

Sèrie 4

Primera part

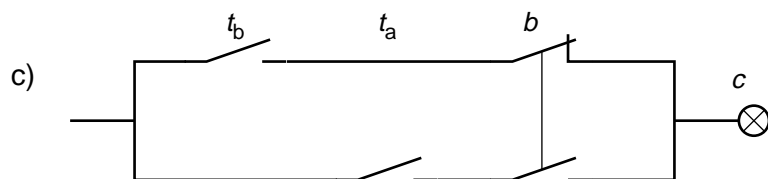
Exercici 1

Q1 b Q2 b Q3 d Q4 c Q5 b

Exercici 2

| | t_b | t_a | b | c | |
|------|-------|-------|-----|-----|------------------|
| | 0 | 0 | 0 | 0 | |
| | 0 | 0 | 1 | 0 | |
| | 0 | 1 | 0 | 0 | |
| a) 0 | 1 | 1 | 1 | 1 | |
| 1 | 0 | 0 | 0 | 1 | |
| 1 | 0 | 1 | 0 | 0 | |
| 1 | 1 | 0 | 0 | X | ← No és possible |
| 1 | 1 | 1 | 1 | X | ← No és possible |

b) Amb $X = 1$ $c = t_b \cdot \bar{b} + t_a \cdot b$



Segona part

OPCIÓ A

Exercici 3

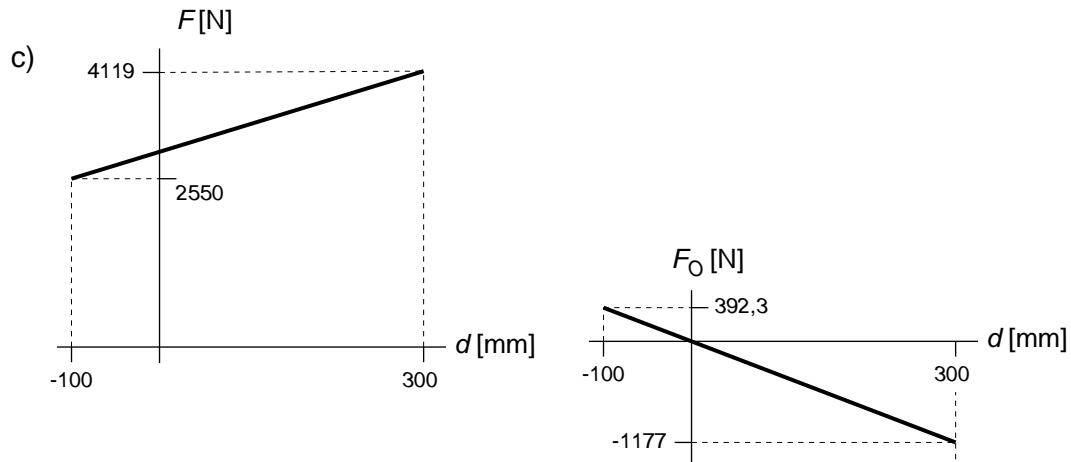
a) $\sum M(O) = 0 \rightarrow mg(L+d) - FL = 0$

$$F = mg \frac{(L+d)}{L} = mg \left(1 + \frac{d}{L} \right) = mg \left(1 + \frac{d}{750} \right) \text{ N, } d \text{ en mm}$$

La roda fa sobre el terra aquesta força F avall.

b) $F + F_O = mg \rightarrow F_O = mg - F = mg - mg \left(1 + \frac{d}{L} \right) = -mg \frac{d}{L}$.

El vehicle fa una força de valor $mg \frac{d}{L}$ vertical avall.



d) $d = 0 \rightarrow F_O = 0$ i $F = 2942$ N

Exercici 4

a) $P = q \cdot \rho_{\text{aigua}} \cdot c_p \cdot \Delta t = 7 \frac{\text{l}}{\text{min}} \frac{1 \text{ min}}{60 \text{ s}} 1000 \frac{\text{g}}{\text{l}} 4,187 \frac{\text{J}}{\text{g K}} 25 \text{ K} = 12,21 \text{ kW}$

b) $\eta = \frac{P}{q_{\text{comb}} \cdot \rho_c} \rightarrow q_{\text{comb}} = \frac{P}{\eta \cdot \rho_c} = 0,32 \frac{\text{g}}{\text{s}}$

c) $m_{\text{comb}} = q_{\text{comb}} \cdot t = 0,32 \cdot 10 \cdot 60 = 192,0 \text{ g}$

$c = m_{\text{comb}} \frac{c_b}{m_b} = 0,2074 \text{ €}$

OPCIÓ B

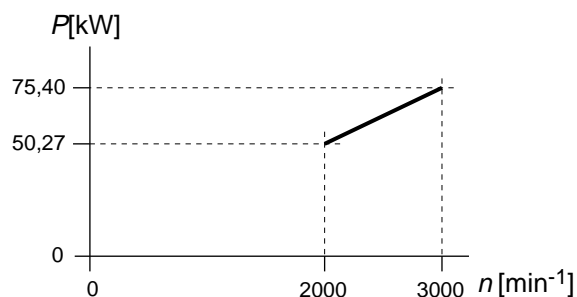
Exercici 3

a) $E_m = \Delta E_c = \frac{1}{2} m v_2^2 = \frac{1}{2} 1290 \left(100 \frac{1000}{3600} \right)^2 = 497,7 \cdot 10^3 \text{ J} = 497,7 \text{ kJ}$

b) $\eta = \frac{E_m}{E_{\text{comb}}} = \frac{E_m}{m_{\text{comb}} \cdot \rho_c} = 0,2129 = 21,29\%$

c) $n_1 = 2000 \text{ min}^{-1} \rightarrow \omega_1 = 209,4 \text{ rad/s} \rightarrow P_1 = 50,27 \text{ kW}$

