

Sèrie 1

Primera part

Exercici 1

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

Exercici 2

a) $V_3 = U_1 - U_2 = 70 \text{ V}$

b) $I_1 = \frac{U_1}{R_2} + \frac{V_3}{R_3} = 20 \text{ A}$

c) $I'_1 = I_1 + \frac{U_1}{R_1} = 25 \text{ A}$

d) $V'_3 = V_3 = 70 \text{ V}$

e) $P_1 = U_1 I'_1 = 2500 \text{ W}$; $P_2 = -U_2 \frac{V_3}{R_3} = -300 \text{ W}$

OPCIÓ A

Exercici 3

a) $X = \frac{U}{I_1} = 22 \Omega$

b) $R = \frac{U}{I_3} = 11 \Omega$

c) $I_2 = \sqrt{I_1^2 + I_3^2} = 22,36 \text{ A}$

d) $\cos \varphi = \frac{I_3}{I_2} = 0,8944$ (inductiu)

Exercici 4

a) $P = V I \Rightarrow I = 10 \text{ A}$; $S = \frac{10 \text{ A}}{3 \text{ A/mm}^2} = 3,333 \text{ mm}^2 \Rightarrow S = 4 \text{ mm}^2$

b) $R = \rho \frac{L}{S} = 0,4465 \Omega$; $\Delta u_{\%} = \frac{\Delta U}{U} 100 = \frac{0,8 R I}{U} 100 = 14,88 \%$

OPCIÓ B

Exercici 3

$$a) \quad V = \frac{U}{\sqrt{3}} = 127,02 \text{ V}; \quad I_R = \frac{V_s}{R} = 31,75 \text{ A}; \quad I_C = \frac{U_s}{X} = 12,70 \text{ A}; \quad I_1 = \sqrt{I_R^2 + I_C^2} = 34,2 \text{ A}$$

$$b) \quad I_2 = 0 \text{ A} \quad (\text{equil.})$$

$$c) \quad \cos \varphi = \frac{I_R}{I_1} = 0,9285 \quad (\text{capacitiu})$$

$$d) \quad P = 3 \frac{V_s^2}{R} = 12,1 \text{ kW}; \quad Q = 3 \frac{V_s^2}{X} = 4,84 \text{ kVAr}; \quad S = \sqrt{P^2 + Q^2} = 13,03 \text{ kVA}$$

Exercici 4

$$a) \quad P_e = U_N I_N = 500 \text{ W}; \quad \eta = \frac{P_N}{P_e} 100 = 80\%$$

$$b) \quad \omega = 1600 \text{ min}^{-1} = 167,6 \frac{\text{rad}}{\text{s}}; \quad \Gamma = \frac{P_N}{\omega} = 2,387 \text{ Nm}$$

$$c) \quad \Gamma = K I \Rightarrow K = 0,9550 \text{ V} \cdot \text{s}; \quad E = K \omega = 160 \text{ V}$$

$$d) \quad U_N = R I_N + E \Rightarrow R = 16 \Omega$$