

SÈRIE 4

Primera part

Exercici 1

Q1 d Q2 c Q3 c Q4 c Q5 a

Exercici 2

$$a) \begin{cases} U_1 = (R_1 + R_3)I_1 + R_5(I_1 + I_2) \\ U_2 = (R_2 + R_4)I_2 + R_3(I_1 + I_2) \end{cases} \rightarrow \begin{cases} 50 = 3I_1 + 4(I_1 + I_2) \\ 40 = 3I_2 + 4(I_1 + I_2) \end{cases} \rightarrow \begin{matrix} I_1 = 5,758 \text{ A} \\ I_2 = 2,424 \text{ A} \end{matrix}$$

$$b) P_1 = U_1 I_1 = 287,9 \text{ W} ; P_2 = U_2 I_2 = 96,97 \text{ W}$$

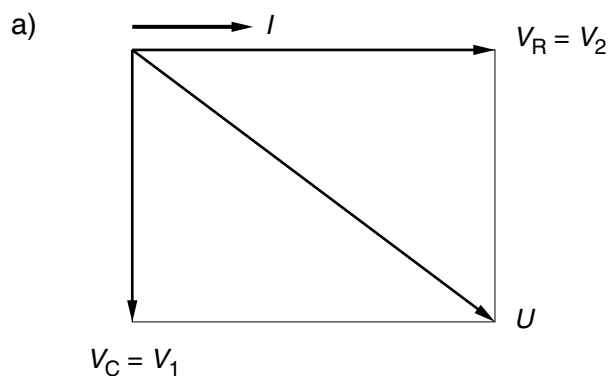
$$c) I_1' = \frac{U_1}{R_1 + R_3} = \frac{50}{3} = 16,66 \text{ A}$$

$$I_2' = \frac{U_2}{R_2 + R_4} = \frac{40}{3} = 13,33 \text{ A}$$

$$I'(R_5) = I_1' + I_2' = 30 \text{ A}$$

OPCIÓ A

Exercici 3



$$b) X_C = \frac{V_1}{I} = 115 \Omega$$

$$c) V_2 = \sqrt{U^2 - V_1^2} = \sqrt{230^2 - 115^2} = 199,2 \text{ V}$$

$$d) P = V_2 I = 199,2 \text{ W}$$

Exercici 4

$$a) \eta(\%) = 100 \frac{P}{\sqrt{3}UI \cos \varphi} = 100 \frac{100000}{\sqrt{3} \cdot 400 \cdot 196 \cdot 0,82} = 89,8 \%$$

$$b) p = 1 \text{ parell de pols}$$

$$c) \Gamma = \frac{P}{\omega} = \frac{100000}{2900 \frac{2\pi}{60}} = 329,3 \text{ Nm}$$

$$d) \text{ Estrella, } I_{\text{línia}} = 196 \text{ A}$$

OPCIÓ B

Exercici 3

$$a) P = 3 \frac{1}{R} \left(\frac{U}{\sqrt{3}} \right)^2 \rightarrow R = \frac{U^2}{P} = \frac{400^2}{10000} = 16 \Omega$$

$$b) Q = 3 X_L \left(\frac{U}{\sqrt{3}} \right)^2 \rightarrow X_L = \frac{U^2}{Q} = \frac{400^2}{10000} = 16 \Omega; L = \frac{X_C}{\omega} = \frac{16}{100 \cdot \pi} = 50,93 \text{ mH}$$

$$c) \text{ fdp} = \cos \varphi = \frac{P}{S} = \frac{P}{\sqrt{P^2 + Q^2}} = \frac{10}{\sqrt{10^2 + 10^2}} = 0,7071 \text{ (i)}$$

$$d) I_{\text{línia}} = \sqrt{I_R^2 + I_L^2} = \sqrt{\left(\frac{U}{\sqrt{3}R} \right)^2 + \left(\frac{U}{\sqrt{3}X_L} \right)^2} = \frac{U}{\sqrt{3}} \sqrt{\frac{1}{R^2} + \frac{1}{X_L^2}} = \frac{400}{\sqrt{3 \cdot 16}} \sqrt{2} = 20,41 \text{ A}$$

Exercici 4

$$a) I = \frac{P}{U} = \frac{500}{36} = 13,89 \text{ A}$$

$$R = \rho \frac{L}{S} = 0,01786 \frac{10}{4} = 0,04465 \Omega$$

$$\Delta U(\%) = 100 \frac{2RI}{U} = 100 \frac{2 \cdot 0,04465 \cdot 13,89}{36} = 3,45\%$$

$$b) 16 \text{ A}$$

$$c) I_{cc} = \frac{U}{2R} = \frac{36}{2 \cdot 0,04465} = 403 \text{ A}$$