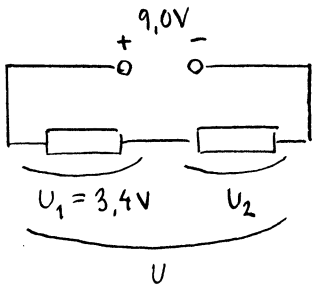
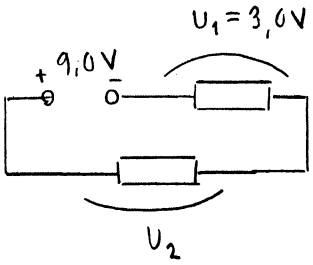
EK01 (a) Bestäm spänningarna U och U_2.



$U = \underline{\underline{9{,}0\,V}}$

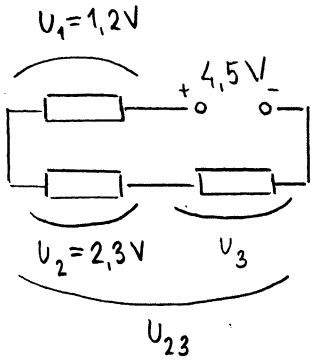
$U_1 + U_2 = U \Rightarrow U_2 = 9{,}0\,V - 3{,}4\,V = \underline{\underline{5{,}6\,V}}$

(b) Bestäm spänningen U_2



$U_1 + U_2 = 9{,}0\,V \Rightarrow U_2 = 9{,}0\,V - 3{,}0\,V = \underline{\underline{6{,}0\,V}}$

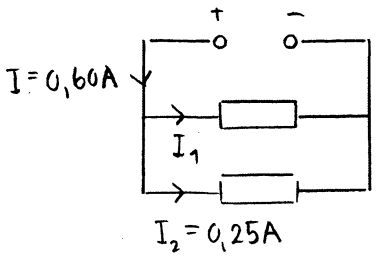
(c) Bestäm spänningarna U_3 och U_{23}.



$U_1 + U_{23} = 4{,}5\,V \Rightarrow U_{23} = 4{,}5\,V - 1{,}2\,V = \underline{\underline{3{,}3\,V}}$

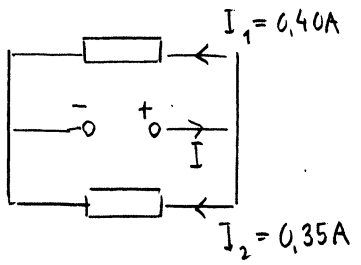
$U_2 + U_3 = U_{23} \Rightarrow U_3 = 3{,}3\,V - 2{,}3\,V = \underline{\underline{1{,}0\,V}}$

EK02 (a) Bestäm strömmen I_1..



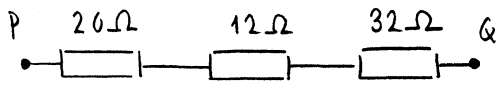
$I = I_1 + I_2 \Rightarrow I_1 = 0{,}60\,A - 0{,}25\,A = \underline{\underline{0{,}35\,A}}$

(b) Bestäm strömmen I.



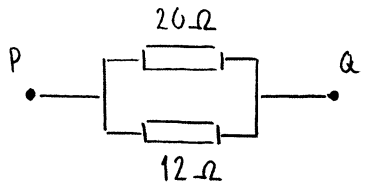
$$I = I_1 + I_2 = 0{,}35\,A + 0{,}40\,A = \underline{\underline{0{,}75\,A}}$$

EK03 (a) Beräkna ersättningsresistansen mellan P och Q.



$$R_E = (20 + 12 + 32)\,\Omega = \underline{\underline{64\,\Omega}}$$

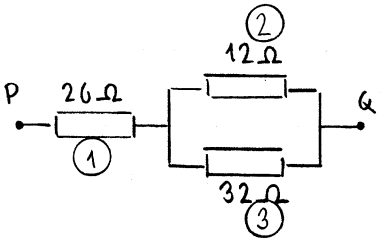
(b) Beräkna ersättningsresistansen mellan P och Q.



$$\frac{1}{R_E} = 0{,}133\,\Omega^{-1}$$

$$\frac{1}{R_E} = \frac{1}{20\,\Omega} + \frac{1}{12\,\Omega} \Rightarrow R_E = \underline{\underline{7{,}5\,\Omega}}$$

(c) Beräkna ersättningsresistansen mellan P och Q.

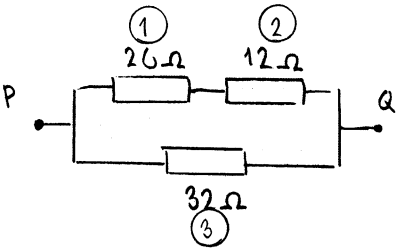


Ersättn.resistansen till 12Ω- och 32Ω-motstanden:

$$\frac{1}{R_{E,23}} = \frac{1}{12\,\Omega} + \frac{1}{32\,\Omega} \Rightarrow R_{E2,3} = 8{,}73\,\Omega$$

Totala ersättn.resistansen $R_{E,tot} = 20\,\Omega + 8{,}73\,\Omega = \underline{\underline{29\,\Omega}}$

(d) Beräkna ersättningsresistansen mellan P och Q.



