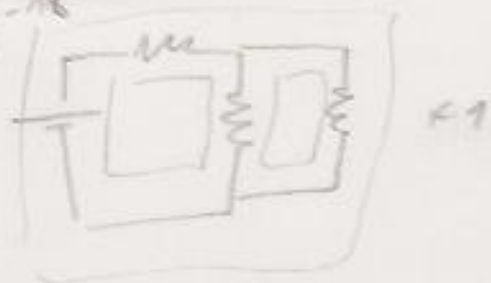
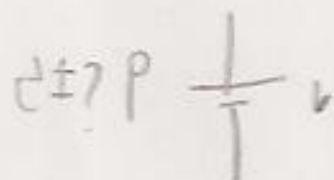
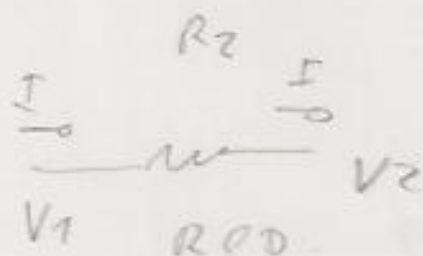


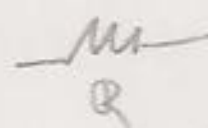
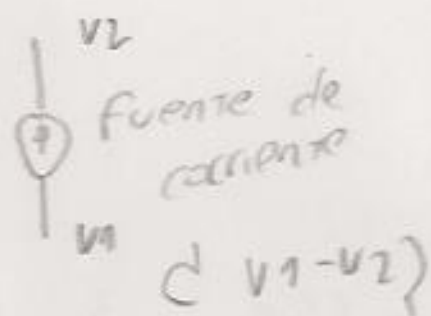
71-9-16
SEMP



PGG/10/10 RCL



$$\frac{1}{s} \rightarrow 0 \text{ V}$$



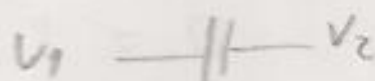
impedancia
(H) ↓

$$V_1 - V_2 = L \frac{dI}{dt}$$

$$V_1 - V_2 = 0$$

en continua

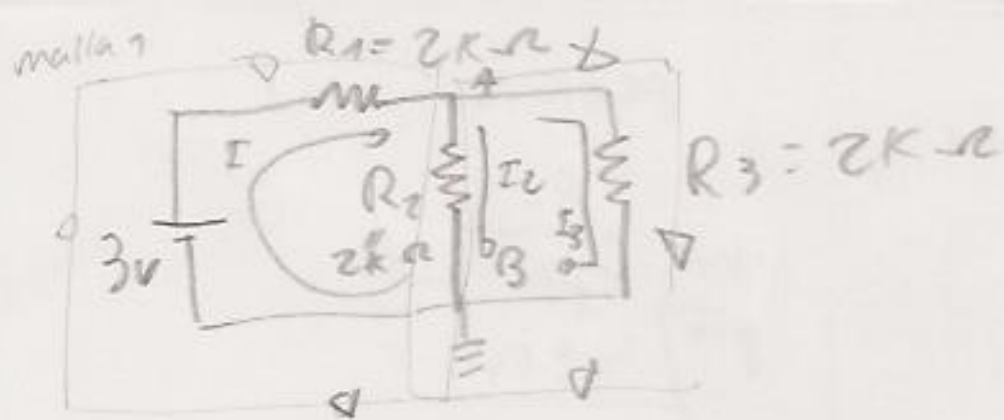
condensador



$$I = 0$$

en continua

$$C = \frac{Q}{V_1 - V_2} \quad \text{12 } \frac{1}{\mu\text{F}} \quad \text{7}$$



1ª ley.

Nodo A

$$I_1 = I_2 + I_3$$

Nodo B

$$I_2 + I_3 = I_1$$

2ª ley

Malla 1

$$3 = V_{R_1} + I_2 R_2 = 2\text{K}\Omega \rightarrow \frac{3}{2} - I_2 = I_1$$

$$I_1 \cdot R_1$$

" "
2KΩ

Malla 2

voy en contra de la corriente
la caída de tensión no
es una caída en este
caso (no)

$$0 = I_3 \cdot R_3 + (-I_2 R_2)$$

" "
2KΩ

$$7I_3 - 2I_2 = 0$$

$$I_3 = I_2$$

②

$$2I_3 - 2I_2 = 0$$

$$\frac{3}{2} - I_2 = I_2 + I_2 \rightarrow \frac{3}{2} = 3I_2 \quad I_2 = \frac{1}{2} \text{ mA}$$

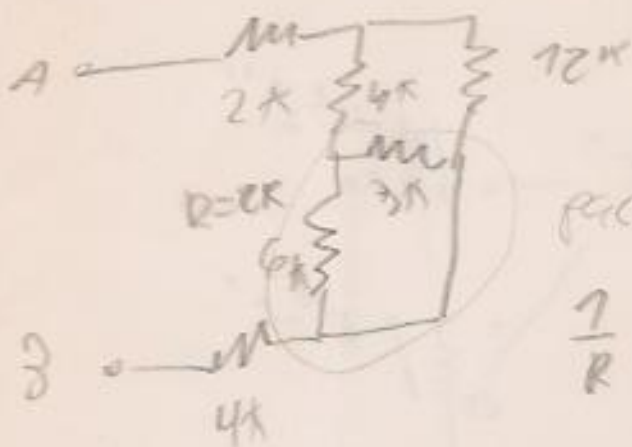
$$V = IR$$

$$\begin{matrix} V & A & R \end{matrix}$$

$$V = IAR$$

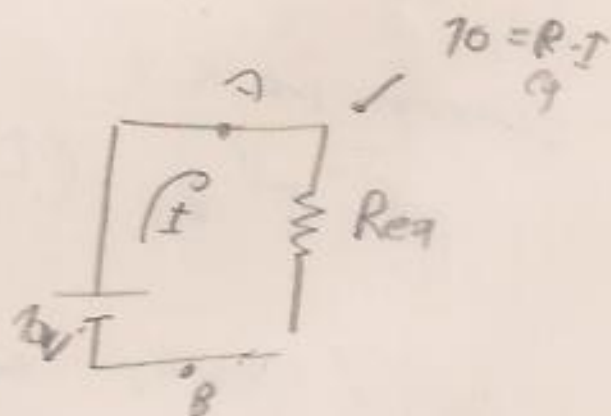
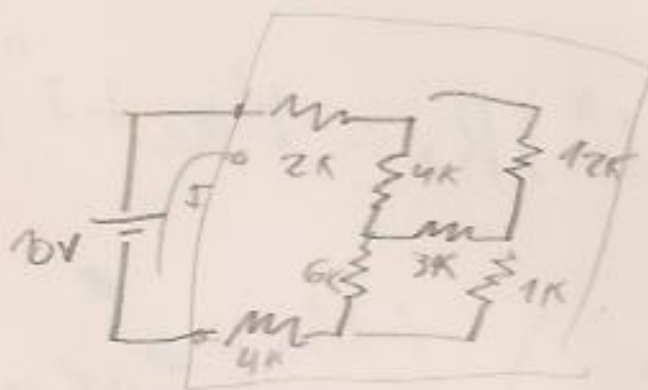
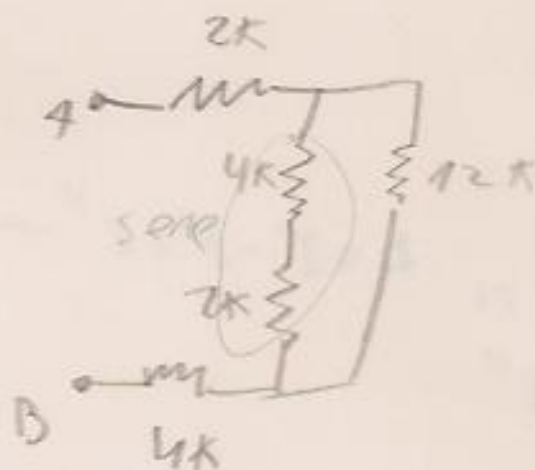
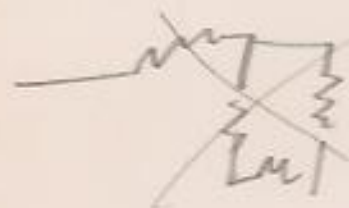
$$I_1 = 1 \text{ mA}$$

