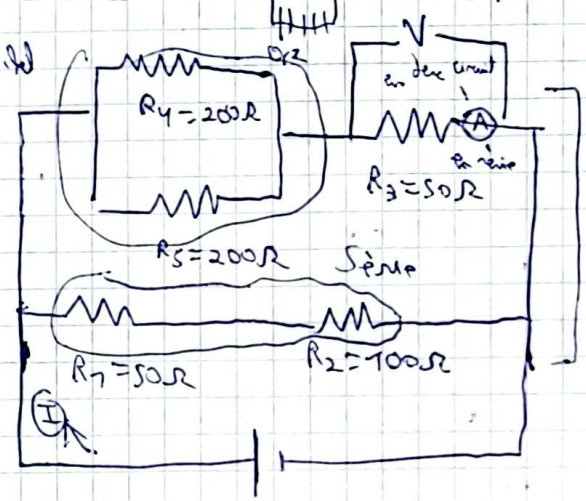
Connexió paral·lel

(A) → transversal

(V) → no tocar res

paral·lel

2n



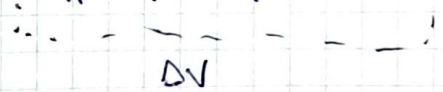
* Anàl·lisi pila

R_{eq}

≡

Llei d'associació de resistències

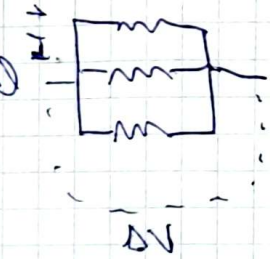
* Sèrie



(1 únic I)

$$\Delta V = \Delta V_1 + \Delta V_2 \dots \Delta V_n = R_1 \cdot I + R_2 \cdot I + \dots R_n \cdot I = \underbrace{(R_1 + R_2 \dots)}_{R_{eq}} I$$

* Paral·lel



(Un d'entre connectat a materia punt (2 punts) resta les dels altres)

$$I = I_1 + I_2 + I_3$$

$$\frac{\Delta V}{R_1} \quad \frac{\Delta V}{R_2} \quad \frac{\Delta V}{R_3}$$

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \dots$$

amb (2) resist

$$R_{eq} = \frac{R_1 \cdot R_2}{R_1 + R_2}$$

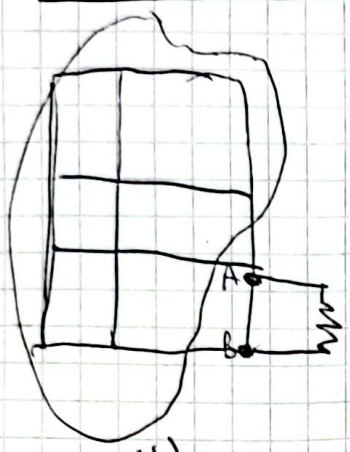
$R_{eq} = \cancel{\frac{50 \cdot 100}{150}} = 150\Omega$

$R_{eq} = 100 + 50 = 150$

$R_{eq} = \frac{200 \cdot 200}{400} = 100\Omega$

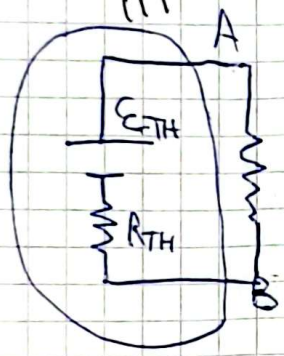
$I = \frac{10}{75} A$

Circuit equivalent thévenin:

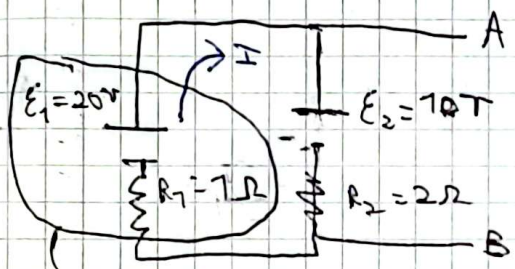


- Tot el circuit pot ser una pila en sèrie amb una resistència
- $\mathcal{E}_{TH}$: diferència potencial entre A i B quan no hi ha res connectat.
- R_{TH}: resistència equivalent entre A i B (anticircuitant les forces electromotrius)

(1)



Exemple: pila equivalent a 2 pila en paral·lel:



