

Sèrie 2

Primera part

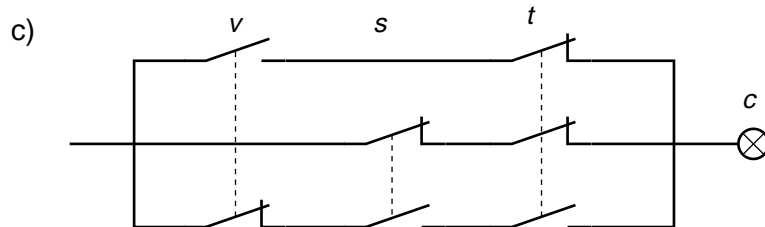
Exercici 1

Q1 c Q2 a Q3 a Q4 b Q5 b

Exercici 2

	v	s	t	c
	0	0	0	1
	0	0	1	0
	0	1	0	0
a)	0	1	1	1
	1	0	0	1
	1	0	1	0
	1	1	0	1
	1	1	1	0

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

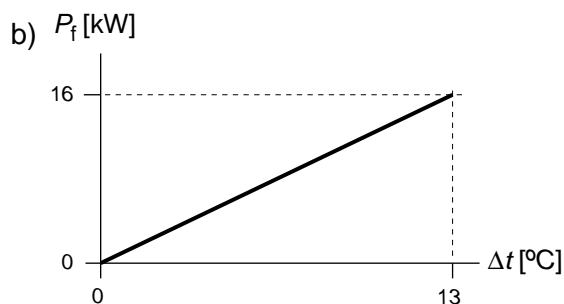


Segona part

OPCIÓ A

Exercici 3

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



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

Exercici 4

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

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

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

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

OPCIÓ B**Exercici 3**

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

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

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

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

Exercici 4

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

$$b) \sum M(B) = 0 \quad \rightarrow \quad mg L_1 \cos \alpha - FL_2 = 0 \quad \rightarrow \quad F = \frac{mg L_1 \cos \alpha}{L_2} = 37,29 \, \text{N}$$

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

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

SÈRIE 5

Primera part

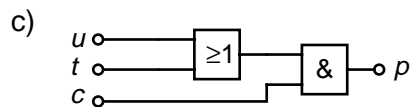
Exercici 1

Q1 d Q2 d Q3 a Q4 a Q5 a

Exercici 2

	t	c	u	p
	0	0	0	0
	0	0	1	0
	0	1	0	0
a)	0	1	1	1
	1	0	0	0
	1	0	1	0
	1	1	0	1
	1	1	1	1

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



Segona part

OPCIÓ A

Exercici 3

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

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

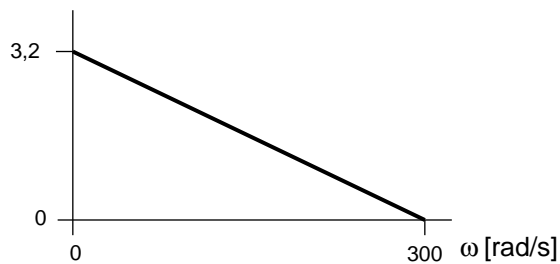
$$c) P = c_a \cdot c_e \cdot \eta = 795,6 \text{ W}$$

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

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

$$b) \Gamma \text{ [Nm]}$$



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

OPCIÓ B**Exercici 3**

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

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

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

Exercici 4

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

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

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

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.