



SÈRIE 1

Exercici 1

Q1 d

Q2 a

Q3 d

Q4 b

Q5 c



Exercici 2

a)

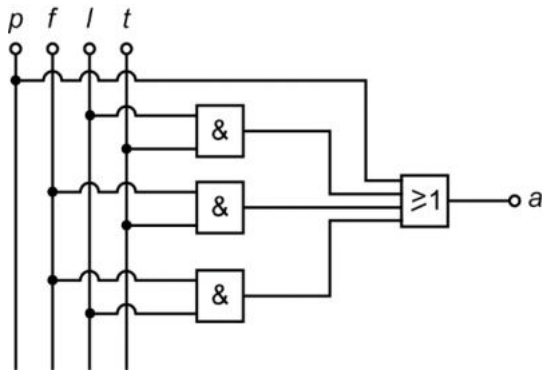
<i>p</i>	<i>f</i>	<i>l</i>	<i>t</i>	<i>a</i>
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

b)

$$a = (p + f + l + t)(p + f + l + \bar{t})(p + f + \bar{l} + t)(p + \bar{f} + l + t)$$

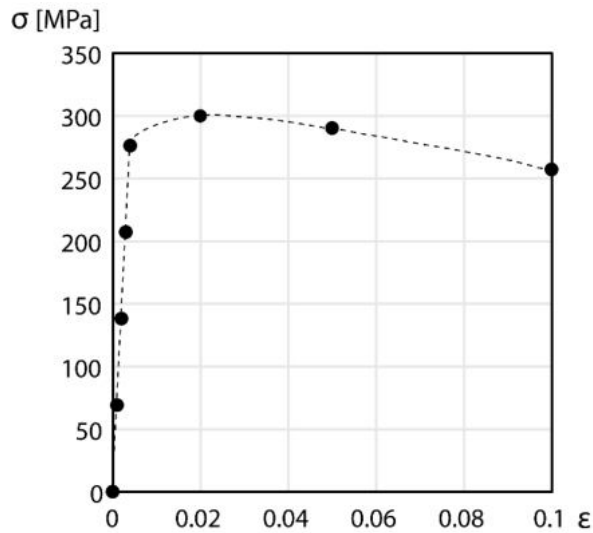
simplificant: $a = p + lt + ft + fl$

c)



Exercici 3

a)



b)

$$E = \frac{\sigma_e}{\varepsilon} = 69 \text{ GPa}$$

c)

$$F = \sigma_F \pi \frac{d^2}{4} = 10,05 \text{ kN};$$

$$\varepsilon = \frac{\sigma_F}{E} = 2,899 \times 10^{-3}; \quad \Delta L = \varepsilon L_0 = 362,3 \times 10^{-3} \text{ mm}$$

d)

Si es sotmet la proveta a 300 MPa no recuperarà la longitud inicial perquè aquesta tensió està per sobre del límit elàstic del material.



Exercici 4

a)

$$P_{\text{cons}} = c \rho_{\text{gasoil}} p_c = 14,81 \text{ kW}$$

b)

$$\eta = \frac{P_{\text{mot}}}{P_{\text{cons}}} = 24,17\%$$

c)

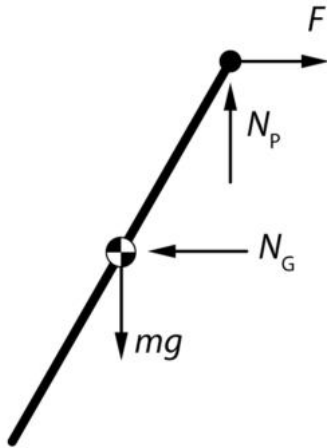
$$v = \omega \frac{d}{2} = n \frac{2\pi d}{60 \cdot 2} = 79,17 \text{ m/s} = 285 \text{ km/h}$$

d)

$$m_{\text{CO}_2} = c F E t = 1,339 \text{ kg de CO}_2$$

Exercici 5

a)



b)

$$h = \sqrt{L^2 - x^2}$$

c)

$$\left. \begin{array}{l} \sum F_{\text{verticals}} = 0 \quad \rightarrow \quad N_p = mg \\ \sum M(G) = 0 \quad \rightarrow \quad F h - N_p x = 0 \end{array} \right\} \quad F = \frac{mgx}{h} = \frac{mgx}{\sqrt{L^2 - x^2}}$$

d)

$$\begin{array}{l} \sum F_{\text{horizontals}} = 0 \quad \rightarrow \quad N_G = F = \frac{mgx}{h} = \frac{mgx}{\sqrt{L^2 - x^2}} \\ \sum F_{\text{verticals}} = 0 \quad \rightarrow \quad N_p = mg \end{array}$$

Exercici 6

a)

$$E_{\text{VSAP}} = n P_{\text{VSAP}} t \ 365 = 123,66 \text{ MWh} = 445,2 \times 10^3 \text{ MJ}$$

$$C_{\text{VSAP}} = c_{\text{elrctr}} E_{\text{VSAP}} = 16941 \text{ €}$$

b)

$$E_{\text{LED}} = \frac{P_{\text{LED}}}{P_{\text{VSAP}}} E_{\text{VSAP}} = 44,52 \text{ MWh} = 1603 \times 10^3 \text{ MJ}$$

$$C_{\text{estalvi}} = C_{\text{VSAP}} + C_{\text{mant}} - C_{\text{LED}} = C_{\text{VSAP}} + C_{\text{mant}} - c_{\text{electr}} E_{\text{LED}} = 24842 \text{ €}$$

c)

$$C_{\text{inv}} = n c_{\text{llum}} + c_{\text{inst}} = 197000 \text{ €}$$

$$\Delta t = \frac{C_{\text{inv}}}{C_{\text{estalvi}}} = 7,9 \text{ anys; es recuperaria en 8 anys.}$$