SEMANA 13 FISICA PARTE 1

ELITE CLASS VIRTUAL

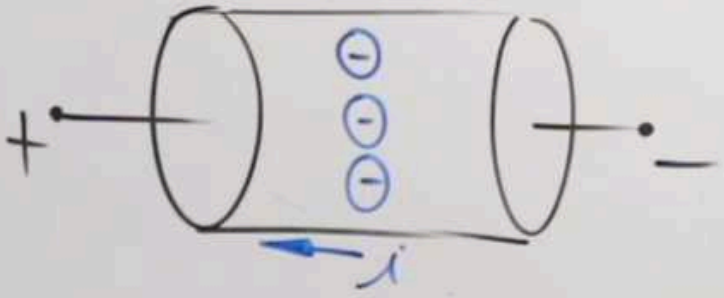
ELECTRODINÁMICA

ESTUDIA LAS CARGAS ELÉCTRICAS EN MOVIMIENTO.

CORRIENTE ELÉCTRICA:

FLUJO DE CARGAS ELÉCTRICAS QUE PASAN POR EL CONDUCTOR.

CORRIENTE REAL



CORRIENTE CONVENSIONAL

INTENSIDAD DE LA CORRIENTE ELÉCTRICA (i)

$$i = \frac{q}{t}$$

NOTA:

$$1A = \frac{1C}{s}$$

q: CARGA ELÉCTRICA (COULOMB = C)

t: TIEMPO (s)

i: INTENSIDAD DE LA CORRIENTE ELÉCT. (AMPERE = A)

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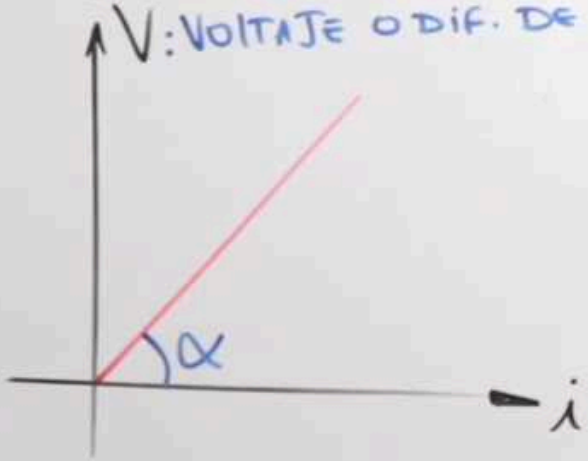
Ley de OHM:

V: Voltaje o Dif. de Potencial



$$tg\alpha = \frac{V}{i} = R \Rightarrow V = i \cdot R$$

R = Resistencia eléctrica (OHMIO = Ω)

V: Voltaje (Voltio)

ÉLITE CL... VIR...

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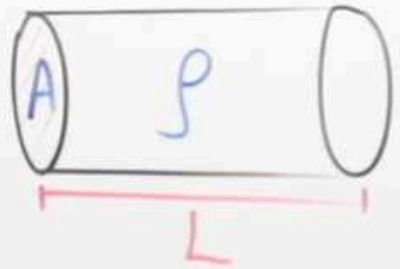
Ley de OHM:

V: Voltaje o... ...cial

V: Voltaje (Voltio)

Ley de Poulliet:



$$R = \rho \cdot \frac{L}{A}$$

L: Longitud (m)

A: Área de la sección transversal (m^2)

ρ: Resistividad eléctrica ($\Omega \cdot m$)

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POTENCIA CONSUMIDA: (P)

$$P = V \cdot i$$

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

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

S.I.

P(Watt=Vatio)

P(W)

EFECTO JOULE:

