

**Nom del alumne/a:**

**Qualificació:**

**Criteris de qualificació:**

**Temps: 90 min**

**Observacions: Cada nombres sense unitat resta 1 punt**

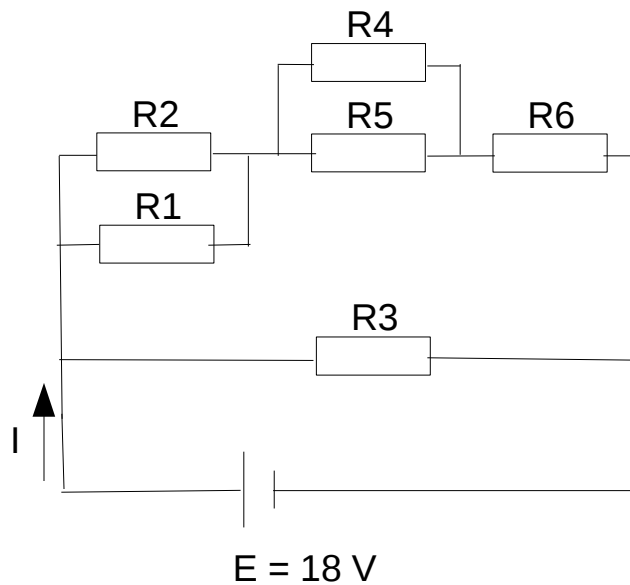
**Els exercicis 1 i 2 són per recuperar el examen del 06/11/24**

**Exercici 1:**

3p

$R_1=1\Omega \dots R_6=6\Omega$

Calcula tensions, corrents i potències en les resistències.

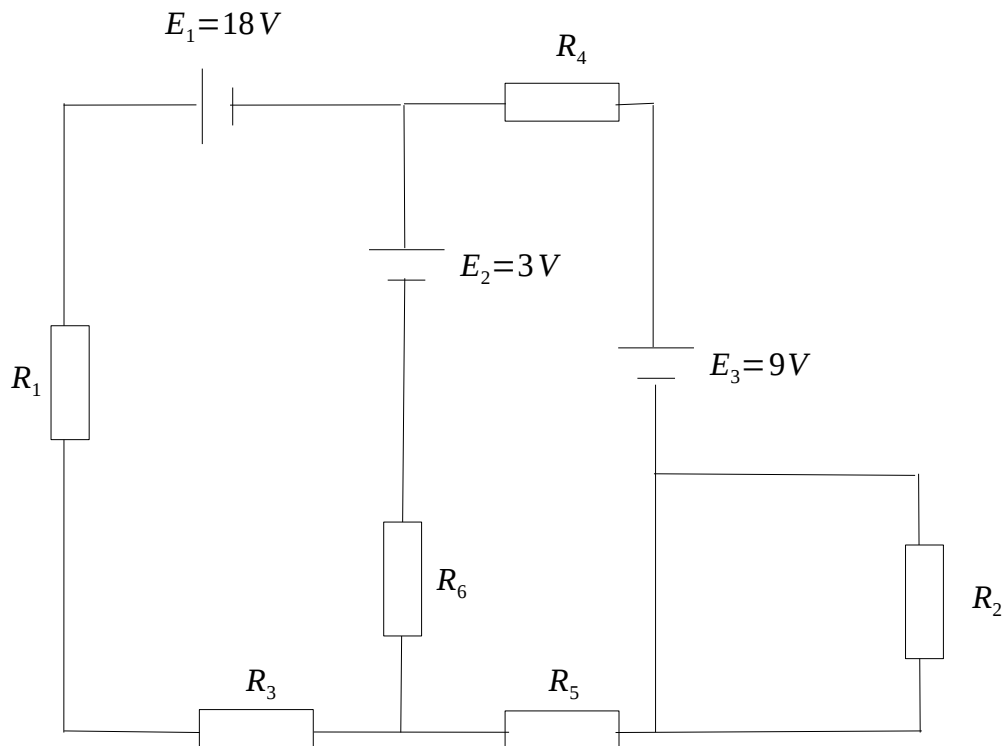


	$R_1$	$R_2$	$R_3$	$R_4$	$R_5$	$R_6$	Total
E	1,36 V	1,36 V	18V	4,5 V	4,5 V	12,2 V	18 V
I	1,36 A	0,68 A	6 A	1,13 A	0,9 A	2,03 A	8,03 A
R	$1\Omega$	$2\Omega$	$3\Omega$	$4\Omega$	$5\Omega$	$6\Omega$	$2,24\Omega$
P	1,36 W	0,92 W	108 W	5,1 W	4,05 W	24,7 W	144,5 W