26-9-18

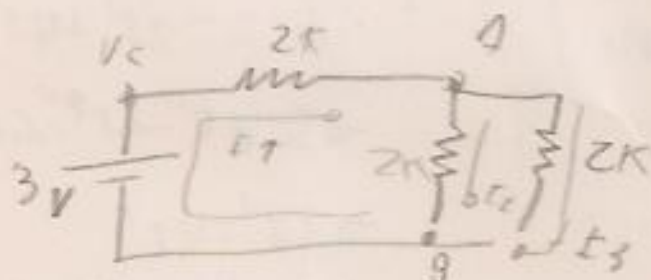


Req 10/6

$$\frac{1}{R} = \frac{1}{6} + \frac{1}{3} = \frac{3}{6} = \frac{1}{2} \quad R=2$$



$$10 = R \cdot I$$



$$V_A - V_B = I_2 \cdot 2 = 1V$$

$$V_C - V_D = I_1 \cdot 2 = 2V$$

Corrente
de ~~10V~~
para

$$I_1 = 1mA$$

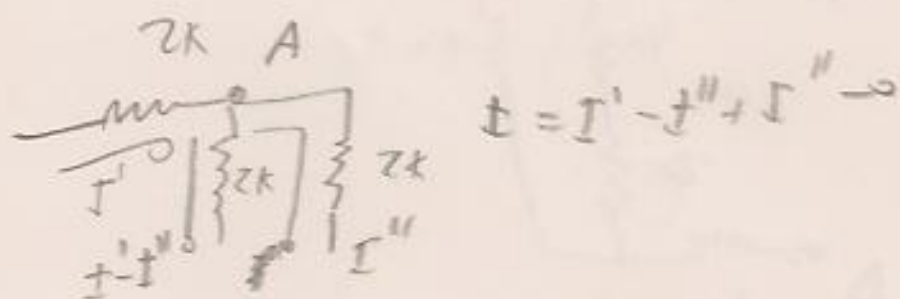
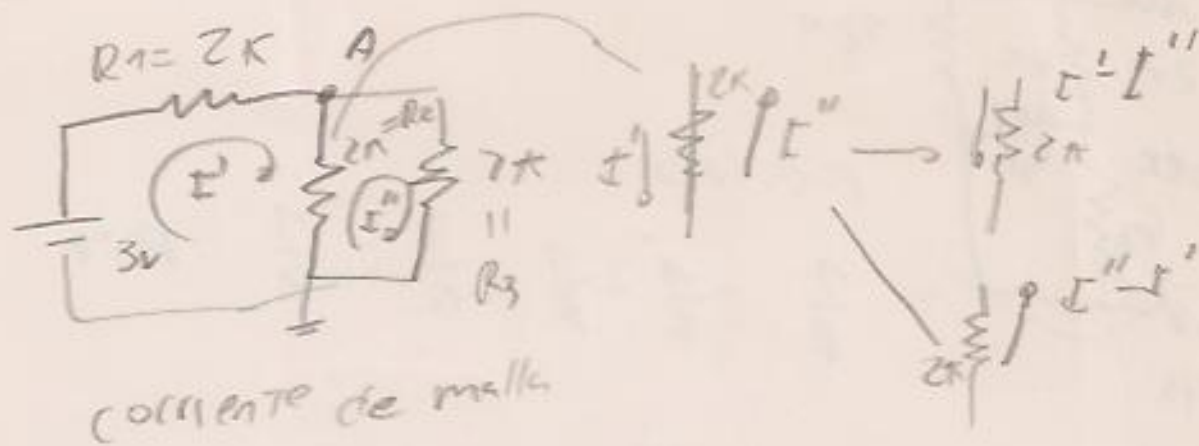
$$I_2 = 0.5mA$$

$$I_3 = 0.5mA$$

Usando del
dico de

1

metodo de las mallas



Ecuación malla 1

$$3 = I' \cdot R_1 + (I' - I'') R_2 = I' (R_1 + R_2) - I'' R_2$$

Ecuación malla 2

$$0 = I'' R_3 - (I' - I'') R_2 = -I' R_2 + I'' (R_3 + R_2)$$

$$\begin{pmatrix} 3 \\ 0 \end{pmatrix} = \begin{pmatrix} R_1 + R_2 & -R_2 \\ -R_2 & R_3 + R_2 \end{pmatrix} \begin{pmatrix} I' \\ I'' \end{pmatrix}$$

$$\begin{aligned} 3 &= 4I' - 2I'' \\ 0 &= -2I' + 4I'' \end{aligned}$$

1. Diagonal - positiva
Fuera diagonal - negativa

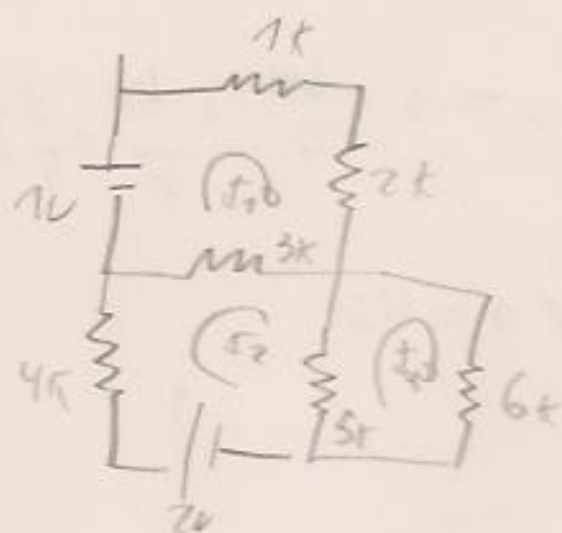
2. Diagonal suma de resistencias
de la malla

$$\begin{aligned} -3 &= 8I'' - 2I' = 6I'' \\ \Rightarrow 2I' &= 4I'' \\ I' &= 2I'' \end{aligned}$$

(7)