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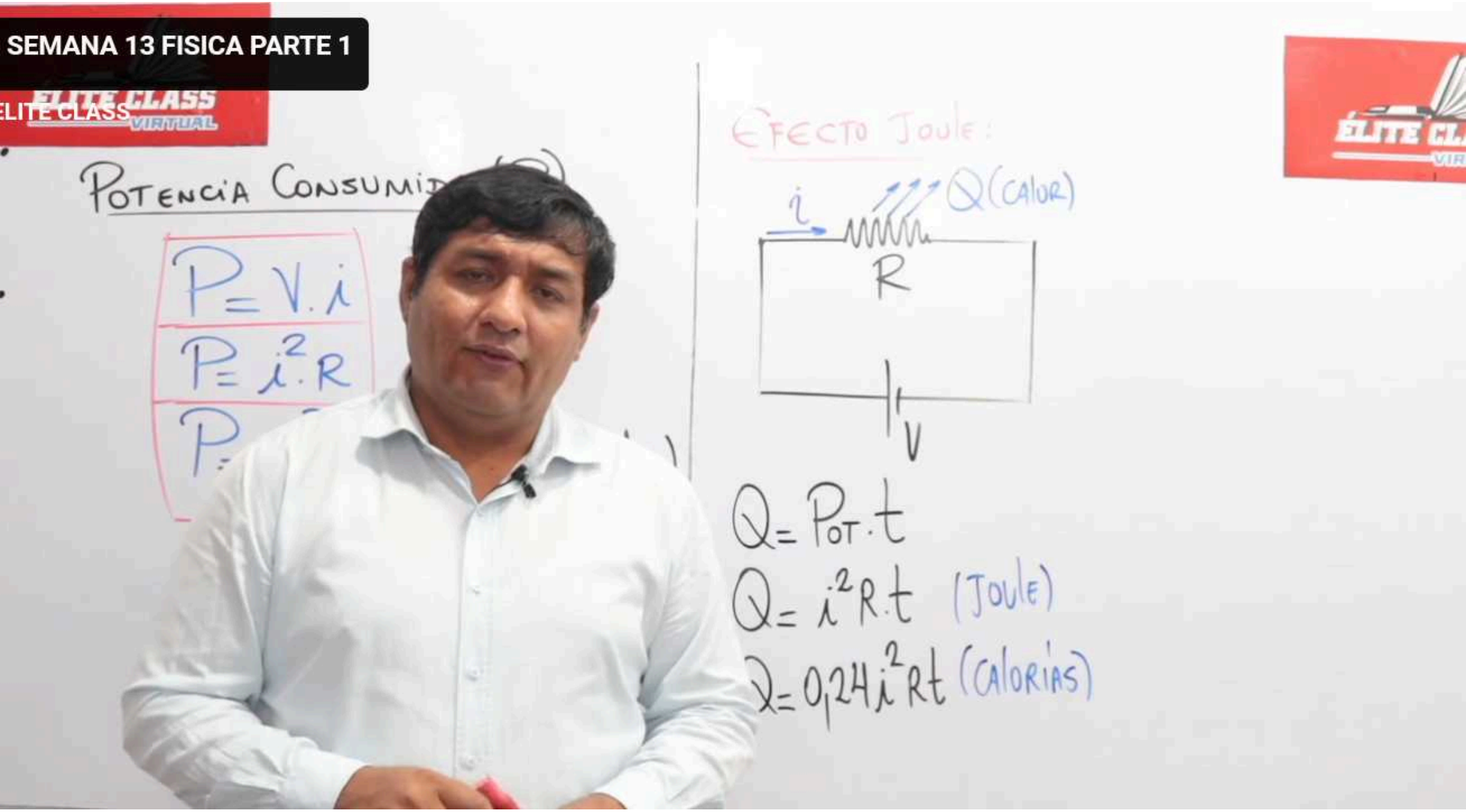

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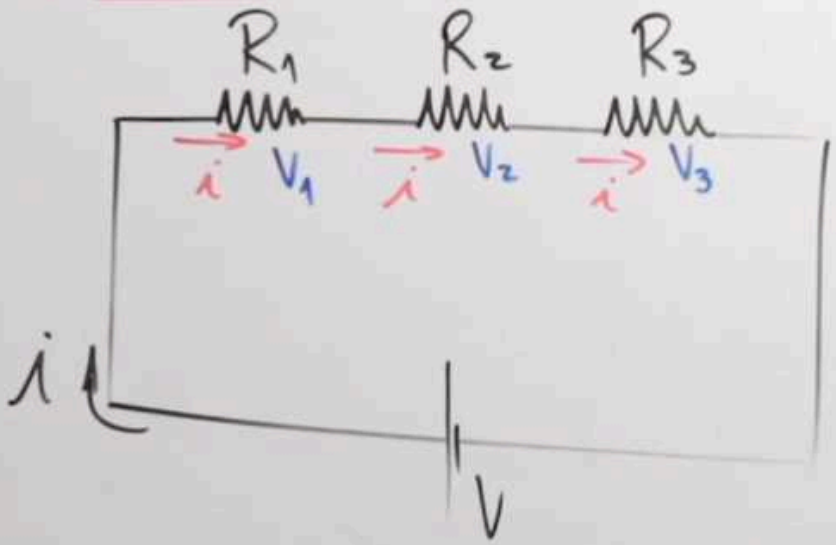
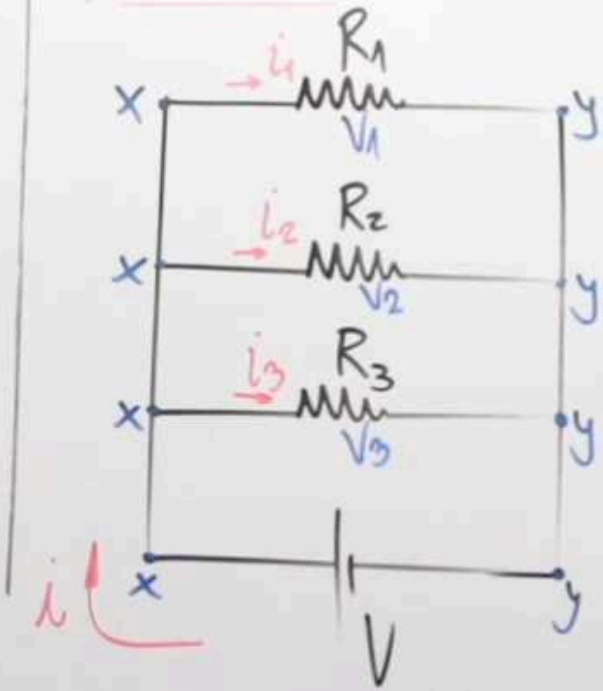
ASOCIACIÓN DE RESISTENCIAS ELÉCTRICAS:

1) SERIE:



- $V_1 + V_2 + V_3 = V$
- $R_{eq} = R_1 + R_2 + R_3$

2) PARALELO:



- $V_1 = V_2 = V_3 = V$
- $i_1 + i_2 + i_3 = i$
- $\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} = \frac{1}{R_{eq}}$
- Si son 2 resist.