$n_1 = 3000 \text{ min}^{-1} \rightarrow \omega_1 = 314,2 \text{ rad/s} \rightarrow P_1 = 75,40 \text{ kW}$



Exercici 4

a) $I_{34} = \frac{U}{R_3 + R_4} = \frac{6}{250 + 125} = 16 \cdot 10^{-3} \text{ A} = 16 \text{ mA}$

b) $U_{DB} = I_{34} \cdot R_4 = 16 \cdot 10^{-3} \cdot 125 = 2 \text{ V}$

c) Com que el pont està equilibrat, la tensió U_{CB} i la U_{DB} és la mateixa.

$$I_2 = \frac{U_{CB}}{R_2} = \frac{U_{DB}}{R_2} = \frac{2}{200} = 10 \cdot 10^{-3} \text{ A} = 10 \text{ mA}$$

d) Com que el pont està equilibrat, el corrent per R_2 i per R_1 és el mateix.

$$U = I_2 (R_1 + R_2) \rightarrow R_1 = \frac{U}{I_2} - R_2 = 400 \Omega$$

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Primera part

Exercici 1

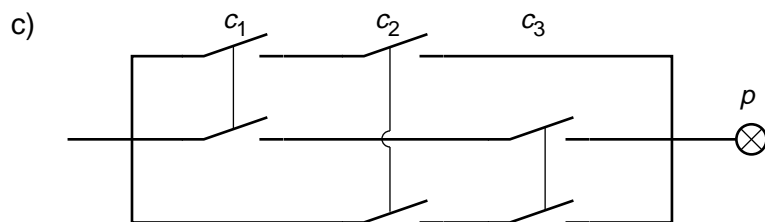
Q1 d Q2 b Q3 c Q4 b Q5 d

Exercici 2

| | c_1 | c_2 | c_3 | p |
|----|-------|-------|-------|-----|
| | 0 | 0 | 0 | 0 |
| | 0 | 0 | 1 | 0 |
| | 0 | 1 | 0 | 0 |
| a) | 0 | 1 | 1 | 1 |
| | 1 | 0 | 0 | 0 |
| | 1 | 0 | 1 | 1 |
| | 1 | 1 | 0 | 1 |
| | 1 | 1 | 1 | 1 |

b)
$$p = \bar{c}_1 \cdot c_2 \cdot c_3 + c_1 \cdot \bar{c}_2 \cdot c_3 + c_1 \cdot c_2 \cdot \bar{c}_3 + c_1 \cdot c_2 \cdot c_3$$

$$p = c_1 \cdot c_2 + c_1 \cdot c_3 + c_2 \cdot c_3$$



Segona part

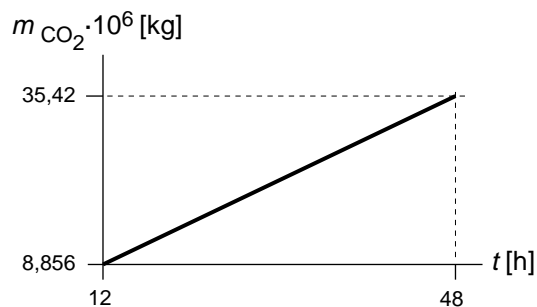
OPCIÓ A

Exercici 3

a)
$$V = \frac{m}{\rho} = 6,296 \cdot 10^3 \text{ m}^3$$

b)
$$\eta = \frac{P_{\text{elèc}}}{P_{\text{calor}}} = \frac{P_{\text{elèc}}}{\rho \cdot \frac{m}{t}} = 0,299$$

c)
$$m_{\text{CO}_2} = e \cdot E_{\text{elèc}} = e \cdot P_{\text{elèc}} \cdot t = 738 \cdot 10^3 \cdot t \text{ kg, } t \text{ en h.}$$



Exercici 4

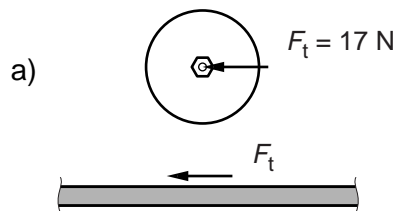
$$a) \left. \begin{array}{l} P = U \cdot I \\ U = R \cdot I \end{array} \right\} \rightarrow R = \frac{U^2}{P} = 88,16 \, \Omega$$

$$b) L = \frac{R \cdot S}{\rho} = \frac{R \cdot \pi \frac{d^2}{4}}{\rho} = 5,540 \, \text{m}$$

$$c) E = P \cdot t = 312,5 \, \text{W} \cdot \text{h}$$

OPCIÓ B

Exercici 3



$$b) P_{\text{mec}} = \Gamma \cdot \omega = F_t \cdot r \cdot \omega = F_E \cdot r \cdot n \cdot \frac{2\pi}{60} = 352,5 \, \text{W}$$

$$c) P_{\text{elèc}} = \frac{P_{\text{mec}}}{\eta} = 542,3 \, \text{W}$$

$$d) E_{\text{elèc}} = P_{\text{elèc}} \cdot t = 226,0 \, \text{W} \cdot \text{h}$$

Exercici 4

$$a) L = 3 \left(10d + 2\pi \frac{d}{2} \right) = 15,77 \, \text{m}$$

$$L_t = n \cdot L = 630,8 \, \text{m}$$

$$b) P = P_{\text{tub}} \cdot L = 788,5 \, \text{W}$$

$$P_t = n \cdot P = 31,54 \, \text{kW}$$

$$c) E = P_t \cdot t = 157,7 \, \text{kW} \cdot \text{h}$$