3. find diagonal Resistances coming

4. simplify



mesh 1

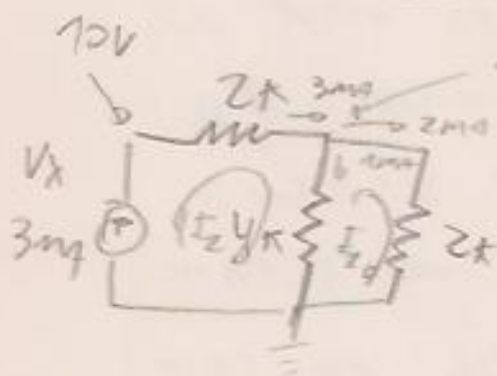
$$1 = 16 - 3I_2 + 0I_3$$

mesh 2

$$2 = 3I_1 + I_2 - I_3$$

mesh 3

$$0 = 0I_1 - I_2 + I_3(6+5)$$



$$I_1 = 3 \text{ mA}$$

mesh 1:

$$V_x = I_1(2+4) - 4I_2$$

$$0 = -I_1 + I_2(2+4)$$

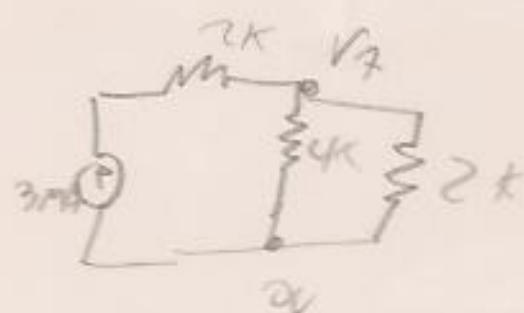
$$\rightarrow 0 = -12 + 6I_2 \rightarrow I_2 = \frac{12}{6} = 2 \text{ mA}$$

$$I_1 = 3 \text{ mA}$$

$$V_x = 6I_1 - 4I_2 = 18 - 8 = 10 \text{ V}$$

Des

metodo de los nodos



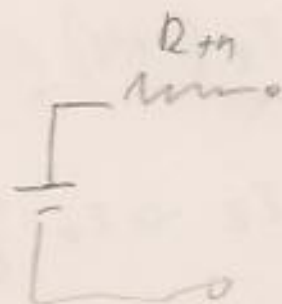
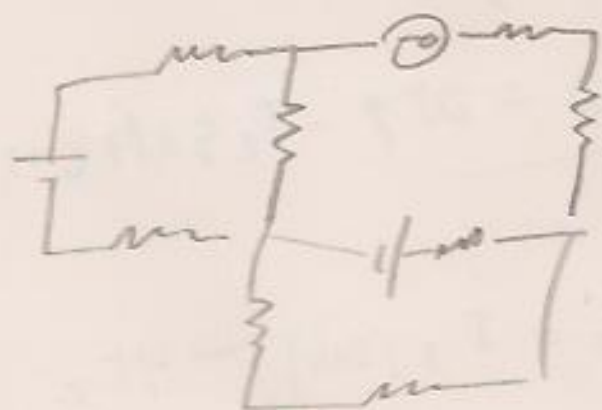
Nodo A.

$$3 + \frac{0 - V_A}{4} + \frac{0 - V_A}{2} = 0$$

$$\Rightarrow 0 \Rightarrow 3 = \frac{V_A}{4} + \frac{V_A}{2} = \frac{3}{4} V_A$$

$$V_A = 4V$$

Equivalente thvenin



LA CIRCUITO

esto de los dos

terminales A, B

para el circuito

por una fuente

donde V_{th} es la

en las resistencia

R_{th}

1° andamos AC Pente

2° calculamos Roy entre A y B

Ejercicio 3 Figura 4



1 sola malla

$$5 = I Req$$

$$Req = \frac{5}{I}$$

negativo para no ser
la misma malla + la malla 2/3

Malla 1

$$5 = I_1(20 + 10 + 9) - I_2(10) - 20I_3(20)$$

malla 2

$$0 = -10I_1 + 25I_2 - 5I_3$$

malla 3

$$0 = -20I_3 - 5I_2 + 34I_3$$

$$I_2 = \frac{5I_3}{25}$$

$$I_2 = \frac{34I_3 - 20I_3}{5}$$

igualación

$$\frac{10I_1 + 5I_3}{25} = \frac{34I_3 - 20I_3}{5}$$

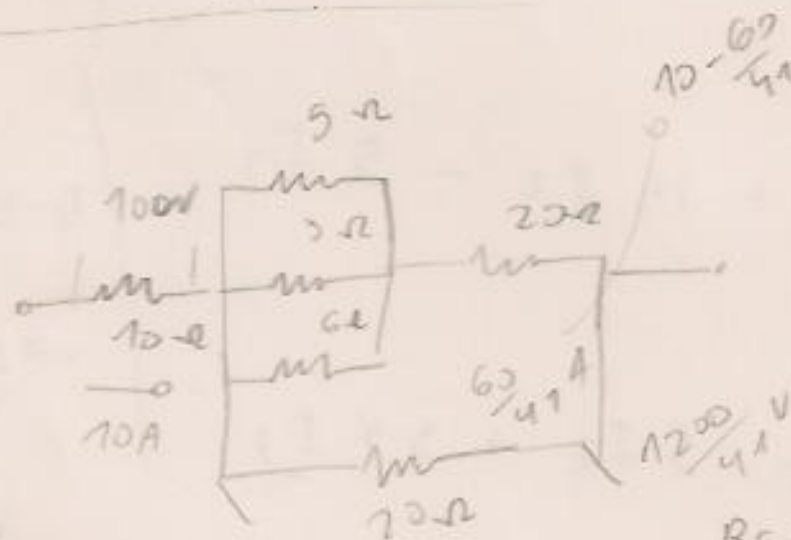
metodo * Kuroi

$$I_1 = \frac{\begin{vmatrix} 34 & -10 & -20 \\ -10 & 25 & -5 \\ -20 & -5 & 34 \end{vmatrix}}{\begin{vmatrix} 5 & -10 & -20 \\ 0 & 25 & -5 \\ 0 & -5 & 34 \end{vmatrix}} = 16775$$

$$\begin{vmatrix} 5 & -10 & -20 \\ 0 & 25 & -5 \\ 0 & -5 & 34 \end{vmatrix} = 4925$$

$$I_1 = \frac{4925}{16775} = 0,29 \text{ mA}$$

$$R_{eq} = \frac{5}{I_1} = \frac{5}{0,29} = 20 \text{ K}$$



$$V = I R$$

$$100 = I \cdot 10$$

$$I = 10 \text{ A}$$

Rams greek

$$\frac{1}{R} = \frac{1}{5} + \frac{1}{3} + \frac{1}{6} = \frac{2}{15}$$

$$R = \frac{15}{2} = 7,5$$

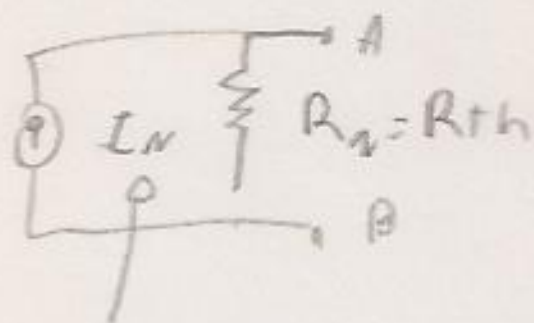
$$\frac{10}{7} \text{ A}$$

$$\frac{1}{\frac{30}{21} + 2} + \frac{1}{20} = \frac{1}{R} \quad R = \frac{120}{41} \Omega$$