$20 - 1I - 2I - I = 0$

$8 - 3I = 0 \qquad I = \frac{\mathcal{E}_1 - \mathcal{E}_2}{r_1 + r_2}$

$V_A - V_B = 2I + 12$

B → A

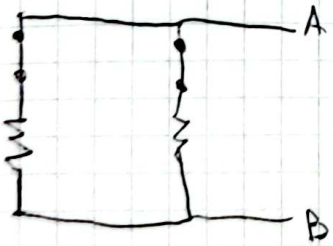
$V_A - V_B = \frac{\mathcal{E}_1 - \mathcal{E}_2 \cdot r_2}{r_1 + r_2} + \mathcal{E}_2$

$V_A - V_B = \frac{\mathcal{E}_1 \cdot r_2 + \mathcal{E}_2 \cdot r_1}{r_1 + r_2} = \mathcal{E}_{TH}$

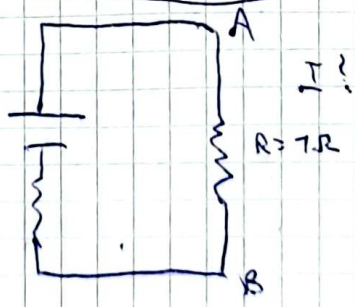
mengr real
mante ΔV
(constant entre els voltes)

model
més real.
r_1: resistència interna
(no constant ΔV)

R_{TH}, (anticircuitar pila (posar cable))



$R_{TH} = \frac{R_1 \cdot R_2}{R_1 + R_2}$

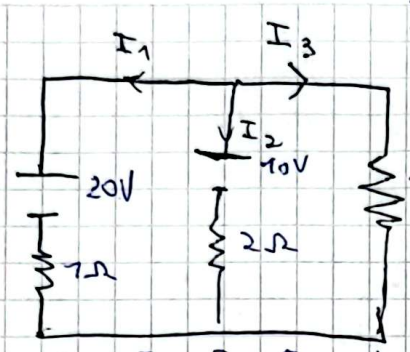


- si pila ideal $\mathcal{E}_{TH} = \mathcal{E}$

  $R_{TH} = \frac{r}{2}$ (millor, perdem energia)

- podem utilitzar per si mai trobem $\underline{\underline{I}}$

I_3?



$R_{TH} = \cancel{\frac{1 \cdot 2}{1+2}} =$

$I_3 = I_1 + I_2$

$I_1 = I_3 - I_2$

$0 = -I_1 - I_2 - I_3$ entran - salen

$I_1 = -I_2 - I_3$

$$\begin{cases} -7I_3 + 2I_2 + 10 = 0 \\ -20 - 7I_1 + 2I_2 + 10 = 0 \end{cases}$$

$$\begin{cases} -I_3 + 2I_2 + 10 = 0 \\ -20 - I_3 + I_2 + 2I_2 + 10 = 0 \end{cases}$$

$$\begin{cases} 3I_2 + I_3 = 10 \\ 2I_2 - I_3 = -10 \end{cases}$$

$$\begin{cases} -I_3 + 2I_2 + 10 = 0 \\ -I_3 + 3I_2 - 10 = 0 \end{cases}$$

mal

$-I_2 + 20 = 0$ $\quad$ $I_3 - 3I_2 + 10 = 0$

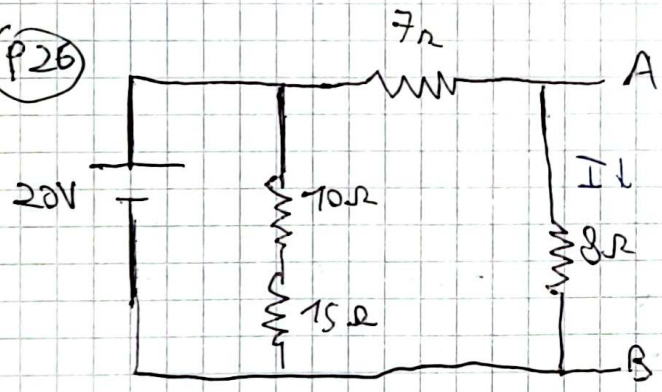
$I_2 = 20\ A$ $\quad$ $I_3 = 50\ A$

$5I_2 = 0$

$I_2 = 0\ A$

$I_3 = 10\ A$

P26



E_{TH}?

