Sèrie 3

Primera part

Exercici 1

Q1 b **Q2** b **Q3** c **Q4** b **Q5** a

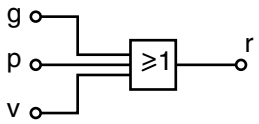
Exercici 2

a)

g	p	v	r	
0	0	0	0	
0	0	1	1	
0	1	0	1	
0	1	1	1	
1	0	0	1	
1	0	1	1	
1	1	0	1	No són possibles
1	1	1	1	

b) $r = g + p + v$

c)



Segona part

OPCIÓ A

Exercici 3

a) $\eta_{\text{motor}} = \dfrac{E_{\text{mec.}}}{E_{\text{comb.}}} = \dfrac{1}{c_e\, p_c} = 0{,}3137$

b) $c = P_{\text{mot}}\, t\, c_e \dfrac{1}{\rho} = 1{,}002 \text{ l/h}$

c) $\eta_{\text{bomba}} = \dfrac{P_{\text{hidr.}}}{P_{\text{motor}}} = \dfrac{p\, q}{P_{\text{motor}}} = 0{,}4040$

Exercici 4

a)
pos 1 $R_{eq1} = \left(\frac{1}{2R} + \frac{1}{2R}\right)^{-1} = R = 470\,\Omega$

pos 2 $R_{eq2} = \left(\frac{1}{R} + \frac{1}{3R}\right)^{-1} = 352{,}5\ \Omega$

b)
pos 1 $P_{BC1} = \frac{(U/2)^2}{R} = 19{,}15$ mW

pos 2 $P_{BC2} = \frac{U^2}{R} = 76{,}6$ mW

OPCIÓ B

Exercici 3

a) $E_{elec} = P_{nom}\, t_t = 26{,}25$ kW h

b) $n = \frac{L}{d} = 15$; $t_{paquet} = \frac{L}{v} = 36$ s

c) $E_{paquet} = \frac{(P_{nom} - P_{buit})\,\eta}{n} t_{paquet} = 1{,}795$ kJ

Exercici 4

a) $m = 2\,b\,h\,e\,\rho = 46{,}80$ kg

b) $\sum \boldsymbol{M}(O)=0 \Rightarrow -m\,g\,b + F h = 0 \ \rightarrow\ F = m\,g\,\frac{b}{h} = 459{,}1$ N

c) $\sum \boldsymbol{F}=0 \Rightarrow\ F_V = m\,g = 459{,}1$ N ; $F_H = F = 459{,}1$ N

d) Si la força *F* fos vertical hauria de ser més petita, en estar a més distància del punt O.

Sèrie 1

Primera part

Exercici 1

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

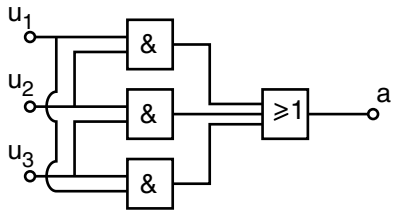
Exercici 2

a)

u_1	u_2	u_3	a
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

b) $$a = u_1 \cdot u_2 \cdot u_3 + \overline{u}_1 \cdot u_2 \cdot u_3 + u_1 \cdot \overline{u}_2 \cdot u_3 + u_1 \cdot u_2 \cdot \overline{u}_3 =$$
$$= u_1 \cdot u_2 + u_2 \cdot u_3 + u_1 \cdot u_3$$

c)



Segona part

OPCIÓ A

Exercici 3

a) $n_t = \dfrac{n_p}{t_p} t_t = 21600$ passatgers

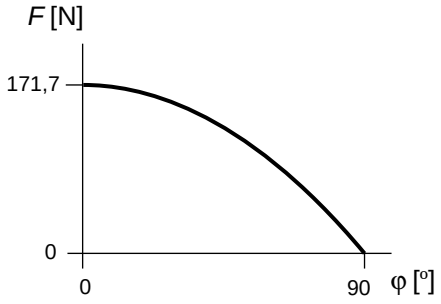
b) $P_p = \dfrac{1}{\eta} \dfrac{E_p}{t_p} n_p = \dfrac{4500 \cdot 10}{0{,}58 \cdot 15} = 5{,}172$ kW

c) $E_t = (P_{buit} + P_p) t_t = 75{,}35$ kW·h

Exercici 4

a) $\sum \boldsymbol{M}(\mathrm{O}) = 0 \;\Rightarrow\; -mgL\cos\varphi + F\,2L = 0 \;\rightarrow F = \dfrac{mg}{2}\cos\varphi$

b)



c) $\sum \boldsymbol{F}_{\text{ext}} = 0 \;\Rightarrow \begin{cases} F_{\mathrm{H}} = F\sin\varphi = \dfrac{mg}{2}\cos\varphi\sin\varphi = 80{,}66\,\mathrm{N} \\ F_{\mathrm{V}} = mg - F\cos\varphi = mg\left(1 - \dfrac{\cos^2\varphi}{2}\right) = 228{,}2\ \mathrm{N} \end{cases}$

OPCIÓ B

Exercici 3

a) $L_{\text{ext}} = 2b + 2h + 2\pi r_{\text{ext}} = 1828\ \text{mm}$
$L_{\text{int}} = 2b + 2h + 2\pi r_{\text{int}} = 1514\ \text{mm}$

b) $t_{\text{total}} = \dfrac{L_{\text{ext}} + L_{\text{int}}}{v} = 0{,}6685\ \text{min} = 40{,}11\ \text{s}$

c) $S = (2b + 2h)(r_{\text{ext}} - r_{\text{int}}) + \pi(r_{\text{ext}}^2 - r_{\text{int}}^2) = 83{,}56{\cdot}10^3\ \text{mm}^2$
$m = \rho S e = 6{,}710\ \text{kg}$

Exercici 4

a) $E_\tau = \dfrac{U^2}{R}\tau = 0{,}192\ \text{J}$

b) $P = \dfrac{E_\tau}{T_0} = 192\ \text{W}$

c) $E = P\,t_{\text{f}} = 1{,}728\ \text{kW}\cdot\text{h}$

d)