Dipôles passifs

18) a) $P = U \cdot I \Rightarrow I = \frac{P}{U} = \frac{75\,W}{220\,V} = 0{,}341\,A$

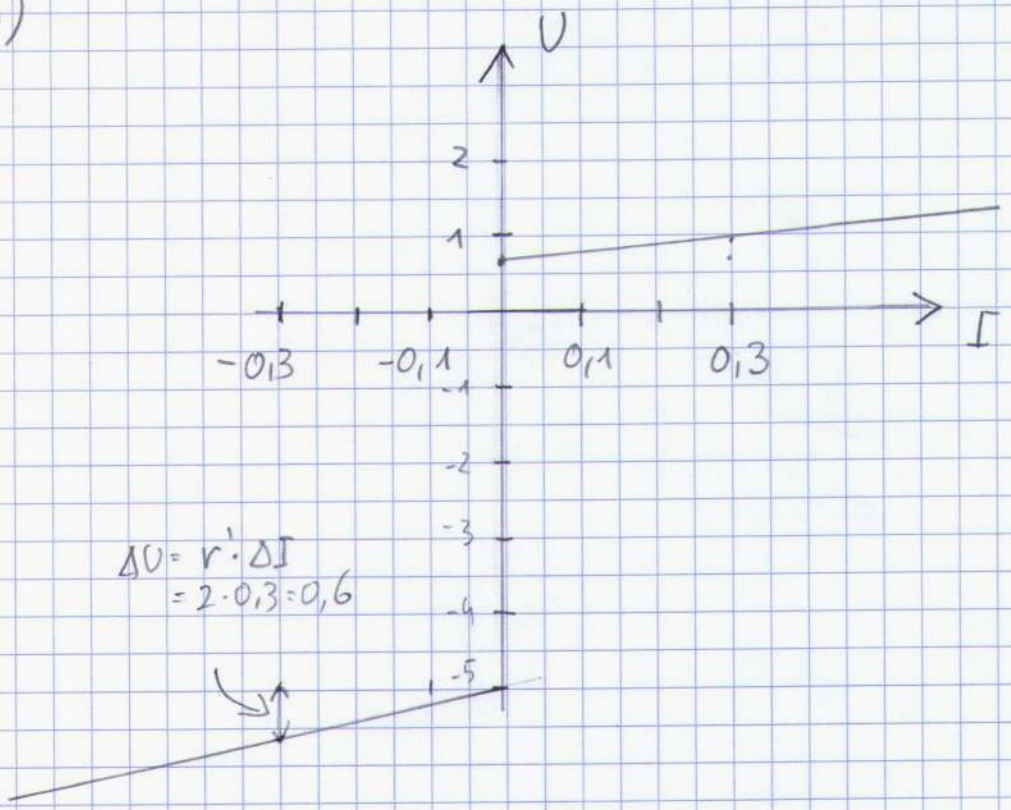
$R = \frac{U}{I} = 645\,\Omega$

b) $U = 25\,V \quad I = 0{,}120\,A$

$R = 208{,}33\,\Omega \quad P = U \cdot I = 3\,W$

c) Si la puissance augmente $3\,W \rightarrow 75\,W$ le filament devient plus chaud et la résistance augmente $208\,\Omega \rightarrow 645\,\Omega$

19)



20) $R_{Fe} = 10 \cdot 10^{-8} \cdot \frac{L}{S} = 6{,}4\,\Omega \quad R_{Cu} = 1{,}7 \cdot 10^{-8} \frac{L}{S} = 1{,}1\,\Omega$

$S = \frac{\pi}{4} \cdot d^2 = 3{,}1415 \cdot 10^{-8}\,m^2$

21) a) $I_1 = \frac{P}{U_1} = \frac{2000}{110} = 18{,}18\,A \quad I_2 = \frac{P}{U_2} = 0{,}0909\,A$

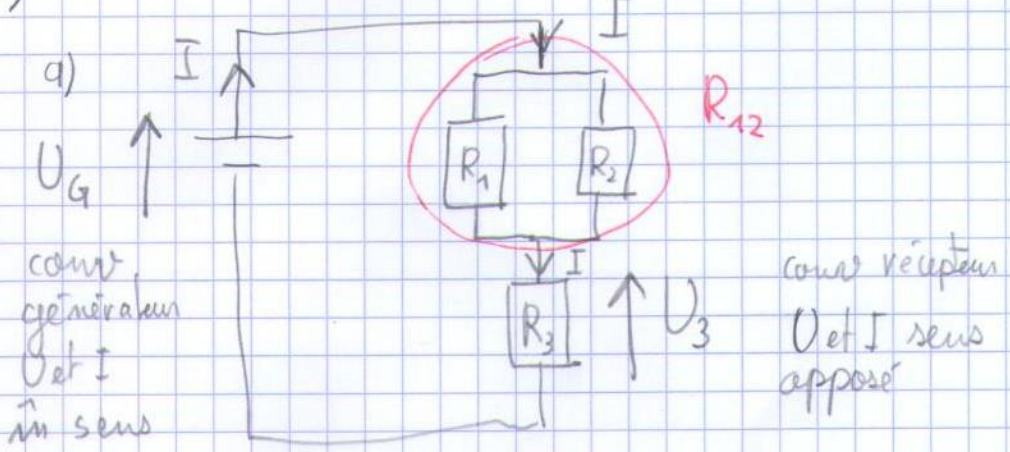
Perte par effet Joule sur $R = 5\,\Omega$

$P_1 = R \cdot I_1^2 = 1652\,W$ (82 % de 2000 W)

$P_2 = R \cdot I_1^2 = 0{,}041\,W$ (0,002 %)

22)

a)



a) $R_{12} = \left(\frac{1}{R_1} + \frac{1}{R_2}\right)^{-1} = 66{,}67\ \Omega$

$R_{tot} = R_{12} + R_3 = 116{,}67\ \Omega$

b) Courant total : $I = \frac{U_G}{R_{tot}} = 0{,}1714\ A$

Tension $U_3 = R_3 \cdot I = 8{,}57\ V$

Tension $U_1 = U_2 = U_G - U_3 = 11{,}43\ V$

Courant $I_1 = \frac{U_1}{R_1} = 0{,}1143\ A$

23) Conducteur haute tension

a) $R = \rho \cdot \frac{L}{S} = 1{,}7 \cdot 10^{-8} \cdot \frac{12\,000}{630 \cdot 10^{-6}} = 0{,}324\ \Omega$

b) pour $I = 5000\ A$ $\Delta U = R \cdot I = 1619\ V$

c) Puissance totale : $P = U \cdot I = 75\ MW$

Puissance perdue : $P_{Joule} = R \cdot I^2 = \Delta U \cdot I = 8{,}1\ MW$

10% perte thermique