

## SÈRIE 1

### Primera part

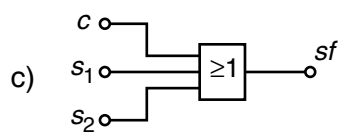
#### Exercici 1

Q1 b      Q2 d      Q3 b      Q4 b      Q5 a

#### Exercici 2

	$s_1$	$s_2$	$c$	$sf$
	0	0	0	0
	0	0	1	1
	0	1	0	1
a)	0	1	1	1
	1	0	0	1
	1	0	1	1
	1	1	0	1
	1	1	1	1

$$b) \overline{sf} = \overline{s_1} \cdot \overline{s_2} \cdot \overline{c} \rightarrow sf = s_1 + s_2 + c$$



### Segona part

#### OPCIÓ A

#### Exercici 3

$$a) L = \pi \cdot r + \pi \cdot R + \pi \cdot r = \pi(2 \cdot r + R) = 3,142 \text{ m}$$

$$L_t = 50 \cdot L = 157,1 \text{ m}$$

$$b) P = P_{\text{tub}} \cdot L = 125,7 \text{ W} ; \quad P_t = 50 \cdot P = 6283 \text{ W} = 6,283 \text{ kW}$$

$$c) E = P_t \cdot t = 31,42 \text{ kW} \cdot \text{h}$$

#### Exercici 4

$$a) \varphi = \arctan\left(\frac{1}{2}\right) = 26,57^\circ$$

$$b) \sum M(O) = 0 \rightarrow mg \cdot L - T \cdot 2L \sin \varphi = 0 \rightarrow T = 109,6 \text{ N}$$

$$c) \sum F = 0 \rightarrow \begin{aligned} F_v + T \sin \varphi - mg &= 0 \rightarrow F_v = 49,04 \text{ N} \\ F_h - T \cos \varphi &\rightarrow F_h = 98,07 \text{ N} \end{aligned}$$

$$d) \sigma = \frac{T}{s} = 36,55 \text{ MPa}$$

OPCIÓ B

**Exercici 3**

$$a) R_{AB} = \left( \frac{1}{2R} + \frac{1}{2R} \right)^{-1} = R = 120 \, \Omega$$

$$b) R_{AC} = \left( \frac{1}{R} + \frac{1}{3R} \right)^{-1} = \frac{3R}{4} = 90 \, \Omega$$

$$c) P = \frac{U^2}{R_{AB}} = 0,2083 \, W$$

**Exercici 4**

$$a) P_{\text{cremador}} = \frac{P_{\text{estufa}}}{5} = 900 \, W$$

$$c = \frac{P_{\text{cremador}}}{\rho_c} = 66,12 \, \text{g/h}$$

$$b) t = \frac{\rho_c \cdot m_b}{3 \cdot P_{\text{cremador}}} = 63,01 \, \text{h}$$

$$c) p = \frac{\rho_{\text{bom}}}{\rho_c \cdot m_b} = 0,06606 \, \text{€/(kW} \cdot \text{h)}$$

SÈRIE 3

Primera part

Exercici 1

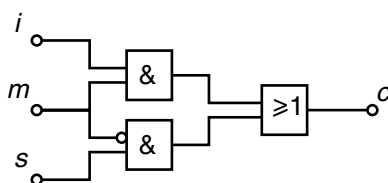
Q1 c      Q2 d      Q3 c      Q4 a      Q5 c

Exercici 2

s	i	m	c
0	0	0	0
0	0	1	0
0	1	0	0
a) 0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	X ← No es pot donar
1	1	1	X ← No es pot donar

b) Amb  $X=0$ :  $c = \bar{s} \cdot i \cdot m + s \cdot \bar{i} \cdot \bar{m}$   
 Amb  $X=1$ :  $c = i \cdot m + s \cdot \bar{m}$