$\frac{1200}{41} V$

Equivalente Norton

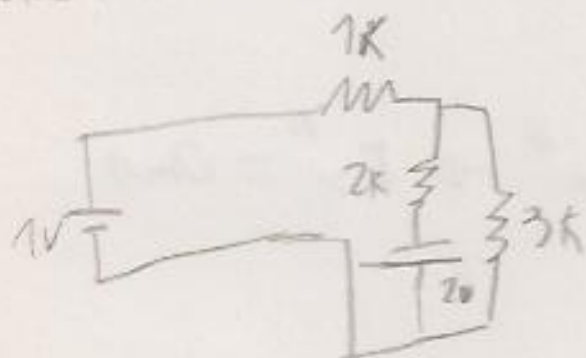
3-10-78



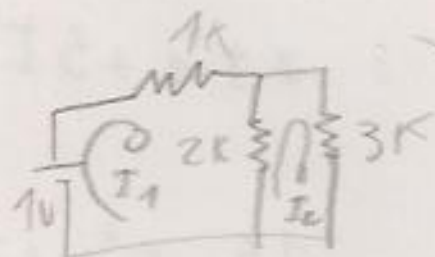
V_{th}

R_{th}

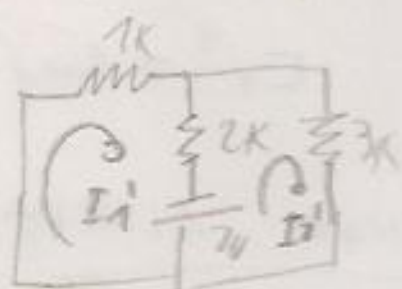
Principio de superposición



→ (A)



→ (B)



mallo 1

$$1 = 3I_1 - 2I_2 \rightarrow 1 = \frac{15}{2}I_2 - 2I_2 = \frac{11}{2}I_2 \rightarrow I_2 = \frac{2}{11} \text{ mA}$$

mallo 2

$$0 = -2I_1 + 5I_2 \rightarrow I_1 = \frac{5}{2}I_2 \rightarrow \frac{5}{11} \text{ mA} = I_1$$

mallo 1

$$2 = 3I'_1 - 2I'_2 \rightarrow 2 = 3\left(\frac{5}{2}I'_2 + 1\right) - 2I'_2 \rightarrow 2 = \frac{15}{2}I'_2 + 3 - 2I'_2 \rightarrow 2 = \frac{11}{2}I'_2 + 3 \rightarrow -1 = \frac{11}{2}I'_2 \rightarrow I'_2 = -\frac{2}{11} \text{ mA}$$

mallo 2

$$-2 = -2I'_1 + 5I'_2$$

$$\rightarrow I'_1 = \frac{5I'_2 + 2}{2} = \frac{5}{2}I'_2 + 1$$

$$2 = \frac{15}{2} I_2' + 3 - 2I_2' = \frac{11}{2} I_2' + 3$$

$$I_2' = -\frac{2}{11} \text{ mA}$$

$$\begin{cases} 3 = 3 I_1'' - 2 I_2'' \\ -2 = -2 I_1'' + 5 I_2'' \end{cases} \rightarrow I_1'' = \frac{5 I_2'' + 2}{2} = \frac{5}{2} I_2'' + 1$$

$$3 = \frac{15}{2} I_2'' + 3 - 2 I_2'' \rightarrow I_2'' = 0 \text{ mA}$$

$$I_1'' = 1 \text{ mA}$$

CORRENTE ALTERNADA

$v(t)$

$i(t)$

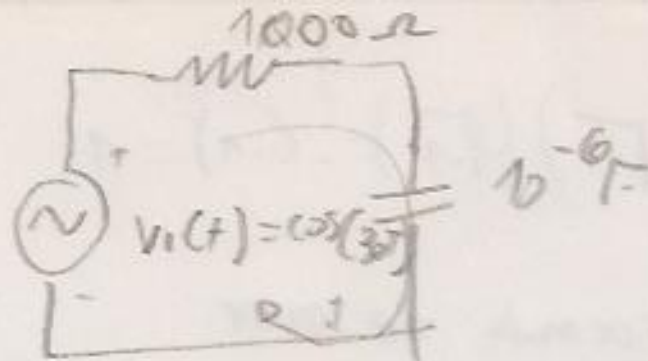
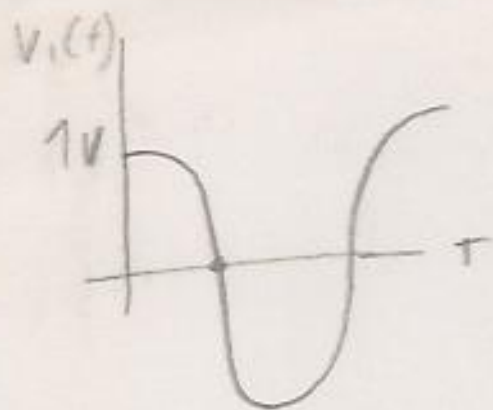
condensador C
 $i(t) = C \frac{dv}{dt}$

v_1 v_2

bobina L

$v(t) = L \frac{di(t)}{dt}$

$v_1(t) = \cos(30t)$



$$\text{mF } 10^{-3}$$

$$\mu\text{F } 10^{-6}$$

$$\text{nF } 10^{-9}$$

$$\text{pF } 10^{-12}$$

Kirchoff

$$\cos(30t) = 1000 i + v_C = 1000 \cdot 10^{-6} \frac{dv_C}{dt} + v_C$$

$$i = C \frac{dv_C}{dt}$$

Porque están en serie

queremos sacar $v_C(t)$ que es una función de tiempo

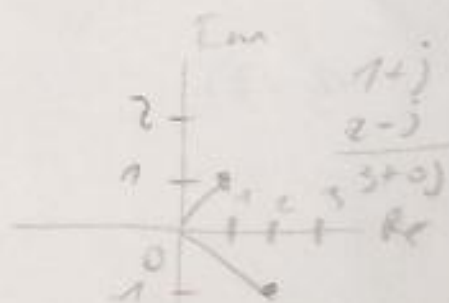
Números complejos

$$x^2 + 1 = 0$$

$$x^2 = -1$$

$$x = \pm \sqrt{-1} = \pm j$$

$$a + bj$$



$$(1+j) \cdot (2-j) = 2-j+2j+(-j)(-j) = 2-j+2j+(-1) = 1+j$$

(3)

