

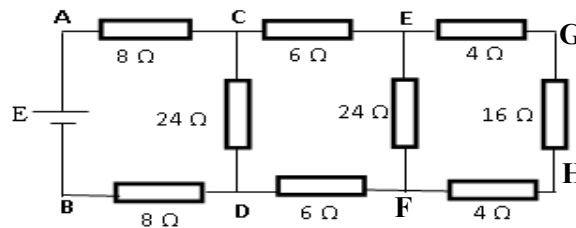


Série de TD N° 4
ELECTROCINETIQUE

Exercise 1

Consider the circuit shown in the figure below:

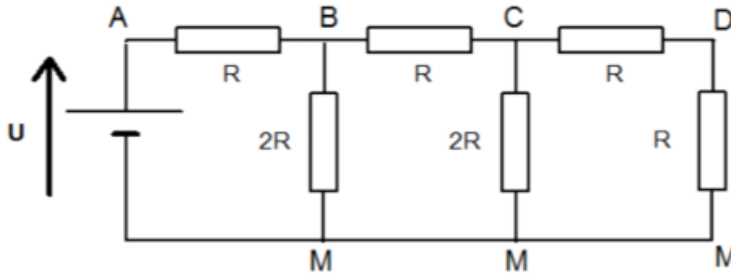
- 1- Calculate the equivalent resistance of the circuit.
- 2- Given the generator voltage $E=56V$, calculate the current I delivered by the generator, specifying the direction of flow.
- 3- Calculate the voltage V_{AC} between points A and C, and deduce the current in branch CD.
- 4- Calculate the voltage V_{EF} between points E and F, and deduce the current in the EF branch.
- 5- Calculate the current in branch GH, and deduce the voltage V_{GH} between points G and H.
- 6- Calculate the power P supplied by source E.



Exercise 2

Consider the following circuit.

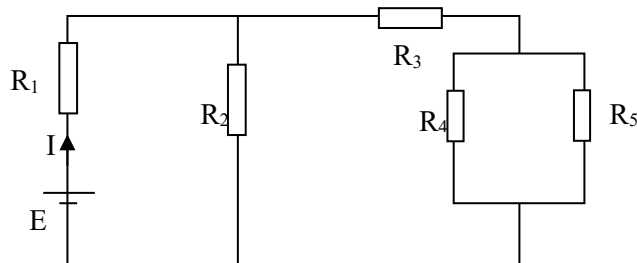
1. Determine (as a function of R) the equivalent resistance of the entire network and deduce the current I drawn by the generator as a function of R .
2. Calculate the voltages V_{BM} , V_{CM} et V_{DM} .



We give: $U = 16 V$.

Exercise 3

Consider the circuit shown in the following diagram:



- 1- Calculate the value of the current I delivered by the generator, using Kirchoff's two laws.
- 2- Find the value of the current I , using the equivalent resistance of the circuit.
- 3- Determine the potential difference (p.d.d) across R_2 and deduce the power generated by this resistor (R_2).
- 4- Find the currents flowing through resistors R_4 and R_5 .

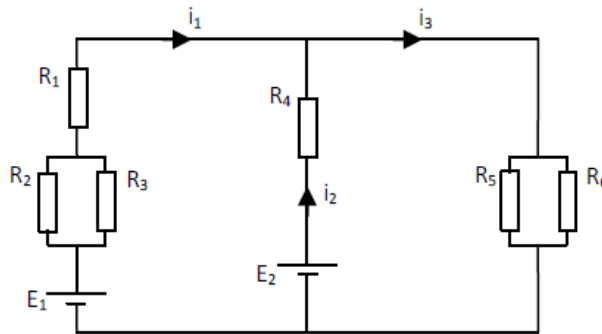
We give: $E=12V$, $R_1=2\Omega$, $R_2=20\Omega$, $R_3=16\Omega$, $R_4=6\Omega$, $R_5=12\Omega$



Exercise 4

The following circuit has six resistors ($R_1=10\Omega$, $R_2=20\Omega$, $R_3=20\Omega$, $R_4=5\Omega$, $R_5=6\Omega$, $R_6=3\Omega$) and two generators ($E_1=20v$, $E_2=10v$).

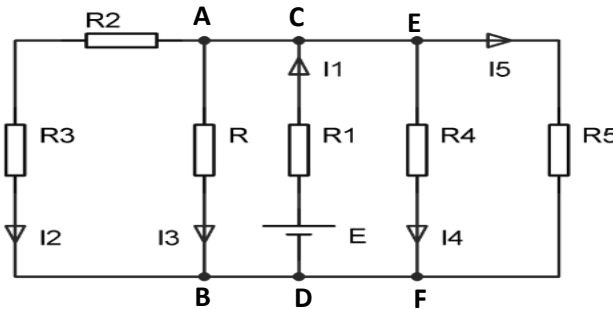
- 1- Simplify the electrical circuit by calculating the equivalent resistances.
- 2- Calculate the currents I_1 , I_2 and I_3 using Kirchoff's laws.



Supplementary exercises

Exercise 1

Consider the following circuit:



We give : $R_1= 1k\Omega$, $R_2= 2k\Omega$, $R_3= 4k\Omega$, $R_4=R_5=3k\Omega$;
 The voltage across the resistance R_2 is, $U_{R_2}= 8v$,and the current $I_3= 2mA$.
 Calculate E et R.

Exercise 2

Consider the circuit shown in the following figure:

We give $E_1=12V$, $E_2=8V$, $r_1= r_2=1\Omega$, $R_1=4 \Omega$, $R_2=3 \Omega$, $R_3=5 \Omega$ and $C=2\mu F$.

- 1- Assuming the capacitor is fully charged, calculate the currents I_1 , I_2 and I_3 using Kirchoff's laws.
- 2- Calculate the potential difference between points A and B.
- 3- Calculate the capacitor charge Q. What energy is stored in the capacitor?
- 4- What is the power released by resistance R_3 ?