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

- Si "n" resist. iguales.

$$R_{eq} = \frac{R}{n}$$

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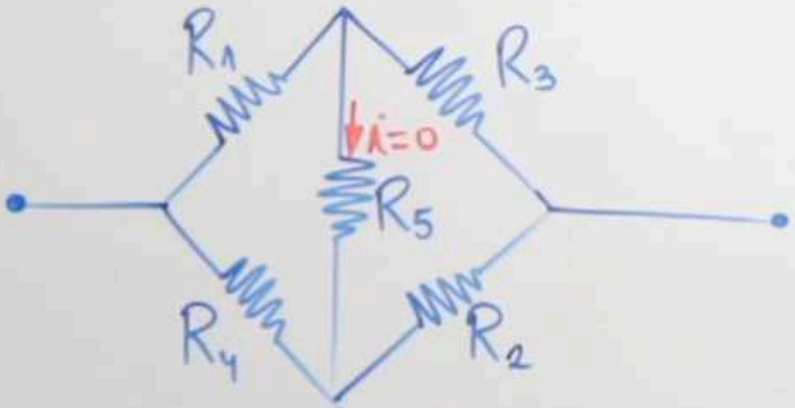
PUENTE DE WENSTHONE :



Si: $R_1 \times R_2 = R_3 \times R_4$

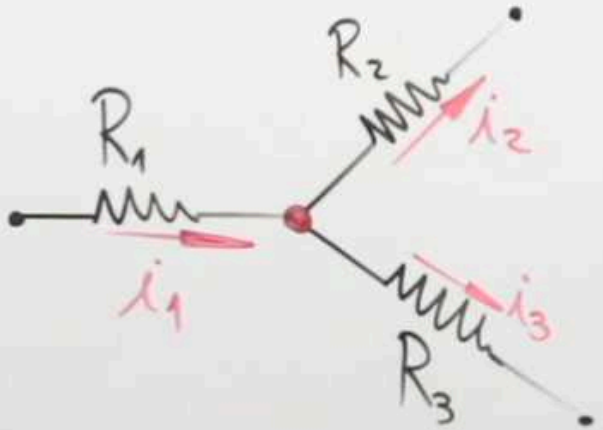
→ R_5 SE DESCONECTA.

LEYES DE KIRCHOFF :

1) LEY DE LOS NODOS :

$$\sum i_{ENTRAN} = \sum i_{SALE}$$

Ej.



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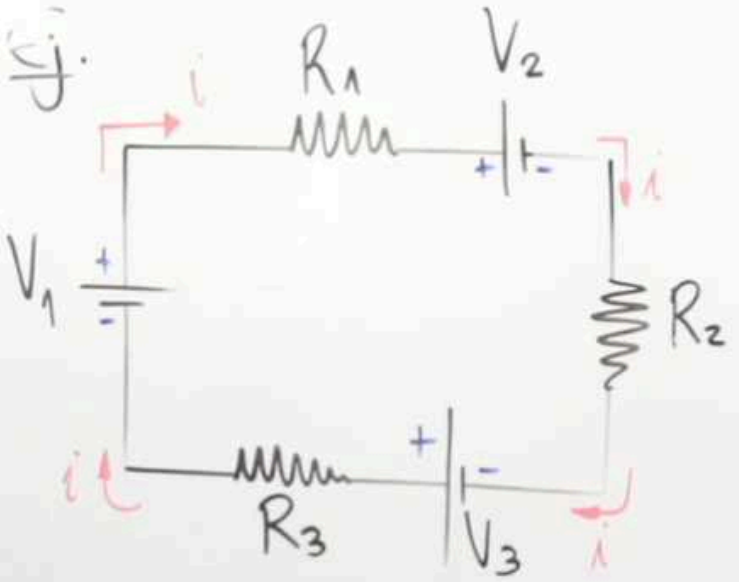
2) Ley de los Voltajes o Mallas

$$\sum V_{\text{totales}} = 0$$

Circuitos simples

$$\underbrace{\sum V}_{\text{Baterías}} = \underbrace{\sum iR}_{\text{Resistencias}}$$



$$\sum V = \sum iR$$

$$V_1 - V_2 + V_3 = iR_1 + iR_2 + iR_3$$

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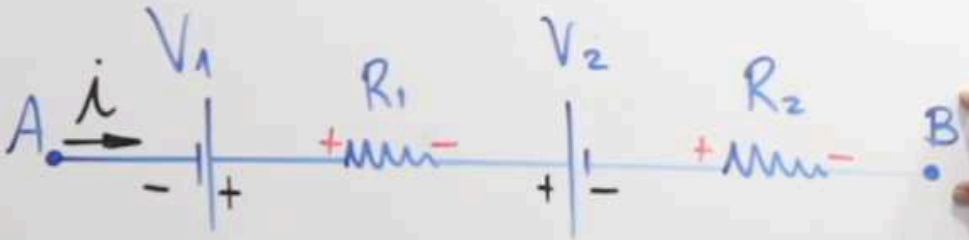
TEOREMA DE LA TRAYECTORIA :



$$V_A + V_1 - iR_1 - V_2 - iR_2 = V_B$$

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ELITE CLASS

① $i = 16mA = 16\times10^{-3}A$

$t = 10min = 600s$

$n = ?$

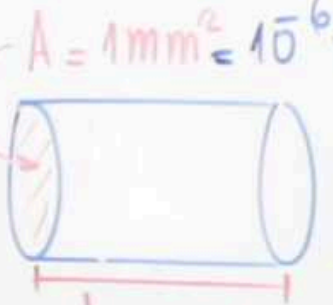
*) $q = i.t$

$q = (16\times10^{-3})(600)$

$q = 96\times10^{-1}\ C$

*) $n = \frac{q}{|e|} = \frac{96\times10^{-1}\ \cancel{C}}{1,6\times10^{-19}\ \cancel{C}} = 6\times10^{19}$

