Sèrie 2

Primera part

Exercici 1

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

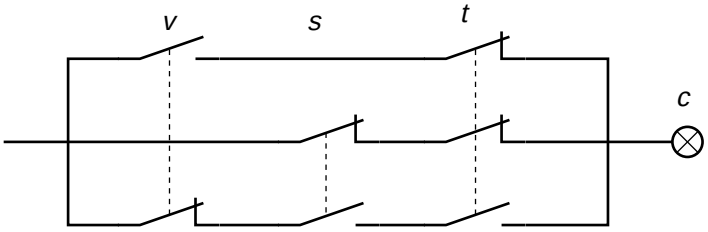
Exercici 2

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)



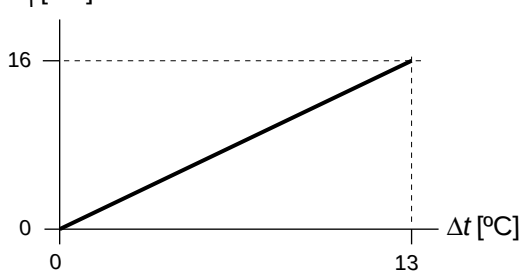
Segona part

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

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

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

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) $\Gamma_{\text{s}} = \frac{P_{\text{s}}}{\omega_{\text{s}}} = \frac{650}{3000 \frac{2\pi}{60}} = 2{,}069\ \text{Nm}$

b) $\eta = \frac{P_{\text{s}}}{P_{\text{e}}} = \frac{P_{\text{s}}}{U \cdot I} = 0{,}6729$

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

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

Exercici 4

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

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

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

SÈRIE 5

Primera part

Exercici 1

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

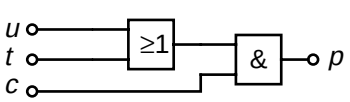
Exercici 2

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

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

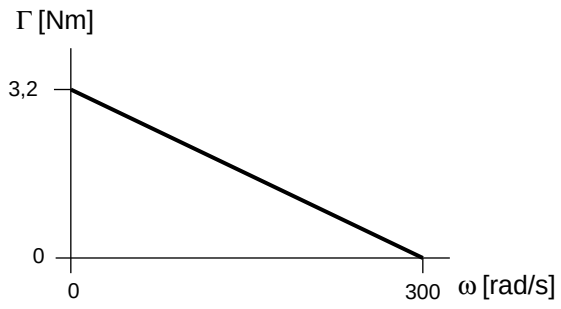
c) $P = c_{\text{a}} \cdot c_{\text{e}} \cdot \eta = 795,6 \text{ W}$

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

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

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

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.