SÈRIE 1

Primera part

Exercici 1

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

Exercici 2

a) $I_2 = \dfrac{U_1 + U_2}{R_2 + R_3} = \dfrac{50}{12} = 4{,}17\ \text{A}$

b) $I(U_1) = I_1 + I_2 = \dfrac{U_1}{R_1} + I_2 = \dfrac{20}{10} + 4{,}17 = 6{,}17\ \text{A}$

$P(U_1) = U_1 \cdot I(U_1) = 20 \cdot 6{,}17 = 123{,}3\ \text{W}$;

$P(U_2) = U_2 \cdot I(U_2) = 30 \cdot 4{,}17 = 125\ \text{W}$

c) $R_{12} = \dfrac{R_1 \cdot R_2}{R_1 + R_2} = \dfrac{10 \cdot 10}{10 + 10} = 5\,\Omega$; $I(U_1)' = I_1' = \dfrac{U_1}{R_{12}} = \dfrac{20}{5} = 4\ \text{A}$

d) $P(R_3) = \dfrac{U_2^2}{R_3} = \dfrac{30^2}{2} = 450\ \text{W}$

OPCIÓ A

Exercici 3

a) $P = V_1 \cdot I_1 = 140 \cdot 10 = 1400\ \text{W}$

b) $R = \dfrac{V_1}{I_1} = \dfrac{140}{10} = 14\,\Omega$

c) $X_\text{C} = \dfrac{V_2}{I_1} = \dfrac{200}{10} = 20\,\Omega$

d) $Z = \dfrac{V_3}{I_1} = \sqrt{R^2 + (X_\text{L} - X_\text{C})^2} \Rightarrow (X_\text{L} - X_\text{C})^2 = Z^2 - R^2 \Rightarrow |X_\text{L} - X_\text{C}| = \sqrt{\left(\dfrac{V_3}{I_1}\right)^2 - R^2}$

$$|X_\text{L} - 20| = \sqrt{\left(\frac{230}{10}\right)^2 - 14^2} \Rightarrow \begin{cases} X_\text{L} - 20 = 18{,}24\,\Omega \\ 20 - X_\text{L} = 18{,}24\,\Omega \end{cases} \Rightarrow \begin{cases} X_\text{L} = 38{,}24\,\Omega \\ X_\text{L} = 1{,}76\,\Omega \end{cases}$$

Exercici 4

a) $\eta(\%) = 100\dfrac{P}{\sqrt{3}UI\cos\varphi} = 100\dfrac{75000}{\sqrt{3}\cdot 400\cdot 131\cdot 0{,}88} = 93{,}90\,\%$

b) p = 1 parell de pols

c) $\Gamma = \dfrac{P}{\omega} = \dfrac{75000}{2977\dfrac{2\pi}{60}} = 240{,}6\ \text{Nm}$

d) Triangle, $I_{\text{línia}}$ = 131 A

OPCIÓ B

Exercici 3

a) $I_B = \dfrac{U}{\sqrt{R^2 + {X_\text{L}}^2}} = \dfrac{690}{\sqrt{40^2 + 20^2}} = 15{,}43\ \text{A}$

b) $I_\text{L} = \sqrt{3}\,I_\text{B} = 26{,}72\ \text{A}$

c) $P = 3\cdot R\cdot I_\text{B}^2 = 3\cdot 40\cdot 15{,}43^2 = 28{,}57\ \text{kW}$

d) $Q = 3\cdot X_\text{L}\cdot I_\text{B}^2 = 3\cdot 20\cdot 15{,}43^2 = 14{,}28\ \text{kvar}$

e) $fdp = \cos\varphi = \dfrac{P}{S} = \dfrac{P}{\sqrt{P^2 + Q^2}} = \dfrac{28{,}57}{\sqrt{28{,}57^2 + 14{,}28^2}} = 0{,}894\,(\text{i})$

Exercici 4

a) $V_\text{O} = 5\ \text{V}$

b) $V_\text{O} = 0\ \text{V}$

c) $P = \dfrac{V_\text{cc}^2}{R} = \dfrac{5^2}{1} = 25\,\text{mW}$

d)

I_1	I_2	O
0	0	0
1	0	0
0	1	0
1	1	1

Funció I (AND)