Sèrie 2

Primera part

Exercici 1
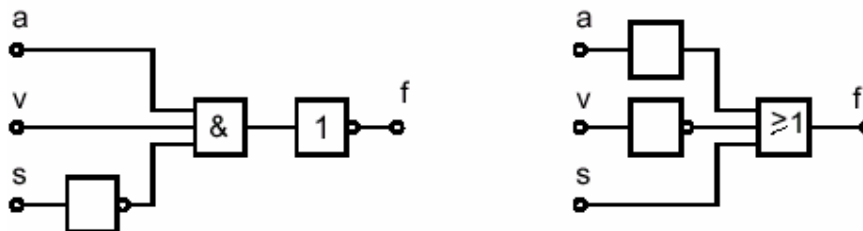
Q1 c **Q2** d **Q3** c **Q4** b **Q5** c

Exercici 2

a)

a	v	s	f
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	1

b) $\bar{f} = a \cdot v \cdot \bar{s} \implies f = \overline{a \cdot v \cdot \bar{s}} = \bar{a} + \bar{v} + s$

c)

Segona part

OPCIÓ A

Exercici 3

a) $P_l = U \cdot I = 621 \text{ W}$; $P_b = \dfrac{P_l}{25} = 24{,}84 \text{ W}$

b) $I_b = \dfrac{I}{25} = 108 \text{ mA}$; $R_b = \dfrac{U}{I_b} = 2{,}130 \text{ k}\Omega$

c) $E_t = P_l \cdot t = 4{,}347 \text{ kWh} = 15{,}65 \text{ MJ}$; $E_b = \dfrac{E_t}{75} = 57{,}96 \text{ Wh} = 208{,}7 \text{ kJ}$

Exercici 4

a) $L = L_1 + L_3 + \sqrt{L_1^2 + L_3^2} = 2243$ mm   ; $t = \dfrac{L}{v_{\text{tall}}} = 186,9$ s

b) $d = \dfrac{s_{\text{triangle}}}{s_{\text{rectangle}}} \times 100 = \dfrac{0,5\ l_1\ l_3}{l_2\ l_4} \times 100 = 28,57\%$

c) $m = (s_{\text{rectangle}} - s_{\text{triangle}})e\ \rho = s_{\text{rectangle}}(1 - \dfrac{d}{100})e\ \rho =$

$= (1 - \dfrac{d}{100})\ l_2\ l_4\ e\ \rho = 15,60$ kg

OPCIÓ B

Exercici 3

a) $\varphi = \arcsin\dfrac{d}{2L} = 12,84°$

b) $m = 2L\rho = 432$ kg

c) $\sum M(O) = 0 \Rightarrow F\,2L\cos\varphi = mgL\sin\varphi \Rightarrow F = \dfrac{mg}{2}\tan\varphi = 483,0$ N

d) $F_V = m\,g = 4238$ N   ; $F_H = F = 483,0$ N

Exercici 4

a) $P = q\,\rho_{\text{aigua}}\,c_{\text{aigua}}\,\Delta t = \dfrac{13,2}{60}\cdot1000\cdot4,18\cdot30 = 27,59$ kW

b) $\eta = \dfrac{P}{q_{\text{comb.}}\ p_c} = \dfrac{27,59\cdot10^3}{0,52\cdot10^{-3}\cdot62\cdot10^6} = 0,8558 = 85,58\%$

c) $t = \dfrac{V}{q} = 13,64$ min $= 818,2$ s   ; $m = t\,q_{\text{comb.}} = 425,5$ g

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Sèrie 5

Primera part
Exercici 1
Q1 b   **Q2** d   **Q3** b   **Q4** c   **Q5** b

Exercici 2

a)

l	h	p	e
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

b)
$$e = \overline{l}\cdot\overline{h}\cdot p + \overline{l}\cdot h\cdot\overline{p} + \overline{l}\cdot h\cdot p + l\cdot\overline{h}\cdot p + l\cdot h\cdot p =$$
$$p\cdot(\overline{l}\cdot\overline{h} + \overline{l}\cdot h + l\cdot\overline{h} + l\cdot h) + \overline{l}\cdot h\cdot\overline{p} = p + \overline{l}\cdot h\cdot\overline{p} = p + \overline{l}\cdot h$$

c)
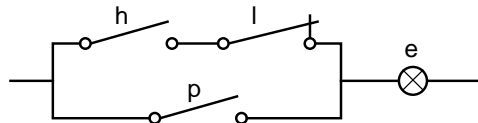
Segona part

OPCIÓ A

Exercici 3

a) $P_{\text{motor}} = P_{\text{elec.}}\eta_{\text{mot}} = 2,805 \text{ kW}$; $\Gamma_{\text{motor}} = \dfrac{P_{\text{motor}}}{\omega_{\text{eix}}} = \dfrac{P_{\text{motor}}}{\dfrac{n_{\text{sort}}}{\tau}\dfrac{2\pi}{60}} = 18,72 \text{ Nm}$

b) $P_{\text{sortida}} = P_{\text{motor}}\eta_{\text{red}} = 1,739 \text{ kW}$; $\Gamma_{\text{sortida}} = \dfrac{P_{\text{sortida}}}{\omega_{\text{sortida}}} = \dfrac{P_{\text{sortida}}}{n_{\text{sort}}\dfrac{2\pi}{60}} = 626,7 \text{ Nm}$

c) $P_{\text{dissipada}} = P_{\text{elec.}} - P_{\text{sortida}} = 1561 \text{ W}$

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Exercici 4

a) $m = s\,L\,\rho = 2280{\cdot}10^{-6}{\cdot}2,5{\cdot}7,8{\cdot}10^3 = 44,46$ kg

b) $\left.\begin{array}{l} F_A \cos\alpha - F_B \cos\beta = 0 \\ F_A \sin\alpha + F_B \sin\beta - mg = 0 \end{array}\right\} \Rightarrow \begin{array}{l} F_A = 391,0 \text{ N} \\ F_B = 319,3 \text{ N} \end{array}$

c) $L = \dfrac{h}{\sin\alpha} + \dfrac{h}{\sin b} = 6,146$ m

OPCIÓ B

Exercici 3

a) $\eta_{\text{alternador}} = \dfrac{P_{\text{elèctrica}}}{P_{\text{motor}}} = 0,8871 \Rightarrow 88,71\%$

b) $\eta_{\text{motor}} = \dfrac{E_{\text{motor}}}{E_{\text{combustible}}} = \dfrac{1}{c_e\, p_c} = 0,3499 \Rightarrow 34,99\%$

c) $c = c_e\, P_{\text{mec}}\, t = 4,557$ kg

Exercici 4

a) $P = \dfrac{v\,\rho_{\text{aigua}}\, c_e\, \Delta T}{t} = 1,045$ kW

b) $R = \dfrac{U^2}{P} = 50,62\ \Omega$

c) $L = \dfrac{R\,s}{\rho} = \dfrac{R\,\dfrac{\pi\, d^2}{4}}{\rho} = 6,881$ m