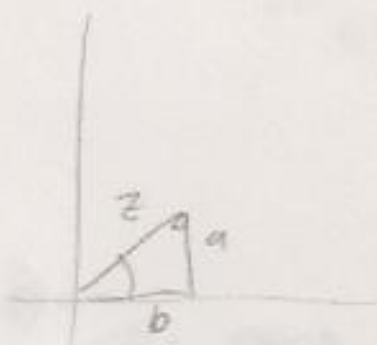
$$(\sqrt{-1})(-\sqrt{-1}) = -(-1) = 1$$

Formula de euler

$$e^{jx} = \cos(x) + j \sin(x)$$

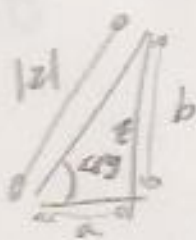
Coordenadas

polaros



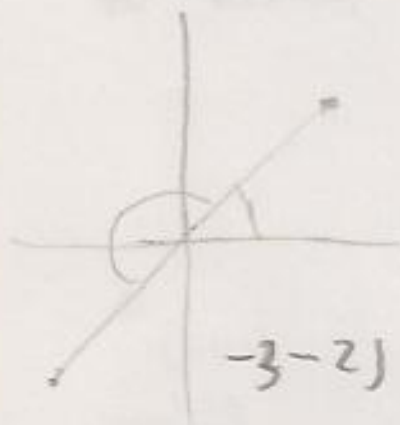
$$|z| = \sqrt{a^2 + b^2}$$

$$\arg z = \arctan\left(\frac{b}{a}\right)$$



$$\tan(\arg z) = \frac{b}{a}$$

$$\arg z = \arctan\left(\frac{b}{a}\right)$$



$$3+2j$$

$$\arg\left(\frac{2}{3}\right) = 33.7^\circ$$

$$\arg\left(\frac{-2}{-3}\right) = 33.7^\circ + \pi$$

$$a = |z| \cos(\arg z)$$

$$\cos(\arg z) = \frac{a}{|z|}$$

$$b = |z| \sin(\arg z)$$

$$\arg z \left\{ \begin{array}{l} \arctan\left(\frac{b}{a}\right) \text{ si } a > 0 \\ \arctan\left(\frac{b}{a}\right) + \pi \text{ si } a < 0 \end{array} \right.$$

$$z = |z| \cos(\arg z) + j |z| \sin(\arg z)$$

$$z = |z| (\cos(\arg z) + j \sin(\arg z))$$

$$e^{j \arg z}$$

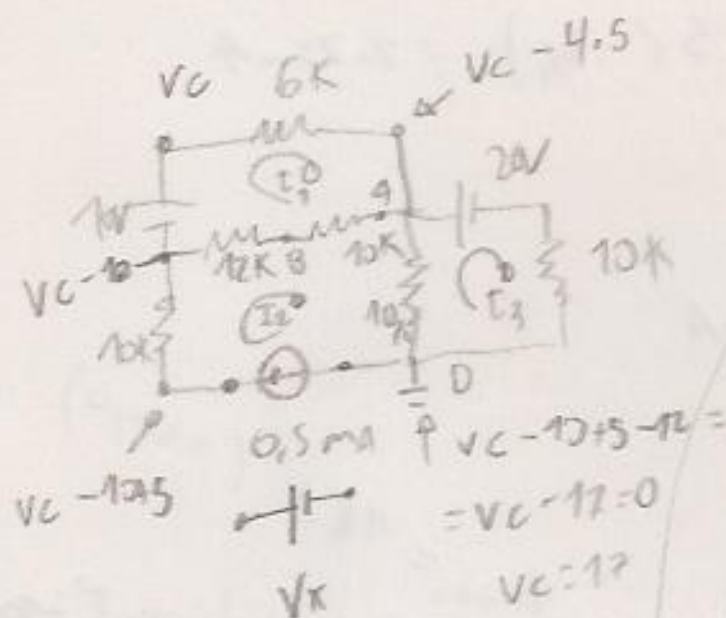
$$z = |z| e^{j \arg z} = a + jb$$

forma
polo

binomial

Rekcion 1

5-12-18



mallo 1

$$0 = 28 I_1 - 22 I_2 - 0 I_3$$

mallo 2

$$V_x = -22 I_1 + 4 I_2 - 10 I_3$$

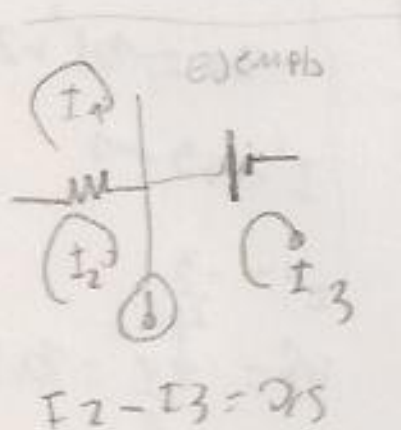
mallo 3

$$-20 = 0 I_1 - 10 I_2 + 20 I_3$$

$$I_2 = 0.5 \text{ mA}$$

$$-20 = -5 + 20 I_3$$

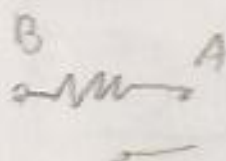
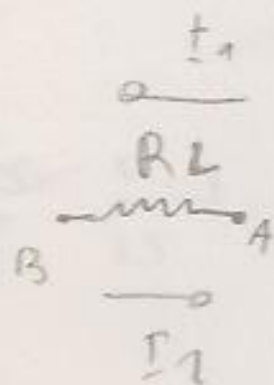
$$I_3 = \frac{-15}{20} = -\frac{3}{4} \text{ mA}$$