②



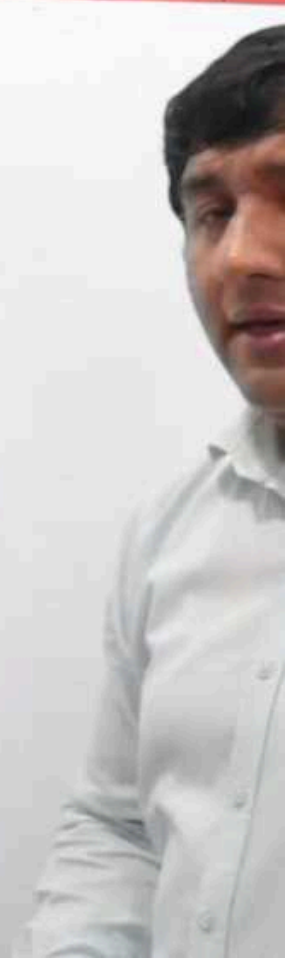
$R = 0,05\Omega$

$\rho = ?$

$R = \rho\frac{L}{A} \rightarrow \rho = \frac{R.A}{L}$

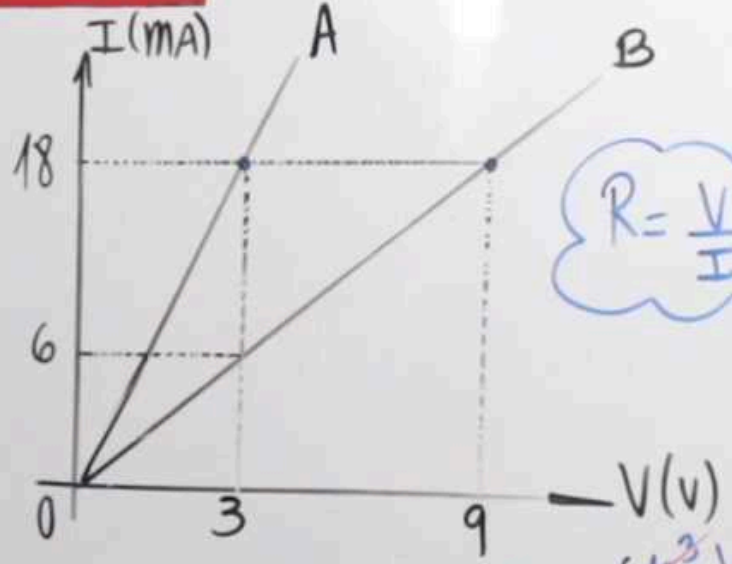
$\rho = \frac{(\cancel{5}\times10^{-2})(10^{-6})}{\cancel{5}\times10^{-1}} = \frac{10^{-8}}{10^{-1}}$

$\rho = 10^{-7}$



ÉLITE CLASS VIRTUAL

(3)



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

$R_A = \frac{3}{18\times10^{-3}}\Omega = \frac{10^3}{6}\Omega$

$R_B = \frac{9}{18\times10^{-3}}\Omega = \frac{10^3}{2}\Omega$

$\frac{R_A}{R_B} = \frac{\left(\frac{10^3}{6}\right)}{\left(\frac{10^3}{2}\right)} = \frac{2}{6} = \frac{1}{3}$

(4) $T_0 = 0°C \longrightarrow R_0 = 5\Omega$

$T_F = 100°C \longrightarrow R_F = ?$

$\alpha = 0{,}005\,°C^{-1} = 5\times10^{-3}\,°C^{-1}$

$R_F = R_0(1 + \alpha.\Delta T)$

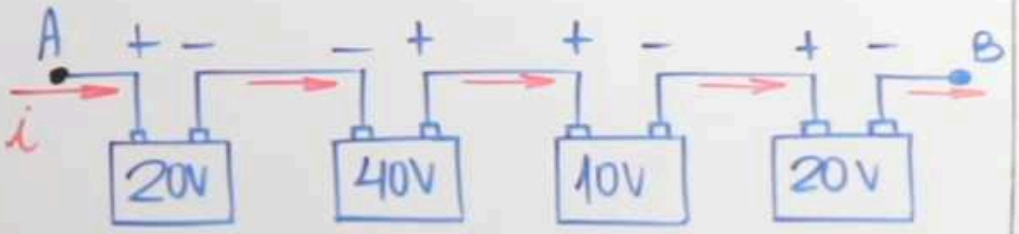
$R_F = 5(1 + 5\times10^{-3}\times100)$

$R_F = 5(1 + 0{,}5)$

$R_F = 7{,}5\Omega$

ÉLITE CLASS VIRTUAL

(5)