$R_{12} = 25\Omega$

E_{TH} - Perdida circuit

$7 + 8 = 15$ (en serie)

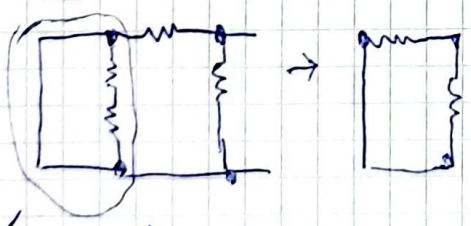
$I = \frac{20}{15}\ A \Rightarrow V_A - V_B = 8 \cdot \frac{20}{15}$

$V_A > V_B$

A gran amb gran

B petit amb petit

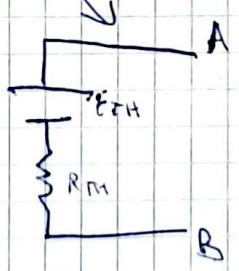
R_{EQ}



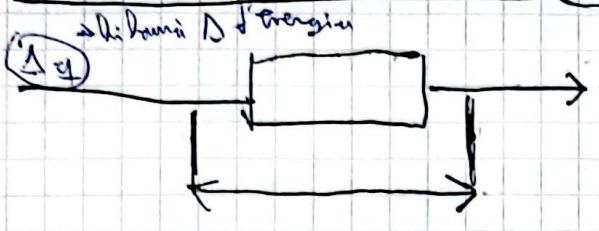
$R_{eq} = \frac{7 \cdot 8}{7+8}$

$R_{eq} = 0$ total

circuit thevenin



Energia / Potència (aplicat a circuits)



ΔU = càrrega · diferència potencial

$\Delta U = \Delta q \cdot \Delta V$

$$P = \frac{\Delta U}{\Delta t} = \frac{\Delta q \cdot \Delta V}{\Delta t} = I \cdot V$$

$\boxed{P = IV}$ resta + o −, però mantenim en quedaran amb $|P|$, i direm si l'element gasta o aporta energia

* Resistència: $P = IV = I(R \cdot I) = RI^2$

$\boxed{P = RI^2}$ (llei de Joule, potència dissipada)

* Força electromotriu:

$\boxed{P = \varepsilon \cdot I}$

{ gasta ≡ dissipa / acumula
aporta ≡ genera

* Pila no ideal.

mateix circuit

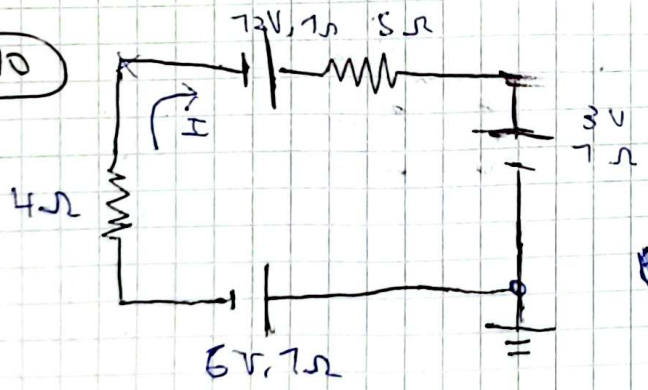
genera $I > 0$ acumula $I < 0$

$I > 0$: potència generada $\varepsilon \cdot I$

potència dissipada $r I^2$

P potència neta = una de les dues

P10



$12 - I - 5I - 3 - I - 6 - I - 4I = 0$

$3 - 12I = 0$

$I = \frac{3}{12} = \frac{1}{4} = 0{,}25\ A$

$P_1 = 12 \cdot 0{,}25$

$P_2 = 3 \cdot 0{,}25$

$P_3 = 6 \cdot 0{,}25$

- Totes les resistències dissipen $R \cdot I^2$
- 12 V genera
- 3 V i 6 V, dissipadores

Suma total potències (dissipada + absorbida) = generada

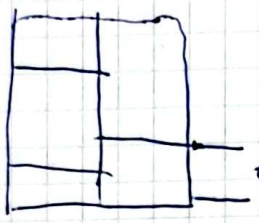
12 V: P generada $= 12 \cdot 0{,}25 = \boxed{3\ W}$

P dissipada $= r \cdot I^2 = 1 \cdot 0{,}25^2 = \boxed{0{,}0625\ W}$

$P_{neta} = (3 - 0{,}0625)\ W$

Escaneado con CamScanner

Teorema de máxima transferencia de potencia



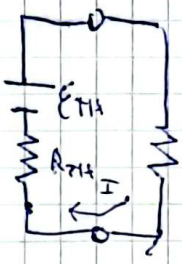
resistencia?