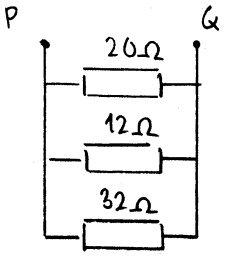
Ersättn resistansen till 1 och 2:

$$R_{E,12} = (20 + 12)\,\Omega = 32\,\Omega$$

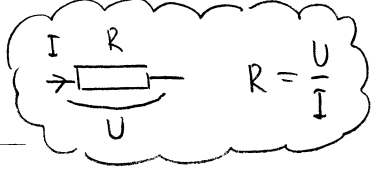
Totala ersättn.resistansen:

$$\frac{1}{R_{E,tot}} = \frac{1}{32\,\Omega} + \frac{1}{32\,\Omega} \Rightarrow R_{E,tot} = \underline{\underline{16\,\Omega}}$$

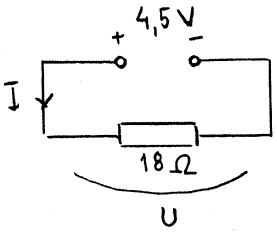
(e) Beräkna ersättningsresistansen mellan P och Q.



$$\frac{1}{R_E} = \frac{1}{20\,\Omega} + \frac{1}{12\,\Omega} + \frac{1}{32\,\Omega} \Rightarrow R_E = \underline{\underline{6{,}1\,\Omega}}$$



EK04 Bestäm spänningen U och strömmen I.



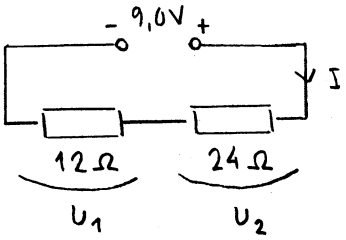
$U = \underline{\underline{4{,}5\ \text{V}}}$

$$I = \frac{U}{R} = \frac{4{,}5\ \text{V}}{18\ \Omega} = \underline{\underline{0{,}25\ \text{A}}}$$

EK05 (a) Bestäm ersättningsresistansen i kretsen nedan.

(b) Beräkna huvudströmmen I.

(c) Beräkna spänningarna U_1 och U_2.



$R_E = (12 + 24)\ \Omega = \underline{\underline{36\ \Omega}}$

$$I = \frac{U}{R_E} = \frac{9{,}0\ \text{V}}{36\ \Omega} = \underline{\underline{0{,}25\ \text{A}}}$$

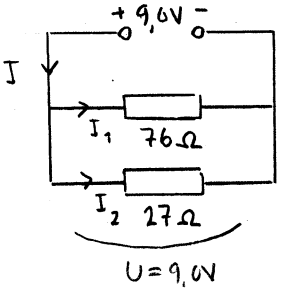
$U_1 = R_1 \cdot I = 12 \cdot 0{,}25\ \text{V} = \underline{\underline{3{,}0\ \text{V}}}$

$U_2 = R_2 \cdot I = 24 \cdot 0{,}25\ \text{V} = \underline{\underline{6{,}0\ \text{V}}}$

EK06 (a) Bestäm ersättningsresistansen i kretsen nedan.

(b) Beräkna huvudströmmen I.

(c) Beräkna grenströmmarna I_1 och I_2.



$$\frac{1}{R_E} = \frac{1}{76\ \Omega} + \frac{1}{27\ \Omega} \Rightarrow R_E = \underline{\underline{20\ \Omega}}$$

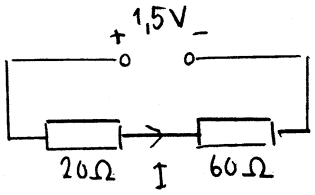
$$I = \frac{U}{R_E} = \frac{9{,}0\ \text{V}}{20\ \Omega} = \underline{\underline{0{,}45\ \text{A}}}$$

$$I_1 = \frac{U}{R_1} = \frac{9{,}0\ \text{V}}{76\ \Omega} = \underline{\underline{0{,}12\ \text{A}}}$$

$$I_2 = \frac{U}{R_2} = \frac{9{,}0\ \text{V}}{27\ \Omega} = \underline{\underline{0{,}33\ \text{A}}}$$

EK07 Bestäm den markerade strömmen.

