

## SÈRIE 5

## Primera part

## Exercici 1

Q1 a    Q2 c    Q3 b    Q4 d    Q5 d

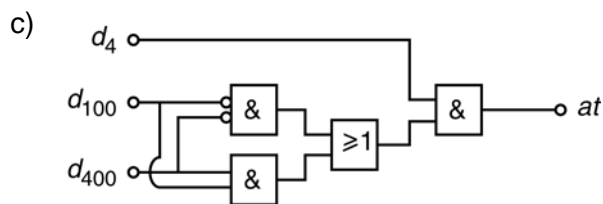
## Exercici 2

$d_4$	$d_{100}$	$d_{400}$	$at$
0	0	0	0
0	0	1	X ← No és possible
0	1	0	X ← No és possible
a) 0	1	1	X ← No és possible
1	0	0	1
1	0	1	X ← No és possible
1	1	0	0
1	1	1	1

b) Amb  $X = 0$ 

$$at = d_4 \cdot \bar{d}_{100} \cdot \bar{d}_{400} + d_4 \cdot d_{100} \cdot d_{400}$$

$$= d_4 (\bar{d}_{100} \cdot \bar{d}_{400} + d_{100} \cdot d_{400})$$



## Segona part

## OPCIÓ A

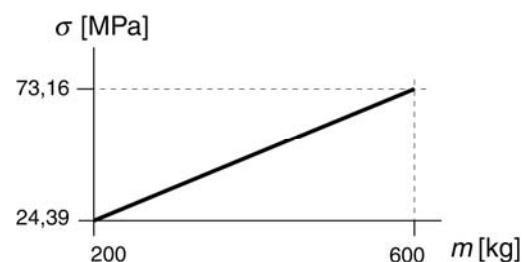
## Exercici 3

$$a) L_2 = 2L_1 \cos \alpha \rightarrow \alpha = \arccos \frac{L_2}{2L_1} = \arccos \frac{6}{2 \cdot 5} = 53,13^\circ$$

$$b) \sum F = 0 \rightarrow 2F \sin \alpha - mg = 0 \rightarrow F = \frac{g}{2 \cdot \sin \alpha} m = 6,129 m \text{ N, } m \text{ en kg}$$

$$c) \sigma = \frac{F}{s} = \frac{F}{\pi \left(\frac{d}{2}\right)^2} = 121,9 \cdot 10^3 m \text{ Pa, } m \text{ en kg}$$

$$d) \varepsilon = \frac{\sigma}{E} = \frac{121,9 \cdot 10^3 \cdot 450}{50 \cdot 10^9} = 1,097 \cdot 10^{-3}$$



**Exercici 4**

$$a) m_a = V \cdot \rho = 530 \cdot 10^3 \cdot 1 = 530 \cdot 10^3 \text{ kg}$$

$$E_{\text{dia}} = m_a c_e \Delta T = 530 \cdot 10^3 \cdot 4,187 \cdot 10^3 (28 - 20) = 17,75 \text{ GJ} = 4931 \text{ kW h}$$

$$b) m_b = \frac{E_{\text{dia}}}{\eta p_b} = \frac{17,75 \cdot 10^9}{0,78 \cdot 12,54 \cdot 10^6} = 1815 \text{ kg}$$

$$E_{\text{dis}} = m_b \cdot p_b (1 - \eta) = 1815 \cdot 12,54 \cdot 10^6 (1 - 0,78) = 5,007 \text{ GJ} = 1391 \text{ kW h}$$

$$c) q = \frac{V}{t} = \frac{530 \cdot 10^3}{16 \cdot 3600} = 9,201 \text{ L/s}$$

**OPCIÓ B****Exercici 3**

$$a) R_{\text{mín}} = \left( \frac{1}{R_3} + \frac{1}{R_4} \right)^{-1} = \frac{R_3 \cdot R_4}{R_3 + R_4} = 787,5 \Omega$$

$$b) I = \frac{U}{R_{\text{mín}}} = 292,1 \text{ mA}$$

$$c) P_1 = \frac{U^2}{R_{\text{mín}}} = \frac{230^2}{787,5} = 67,17 \text{ W} ; P_2 = \frac{U^2}{R_3} = \frac{230^2}{1400} = 37,79 \text{ W}$$

$$P_3 = \frac{U^2}{R_4} = \frac{230^2}{1800} = 29,38 \text{ W} ; P_4 = \frac{U^2}{R_3 + R_4} = \frac{230^2}{3200} = 16,53 \text{ W}$$

$$d) E_{\text{elèctr}} = P_1 \cdot t = 67,17 \cdot 2 = 134,3 \text{ W h}$$

**Exercici 4**

$$a) \Gamma_s = \frac{P_s}{\omega} = \frac{150 \cdot 10^3}{3800 \frac{2\pi}{60}} = 376,9 \text{ Nm}$$

$$b) c = \frac{V \cdot \rho}{P_s \cdot t} = \frac{600 \cdot 0,85}{150 \cdot 19,5} = 0,1744 \frac{\text{kg}}{\text{kW h}}$$

$$c) \eta = \frac{P_s}{P_e} = \frac{P_s}{\frac{\rho_c}{\rho} P_s c} = \frac{\rho}{\rho_c c} = \frac{0,85}{41700 \cdot 0,1744 \frac{1}{3600}} = 0,4209$$