↓

altavoces

aparell de música

≡



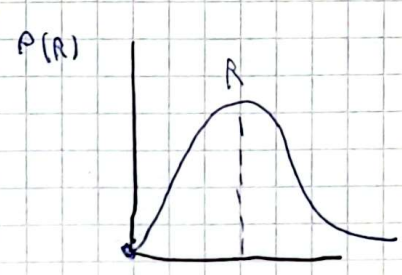
R? tal P sigui màxima

$P = R \cdot I^2$

$I = \dfrac{\mathcal{E}_{TH}}{R_{TH}+R}$ → $P = \dfrac{R \cdot \mathcal{E}_{TH}^2}{(R+R_{TH})^2}$ → $R \to 0$ 0!

→ funció de R $P(R)$

potència màxima ≡ màxim de $P(R)$?



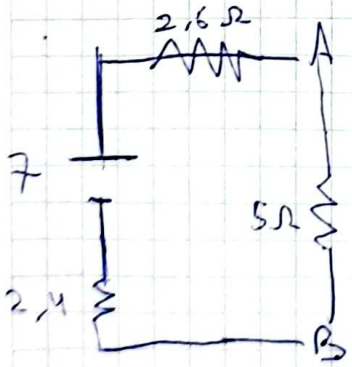
$\dfrac{\partial P}{\partial R} = 0$ $\quad P_{màx} = \dfrac{\mathcal{E}_{TH}^2}{(R_{TH}+R_{TH})^2}$

$\mathcal{E}_{TH}^2 = 7 \cdot (R_{TH}+R)^2 -$

$\boxed{R = R_{TH}}$

P 24 P20 Q 30

P.24



~~$\mathcal{E}_1 - 4I_1 - 6I_1 + \mathcal{E}_2 = 0$~~

a) $\mathcal{E}_{TH} = \dfrac{\mathcal{E}_1 \cdot r_2 + \mathcal{E}_2 \cdot r_1}{r_1 + r_2} = 7V$

$7 = 5 \cdot I$

$1,4 A = I$

$R_{eq} = \dfrac{R_1 \cdot R_2}{R_1 + R_2} = 2,4\Omega + 2,6 = 5\Omega$

b) ~~$P = I^2 \cdot R = 1,4^2 \cdot 5 = 2,45 W \cdot 600$~~

~~$5888 = \dfrac{D_4 \cdot 5}{600}$~~ $\quad \dfrac{9,8 \cdot 600}{7} =$

~~$D_4 = 5880\Omega$~~ ~~940~~

$0 = -2,6I - 5I - 2,4I + 7$

$0,7A = I$

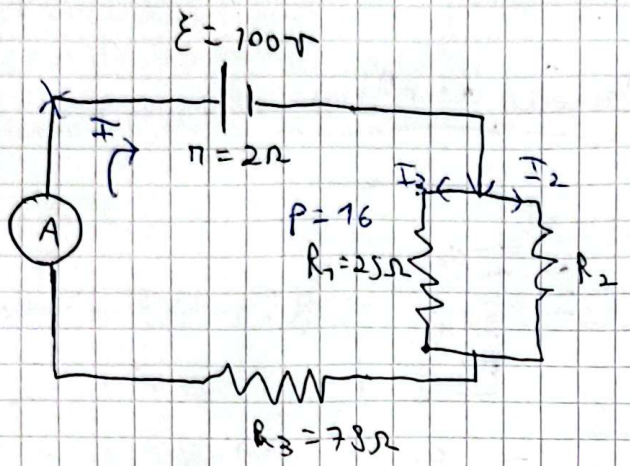
b) $P = I^2 \cdot R = 0,7^2 \cdot 5 \cdot 600 = 1470 J$

c) $R = R_{TH} = 5\Omega$

$P = 2,45 W$

Escaneado con CamScanner

P 20



$16 = I^2 \cdot R$

$I = \sqrt{\frac{16}{25}} = 0{,}8\,A$

$V = 25 \cdot 0{,}8 = 20\,V$

$20 = R_2 (I_1 - 0{,}8)$

$20 = R_2 I_1 - 0{,}8 R_2$

$-100 - 2I - I \cdot \frac{R_1 \cdot R_2}{R_1 + R_2} - 78I = 0$

$-100 - 2\left(\frac{20}{R_2}\right) - \frac{20}{R_2} \cdot \frac{R_1 \cdot R_2}{R_1 + R_2} - 78 \cdot \frac{20}{R_2} = 0$

