

**SÈRIE 2****Primera part****Exercici 1**

**Q1** c      **Q2** b      **Q3** c      **Q4** c      **Q5** a

**Exercici 2**

$$a) R_1 = \frac{V_1}{I_1} = \frac{20}{2} = 10 \, \Omega$$

$$b) R_2 = \frac{V_2}{I_2} = \frac{10}{5} = 2 \, \Omega$$

$$c) I(R_3) = I_3 = I_1 - I_2 = 2 - 5 = -3 \, A$$

$$d) U_1 = V_1 + R_3 \cdot I_3 = 20 - 3 = 17 \, V$$

$$e) U_2 = V_2 - R_3 \cdot I_3 = 10 + 3 = 13 \, V$$

**OPCIÓ A****Exercici 3**

$$a) P = R \cdot I^2 \Rightarrow I = \sqrt{\frac{P}{R}} = \sqrt{\frac{100}{25}} = 2 \, A$$

$$b) Z = \sqrt{R^2 + X_L^2} = \sqrt{25^2 + 20^2} = 32,01 \, \Omega; U = Z \cdot I = 32,01 \cdot 2 = 64,02 \, V$$

$$c) V_2 = I \cdot X_L = 2 \cdot 20 = 40 \, V$$

$$d) Q = V_2 \cdot I = 40 \cdot 2 = 80 \, \text{var}$$

**Exercici 4**

$$a) \eta(\%) = 100 \frac{P_{\text{mec.}}}{P_{\text{elèc.}}} = 100 \frac{P_{\text{mec.}}}{U \cdot I} = 100 \frac{200}{40 \cdot 6} = 83,33 \%$$

$$b) P_{\text{pèrdues}} = UI - P_{\text{mec.}} = 40 \cdot 6 - 200 = 40 \, W; R_i = \frac{P_{\text{pèrdues}}}{I^2} = \frac{40}{6^2} = 1,111 \, \Omega$$

$$c) \text{En les condicions nominals: } E_N = U - R_i \cdot I = 40 - 1,111 \cdot 6 = 33,33 \, V$$

$$\text{En les condicions actuals: } E = U - R_i \cdot I = 30 - 1,111 \cdot 6 = 23,33 \, V$$

$$n' = n_N \frac{E}{E_N} = 800 \frac{23,33}{33,33} = 560 \, \text{min}^{-1}$$

## OPCIÓ B

## Exercici 3

$$a) \eta(\%) = 100 \frac{P}{\sqrt{3}UI \cos \varphi} = 100 \frac{55000}{\sqrt{3} \cdot 230 \cdot 187 \cdot 0,79} = 93,46\%$$

$$b) p = 4 \text{ parells de pols}$$

$$c) \Gamma = \frac{P}{\omega} = \frac{55000}{741 \frac{2\pi}{60}} = 709 \text{ Nm}$$

d)

$$Q = \sqrt{S^2 - P^2} = \sqrt{(\sqrt{3} \cdot U \cdot I)^2 - (\sqrt{3} \cdot U \cdot I \cdot \cos \varphi)^2} = \sqrt{3} \cdot U \cdot I \cdot \sqrt{1 - \cos^2 \varphi}$$

$$Q = \sqrt{3} \cdot 230 \cdot 187 \cdot \sqrt{1 - 0,79^2} = 45,67 \text{ kvar}$$

## Exercici 4

$$a) V_O = V_1 \frac{R_3}{R_2 + R_3} = 10 \frac{100}{100 + 100} = 5 \text{ V}$$

$$b) V_O = V_2 = 10 \text{ V}$$

$$c) V_O = V_1 \frac{R_3}{R_1 + R_2 + R_3} = 10 \frac{100}{100 + 100 + 100} = 3,333 \text{ V}$$

$$d) V_O = V_2 = 10 \text{ V}$$

$$e) P = \frac{V_O^2}{R_3} = \frac{10^2}{100} = 1 \text{ W}$$