$$10 = 28 I_1 - 11$$

$$I_1 = \frac{21}{28} = \frac{3}{4} \text{ mA}$$

$$V_x = -16.5 + 21 + 7.5 = 12 \text{ V}$$



$$I_1 - I_2 = 0.75 - 0.15 = 0.25 \text{ mA}$$

$$V_A - V_B = 0.25 \times 100 = 25 \text{ V}$$

①

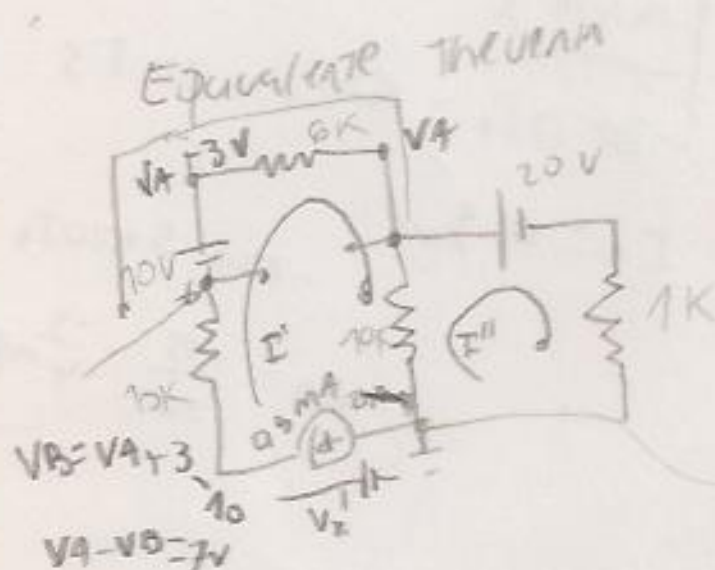
$$V_C = 4.5$$

$$25 \parallel 10 \parallel 3 = 3.4$$

$$V_C - 4.5 = 12.5$$

$$60.5(-3.4) = 1.25 \text{ mA}$$

$$1 \parallel -\frac{3}{5} - 0.5 = 1.29 \text{ mA}$$



$$R_{th} = 18K$$

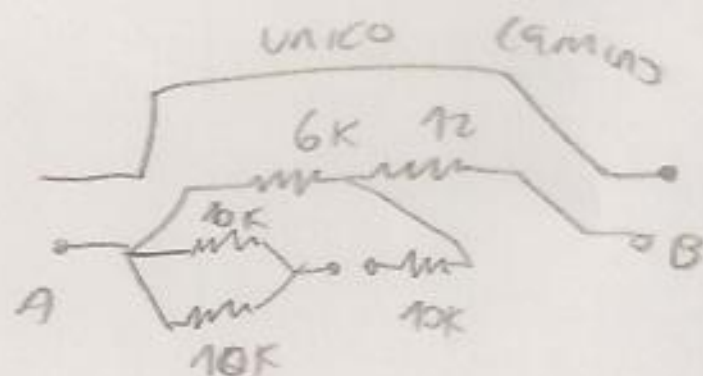
$$10V_x' = 26I' - 10I'$$

$$-20 = -10I' + 20I'$$

$$I' = 0.9 \text{ mA}$$

$$I'' = -\frac{3}{4}$$

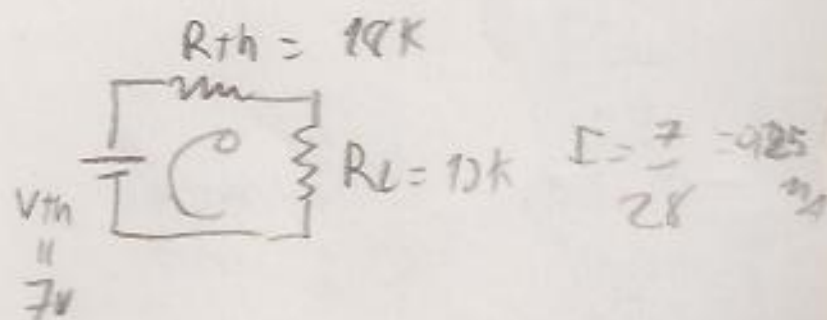
$$V_x' = \frac{21}{2} = 10.5V$$



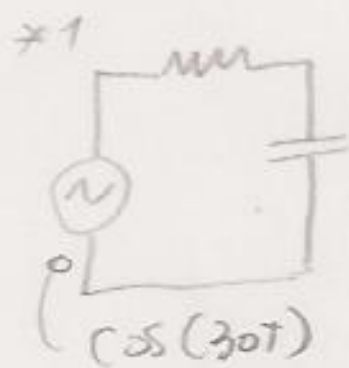
$$6K + 12K = 18K$$

$$V_{th} = V_A - V_B$$

$$V_{th} = 7V$$



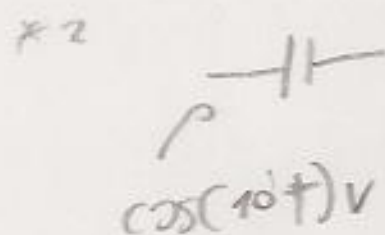
10-10-18



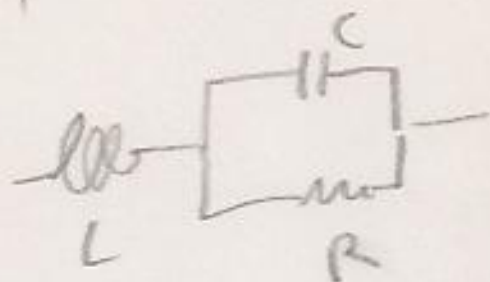
bobina

Condense

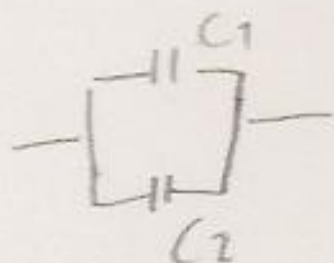
$$V = L \frac{di}{dt}$$



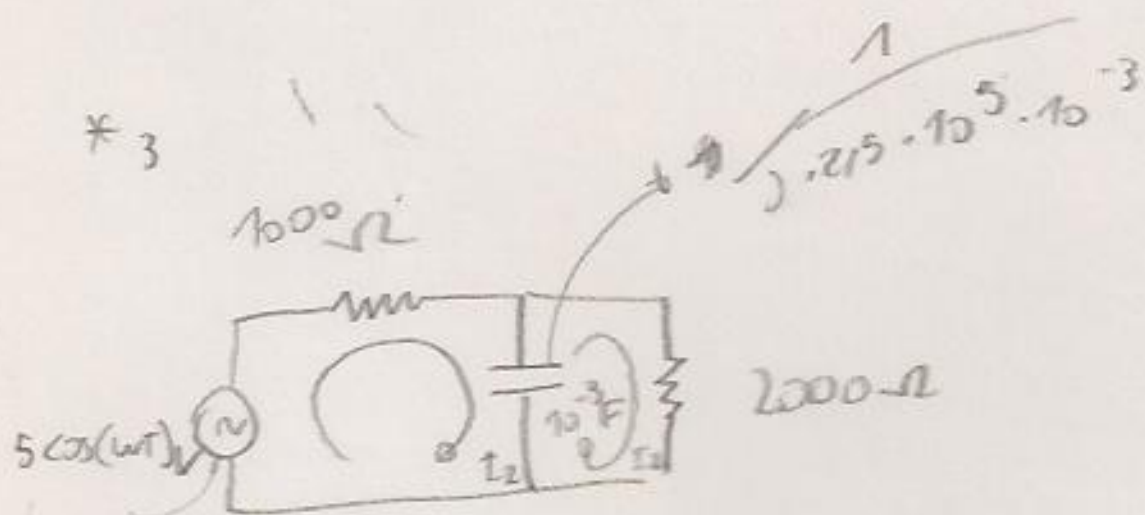
* 1



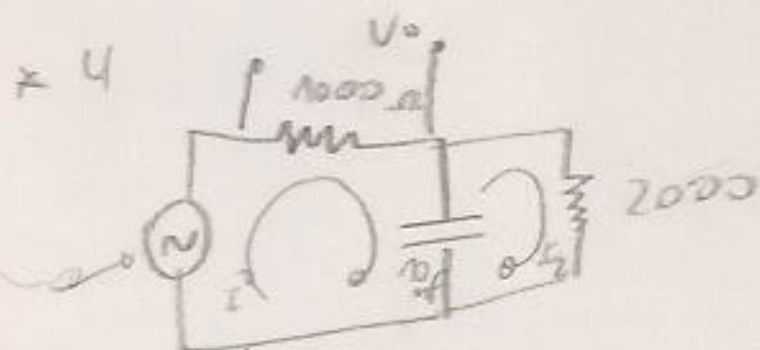
* 2

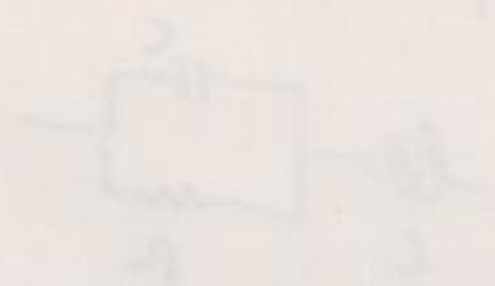
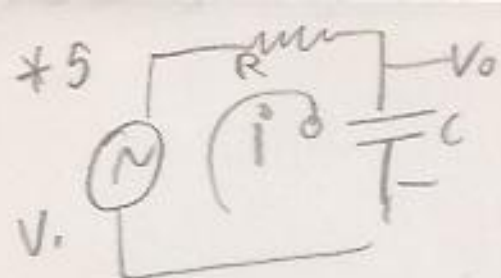