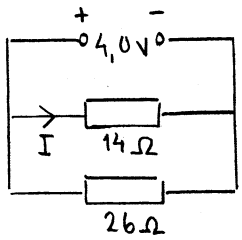
(a)



$R_E = (20 + 60)\ \Omega = 80\ \Omega$

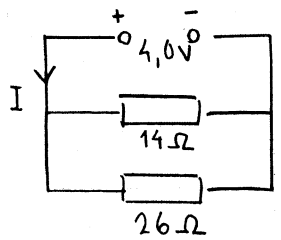
$$I = \frac{U}{R_E} = \frac{1{,}5\ \text{V}}{80\ \Omega} = \underline{\underline{0{,}019\ \text{A}}}$$

(b)



$$I = \frac{U}{R} = \frac{4{,}0\ \text{V}}{14\ \Omega} = \underline{\underline{0{,}29\ \text{A}}}$$

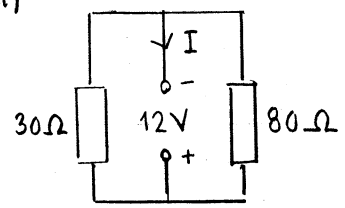
(c)



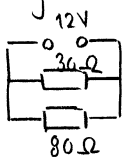
$$\frac{1}{R_E} = \frac{1}{14\,\Omega} + \frac{1}{26\,\Omega} \Rightarrow R_E = \underline{\underline{9{,}1\,\Omega}}$$

$$I = \frac{U}{R_E} = \frac{4{,}0\,V}{9{,}1\,\Omega} = \underline{\underline{0{,}44\,A}}$$

(d)



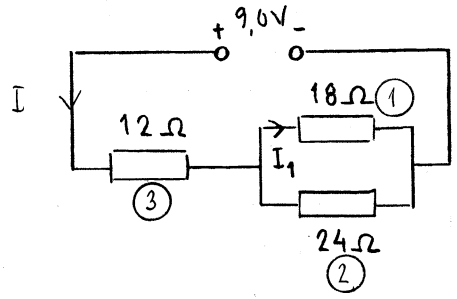
Motstånden är parallellkopplade till spänningskällan!

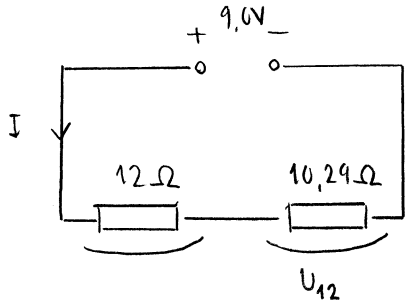


$$\frac{1}{R_E} = \frac{1}{30\,\Omega} + \frac{1}{80\,\Omega} \Rightarrow R_E = 21{,}8\,\Omega$$

$$I = \frac{U}{R_E} = \frac{12\,V}{21{,}8\,\Omega} = \underline{\underline{0{,}55\,A}}$$

EK08 Bestäm strömmen I_1.





Ersättningsresistansen till 1 och 2:

$$\frac{1}{R_{E,12}} = \frac{1}{18\,\Omega} + \frac{1}{24\,\Omega} \Rightarrow R_{E,12} = 10{,}29\,\Omega$$

Totala ersättn resistansen

$$R_{E,tot} = (12 + 10{,}29)\,\Omega = 22{,}29\,\Omega$$

Huvudströmmen

$$I = \frac{U}{R_{E,tot}} = \frac{9{,}0\,V}{22{,}29\,\Omega} = 0{,}404\,A$$

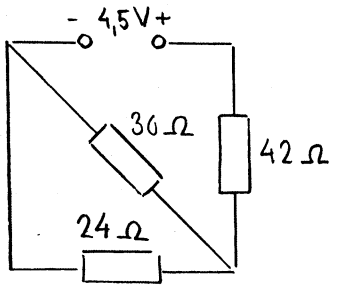
Spänningen över 1 (och 2):

$$U_{12} = I \cdot R_{E,12} = 0{,}404\,A \cdot 10{,}29\,\Omega = 4{,}16\,V$$

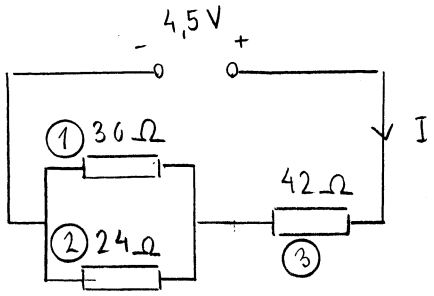
Sökta strömmen

$$I_1 = \frac{U_{12}}{R_1} = \frac{4{,}16\,V}{18\,\Omega} = \underline{\underline{0{,}23\,A}}$$

EK09 Bestäm strömmen genom 42 Ω-motståndet.



Vi ritar först om kopplingsschemat så att vi känner igen oss:



Ersättningsresistansen till 1 och 2:

$$\frac{1}{R_{E,12}} = \frac{1}{30\,\Omega} + \frac{1}{24\,\Omega} \Rightarrow R_E = 13{,}33\,\Omega$$

Totala ersättningsresistansen

$$R_{E,tot} = (13{,}33 + 42)\,\Omega = 55{,}33\,\Omega$$

Huvudströmmen

$$I = \frac{U}{R_{E,tot}} = \frac{4{,}5\,V}{55{,}33\,\Omega} = \underline{\underline{0{,}081\,A}}$$