

SÈRIE 1

Primera part

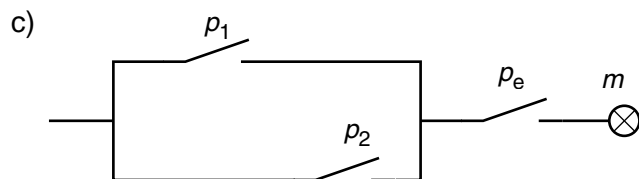
Exercici 1

Q1 b Q2 c Q3 c Q4 a Q5 b

Exercici 2

	p_1	p_2	p_e	m
	0	0	0	0
	0	0	1	0
	0	1	0	0
a)	0	1	1	1
	1	0	0	0
	1	0	1	1
	1	1	0	0
	1	1	1	1

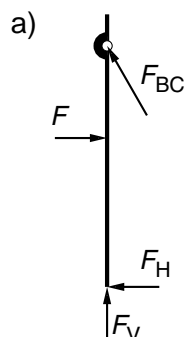
b) $m = \bar{p}_1 \cdot p_2 \cdot p_e + p_1 \cdot \bar{p}_2 \cdot p_e + p_1 \cdot p_2 \cdot p_e$
 $m = (p_1 + p_2) \cdot p_e$



Segona part

OPCIÓ A

Exercici 3



b) $\sum M(A) = 0 \rightarrow F s - F_{BC} L \cos \alpha = 0$

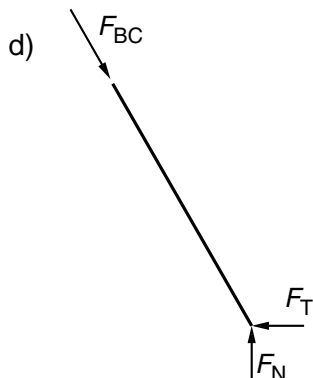
$$F_{BC} = \frac{F s}{L \cos \alpha} = \frac{840 \cdot 1,25}{2 \cos 60^\circ} = 1050 \text{ N}$$

c) $F_V + F_{BC} \sin \alpha = 0 \rightarrow F_V = -F_{BC} \sin \alpha = -909,3 \text{ N}$

$F - F_H - F_{BC} \cos \alpha = 0 \rightarrow F_H = F - F_{BC} \cos \alpha = 315 \text{ N}$

d)

$$F_T = F_{BC} \cos \alpha = 525 \text{ N}$$



Exercici 4

$$a) \Gamma_s = \frac{P_s}{\omega} = \frac{60 \cdot 10^3}{5000 \frac{2\pi}{60}} = 114,6 \text{ Nm}$$

$$b) c_h = c \cdot P_s = 180 \cdot 60 = 10,8 \frac{\text{kg}}{\text{h}}$$

$$c) \eta = \frac{P_s}{P_e} = \frac{P_s}{\rho_c \frac{1}{\rho} c_h} = \frac{60 \cdot 10^3}{35500 \cdot 10^3 \frac{1}{0,85} 10,8 \frac{1}{3600}} = 0,4789$$

$$d) V = c_h \cdot t \cdot \frac{1}{\rho} = 10,8 \cdot 3 \cdot \frac{1}{0,85} = 38,12 \text{ L}$$

OPCIÓ B

Exercici 3

$$a) P_h = q \cdot \rho \cdot g \cdot h = 17 \cdot 1 \cdot 9,807 \cdot 2,8 = 466,8 \text{ W}$$

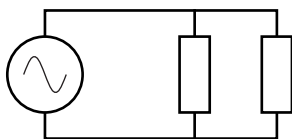
$$b) W_{\text{bomba}} = P_h \cdot t = 466,8 \cdot 7 = 3268 \text{ W} \cdot \text{h}$$

$$c) \eta = \frac{W_{\text{bomba}}}{E_{\text{elèc}}} = 0,5941$$

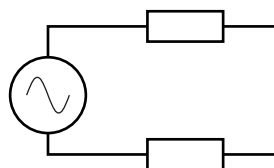
$$d) c_{\text{total}} = c \cdot E_{\text{elèc}} = 0,12 \cdot 5,5 = 0,66 \text{ €}$$

