SÈRIE 1

Exercici 1

Q1 d **Q2** c **Q3** b **Q4** b **Q5** a **Q6** c **Q7** c **Q8** a

Exercicis 2 3 i 4

Exercici 2

2.1

$$E_{\text{aigua}} = m_a \cdot c_e \cdot \Delta T = 0{,}5 \cdot 4{,}17 \cdot (95 - 18) = 160{,}9 \text{ kJ}$$

2.2

$$P_{\text{crem}} = q\ p_{\text{c}} = \frac{58{,}44}{1000 \cdot 3600} \cdot 46 \times 10^6 = 746{,}7 \text{ W}$$

2.3

$$t_{\text{ideal}} = \frac{E_{aigua}}{P_{\text{crem}}} = \frac{160{,}9 \times 10^3}{746{,}7} = 215{,}5 \text{ s} = 3{,}592 \text{ min}$$

$$\eta = \frac{t_{\text{ideal}}}{t_{\text{cons}}} = \frac{3{,}591}{14} = 0{,}2566$$

o també

$$\eta = \frac{E_{\text{aigua}}}{E_{\text{crem}}} = \frac{E_{\text{aigua}}}{P_{\text{crem}}\ t_{\text{cons}}} = \frac{160{,}9}{746{,}7 \cdot 14 \cdot 60} = 0{,}2566$$

2.4

$$m_{\text{propà}} = q\ t_{\text{cons}} = \frac{58{,}44}{60} 14 = 13{,}64 \text{ g}$$

$$p_{\text{total}} = p_{\text{unitat}} \frac{m_{\text{propà}}}{m_{\text{cartutx}}} = 9{,}5 \frac{13{,}64}{450} = 0{,}2879 \text{ €}$$

Exercici 3

3.1

$$i_{\text{nec}} = \frac{n_{\text{mot}}}{n_{\text{eix}}} = \frac{1420}{600} = 2{,}367$$

El més proper és i = 2,5, És el que cal seleccionar per a minimitzar la diferència amb i_{nec}

3.2

$$n_{\text{real}} = \frac{n_{\text{mot}}}{i_{\text{real}}} = \frac{1420}{2{,}5} = 568\ \text{min}^{-1}$$

$$v_{\text{real}} = \omega_{\text{real}} \frac{d}{2} = n_{\text{real}} \frac{2\pi}{60} \frac{d}{2} = 568\ \frac{2\pi}{60} \frac{0{,}330}{2} = 9{,}814\ \text{m/s}$$

3.3

$$\Delta(\%) = \frac{v_{\text{recom}} - v_{\text{real}}}{v_{\text{recom}}} 100 = \frac{10 - 9{,}814}{10} 100 = 1{,}857\ \%$$

L'error percentual és inferior al 5% recomanat pel fabricant, i per tant l'elecció compleix amb les seves recomanacions.

Exercici 4

4.1

$$P_{\text{mec}} = \frac{P_{elèc}}{\eta_{alt}} = \frac{4{,}96}{0{,}9} = 5{,}511\ \text{kW}$$

4.2

$$\Gamma = \frac{P_{\text{mec}}}{\omega_{\text{mot}}} = \frac{P_{\text{mec}}}{n_{\text{mot}} \frac{2\pi}{60}} = \frac{5{,}511 \times 10^3}{3000 \frac{2\pi}{60}} = 17{,}54 \text{ Nm}$$

4.3

$$q = c_{\text{e}}\ P_{\text{mec}} = 0{,}29 \cdot 5{,}511 = 1{,}598 \text{ kg/h}$$

$$t = \frac{\rho V}{q} = \frac{0{,}84 \cdot 15}{1{,}6} = 7{,}884 \text{ h}$$

4.3

$$E_{elec} = P_{elèc}\ t = 4{,}96 \cdot 7{,}884 = 39{,}10 \text{ kWh} = 140{,}8 \times 10^3 \text{ kJ} = 140{,}8 \text{ MJ}$$