

SÈRIE 5**Primera part****Exercici 1****Q1 d Q2 c Q3 b Q4 b Q5 b****Exercici 2**

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

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

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

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

$$d) P_1 = U_1 I_1 = 250 \text{ W}$$

Segona part**OPCIÓ A****Exercici 3**

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

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

$$c) I_N = 0 \text{ A}$$

Exercici 4

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

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

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

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

OPCIÓ B**Exercici 3**

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

$$\text{b) } P = UI_R = 4840 \text{ W}; S = UI_1 = 5,317 \text{ kVA}; Q = \sqrt{S^2 - P^2} = 2200 \text{ VAR}$$



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

Exercici 4

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

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

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