$R_2 \cdot \left(-100 - \frac{40}{R_2} - \frac{500 R_2}{25R_2 + R_2^2} - \frac{1560}{R_2}\right) = 0 \quad | R_2$

$-100 R_2 - 40 - \frac{500 \cdot R^2 \cdot R^2}{R_2 (25 + R_2)} - 1560 = 0$

$-1600 - 100 R_2 - \frac{500 R_2}{25 + R_2} = 0$

$\frac{-40000 - 1600 R_2 - 2500 R_2 - 100 R_2^2 - 500 R_2}{25 + R_2} = 0$

$\rightarrow -100 R_2^2 - 4600 - 40000 = 0$

$I_1 = I_2 + I_3$

$\begin{cases} -100 - 2I_1 - \frac{R_1 R_2}{25 + R_2} \cdot I_1 - 78 I_1 = 0 \\ 20 = R_2 I_1 - 0{,}8 R_2 \end{cases}$

$\frac{20}{I_1 - 0{,}8} = R_2$

I_1

$I_1 \left(2 + 78 + \frac{25 R_2}{25 + R_2}\right) = 100$

$I_1 \left(80 + \frac{25 R_2}{25 + R_2}\right) = 100$

$80 I_1 + \frac{25 R_2}{25 + R_2} I_1 - 100 = 0$

$-I_1 \left(\frac{R_1 \cdot R_2}{R_1 + R_2} + R_3 + r\right) - 100 = 0$

$100 = 0{,}8 R_2 + I_2 R_2$

$V = RI$

$I_1 + I_2 = I_3$

$\begin{cases} 100 = R_2 (0{,}8 + I_2) \\ 20 = R_2 \cdot I_2 \end{cases} \leftarrow I_2 \cdot R_2 = 100 - 0{,}8 R_2$

$I_2 = \frac{20}{100} = 0{,}2$

$I = 0{,}8 + 0{,}2 = 1\,A$

$20 = 100 - 0{,}8 R_2$

$R_2 = \frac{200 - 100}{-0{,}8} = 100\,\Omega$

	R (Ω)	I (A)	V (V)	P (W)
R_1	25	0,8	20	16
R_2	X		20	
R_3	78			
	2		100	

Escaneado con CamScanner

Q 30

$$\frac{R^2}{2R} = \frac{R\cdot R}{R\cdot 2} = \frac{R}{2}$$

$$P = 2R\cdot I^2 \qquad P_2 = \frac{R^2}{2R}\cdot I^2$$

$$\frac{R\cdot R}{R+R} = \frac{R^2}{2R} \qquad I^2 = \frac{P}{2R} \qquad I^2 = \frac{P_2}{\frac{R}{2}} = \frac{2P_2}{R}$$

$$\frac{P}{2R} = \frac{2P_2}{R} \Rightarrow \cancel{2R\frac{P}{2R} = P_2} \Rightarrow \cancel{P_2 = \frac{P}{2}}$$

$$V = RI \qquad \frac{V}{R}$$

$$\frac{P}{2R} = \frac{2P_2}{R} \Rightarrow \frac{RP}{4\cdot R} = P_2$$

$$P = R\cdot I^2$$

$$P = \frac{R\cdot V^2}{R^2} = \frac{V^2}{2R} \qquad P\cdot 2R = V^2$$

$$P_2 = \frac{V^2}{\frac{R}{2}} = \frac{2V^2}{R} \qquad \frac{P_2\cdot R}{2} = V^2$$

$$P\cdot 2R = \frac{P_2\cdot R}{2}$$

$$\frac{4P\cdot R}{R} = P_2$$

$$\boxed{4P_1 = P_2}$$

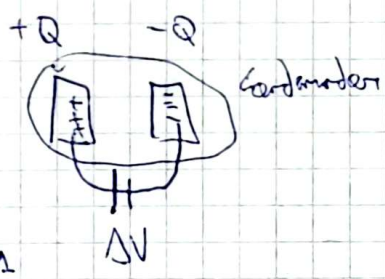
Condensadors (flash, etc...)

