SÈRIE 5

Primera part

Exercici 1

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

Exercici 2

a) $\frac{1}{R_p} = \frac{1}{R_2} + \frac{1}{R_3} \Rightarrow R_p = 3\Omega$ $\qquad V_{23} = R_p I_1 = 30$ V

b) $I_2 = \frac{V_{23}}{R_2} = 2,5$ A

$I_3 = \frac{V_{23}}{R_3} = 7,5$ A

c) $U_1 - R_1 I_1 + U_2 - V_{23} = 0 \Rightarrow U_2 = 25$ V

d) $P_1 = U_1 I_1 = 250$ W

Segona part

OPCIÓ A

Exercici 3

a) $V_{AN} = \frac{U}{\sqrt{3}}$; $I_R = \frac{V_{AN}}{R} = 16,88$ A; $I_X = \frac{V_{AN}}{X} = 7,31$ A; $I_A = \sqrt{I_R^2 + I_X^2} = 18,39$ A

b) $P = 3\frac{V_{AN}^2}{R} = 11,11$ kW; $Q = 3\frac{V_{AN}^2}{X_1} = 4,813$ kVAr; $S = \sqrt{P^2 + Q^2} = 12,11$ kVA

c) $I_N = 0$ A

Exercici 4

a) $I = \frac{P_b + P_e}{U} = \frac{2500}{220} = 11,36$ A; $U - U_f = 0,05U = 2RI \Rightarrow R_{màx} = 0,484\ \Omega$;

$R_{màx} = \rho\frac{l}{S_{mín}} \Rightarrow S_{mín} = 17,86 \cdot 10^{-9}\frac{500}{0,484} = 18,45 \cdot 10^{-6}\text{m}^2 = 18,45\ \text{mm}^2$

b) $S = 25\ \text{mm}^2$

c) $R = \rho\frac{l}{S} = 0,357\ \Omega$; $\Delta U = \Delta U\frac{R}{R_{màx}} = 5\frac{0,357}{0,484} = 3,68\%$ (8,11V)

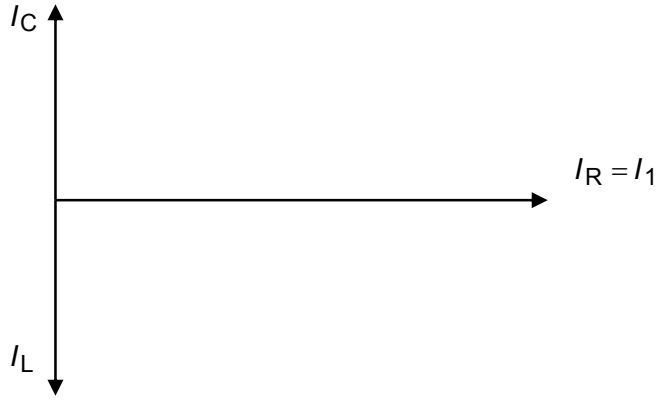
OPCIÓ B

Exercici 3

a) $I_R = \frac{U}{R_1} = 22\ \text{A}$; $I_L = \frac{U}{X_L} = 10\ \text{A}$; $I_1 = \sqrt{I_R^2 + I_L^2} = 24{,}17\ \text{A}$

b) $P = U I_R = 4840\ \text{W}$; $S = U I_1 = 5{,}317\ \text{kVA}$; $Q = \sqrt{S^2 - P^2} = 2200\ \text{VAr}$

c)



d) $X_C = X_L = 22\Omega \Rightarrow C = \frac{1}{2\pi f X_C} = 144{,}7\,\mu\text{F}$

Exercici 4

a) $T_A = T_B = 20\ \text{ms}$; $f_A = f_B = \frac{1}{T_A} = 50\ \text{Hz}$

b) $V_A = \frac{V_{Apic}}{\sqrt{2}} = \frac{200}{\sqrt{2}} = 141{,}4\ \text{V}$; $V_B = \frac{V_{Bpic}}{\sqrt{2}} = \frac{150}{\sqrt{2}} = 106{,}1\,\text{V}$

c) $\varphi_{BA} = \frac{\pi}{2}\ \text{rad} = 90^\circ$