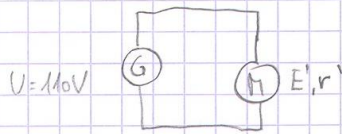


## Correction succincte exercices électricité EL 19 - EL31

EL 19



$$a) U = E' + r' \cdot I$$

$$I = \frac{U - E'}{r'} = \frac{110 - 60}{4} = 2,5A$$

$$b) U = 100 + 4 \cdot 4 = 116V$$

EL 20

$$U = E' + r' \cdot I$$

$$a) E' = U - r' \cdot I = 90 - 0,8 \cdot 10 = 82V$$

$$b) P = U \cdot I = 900W$$

$$c) P_{\text{mot}} = E' \cdot I = 820W$$

$$d) \eta_{\text{el}} = \frac{P_{\text{mot}}}{P} = 0,911$$

EL 21



$$E - r \cdot I = E' + r' \cdot I$$

$$a) I = \frac{E - E'}{r + r'} = \frac{12 - 10}{3} = 0,667A$$

$$b) U = E - r \cdot I = 12 - 0,667 = 11,333V$$

$$c) P_{\text{mot}} = E' \cdot I = 6,667W$$

$$d) \eta = \frac{P_{\text{mot}}}{U \cdot I} = 0,833$$

EL 22

$$a) I = \frac{E - E'}{r + r'} = \frac{6}{0,6} = 10A$$

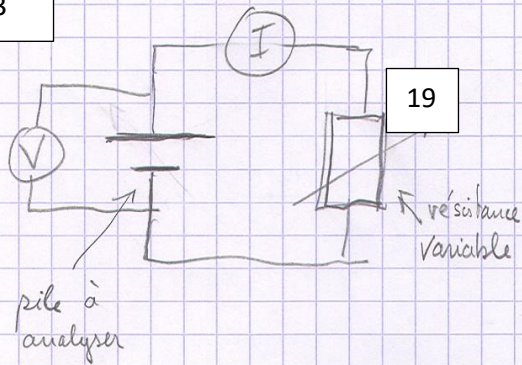
$$b) I_{\text{bloc}} = \frac{E}{r + r'} = 20A$$

$$c) I_{\text{max}} = \frac{E}{r + r' + R} = 12A \Rightarrow R + r + r' = \frac{12}{12} = 1\Omega$$

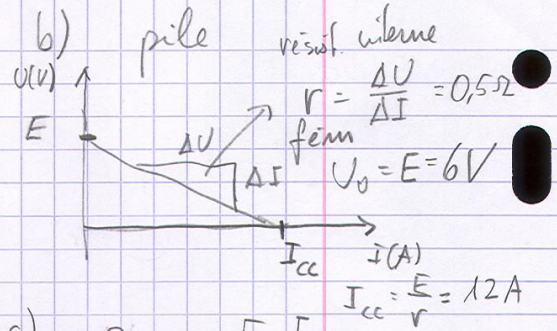
$$\Rightarrow R = 0,4\Omega$$



EL 23



19



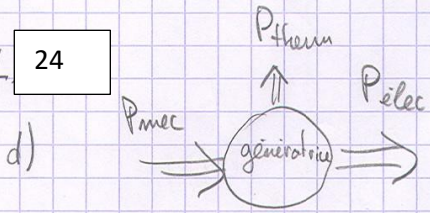
c)

$$P_{\text{chim}} = E \cdot I \quad \leftarrow \text{puissance générée}$$

$$P_{\text{joule}} = r \cdot I^2 \quad \leftarrow \text{puissance perdue à l'intérieur}$$

$$P_{\text{utile}} = (E - r \cdot I) \cdot I \quad \leftarrow \text{puissance utile}$$

EL 24



$$U = 112V$$

$$I = 14,2A$$

a)  $P_{\text{pile}} = U \cdot I = 1590,4W$

b)  $P_{\text{therm}} = P_{\text{mec}} - P_{\text{elec}} = 269,6W$

c) Modèle  $U = E - r \cdot I$

$$P_{\text{therm}} = r \cdot I^2 \Rightarrow r = \frac{P_{\text{therm}}}{I^2} = 1,34 \Omega$$

$$E = U + r \cdot I = 131V$$

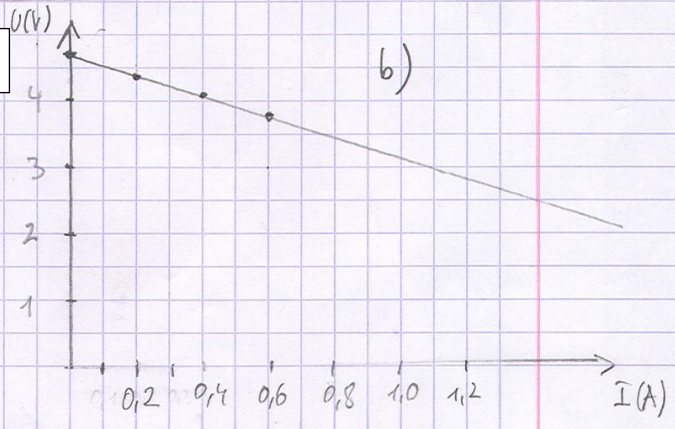
EL 25

schéma idem EL 23

c)  $r = \frac{\Delta U}{\Delta I} = \frac{4,7 - 3,82}{0,6} = 1,4667 \Omega$

$$E = 4,7V = U_0$$

d)  $I_{\text{cc}} = \frac{4,7}{r} = 3,20A$

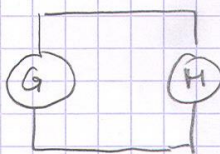




EL 26

$E = 12V$

$r = 2\Omega$



$E' = 4V$

$r' = 4\Omega$

$$a) \quad I = \frac{E - E'}{r + r'} = \frac{8}{6} = 1,33 \text{ A} \quad (\text{Pouillet})$$

$$U_G = U_H = E' + r' \cdot I = 9,333 \text{ V}$$

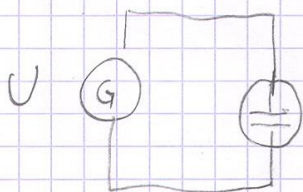
$$b) \quad \text{Blockage} \Rightarrow E' = 0$$

$$I = \frac{E}{r + r'} = 2 \text{ A}$$

$$U = r' \cdot I = 8 \text{ V}$$

EL 27

a)



← électrolyseur  
 $E' = 1,6V$   
 $r = 0,1\Omega$

$$a) \quad I_1 = \frac{U_1 - E'}{r'} = 5 \text{ A}$$

$$b) \quad U_2 = E' + r' \cdot I_2 = 1,6 + 0,8 = 2,4 \text{ V}$$

$$c) \quad P_{el} = U_2 \cdot I_2 = 19,2 \text{ W} \quad P_{therm} = r \cdot I_2^2 = 6,4 \text{ W}$$

$$d) \quad \eta = \frac{P_{chi}}{P_{el}} = \frac{P_{el} - P_{therm}}{P_{el}} = 1 - \frac{6,4}{19,2} = 0,666$$

$$e) \quad P_{el} = U \cdot I = E' \cdot I + r \cdot I^2 = 15,5 \text{ W} \Leftrightarrow 0,1 \cdot I^2 - 1,6 \cdot I + 15,5 = 0 \quad \left. \begin{array}{l} I = 6,79 \text{ A} \\ U = 2,279 \text{ V} \end{array} \right\}$$

