

## SÈRIE 5

## Primera part

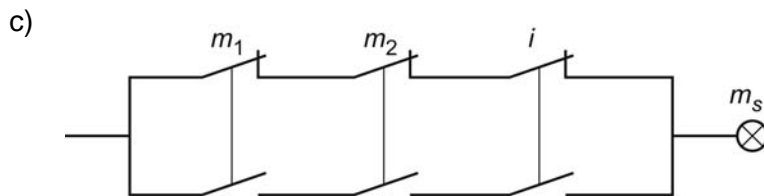
## Exercici 1

Q1 b      Q2 b      Q3 a      Q4 b      Q5 a

## Exercici 2

$m_1$	$m_2$	$i$	$m_s$
0	0	0	1
0	0	1	0
0	1	0	0
a) 0	1	1	X ← No és possible
1	0	0	0
1	0	1	X ← No és possible
1	1	0	X ← No és possible
1	1	1	1

b) Amb  $X = 0$        $m_s = \bar{m}_1 \cdot \bar{m}_2 \cdot \bar{i} + m_1 \cdot m_2 \cdot i$



## Segona part

## OPCIÓ A

## Exercici 3

$$a) 3U_{\text{bat}} - 3I_{\text{led}}R - U_{\text{led}} = 0 \Rightarrow R = \frac{3U_{\text{bat}} - U_{\text{led}}}{3I_{\text{led}}} = 1,067 \Omega$$

$$b) E_{\text{total}} = \left( R(3I_{\text{led}})^2 + 3U_{\text{led}} \cdot I_{\text{led}} \right) t = 3U_{\text{bat}} 3I_{\text{led}} t = 149,9 \text{ kJ} = 41,63 \text{ Wh}$$

$$c) 2U_{\text{bat}} - 3I_{\text{led}2}R - U_{\text{led}} = 0 \Rightarrow I_{\text{led}2} = \frac{2U_{\text{bat}} - U_{\text{led}}}{3R} = 1,344 \text{ A}$$

$$d) \text{ Amb 3 bateries: } t_{\text{bat}} = \frac{C_{\text{bat}}}{3I_{\text{led}}} = 0,4 \text{ h} \qquad \text{Amb 2 bateries: } t_{\text{bat}} = \frac{C_{\text{bat}}}{3I_{\text{led}2}} = 0,7441 \text{ h}$$

**Exercici 4**

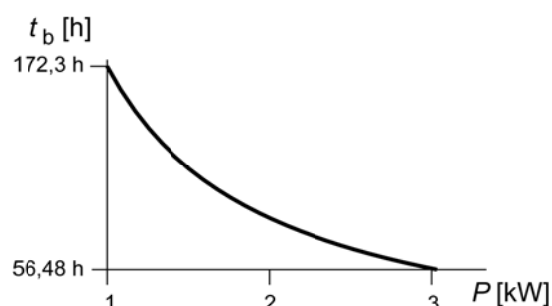
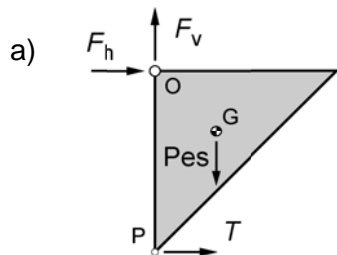
$$a) c = \frac{P}{c_b} = 0,2213 \text{ kg/h}$$

$$b) t_b = \frac{m_b}{c} = 56,48 \text{ h}$$

$$c) V_{ini} = m_b / \rho = 4,960 \text{ m}^3 \quad V_{fi} = \pi d^2 h / 4 = 0,03181 \text{ m}^3$$

$$\frac{\Delta V}{V_{ini}} = \frac{V_{ini} - V_{fi}}{V_{ini}} = 1 - \frac{V_{fi}}{V_{ini}} = 0,9936 = 99,36\%$$

$$d) m_b = t_b c = t_b \frac{P}{c_b} \Rightarrow t_b = \frac{m_b c_b}{P} \Rightarrow$$

**OPCIÓ B****Exercici 3**

$$b) m = \rho_{acer} \frac{1}{2} L^2 e = 9,616 \text{ kg}$$

$$c) \sum M(O) = 0 \rightarrow \frac{L}{3} mg - LT = 0 \rightarrow T = 31,44 \text{ N}$$

$$\sum F = 0 \rightarrow F_v - mg = 0 \rightarrow F_v = 94,31 \text{ N}$$

$$F_h + T = 0 \rightarrow F_h = -31,44 \text{ N}$$

$$d) \sigma = \frac{T}{s} = 11,64 \text{ MPa}$$

**Exercici 4**

$$a) P_{motor} = \eta_{motor} P_{elect} = \eta_{motor} UI = 343,6 \text{ W}$$

$$\eta_{motor} = \frac{n_s}{\tau} \rightarrow \Gamma_{motor} = \frac{P_{motor}}{\frac{2\pi}{60} n_{motor}} = \frac{P_{motor}}{\frac{2\pi}{60} \frac{n_s}{\tau}} = 1,151 \text{ Nm}$$

$$b) P_s = \eta_{tot} P_{elect} = \eta_{tot} UI = 136,6 \text{ W}$$

$$\Gamma_s = \frac{P_s}{\frac{2\pi}{60} n_s} = 130,5 \text{ Nm}$$

$$c) \Gamma_s = mg \frac{d}{2} \Rightarrow m = \frac{2\Gamma_s}{gd} = 120,9 \text{ kg}$$