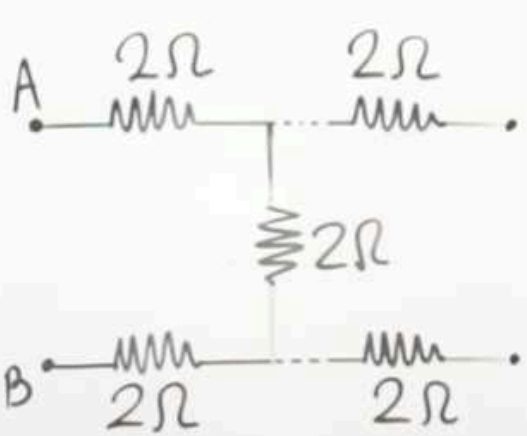


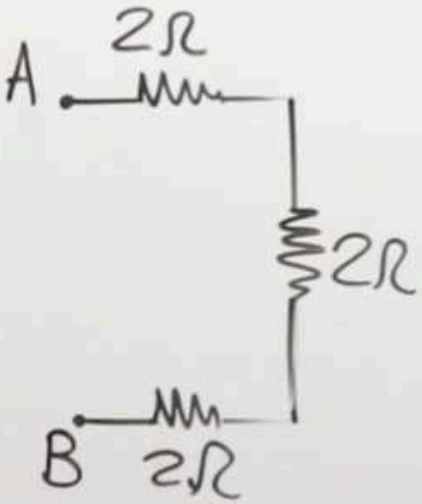
$$V_A - 20 + 40 - 10 - 20 = V_B$$

$$V_A - 10 = V_B$$

$$\rightarrow V_A - V_B = 10\,V$$

(6)



