Sèrie 3

Primera part

Exercici 1

Q1 b **Q2** d **Q3** d **Q4** c **Q5** c

Exercici 2

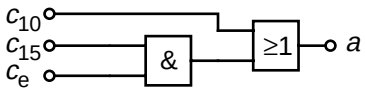
a)

c_{10}	c_{15}	c_e	a
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	x ← No és possible
1	0	1	x ← No és possible
1	1	0	1
1	1	1	1

b) Amb x = 0 : $a = (c_{10} + c_e) \cdot c_{15}$

Amb x = 1: $a = c_{10} + c_{15} \cdot c_e$

c) Amb ***x*** = 1



Segona part

OPCIÓ A

Exercici 3

a) $\eta_{bomba} = \dfrac{p\,q}{P_{mot}} = 0,7086$

b) $\eta_{mq} = \dfrac{P_{mot}}{P_{dipòsit}} = \dfrac{P_{mot}\,t_{au}}{E_{dipòsit}} = \dfrac{P_{mot}\,t_{au}}{V\,\rho\,p_e} = 0,4247$

c) $c = \dfrac{V\,\rho}{P_{mot}\,t_{au}} = \dfrac{1}{p_c \eta_{mq}} = 197,1 \dfrac{g}{kW \cdot h}$

Exercici 4

a) $\varphi_1 = \arctan\frac{L}{3L} = 18,43°$ $\qquad \varphi_2 = \arctan\frac{1,5L}{3L} = 26,57°$

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

$$F_1 = mg\frac{\cos\varphi_2}{\sin(\varphi_1 + \varphi_2)} = 496,2 \text{ N}$$

$$F_2 = mg\frac{\cos\varphi_1}{\sin(\varphi_1 + \varphi_2)} = 526,3 \text{ N}$$

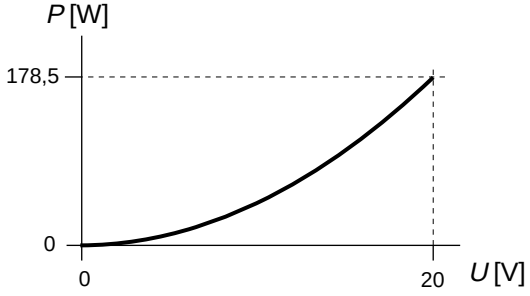
c) $\sigma_1 = \frac{F_1}{S}$; $\sigma_2 = \frac{F_2}{S}$ $\qquad \rightarrow \frac{\sigma_1}{\sigma_2} = \frac{F_1}{F_2} = 0,9428$

OPCIÓ B

Exercici 3

a) $R = \rho\frac{L}{S} = \rho\frac{L}{\pi\left(\frac{d}{2}\right)^2} = 2,241\ \Omega$

b) $P = U\,I = \frac{U^2}{R}$



c) $E = P\,t\,\frac{1}{\eta} = \frac{U^2}{R}\,t\,\frac{1}{\eta} = 1,148 \text{ MJ} = 318,9 \text{ W·h}$

Exercici 4

a) $\eta_{\text{elèc}} = \frac{E_{\text{elèc}}}{m_{\text{r}}\ p} = 0,2644$

b) $E_{\text{aigua}} = m_{\text{a}}\ c_{\text{e}}\ \Delta t = 501,6 \cdot 10^3 \text{ MJ}$

$$E_{\text{tèrmica}} = m_{\text{r}}\ p\ (1 - \eta_{\text{elèc}}) = 651,0 \cdot 10^3 \text{ MJ}$$

$$\eta_{\text{tèrmic}} = \frac{E_{\text{aigua}}}{E_{\text{tèrmica}}} = 0,7705$$

c) $P_{\text{elèc}} = \frac{E_{\text{elèc}}}{24} = 2,708 \text{ MW}$ $\qquad q = \frac{m_{\text{a}}}{24 \cdot 3600}\frac{1}{\rho_{\text{aigua}}} = 34,72 \text{ l/s}$