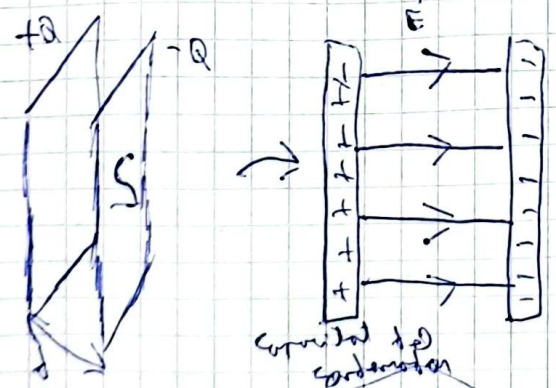
→ Emmagatzemen càrrega

→ Exercicis C.A

→ Comportament temporal transitoris

→ Relació tensió - càrrega





$$\Delta V = E d$$

$$\boxed{V_Q - V_{-Q} = E d}$$

$$E = k\cdot\frac{Q}{d^2} = \frac{1}{4\pi\varepsilon_0}\cdot\frac{Q}{d^2}$$

$$9\cdot 10^9\ \frac{N\cdot m^2}{C^2}$$

$$\boxed{E = \frac{Q}{\varepsilon_0 S}}$$

$$\Delta V = \frac{Q}{\varepsilon_0 S}\cdot d \qquad \frac{1}{C} \qquad \boxed{C = \varepsilon_0\frac{S}{d}}$$

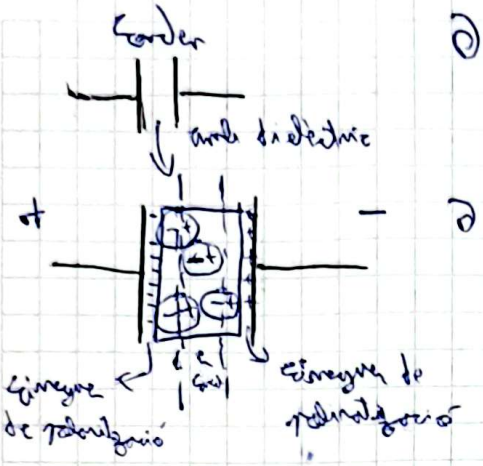
$$\boxed{\Delta V = \frac{Q}{C}}$$

- Càrrega total = 0
- $C\uparrow$ si $d\downarrow$ o $S\uparrow$ $\quad C = \varepsilon_0\cdot\frac{S}{d}$
- Potencial entre cada una mitades (punts)

- Material dielèctric (No CONDUCTOR)
  - Suport mecànic
  - Augmenta capacitat cada, NO flotadors

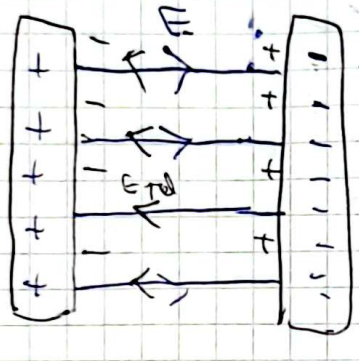
(Polarització del dielèctric)

Escaneado con CamScanner



∂ Todo la barra del -||- está $\boxed{I = 0\,A}$

∂ Atomo se deforman, hay una $\boxed{\text{Polarización del dieléctrico}}$



∂ $E_{tot} = E - E_{pol}$ - Campo E disminuye

- $\varepsilon_r \geq 1$

∂ $E_{tot} = \dfrac{E}{\varepsilon_r}$ → Si ponemos un dieléctrico

$$C' = \varepsilon_r \cdot C, \quad \varepsilon_r \geq 1$$

— Energía condensador:

· La energía que en la carga acumulada es la suma de ΔU:

$$\Delta U = \Delta q \cdot V \quad \int_0^Q V\,dq = \int_0^Q \frac{Q}{C}\,dq = \left[\frac{q^2}{2C}\right]_0^Q = \boxed{\frac{Q^2}{2C}}$$

∂ $\dfrac{Q^2}{2C} \overset{Q=CV}{=} \dfrac{1}{2} Q \cdot V = \dfrac{1}{2} C V^2$

