



SÈRIE 3

Exercici 1

Q1 b

Q2 b

Q3 a

Q4 c

Q5 d

Exercici 2

a)

$$S = \overline{(\bar{a} + b)(a + b)} + (\bar{c} d)$$

simplificant

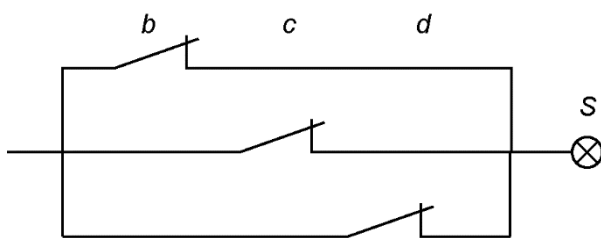
$$S = \bar{b} + \bar{c} + \bar{d}$$



b)

<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>S</i>
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	0
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	0

c)





Exercici 3

a)

$$\omega_{\text{red}} = \tau n_{\text{mot}} \frac{2\pi}{60} = 1,385 \text{ rad/s}$$

b)

$$W = m g h = 156,9 \text{ kJ}$$

c)

$$P_{\text{elèc}} = \frac{P_{\text{útil}}}{\eta} = \frac{W}{\eta t} = 2,906 \text{ kW}$$

d)

$$I = \frac{P_{\text{elèc}}}{U \cos(\varphi)} = 14,86 \text{ A}$$

Exercici 4

a)

$$V = \pi \frac{d^2}{4} s n_c = 2954 \text{ cm}^3$$

b)

$$\Gamma = \frac{P_{\text{mec}}}{\omega_{\text{mot}}} = \frac{P_{\text{mec}}}{n \frac{2\pi}{60}} = 63,66 \text{ Nm}$$

c)

$$P_{\text{tèrm}} = c \rho p_c = 60,67 \text{ kW}$$

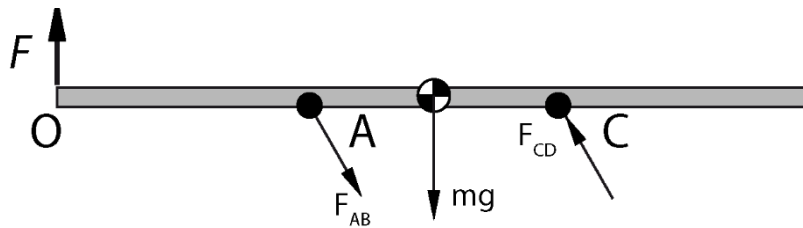
d)

$$\eta = \frac{P_{\text{mec}}}{P_{\text{tèrm}}} = 0,3297$$



Exercici 5

a)



b)

$$\left. \begin{aligned} \sum F_{\text{horizontals}} &= 0 \rightarrow F_{AB} \cos(\varphi) - F_{CD} \cos(\varphi) = 0 \\ \sum F_{\text{verticals}} &= 0 \rightarrow F - F_{AB} \sin(\varphi) + F_{AB} \sin(\varphi) - mg = 0 \end{aligned} \right\} \begin{aligned} F_{AB} &= F_{CD} \\ F &= mg = 39,23 \text{ N} \end{aligned}$$

c)

$$\sum M(A) = 0 \rightarrow FL + mg \frac{L}{2} - F_{CD} L \sin(60) = 0 \rightarrow F_{CD} = \frac{F + \frac{mg}{2}}{\sin(60)} = 67,94 \text{ N}$$

$$F_{AB} = F_{CD} = 67,94 \text{ N}$$

La barra AB treballa a tracció i la barra CD a compressió.



Exercici 6

a)

$$I_i = \frac{P_1}{U_1} = 3,913 \text{ A}$$

$$I = n I_i = 27,39 \text{ A}$$

b)

$$R = \frac{U_1^2}{P_1} = 58,78 \, \Omega$$

c)

$$R = \frac{U_1^2}{P_1} = \frac{U_2^2}{P_2} \Rightarrow P_2 = \frac{U_2^2 P_1}{U_1^2} = 265,8 \text{ W}$$