

SÈRIE 2**Primera part****Exercici 1**

Q1 a Q2 c Q3 d Q4 b Q5 c

Exercici 2

- a) $L = \frac{X_L}{2 \cdot \pi \cdot f} = \frac{\frac{72}{0,9}}{2 \cdot \pi \cdot 50} = 254,65 \text{ mH}$
 b) $C = \frac{1}{2 \cdot \pi \cdot f \cdot X_C} = \frac{1}{2 \cdot \pi \cdot 50 \cdot \frac{280}{0,9}} = 10,23 \text{ } \mu\text{F}$
 c) $A_1 = \frac{230}{100} = 2,3 \text{ A}$
 d) En estar el circuit en ressonància, $\text{fdp} = 1$

Segona part**OPCIÓ A****Exercici 3**

- a) $I_R = \frac{U_{ab}}{R} = \frac{400}{10} = 40 \text{ A}$ $I_{X_L} = \frac{U_{ab}}{X_L} = \frac{400}{10} = 40 \text{ A}$
 $I_1 = \sqrt{I_R^2 + I_{X_L}^2} = \sqrt{40^2 + 40^2} = 56,57 \text{ A}$
 b) $I_2 = \sqrt{3} \cdot I_1 = \sqrt{3} \cdot 56,57 = 97,98 \text{ A}$
 c) $P = 3 \cdot \frac{U_{ab}^2}{R} = 3 \cdot \frac{400^2}{10} = 48 \text{ kW}$ $Q = 3 \cdot \frac{U_{ab}^2}{X_L} = 3 \cdot \frac{400^2}{10} = 48 \text{ kvar}$
 $S = \sqrt{3} \cdot U_{ab} \cdot I_2 = \sqrt{3} \cdot 400 \cdot 97,98 = 67,88 \text{ kVA}$

Exercici 4

- a) $I_1 = \frac{U_1}{R_1} = \frac{15}{10} = 1,5 \text{ A}$
 b) $I_1 = \frac{U_2}{R_1 + R_2} = \frac{15}{10 + 5} = 1 \text{ A}$
 c) $I_1 = \frac{U_1}{R_1} = \frac{15}{10} = 1,5 \text{ A}$
 d) $P_{\text{Font}} = \frac{U_2^2}{R_1 + R_2} = \frac{15^2}{10 + 5} = 15 \text{ W}$

OPCIÓ B

Exercici 3

- a) $\eta(\%) = 100 \cdot \frac{P}{\sqrt{3} \cdot U \cdot I \cdot \cos \varphi} = 100 \cdot \frac{15000}{\sqrt{3} \cdot 400 \cdot 32,7 \cdot 0,75} = 88,28 \%$
- b) $p = 3$ parells de pols
- c) $\Gamma = \frac{P_N}{\omega_N} = \frac{15000}{968 \cdot \frac{2\pi}{60}} = 147,97 \text{ Nm}$
- d) $Q = S \cdot \sin \varphi = \sqrt{3} \cdot U \cdot I \cdot \sqrt{1 - (\cos \varphi)^2} = \sqrt{3} \cdot 400 \cdot 32,7 \cdot \sqrt{1 - 0,75^2} = 14,985 \text{ kvar}$

Exercici 4

- a) $P(R_1) = 2 \cdot R_1 \cdot I_1^2$ $I_1 = \frac{2 \cdot U_1}{2 \cdot R_1 + \frac{(R_2+R_3) \cdot R_4}{(R_2+R_3)+R_4}} = \frac{2 \cdot 48}{2 \cdot 0,5 + \frac{(14,5+20,25) \cdot 68}{(14,5+20,25)+68}} = 4 \text{ A}$
- $P(R_1) = 2 \cdot 0,5 \cdot 4^2 = 16 \text{ W}$
- b) $P(R_2, R_3, R_4) = R_{\text{Eq.}} \cdot I_1^2 = \frac{(R_2+R_3) \cdot R_4}{(R_2+R_3)+R_4} \cdot I_1^2 = \frac{(14,5+20,25) \cdot 68}{(14,5+20,25)+68} \cdot 4^2 = 368 \text{ W}$
- c) $\eta(\%) = 100 \cdot \frac{P_{\text{Útil}}}{P_{\text{Total}}} = 100 \cdot \frac{368}{368+16} = 95,83 \%$
- d) $I'_1 = \frac{2 \cdot U_1}{2 \cdot R_1 + \frac{R_2 \cdot R_4}{R_2+R_4}} = \frac{2 \cdot 48}{2 \cdot 0,5 + \frac{14,5 \cdot 68}{14,5+68}} = 7,41 \text{ A}$
- e) $I_{\text{SW}} = \frac{R_4}{R_2+R_4} \cdot I'_1 = \frac{68}{14,5+68} \cdot 7,41 = 6,11 \text{ A}$