

SÈRIE 2

Primera part

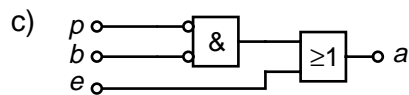
Exercici 1

Q1 a Q2 a Q3 d Q4 b Q5 c

Exercici 2

| p | b | e | a |
|------|-----|-----|-----|
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 0 |
| a) 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 |

b) $a = e + \bar{p} \cdot \bar{b}$



Segona part

OPCIÓ A

Exercici 3

a) $R_{\text{eq}} = \left(\frac{1}{R_1} + \frac{1}{R_2} \right)^{-1} = 18 \Omega$

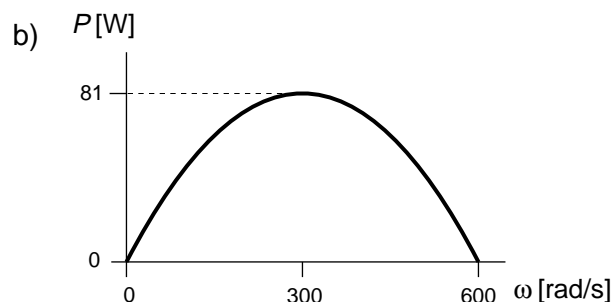
b) $I = \frac{U}{R_{\text{eq}}} = 12,7 \text{ A}$

c) $P = \frac{U^2}{R_{\text{eq}}} = 2,938 \text{ kW}$

d) $c = E p = P t p = 0,5114 \text{ €}$

Exercici 4

$$a) P = \Gamma \omega = c l \omega = \frac{cU}{R} \omega - \frac{c^2}{R} \omega^2 = (0,54 \omega - 900 \cdot 10^{-6} \omega^2) \text{ W}$$



$$c) E = P_{\text{elèc}} t = U I t = 1,4 \text{ MJ} = 388,8 \text{ W}\cdot\text{h}$$

OPCIÓ B

Exercici 3

$$a) \varphi_1 = \arcsin \frac{L}{4L} = 14,48^\circ \quad \varphi_2 = \arcsin \frac{L}{3L} = 19,47^\circ$$

$$b) \sum \mathbf{F}_{\text{ext}} = 0 \rightarrow \begin{cases} F_1 \cos \varphi_1 - F_2 \cos \varphi_2 = 0 \\ F_1 \sin \varphi_1 + F_2 \sin \varphi_2 - mg = 0 \end{cases}$$

$$F_1 = mg \frac{\cos \varphi_2}{\sin(\varphi_1 + \varphi_2)} = 745,1 \text{ N}$$

$$F_2 = mg \frac{\cos \varphi_1}{\sin(\varphi_1 + \varphi_2)} = 765,2 \text{ N}$$

$$c) \sigma_1 = \frac{F_1}{S} ; \quad \sigma_2 = \frac{F_2}{S} \rightarrow \frac{\sigma_1}{\sigma_2} = \frac{F_1}{F_2} = 0,9737$$

Exercici 4

$$a) E_{\text{elèc}} = m p \eta_{\text{elèc}} = 64,85 \text{ MW}\cdot\text{h}$$

$$P_{\text{elèc}} = \frac{E_{\text{elèc}}}{\Delta t} = 2,702 \text{ MW}$$

$$b) E_{\text{tèrmica}} = m p (1 - \eta_{\text{elèc}}) \eta_{\text{tèrmic}} \rightarrow m_{\text{aigua}} = \frac{E_{\text{tèrmica}}}{c_e \Delta t} = \frac{m p (1 - \eta_{\text{elèc}}) \eta_{\text{tèrmic}}}{c_e \Delta t} = 2,93 \cdot 10^6 \text{ kg}$$

$$c) q = \frac{m_{\text{aigua}}}{24 \cdot 3600} \frac{1}{\rho_{\text{aigua}}} = 33,91 \text{ l/s}$$

SÈRIE 1

Primera part

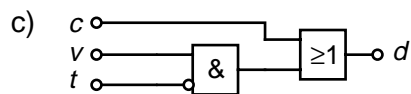
Exercici 1

Q1 a Q2 b Q3 d Q4 d Q5 b

Exercici 2

| c | v | t | d |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

a) b) $d = c + v \cdot \bar{t}$



Segona part

OPCIÓ A

Exercici 3

a) $\varphi = \arctan \frac{2L}{3L} = 33,69^\circ$

b) $\sum M(O) = 0 \rightarrow 3LT \sin \varphi - 2Lmg = 0 \rightarrow T = \frac{2}{3} \frac{mg}{\sin \varphi} = 176,8 \text{ N}$

c) $\sum F_{\text{ext}} = 0 \rightarrow \begin{cases} F_h - T \cos \varphi = 0 \\ F_v + T \sin \varphi - mg = 0 \end{cases} \rightarrow \begin{cases} F_h = \frac{2}{3} \frac{mg}{\sin \varphi} \cos \varphi = mg = 147,1 \text{ N} \\ F_v = mg - T \sin \varphi = 49,04 \text{ N} \end{cases}$

d) $\sigma = \frac{T}{s} = 14,14 \text{ MPa}$

Exercici 4

a) $P = q \rho_{\text{aigua}} c_{\text{aigua}} \Delta t = 24,04 \text{ kW}$

b) $\eta = \frac{P}{\rho_c q_{\text{comb}}} = 0,7726$

c) $t = \frac{V}{q} = 10,87 \text{ min} = 652,2 \text{ s}$ $m = t q_{\text{comb}} = 332,6 \text{ g}$

OPCIÓ B

Exercici 3

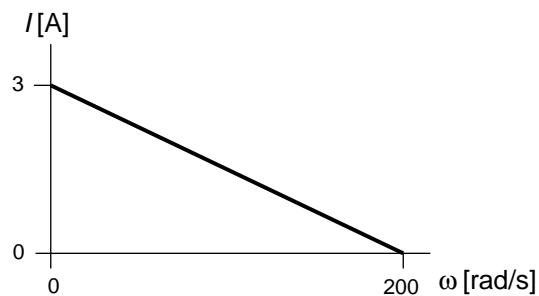
a) $P = \frac{U^2}{R} \rightarrow R = \frac{U^2}{P} = 26,45 \Omega$

b) $R = \rho \frac{L}{S} \rightarrow L = \frac{RS}{\rho} = 3,324 \text{ m}$

c) $E = P t = 2,25 \text{ kW} \cdot \text{h} = 8,1 \text{ MJ}$

Exercici 4

a) $\omega = \frac{U - c I}{R} \rightarrow I = \frac{U - c \omega}{R}$



b) $\Gamma_{\text{màx}} = c I_{\text{màx}} = 0,18 \text{ Nm}$. Es produeix per a $\omega = 0$, és a dir en arrencar.

c) $E_{\text{elèc}} = P_{\text{elèc}} \Delta t = U I \Delta t = 3,456 \text{ kJ} = 0,96 \text{ W} \cdot \text{h}$