

**SÈRIE 4**

**Primera part**

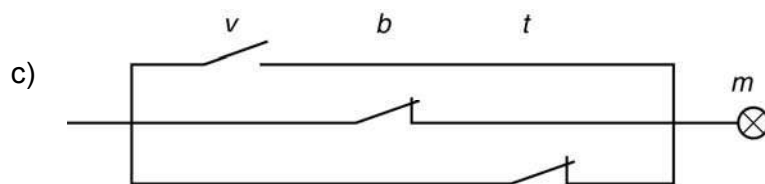
**Exercici 1**

Q1 b      Q2 d      Q3 a      Q4 b      Q5 d

**Exercici 2**

$v$	$b$	$t$	$m$
0	0	0	1
0	0	1	1
0	1	0	1
a) 0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

b)  $m = \overline{v \cdot b \cdot t} = \overline{v} + \overline{b} + \overline{t}$



**Segona part**

**OPCIÓ A**

**Exercici 3**

a)  $n = \frac{P}{P_{\text{bombeta}}} = \frac{360}{5} = 72 \rightarrow n_{\text{total}} = 4 \cdot n = 288 \text{ bombetes}$

b)  $I = \frac{P}{U} = \frac{360}{230} = 1,565 \text{ A} \quad R = \frac{U_{\text{bombeta}}}{I} = \frac{230/72}{1,565} = 2,041 \Omega$

c)  $E_{\text{total}} = P \cdot t = 360 \cdot 6 \cdot 3600 = 7776 \text{ kJ} = 2,16 \text{ kW h}$

$E_{\text{bombeta}} = E_{\text{total}} / n_{\text{total}} = 27 \cdot 10^3 \text{ J} = 7,5 \text{ W h}$

### Exercici 4

$$a) t_1 = \frac{d}{v_1} = 0,3125 \text{ h} = 1125 \text{ s} \quad t_2 = \frac{d}{v_2} = 0,2083 \text{ h} = 750 \text{ s}$$

$$b) P_{\text{res}} = F_{\text{res}} \cdot v = 0,42 v^3 \text{ W, amb } v \text{ en m/s.}$$

$$c) \eta = \frac{E_m}{E_{\text{comb}}} = \frac{P_{\text{res}} \cdot t}{m_{\text{comb}} \cdot \rho_c} \quad m_{\text{comb}1} = \frac{P_{\text{res}} \cdot t_1}{\eta \cdot \rho_c} = \frac{0,42 \cdot (80/3,6)^3 \cdot 1125}{0,23 \cdot 47,1 \cdot 10^6} = 0,4786 \text{ kg}$$

$$m_{\text{comb}2} = \frac{P_{\text{res}} \cdot t_2}{\eta \cdot \rho_c} = \frac{0,42 \cdot (120/3,6)^3 \cdot 750}{0,23 \cdot 47,1 \cdot 10^6} = 1,077 \text{ kg}$$

$$d) (\text{CO}_2)_{v_1} = \frac{m_{\text{comb}1}}{\rho} \cdot 2,38 = 1,675 \text{ kg de CO}_2$$

$$(\text{CO}_2)_{v_2} = \frac{m_{\text{comb}2}}{\rho} \cdot 2,38 = 3,769 \text{ kg de CO}_2$$

### OPCIÓ B

#### Exercici 3

$$a) E = m \cdot g \cdot h = 115 \cdot 9,807 \cdot (3 - 0,7) = 2594 \text{ J} = 0,7206 \text{ Wh}$$

$$b) t = \frac{E}{P_s} = \frac{2594}{200} = 12,97 \text{ s}$$

$$c) L = \omega R t = 14 \frac{2\pi}{60} \cdot 0,1 \cdot 12,97 = 1,901 \text{ m}$$

$$d) E_{\text{elèc}} = \frac{E}{\eta} = \frac{2594}{0,3} = 8647 \text{ J} = 2,402 \text{ Wh}$$

$$E_{\text{dis}} = E_{\text{elèc}} - E = 6053 \text{ J} = 1,681 \text{ Wh}$$

#### Exercici 4

$$a) \varphi = \arcsin \frac{s}{L} = \arcsin \frac{0,45}{0,8} = 34,23^\circ$$

$$h = L - L \cos \varphi = L(1 - \cos \varphi) = 0,1386 \text{ m}$$

$$b) \sum F_{\text{verticals}} = 0 \rightarrow (F_A + F_B) \cos \varphi - mg = 0$$

$$\sum F_{\text{horizontals}} = 0 \rightarrow (F_A + F_B) \sin \varphi - F = 0$$

$$F = mg \tan \varphi = 400,3 \text{ N}$$

$$c) \sum M(G) = 0 \rightarrow F_A = F_B \rightarrow F_A = F_B = \frac{mg}{2 \cos \varphi} = 355,8 \text{ N}$$