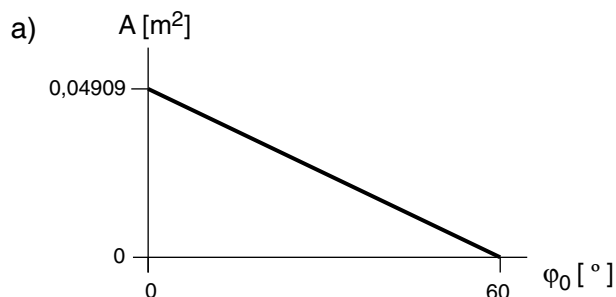
c) Amb  $X=1$ :



Segona part

OPCIÓ A

Exercici 3

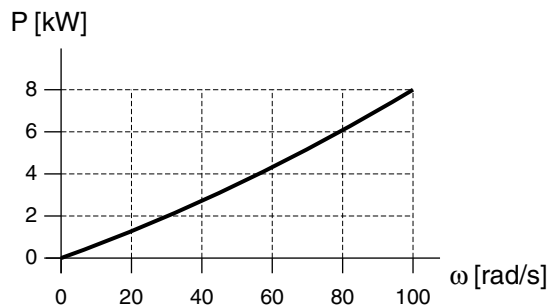


b)  $\sum M(O)=0 \Rightarrow -mgs_1 + Fs_2 = 0 \rightarrow F = mg \frac{s_1}{s_2} = 9,807 \text{ N}$

c)  $\sum F=0 \Rightarrow F_v - F - mg = 0 \rightarrow F_v = mg + F = 29,42 \text{ N}$   
 $F_h = 0$

### Exercici 4

a)  $\Gamma = \left(60 + \frac{20}{100}\omega\right) \text{ N}\cdot\text{m} \rightarrow P = \Gamma \cdot \omega = (60\omega + 0,2\omega^2) \text{ W}$ , expressant  $\omega$  en rad/s



b)  $n = \omega \frac{60}{2\pi} = 954,9 \text{ min}^{-1}$

c)  $E = \sum P \cdot t = \Gamma_1 \cdot \omega_1 \cdot t_1 + \Gamma_2 \cdot \omega_2 \cdot t_2 = 40,44 \text{ kW}\cdot\text{h}$

### OPCIÓ B

### Exercici 3

a)  $R_1 = R = 110 \Omega$ ;  $R_2 = \left(\frac{1}{R} + \frac{1}{R}\right)^{-1} = 55 \Omega$ ;  $R_3 = \left(\frac{1}{R} + \frac{1}{R} + \frac{1}{R}\right)^{-1} = 36,67 \Omega$

b)  $I_1 = \frac{U}{R_1} = 2,091 \text{ A}$ ;  $I_2 = \frac{U}{R_2} = 4,182 \text{ A}$ ;  $I_3 = \frac{U}{R_3} = 6,273 \text{ A}$

c)  $P_1 = \frac{U^2}{R_1} = 480,9 \text{ W}$ ;  $P_2 = \frac{U^2}{R_2} = 981,8 \text{ W}$ ;  $P_3 = \frac{U^2}{R_3} = 1443 \text{ W}$

### Exercici 4

a)  $\omega_r = \tau \cdot \omega_{\text{mot}} = \tau \cdot n_{\text{mot}} \cdot \frac{2\pi}{60} = 75,61 \text{ rad/s}$

b)  $v = \omega \frac{d}{2} = 28,81 \text{ m/s} = 103,7 \text{ km/h}$

c)  $\Gamma = \frac{P}{\omega} = 100,5 \text{ Nm}$

d)  $v_{\text{mín}} = \tau \omega_{\text{mín}} \frac{d}{2} = 18,95 \text{ m/s} = 68,23 \text{ km/h}$

$v_{\text{màx}} = \tau \omega_{\text{màx}} \frac{d}{2} = 68,23 \text{ m/s} = 245,6 \text{ km/h}$