P30

a) Condensador: $S = 10\,\mu m^2 \cdot \left(\dfrac{1\,m}{10^6\,\mu m}\right)^2 = 10 \cdot 10^{-12}\,m$

(grosor) $d = 30\,nm \left(\dfrac{1\,m}{10^9\,nm}\right) = 30 \cdot 10^{-9}\,m$

$\varepsilon_r = 3.9$

$$C = 3{,}9 \cdot \frac{1}{4\pi \cdot 9 \cdot 10^9} \cdot \frac{10 \cdot 10^{-12}}{30 \cdot 10^{-9}} = 1{,}15 \cdot 10^{-14}\,F$$

c) $E_{máx} = 10^7\,\dfrac{V}{cm}$ ↓ ΔV?

$10^7\,\dfrac{V}{cm} \cdot \dfrac{10^2\,cm}{1\,m}$

$10^9\,\dfrac{V}{m}$

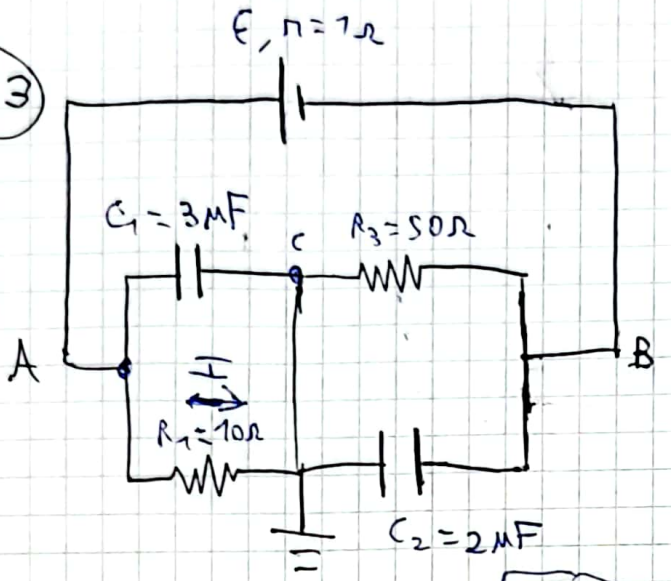
$C = \varepsilon_r \cdot \varepsilon_0 \cdot \dfrac{S}{d}$

b) Si $\Delta V = 4\,V \rightarrow \begin{cases} Q? \\ E? \end{cases}$ $\quad \Delta V = E \cdot d$

$E = \dfrac{4}{30 \cdot 10^{-9}} = 1{,}3 \cdot 10^8\,\dfrac{V}{m}$

Escaneado con CamScanner

P33



- Règim transitori, condensadors es carreguen i es carreguen.
- Règim estacionari, cond carregat, per tant I de cond I = 0 allà

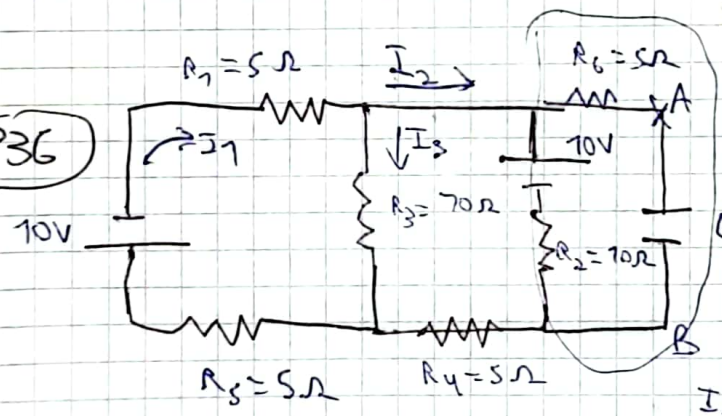
$V_A = 10\,V$

a) Intensitat: $10 = 10I$ $\boxed{I = 1A}$ La intensitat de condensador carregat sempre és 0 A

b) Càrrega: $\Delta V = \frac{Q}{C} \Rightarrow Q = \Delta V C$ $\Delta V = |V_A - V_C| = I \cdot R_2 + I \cdot R_1 = 5\,\mu C$

c) ε

Examen P36



a) Intensitat (mr esq analit règim estacionari)

