

**Sèrie 3**

**Primera part**

**Exercici 1**

Q1 b      Q2 b      Q3 c      Q4 b      Q5 a

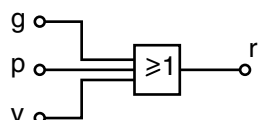
**Exercici 2**

<i>g</i>	<i>p</i>	<i>v</i>	<i>r</i>
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)  $r = g + p + v$

} No són possibles

c)



**Segona part**

OPCIÓ A

**Exercici 3**

a)  $\eta_{\text{motor}} = \frac{E_{\text{mec.}}}{E_{\text{comb.}}} = \frac{1}{c_e \rho_c} = 0,3137$

b)  $c = P_{\text{mot}} t c_e \frac{1}{\rho} = 1,002 \text{ l/h}$

c)  $\eta_{\text{bomba}} = \frac{P_{\text{hidr.}}}{P_{\text{motor}}} = \frac{pq}{P_{\text{motor}}} = 0,4040$

**Exercici 4**

$$\text{pos 1 } R_{\text{eq1}} = \left( \frac{1}{2R} + \frac{1}{2R} \right)^{-1} = R = 470 \Omega$$

a)

$$\text{pos 2 } R_{\text{eq2}} = \left( \frac{1}{R} + \frac{1}{3R} \right)^{-1} = 352,5 \Omega$$

b)

$$\text{pos 1 } P_{\text{BC1}} = \frac{(U/2)^2}{R} = 19,15 \text{ mW}$$

$$\text{pos 2 } P_{\text{BC2}} = \frac{U^2}{R} = 76,6 \text{ mW}$$

## OPCIÓ B

**Exercici 3**

$$\text{a) } E_{\text{elec}} = P_{\text{nom}} t_t = 26,25 \text{ kWh}$$

$$\text{b) } n = \frac{L}{d} = 15 \quad ; \quad t_{\text{paquet}} = \frac{L}{v} = 36 \text{ s}$$

$$\text{c) } E_{\text{paquet}} = \frac{(P_{\text{nom}} - P_{\text{buit}}) \eta}{n} t_{\text{paquet}} = 1,795 \text{ kJ}$$

**Exercici 4**

$$\text{a) } m = 2bh\rho = 46,80 \text{ kg}$$

$$\text{b) } \sum \mathbf{M}(O) = 0 \Rightarrow -mgb + Fh = 0 \rightarrow F = mg \frac{b}{h} = 459,1 \text{ N}$$

$$\text{c) } \sum \mathbf{F} = 0 \Rightarrow F_V = mg = 459,1 \text{ N} \quad ; \quad F_H = F = 459,1 \text{ N}$$

d) Si la força  $F$  fos vertical hauria de ser més petita, en estar a més distància del punt O.

**Sèrie 1**

**Primera part**

**Exercici 1**

Q1 d      Q2 b      Q3 d      Q4 d      Q5 c

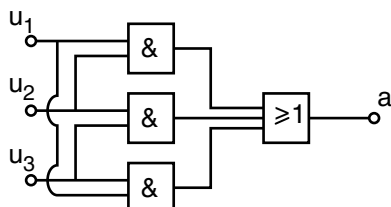
**Exercici 2**

$u_1$	$u_2$	$u_3$	$a$
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	1
1	1	1	1

b) 
$$a = u_1 \cdot u_2 \cdot u_3 + \bar{u}_1 \cdot u_2 \cdot u_3 + u_1 \cdot \bar{u}_2 \cdot u_3 + u_1 \cdot u_2 \cdot \bar{u}_3 =$$

$$= u_1 \cdot u_2 + u_2 \cdot u_3 + u_1 \cdot u_3$$

c)



**Segona part**

**OPCIÓ A**

**Exercici 3**

a)  $n_t = \frac{n_p}{t_p} t_t = 21600 \text{ passatgers}$

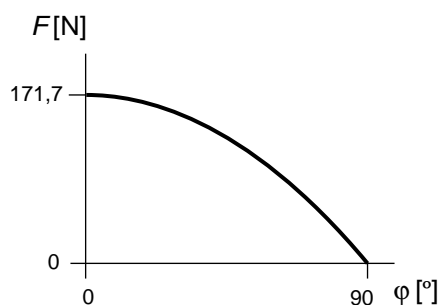
b)  $P_p = \frac{1}{\eta} \frac{E_p}{t_p} n_p = \frac{4500 \cdot 10}{0,58 \cdot 15} = 5,172 \text{ kW}$

c)  $E_t = (P_{\text{buit}} + P_p) t_t = 75,35 \text{ kW}\cdot\text{h}$

**Exercici 4**

$$a) \sum M(O) = 0 \Rightarrow -mgL \cos \varphi + F 2L = 0 \rightarrow F = \frac{mg}{2} \cos \varphi$$

b)



$$c) \sum \mathbf{F}_{\text{ext}} = 0 \Rightarrow \begin{cases} F_H = F \sin \varphi = \frac{mg}{2} \cos \varphi \sin \varphi = 80,66 \text{ N} \\ F_V = mg - F \cos \varphi = mg \left(1 - \frac{\cos^2 \varphi}{2}\right) = 228,2 \text{ N} \end{cases}$$

**OPCIÓ B****Exercici 3**

$$a) L_{\text{ext}} = 2b + 2h + 2\pi r_{\text{ext}} = 1828 \text{ mm}$$

$$L_{\text{int}} = 2b + 2h + 2\pi r_{\text{int}} = 1514 \text{ mm}$$

b)

$$t_{\text{total}} = \frac{L_{\text{ext}} + L_{\text{int}}}{v} = 0,6685 \text{ min} = 40,11 \text{ s}$$

$$c) S = (2b + 2h)(r_{\text{ext}} - r_{\text{int}}) + \pi(r_{\text{ext}}^2 - r_{\text{int}}^2) = 83,56 \cdot 10^3 \text{ mm}^2$$

$$m = \rho S e = 6,710 \text{ kg}$$

**Exercici 4**

$$a) E_{\tau} = \frac{U^2}{R} \tau = 0,192 \text{ J}$$

$$b) P = \frac{E_{\tau}}{T_0} = 192 \text{ W}$$

$$c) E = P t_f = 1,728 \text{ kW} \cdot \text{h}$$

d)