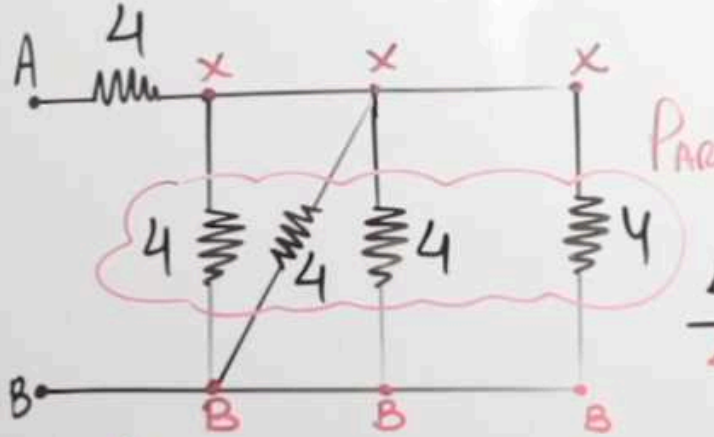


$$\therefore R_{AB} = 2+2+2$$

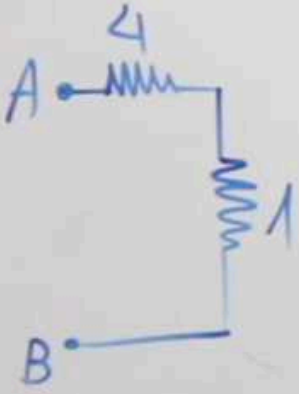
$$= 6\Omega$$

ÉLITE CLASS VIRTUAL

⑦



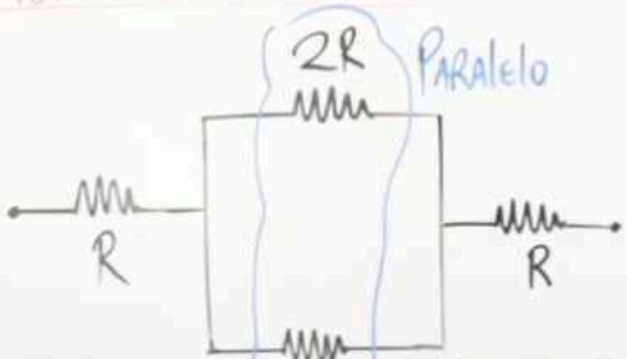
$\frac{4}{4} = 1\Omega$



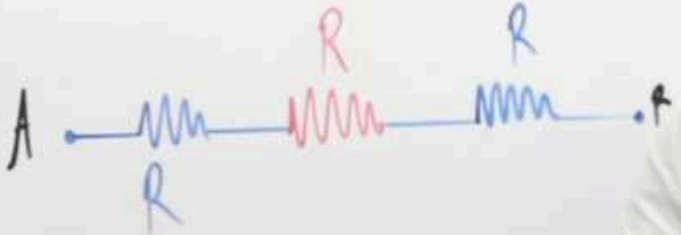
$R_{AB} = 4 + 1 = 5\Omega$

PRACTICA DE CLASE

③



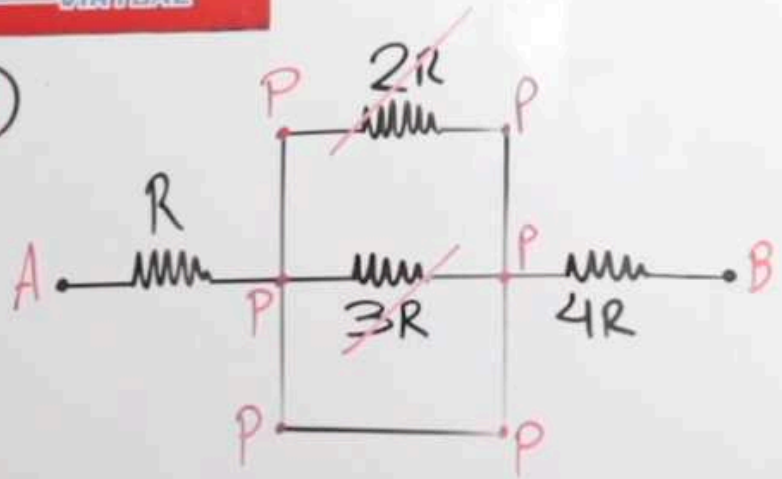
$\frac{2R}{2} = R$

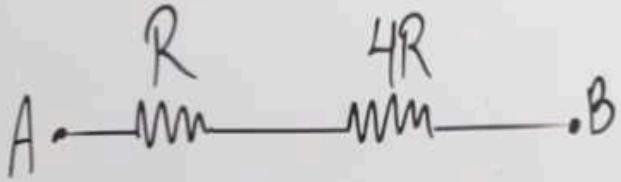


$R_{AB} = R + R + R = 3R$

ÉLITE CLASS VIRTUAL

④

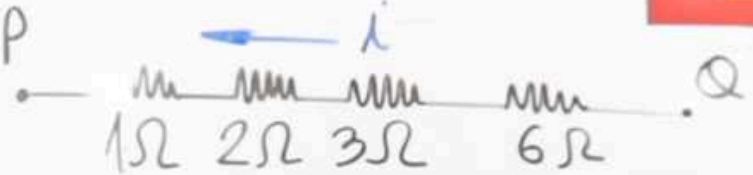


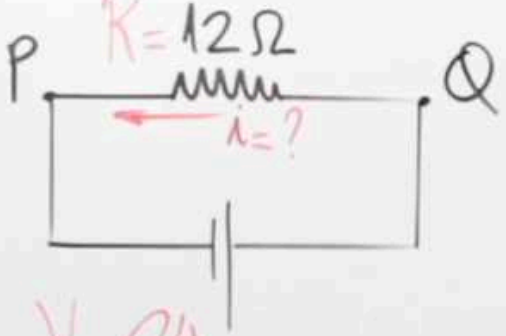


$R_{AB} = 5R$

⑤

$V_{PQ} = 24V$





$V = 24V$

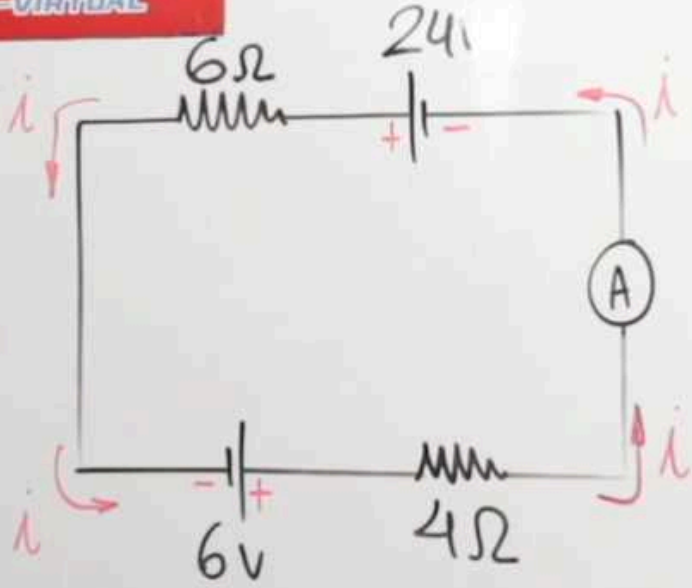
$V = iR \rightarrow 24 = i(12)$

$i = 2A$

ÉLITE CLASS VIRTUAL

ÉLITE CLASS VIRTUAL

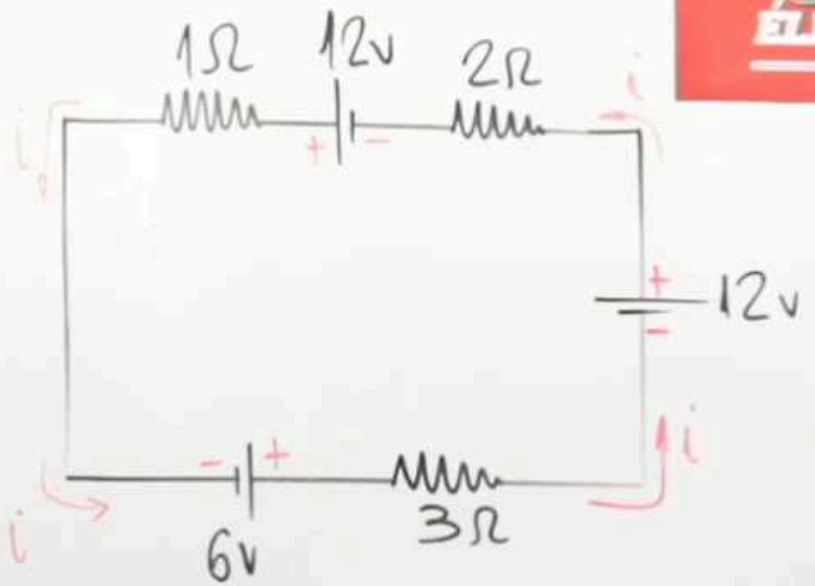
⑥



$$\sum V = \sum iR$$

$$24 + 6 = 6i + 4i \rightarrow \boxed{i = 3A}$$

⑦



$$\sum V = \sum iR$$

$$12 + 6 + 12 = 3i + 2i + 1i$$

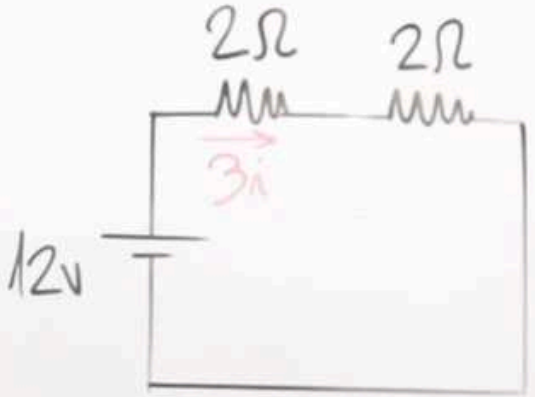
