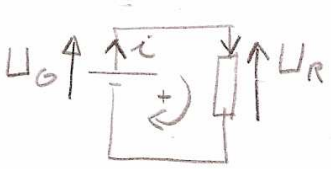
Loi d'Ohm

MPI

Exercice 1 : $U = R \times i \Rightarrow U = 220 \times 15 \times 10^{-3} = 3{,}3\,V$

Exercice 2 :



Loi des mailles $U_G - U_R = 0V \Rightarrow U_G = U_R$

$U_G = U_R = R \times i$

$\Rightarrow R = \frac{U_R}{i} = \frac{U_G}{i} = \frac{12}{50 \times 10^{-3}}$

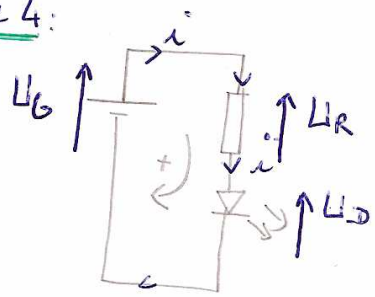
$R = 2{,}4 \times 10^{2}\,\Omega$

Exercice 3 : Il n'y a pas de courant dans le voltmètre (Résistance très grande)

donc $U = U_R$ (tension aux bornes de la résistance)

$U = U_R = R \times i \Rightarrow i = \frac{U}{R} = \frac{9{,}89}{470} = 0{,}0210\,A\ (21{,}0\,mA)$

Exercice 4 :



Loi des mailles $U_G - U_R - U_D = 0$

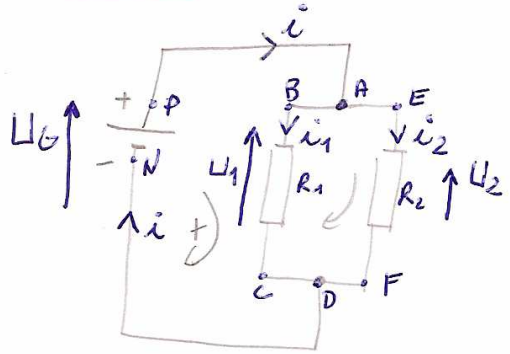
$U_G - U_D = U_R$

$12 - 1{,}8 = 10{,}2V = U_R$

$U_R = R \times i \Rightarrow i = \frac{U_R}{R}$

$i = \frac{10{,}2}{500} = 2{,}04 \times 10^{-2}\,A\ (20{,}4\,mA)$

Exercice 5 :



Loi des noeuds $i = i_1 + i_2$

Loi des mailles dans la maille [P, A, B, C, D, N, P]

$U_G - U_1 = 0 \Rightarrow U_G = U_1$

et $U_1 - U_2 = 0$ (maille [B, A, E, F, D, C, B])

$\Rightarrow U_1 = U_2$

donc $U_G = U_1 = U_2$

R_1 et R_2 sont en parallèle ou dérivation

$U_G = U_1 = R_1 \times i_1 \Rightarrow i_1 = \frac{U_1}{R_1} = \frac{U_G}{R_1} = \frac{15}{220} = 6{,}8 \times 10^{-2}\,A$

$U_G = U_2 = R_2 \times i_2 \Rightarrow i_2 = \frac{U_2}{R_2} = \frac{U_G}{R_2} = \frac{15}{330} = 0{,}045 = 4{,}5 \times 10^{-2}\,A$

$i = i_1 + i_2 = 6{,}8 \times 10^{-2} + 4{,}5 \times 10^{-2} \Rightarrow i = 1{,}1 \times 10^{-1}\,A$