Exercici 4

a) Posició 1



Posició 2



$$b) \text{ Posició 1 } R_{\text{eq1}} = \frac{R}{2} \rightarrow I_{\text{total1}} = \frac{U}{R_{\text{eq1}}} = \frac{230}{25} = 9,2 \text{ A} \rightarrow I_1 = \frac{I_{\text{total1}}}{2} = 4,6 \text{ A}$$

$$\text{ Posició 2 } R_{\text{eq2}} = 2R \rightarrow I_{\text{total2}} = \frac{U}{R_{\text{eq2}}} = \frac{230}{100} = 2,3 \text{ A} \rightarrow I_2 = I_{\text{total2}} = 2,3 \text{ A}$$

$$c) \text{ Posició 1 } P_1 = U \cdot I_{\text{total1}} = 2116 \text{ W}$$

$$\text{ Posició 2 } P_2 = U \cdot I_{\text{total2}} = 529 \text{ W}$$

SÈRIE 4

Primera part

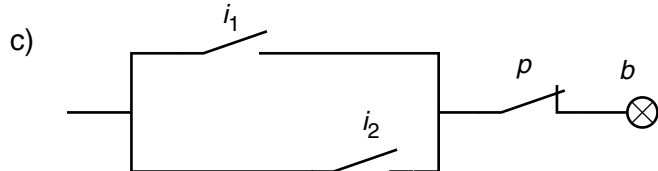
Exercici 1

Q1 d Q2 b Q3 d Q4 a Q5 a

Exercici 2

	i_1	i_2	p	b
	0	0	0	0
	0	0	1	0
	0	1	0	1
a)	0	1	1	0
	1	0	0	1
	1	0	1	0
	1	1	0	1
	1	1	1	0

b) $b = \bar{i}_1 \cdot i_2 \cdot \bar{p} + i_1 \cdot \bar{i}_2 \cdot \bar{p} + i_1 \cdot i_2 \cdot \bar{p}$
 $b = (i_1 + i_2) \cdot \bar{p}$



Segona part

OPCIÓ A

Exercici 3

a) $m = a \cdot h \cdot \sigma = 1,6 \cdot 1,1 \cdot 7 = 12,32 \text{ kg}$

b) $P_s = \Gamma_s \omega = 38 \cdot 17 \frac{2\pi}{60} = 67,65 \text{ W}$

c) $\eta = \frac{P_s}{U I} = \frac{67,65}{230 \cdot 1,3} = 0,2263$

d) $E_{\text{elèc}} = P_{\text{elèc}} \cdot t = U \cdot I \cdot t = 230 \cdot 1,3 \cdot 30 = 8970 \text{ J}$

$E_{\text{dis}} = E_{\text{elèc}} (1 - \eta) = 6941 \text{ J}$

Exercici 4

a) $L_2 = 2L_1 \cos \alpha = 2 \cdot 2 \cdot \cos 40^\circ = 3,064 \text{ m}$

b) $\sum F = 0 \rightarrow 2F \sin \alpha - mg = 0 \rightarrow F = \frac{mg}{2 \sin \alpha} = \frac{200 \cdot 9,807}{2 \cdot \sin 40} = 1526 \text{ N}$

c) $\sigma = \frac{F}{s} = \frac{F}{\pi \left(\frac{d}{2}\right)^2} = \frac{1526}{\pi \left(\frac{5 \cdot 10^{-3}}{2}\right)^2} = 77,70 \text{ MPa}$

d) $\varepsilon = \frac{\sigma}{E} = \frac{77,70 \cdot 10^6}{20 \cdot 10^9} = 3,885 \cdot 10^{-3}$

OPCIÓ B

Exercici 3

a) $E = P \cdot s \cdot t = 75 \cdot 1,8 \cdot 1,35 \cdot 8 = 1,458 \text{ kW} \cdot \text{h} = 5249 \text{ kJ}$

b) $I = \frac{P \cdot s}{U} = \frac{75 \cdot 1,8 \cdot 1,35}{230} = 0,7924 \text{ A} \quad R = \frac{U}{I} = 290,3 \Omega$

c) $P_c = \frac{U^2}{R} = 41,69 \text{ W}$

d) $L = \frac{R \cdot s}{\rho} = \frac{290,3 \cdot \pi \cdot \left(\frac{0,6 \cdot 10^{-3}}{2}\right)^2}{0,2 \cdot 10^{-6}} = 410,3 \text{ m}$

Exercici 4

a) $W = \Delta E_p = mgh = 800 \cdot 9,807 \cdot 5 \cdot 3 = 117,7 \text{ kJ}$

b) $t = \frac{h}{v} = \frac{5 \cdot 3}{1,2} = 12,5 \text{ s} \rightarrow P_m = \frac{W}{t} = 9415 \text{ W}$

O bé: $P_m = mgv = 9415 \text{ W}$

c) $\eta = \frac{P_m}{P_{\text{elèc}}} = 0,7846$

d) $P_{\text{dis}} = P_{\text{elèc}} - P_m = P_{\text{elèc}} (1 - \eta) = 2585 \text{ W}$