**Exercici 2:**

3 p

Indica la matriu per a calcular els corrents  $I_a$  ,  $I_b$  ,  $I_c$  ,  $I_d$  ,  $I_e$  .  
 $R_1=1\Omega$  ...  $R_6=6\Omega$



The diagram shows a circuit with two meshes (I and II) and three nodes (A, B, C). A 18V source is in the top-left branch. A 3V source is in the middle-left branch. A 9V source is in the middle-right branch. Resistors  $R_1$ ,  $R_2$ ,  $R_3$ ,  $R_4$ ,  $R_5$ , and  $R_6$  are distributed throughout the circuit. Currents  $I_a$ ,  $I_b$ ,  $I_c$ ,  $I_d$ , and  $I_e$  are indicated with arrows.

$I_e = 0, I_c = I_d$   
 Incògnites:  $I_a, I_b, I_c$   
 Nudo A:  $-I_a - I_b - I_c = 0A$   
 Malla 1:  $18V + 3V + 6\Omega \cdot I_b - I_a \cdot 4\Omega = 0V$   
 Malla 2:  $9V + 9\Omega \cdot I_c - 3V - 6\Omega \cdot I_b = 0V$

$I_a$	$I_b$	$I_c$	
-1	-1	-1	0
-4	6	0	-21
0	-6	9	-6

$I_a = \frac{117}{38} A = 3,1A$   
 $I_b = -\frac{55}{38} A = -1,45A$   
 $I_c = -\frac{31}{19} A = -1,63A$   
 $I_d = -1,63A$   
 $I_e = 0A$