* 3

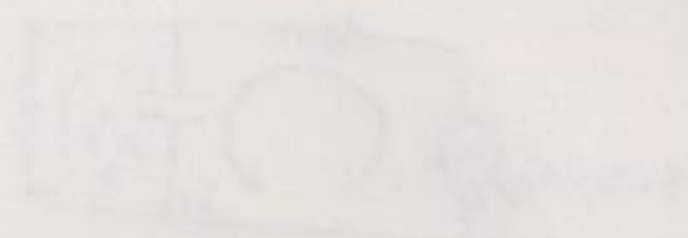


$$\omega = 2,5 \cdot 10^5 \text{ rad/s}$$

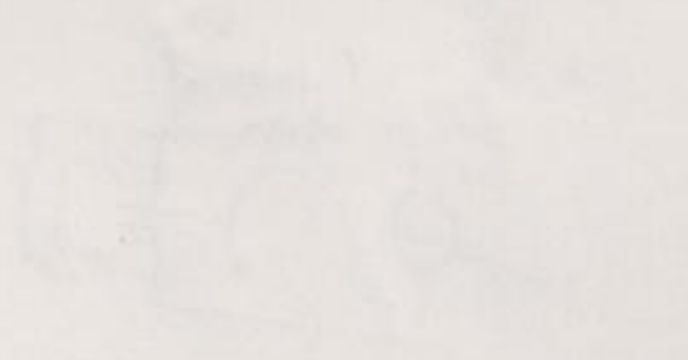




$i = C \frac{dV_0}{dt}$

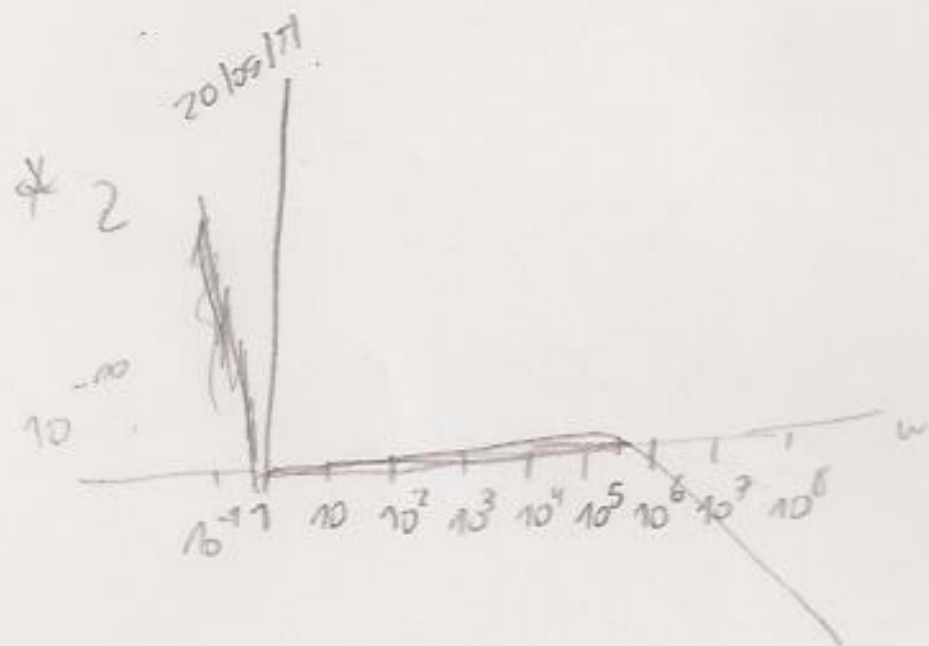
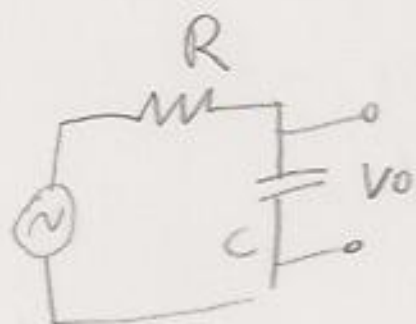