$C = 4\,\mu F$

$$\begin{cases} -20I_1 + 10I_2 = 10 \\ 10I_1 - 25I_2 = 10 \end{cases}$$

$I_1 = -0{,}875\,A$

$I_3 = -0{,}3\,A$

$I_3 = -0{,}125\,A$

b) ΔV entre A i B, Q, M

$\cancel{V_B - V_A = 5I_2 - 10 + 10I_2}$

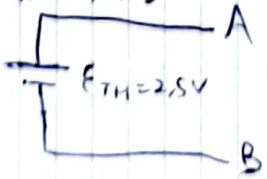
$V_A - V_B = +I_2 \cdot R_2 + \varepsilon_2 + R_6 \cdot \overset{0}{\overset{\parallel}{I}}$

$V_A - V_B = 2{,}5\,V$

c) Circuit Thevenin entre A i B

ε_{TH} = tendim circuit, i calculem ΔV_{AB} sense bateria

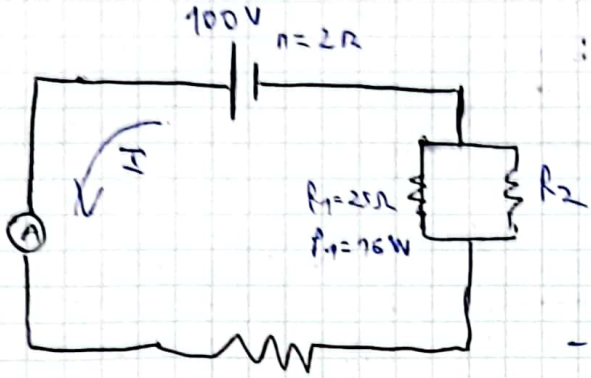
$\varepsilon_{TH} = 2{,}5\,V$



$R_{TH} = R_1 + R_5 \ldots = 10\,\Omega$

Escaneado con CamScanner

P20



$16 = 25 \cdot I_1^2$

$I_1 = 0{,}8\,A$

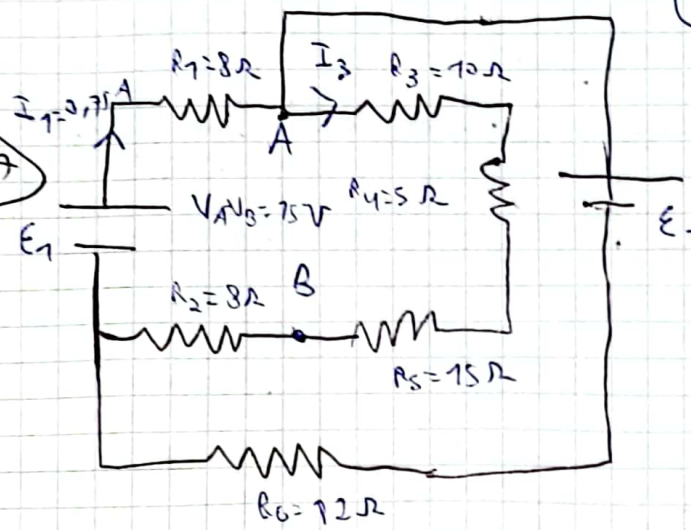
Dure maller

$-IR_3 - I_1R_1 + 100 - r \cdot I = 0$

$-78I - 20 + 100 - 2I = 0$

$I = 1\,A$

P27



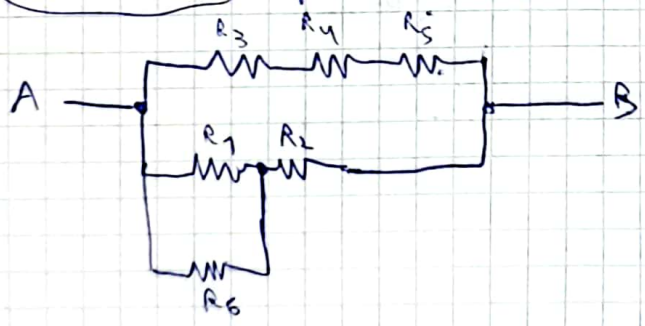
$\frac{15}{30} = I_3$

$0{,}5\,A = I_3$

$V_A - V_B$ = passant per $E_1 = -R_2 I_3 + E_1 - R_1 \cdot I_1$

El circuit equivalent Thevenin

$E_{TH} = 15\,V$ per R_{TH}, redibuixar circuit



$R_T = 8{,}9\,\Omega$

Escaneado con CamScanner