**Exercici 3:**

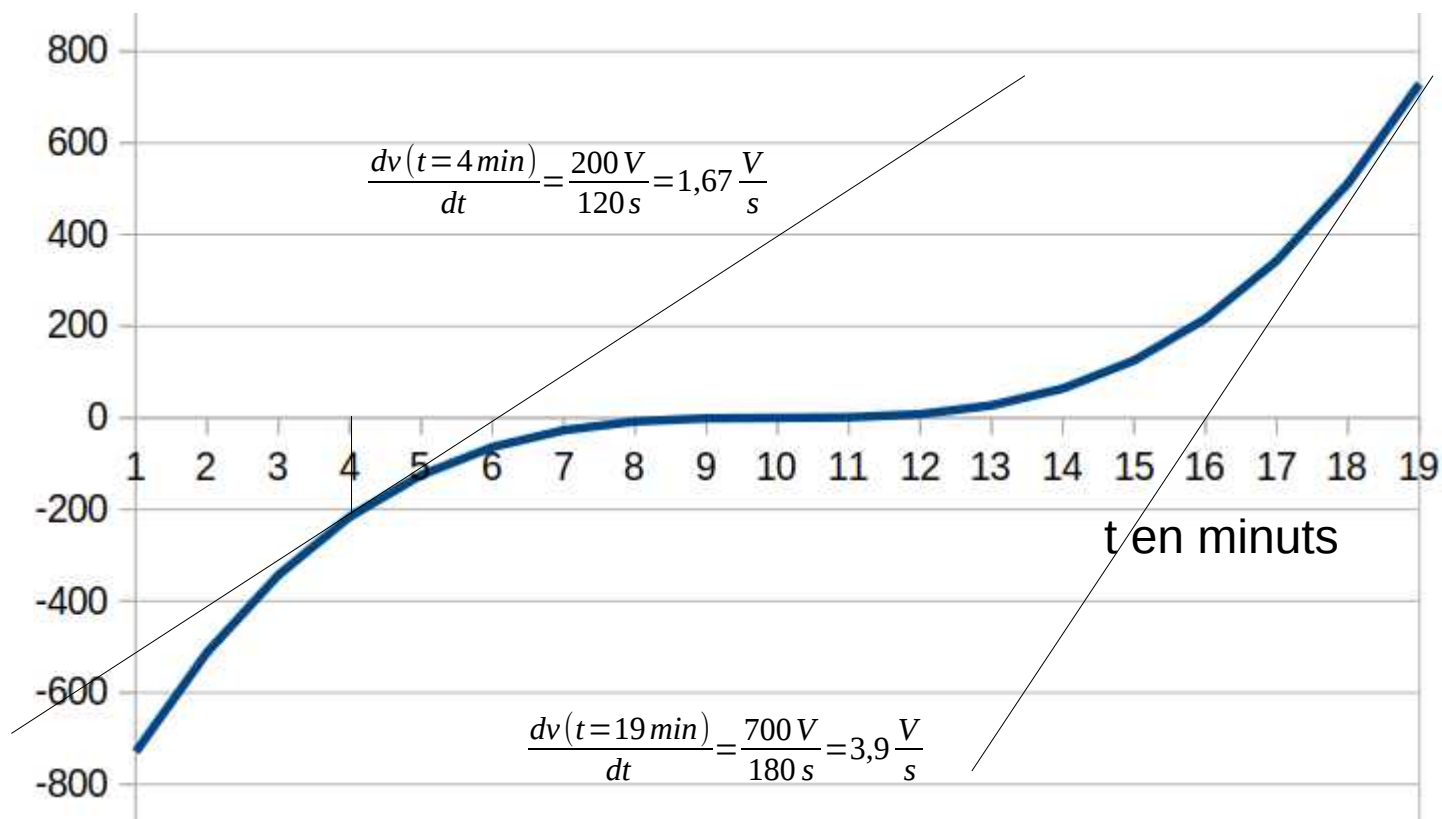
3 p

El gràfic mostra la tensió d'un condensador en funció del temps.

Indica la pendent en  $t_1=4 \text{ min}$  i  $t_2=19 \text{ min}$  i calcula el corrent corresponent.

$C = 300 \text{ mF}$

E en V



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

$$\rightarrow i(t=4 \text{ min}) = C \cdot \frac{dv(t=4 \text{ min})}{dt} = 0,3 \text{ F} \cdot 1,67 \frac{\text{V}}{\text{s}} = 0,5 \text{ A}$$

$$\rightarrow i(t=19 \text{ min}) = C \cdot \frac{dv(t=19 \text{ min})}{dt} = 0,3 \text{ F} \cdot 3,9 \frac{\text{V}}{\text{s}} = 1,17 \text{ A}$$

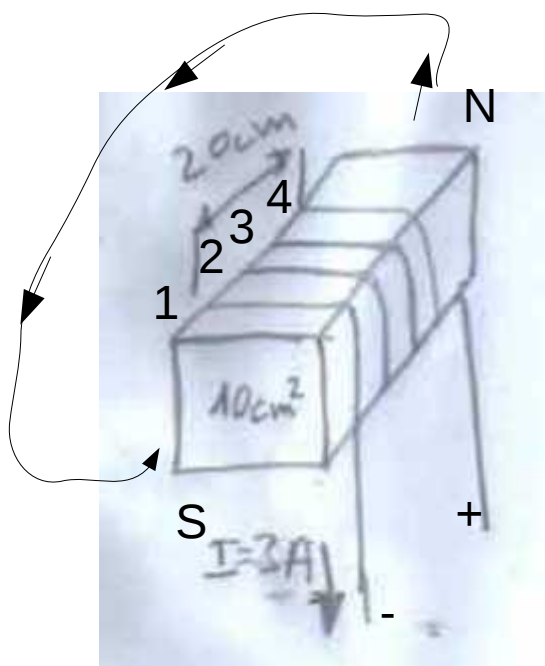
**Exercici 4:**

3 p

Per la bobina de la imatge calcula: mmf,  $\Phi$ , H, B i  $R_{mag}$ .

$$\mu_r = 600$$

Senyala la direcció del camp magnètic.



$$mmf = 4 \cdot 3 \text{ A} = 12 \text{ Av}$$

$$H = \frac{mmf}{l} = \frac{12 \text{ Av}}{0,2 \text{ m}} = 60 \frac{\text{Av}}{\text{m}}$$

$$\mu = \mu_r \cdot \mu_0 = 600 \cdot 4 \cdot \pi \cdot 10^{-7} \frac{\text{T} \cdot \text{m}}{\text{Av}} = 7,5 \cdot 10^{-4} \frac{\text{T} \cdot \text{m}}{\text{Av}}$$

$$B = \mu \cdot H = 7,5 \cdot 10^{-4} \frac{\text{T} \cdot \text{m}}{\text{Av}} \cdot 60 \frac{\text{Av}}{\text{m}} = 4,52 \cdot 10^{-2} \text{ T}$$

$$\Phi = B \cdot S = 4,52 \cdot 10^{-2} \cdot 0,001 \text{ m}^2 = 4,52 \cdot 10^{-5} \text{ Wb}$$

$$R_{mag} = \frac{mmf}{\Phi} = \frac{12 \text{ Av}}{4,52 \cdot 10^{-5} \text{ Wb}} = 2,65 \cdot 10^5 \frac{\text{Av}}{\text{Wb}}$$