$$30 = 6i$$

$$i = 5A$$

ÉLITE CLASS VIRTUAL

⑧

$$\frac{3\times 6}{3+6} = 2$$



$V = iR$

$12 = (3i)(2+2)$

$\boxed{i = 1A}$

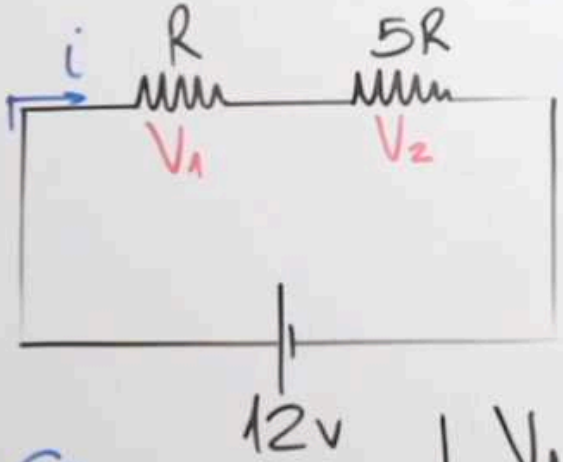
Rpta:

$2i = 2(1) = 2A$

ÉLITE CLA VIR

ÉLITE CLASS VIRTUAL

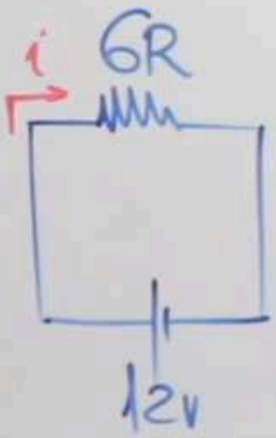
(10)



$V_1 + V_2 = 12$

$V_1 = iR = 2v$

$V_2 = i(5R) = 5(2) = 10v$



$V = iR$

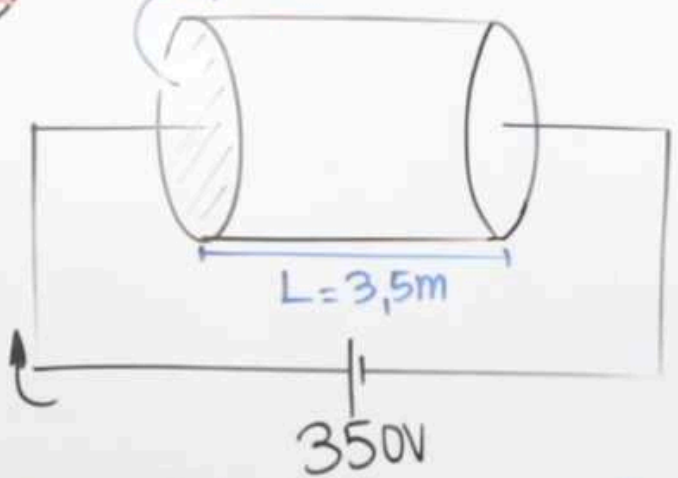
$12 = i(6R)$

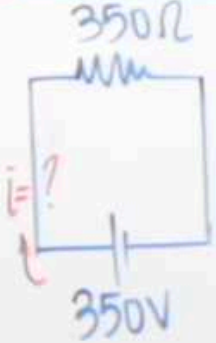
$2 = iR$

(12)

$\rho = 2 \times 10^{-4}\ \Omega m$

$A = 2mm^2 = 2 \times 10^{-6}\ m^2$





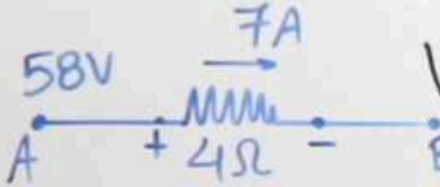
*) $R = \rho \frac{L}{A} = \frac{(2 \times 10^{-4})(3,5)}{2 \times 10^{-6}} = 3,5 \times 10^2 = 350\Omega$

*) $V = iR \rightarrow 350 = i(350)$

$i = 1A$

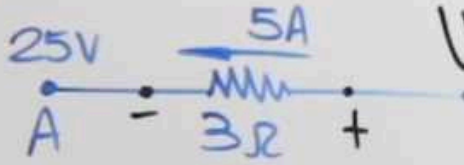
ÉLITE CLASS VIRTUAL

(14)



$\Delta V = iR$ ⇨ $58 - V_B = 7(4)$

$V_B = 30V$ ✶



$\Delta V = iR$ ⇨ $V_B - 25 = 5(3)$

$V_B = 40V$ ✶

(15)

