Sèrie 2

Primera part

Exercici 1

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

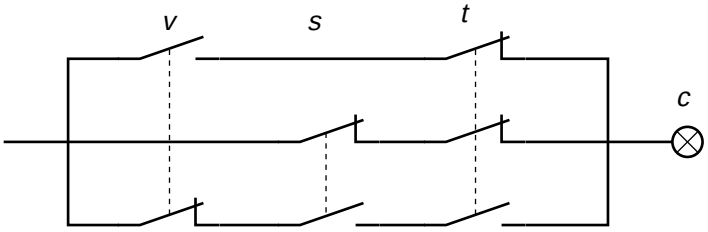
Exercici 2

a)

v	s	t	c
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0

b) $c = \overline{v} \cdot \overline{s} \cdot \overline{t} + \overline{v} \cdot s \cdot t + v \cdot \overline{s} \cdot \overline{t} + v \cdot s \cdot \overline{t} = v \cdot \overline{t} + \overline{s} \cdot \overline{t} + \overline{v} \cdot s \cdot t$

c)



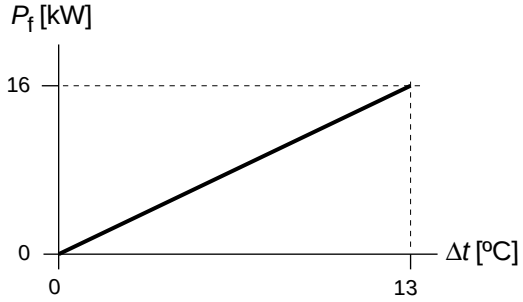
Segona part

OPCIÓ A

Exercici 3

a) $c_1 = V \cdot \rho \cdot c_p \left(t_2 - t_1\right) \cdot \frac{1}{p} \cdot \frac{1}{\eta} \cdot c = 0{,}0696\ €$

b)



c) $c_2 = P_f \cdot t \cdot \frac{1}{p} \cdot \frac{1}{\eta} \cdot c = 4{,}11\ €$

Exercici 4

a) $R_{mín} = \left(\frac{1}{R} + \frac{1}{R}\right)^{-1} = \left(\frac{2}{R}\right)^{-1} = 35\ \Omega$

b) $I = \frac{U}{R_{mín}} = \frac{230}{35} = 6{,}571\ \text{A}$

c) $P_1 = \frac{U^2}{R_{mín}} = \frac{230^2}{35} = 1511\ \text{W}$ $\qquad P_2 = \frac{U^2}{R} = \frac{230^2}{70} = 755{,}7\ \text{W}$

d) $L = \frac{R \cdot S}{\rho} = \frac{R \cdot \pi \frac{d^2}{4}}{\rho} = 2{,}524\ \text{m}$

OPCIÓ B

Exercici 3

a) $\Gamma_s = \frac{P_s}{\omega_s} = \frac{650}{3000\frac{2\pi}{60}} = 2{,}069\ \text{Nm}$

b) $\eta = \frac{P_s}{P_e} = \frac{P_s}{U \cdot I} = 0{,}6729$

c) $E_{elèc} = P_{elèc} \cdot t = U \cdot I \cdot t = 115{,}9\ \text{kJ}$

$E_{dis} = E_{elèc} \cdot (1 - \eta) = 37{,}92\ \text{kJ}$

Exercici 4

a) $L_c = L_2 \tan\alpha = 473{,}4\ \text{mm}$

b) $\sum M(\text{B}) = 0 \quad \rightarrow \quad mg\, L_1 \cos\alpha - F L_2 = 0 \quad \rightarrow \quad F = \frac{mg\, L_1 \cos\alpha}{L_2} = 37{,}29\ \text{N}$

c) $\sum F_{\text{verticals}} = 0 \quad \rightarrow F_v - mg + F\cos\alpha = 0 \rightarrow \quad F_v = mg - F\cos\alpha = 55{,}97\ \text{N}$

$\sum F_{\text{horitzontals}} = 0 \rightarrow F_h - F\sin\alpha = 0 \quad \rightarrow \quad F_h = F\sin\alpha = 18{,}64\ \text{N}$

SÈRIE 5

Primera part

Exercici 1

Q1 d **Q2** d **Q3** a **Q4** a **Q5** a

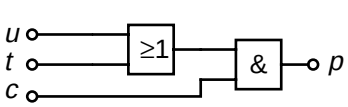
Exercici 2

a)

t	c	u	p
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

b) $p = (u + t) \cdot c$

c)



Segona part

OPCIÓ A

Exercici 3

a) $q_{sense} = c \cdot s = \frac{5,9}{100} \cdot 155 = 9,145 \text{ l} \quad q_{amb} = q_{sense} + c_a \cdot \frac{s}{v} = 9,145 + \frac{0,25}{1} \cdot \frac{155}{70} = 9,699 \text{ l}$

b) $\Delta c = \frac{c_a \cdot t_{100}}{100 \text{ km}} = \frac{0,25 \cdot \frac{100}{70}}{100 \text{ km}} = 0,3571 \text{ l/(100 km)}$

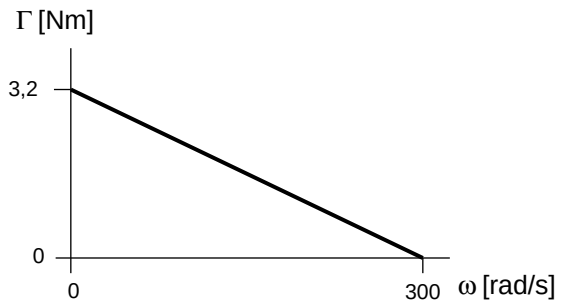
c) $P = c_a \cdot c_e \cdot \eta = 795,6 \text{ W}$

d) Si s'augmenta la velocitat mitjana es disminueix el temps del trajecte, per tant, en principi, disminueix el consum de l'aire condicionat. Ara bé, l'augment de la velocitat implica un augment de les resistències passives que fan incrementar el consum. Per tant no queda garantida una disminució del consum total.

Exercici 4

a) $\Gamma = c\dfrac{U - c\omega}{R}$

b)



c) $E = P \cdot t = U\dfrac{\Gamma}{c} \cdot t = 486\ \text{kJ} = 135\ \text{W·h}$

OPCIÓ B

Exercici 3

a) $\eta_{\text{bomba}} = \dfrac{P_{\text{hid}}}{P_{\text{mot}}} = \dfrac{p \cdot q}{P_{\text{mot}}} = 0,7368$

b) $V = q \cdot t = 13500\ \text{l}$

c) $c_e = c \cdot \dfrac{P_{\text{motor}}}{\eta_{\text{mot}}} \cdot \dfrac{1}{q} = 0,02639\ \text{€/m}^3$

Exercici 4

a) $\sum \boldsymbol{M}(\text{O}) = 0 \quad \rightarrow \quad mg \cdot s\sin\alpha - F \cdot b\sin 2\alpha = 0 \quad \rightarrow \quad F = 38,83\ \text{N}$

b) $\sum \boldsymbol{F} = 0 \quad \rightarrow \quad F_v + F\cos\alpha - mg = 0 \quad \rightarrow \quad F_v = 44,83\ \text{N}$

$F_h - F\sin\alpha = 0 \quad \rightarrow \quad F_h = 19,41\ \text{N}$

c) Quan $\alpha = 0$ la força que fa el cilindre passa per O i per tant no es pot iniciar el moviment d'obertura de la finestra. No és, doncs, una bona solució.