SÈRIE 1

Exercici 1

Q1 c

Q2 b

Q3 d

Q4 a

Q5 d

Exercici 2

a)

h	*c*	*t*	*e*	*a*
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	0
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*)**

$$a=(h+c+t+e)(h+c+t+\bar{e})(h+c+\bar{t}+e)(h+\bar{c}+t+e)(\bar{h}+c+t+e)$$

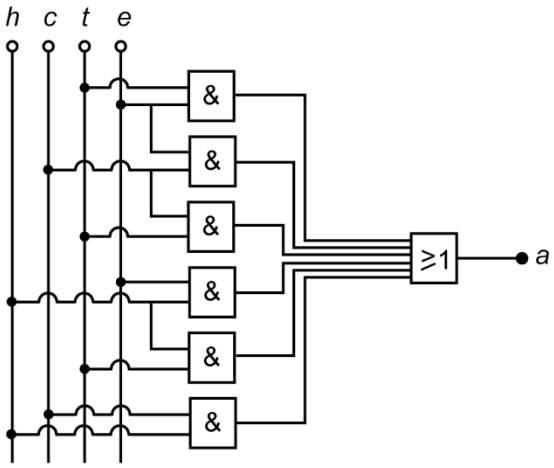
simplificant

$$a=te+ce+ct+he+ht+hc$$

o també

$$a=c(e+h+t)+e(h+t)+ht$$

***c*)**



Exercici 3

***a*)**

$$P_{\text{mec}}=mgv\sin(\alpha);\ \ P_{\text{elèctr}}=\frac{P_{\text{mec}}}{\eta};$$

$$P_{\text{elèctr}}=\frac{mgv\sin(\alpha)}{\eta}=218,7\,W$$

***b*)**

$$\omega_{mot} = \frac{v}{d/2} = 31{,}75\,\text{rad/s}$$

$$\Gamma = \frac{P_{mec}}{\omega_{mot}} = 5{,}856\,\text{Nm}$$

***c*)**

$$t = \frac{s}{v}; \qquad E_{cons} = P_{elèctr}\, t$$

$$\Delta = \frac{E_{cons}}{E_{bat}} = 21{,}87\,\%$$

Exercici 4

***a*)**

$$W = \Delta E_c = \frac{1}{2} m v^2 = 120{,}6\,\text{kJ}$$

***b*)**

$$E_{cons} = \frac{W}{\eta};$$

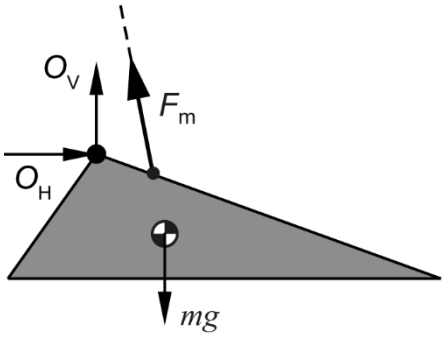
$$m_{ben} = \frac{E_{cons}}{p_c} = 10{,}48\,\text{g}$$

***c*)**

$$m_{CO_2} = \frac{m_{benz}}{\rho} FE = 31{,}41\,\text{g}$$

Exercici 5

***a*)**



***b*)**

$$\sum M(O)=0; \quad F_m\, a - mg\ b = 0; \quad \rightarrow \quad F_m = 25{,}17\,\text{N}$$

c)

$$\left.\begin{array}{ll} \sum F_{\text{horitzontals}} = 0 & \rightarrow \quad O_H = F_m \sin(\varphi) \\ \sum F_{\text{verticals}} = 0 & \rightarrow \quad O_V + F_m \cos(\varphi) - mg = 0 \end{array}\right\} \begin{array}{l} O_H = 3{,}938\,\text{N} \\ O_V = -3{,}286\,\text{N} \end{array}$$

El signe negatiu d'O_V indica que té sentit oposat al dibuixat al diagrama de cos lliure plantejat.

Exercici 6

***a*)**

$X_{L1} = \omega L_1 = 2\pi f L_1 = 2{,}199\,\Omega$

***b*)**

$\tan\varphi = \dfrac{X_{L1}}{R_1} = 0{,}44 \;\rightarrow\; \varphi = 23{,}75° \;\rightarrow\; \cos\varphi = 0{,}9154$

Alternativament $\left(\text{mirar càlculs dels següents apartats}\right)$

$\cos\varphi = \dfrac{P}{S} = \dfrac{W_1}{Z\,A_1^2} = 0{,}9154$

o també

$\cos\varphi = \dfrac{P}{S} = \dfrac{W_1}{U_1\,A_1} = 0{,}9154$

***c*)**

$Z = \sqrt{R_1^2 + X_{L1}^2} = 5{,}462\,\Omega$

***d*)**

$W_1 = R_1\,A_1^2; \;\rightarrow A_1 = \sqrt{\dfrac{W_1}{R_1}} = 13{,}78\ \text{A}$

***e*)**

$U_1 = Z\,A_1 = 75{,}29\ \text{V}$