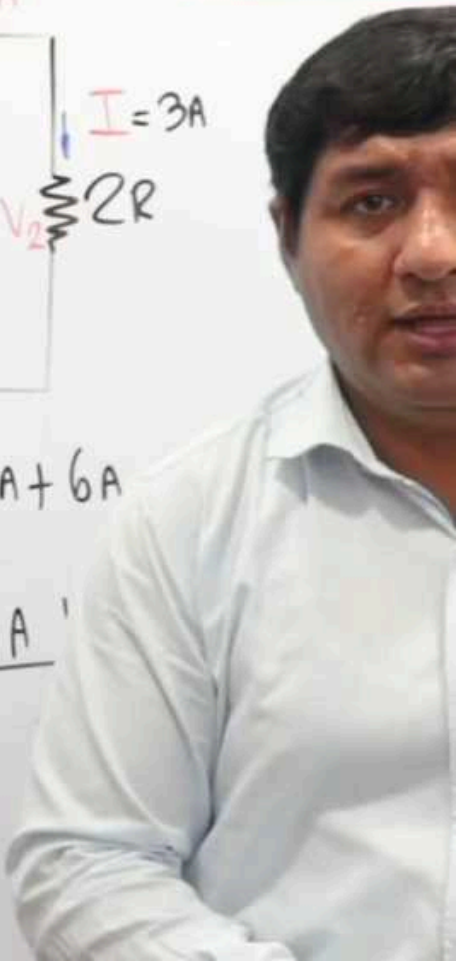
$V_1 = V_2$

$6R = I(2R)$

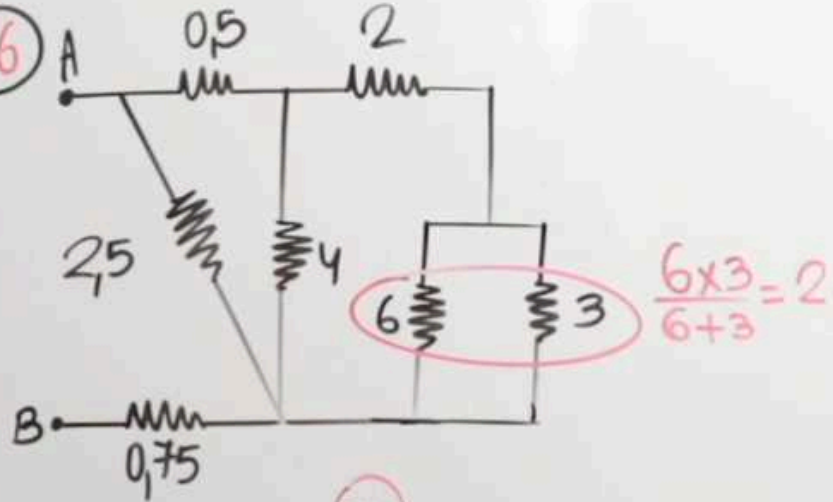
$I = 3A$

$I' = 3A + 6A$

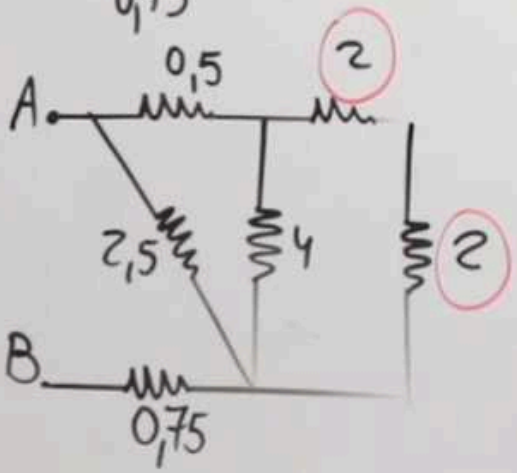
$I' = 9A$

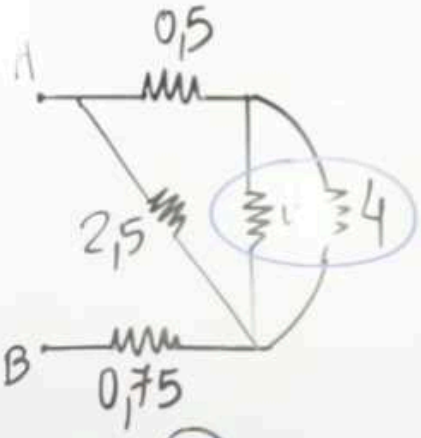


16)

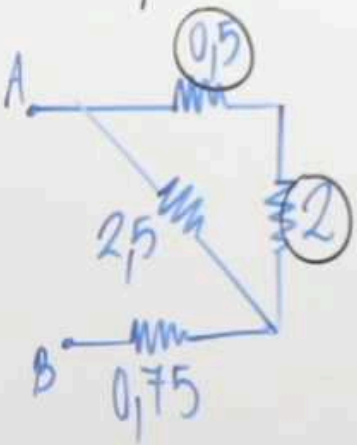


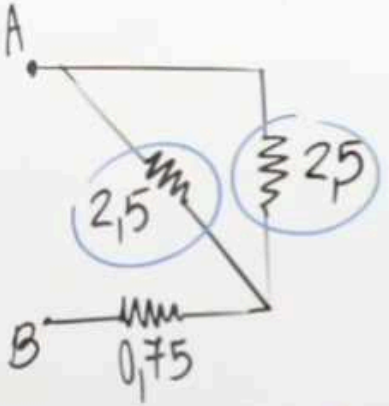
$\frac{6 \times 3}{6+3} = 2$



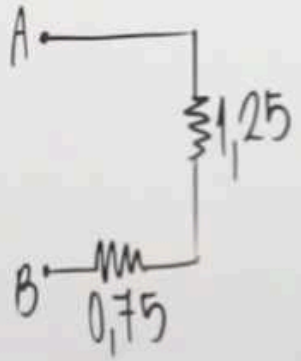


$\frac{4 \times 4}{4+4} = 2$





$\frac{2,5}{2} = 1,25$



$R_{AB} = 2\Omega$