SÈRIE 3

Exercici 1

Q1 b

Q2 b

Q3 a

Q4 c

Q5 d

Exercici 2

a)

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

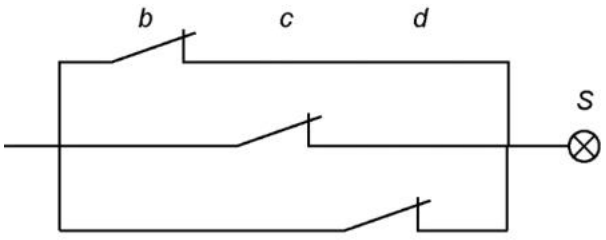
simplificant

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

b)

a	b	c	d	S
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)

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

b)

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

c)

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

d)

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

Exercici 4

a)

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

b)

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

c)

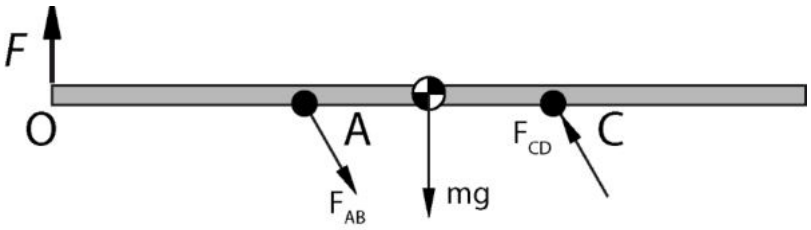
$$P_{tèrm} = c\, \rho\, p_c = 60{,}67 \text{ kW}$$

d)

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

Exercici 5

a)



b)

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

c)

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

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

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)

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