$V_0 = \frac{1}{C} \int i dt$



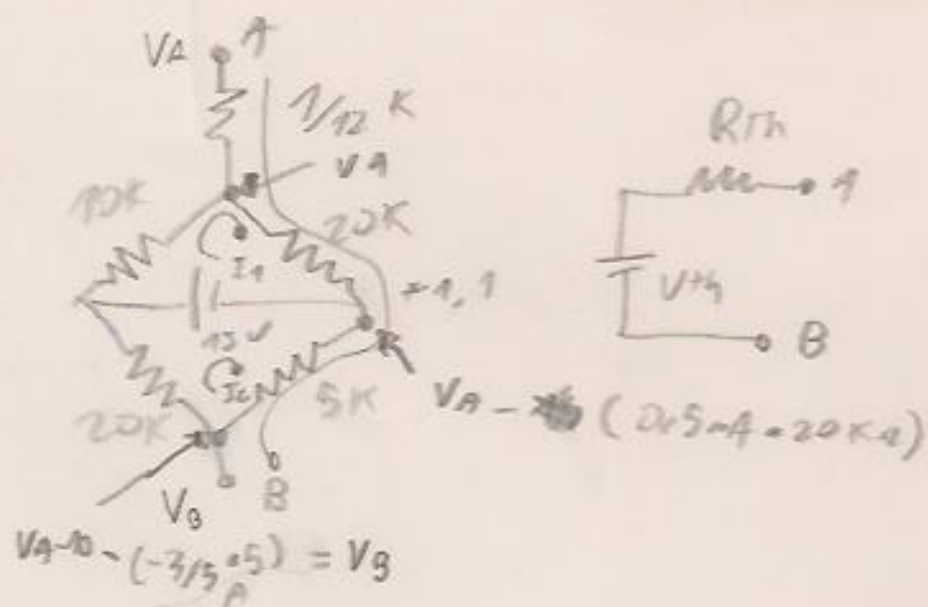
1

18-10-18

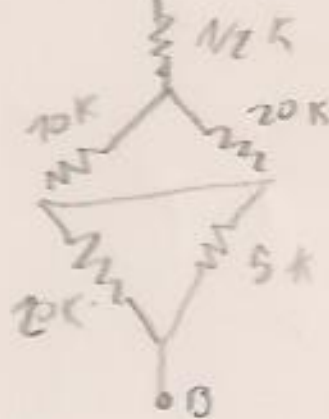


19-10-18

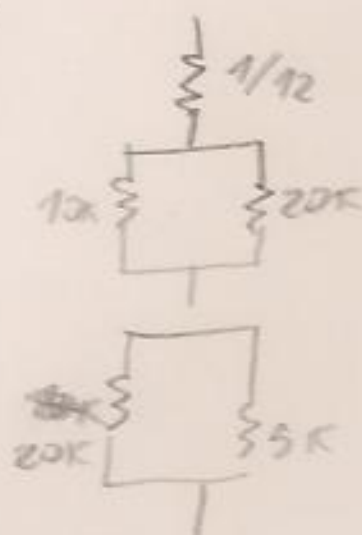
* 1



* 2

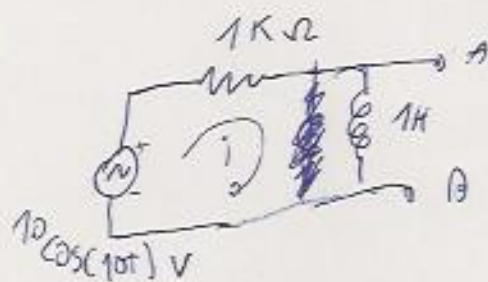
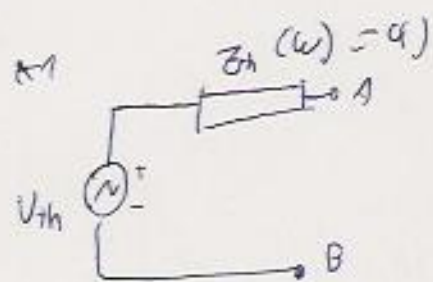


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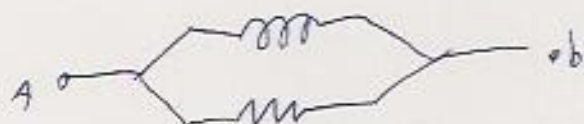


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31-10-16

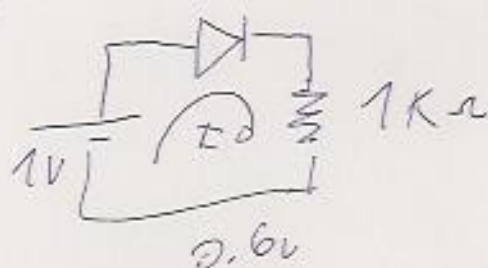


V_1

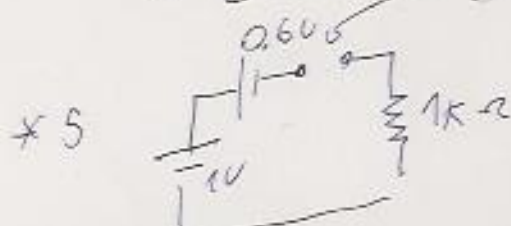
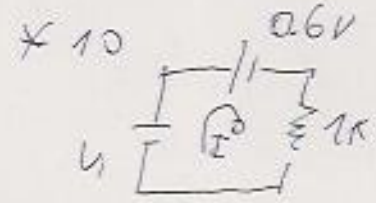
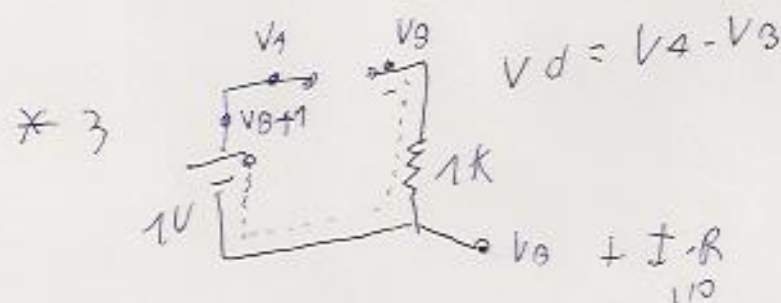
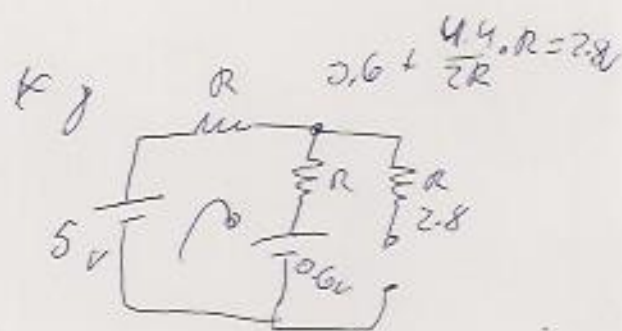
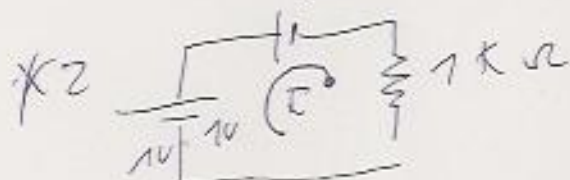
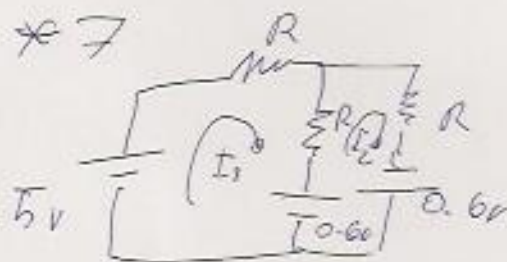


7-11-18

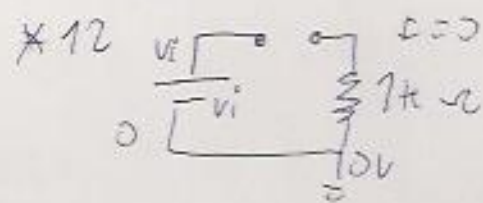
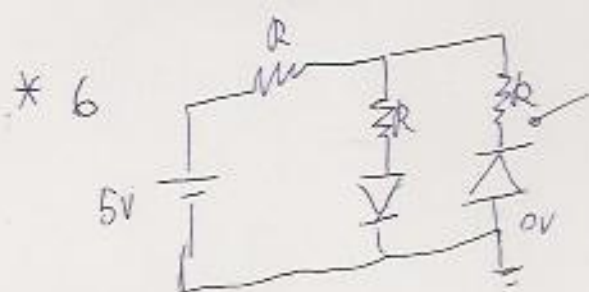
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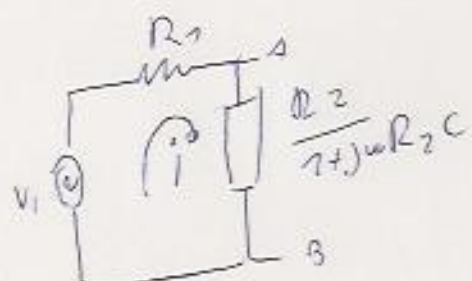
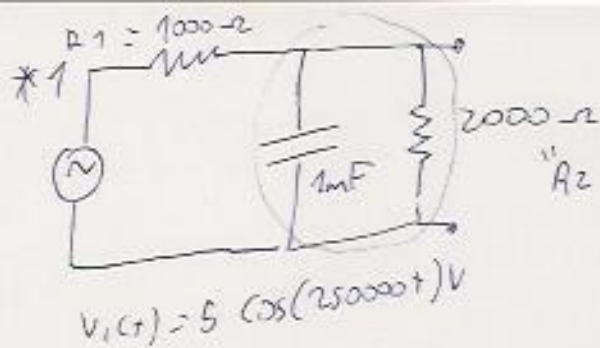


*7



*11





*2

