SÈRIE 4

Primera part

Exercici 1

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

Exercici 2

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

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

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

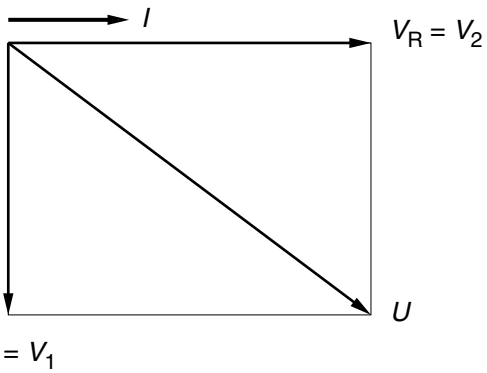
$I_2' = \dfrac{U_2}{R_2 + R_4} = \dfrac{40}{3} = 13{,}33 \text{ A}$

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

OPCIÓ A

Exercici 3

a)



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

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

b) p = 1 parell de pols

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

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

OPCIÓ B

Exercici 3

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

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

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

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

Exercici 4

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

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

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

b) 16 A

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