

SÈRIE 2**Primera part****Exercici 1**

Q1 c Q2 b Q3 c Q4 c Q5 a

Exercici 2

a) $R_1 = \frac{V_1}{I_1} = \frac{20}{2} = 10 \Omega$

b) $R_2 = \frac{V_2}{I_2} = \frac{10}{5} = 2 \Omega$

c) $I(R_3) = I_3 = I_1 - I_2 = 2 - 5 = -3 \text{ A}$

d) $U_1 = V_1 + R_3 \cdot I_3 = 20 - 3 = 17 \text{ V}$

e) $U_2 = V_2 - R_3 \cdot I_3 = 10 + 3 = 13 \text{ V}$

OPCIÓ A

Exercici 3

a) $P = R \cdot I^2 \Rightarrow I = \sqrt{\frac{P}{R}} = \sqrt{\frac{100}{25}} = 2 \text{ A}$

b) $Z = \sqrt{R^2 + X_L^2} = \sqrt{25^2 + 20^2} = 32,01 \Omega$; $U = Z \cdot I = 32,01 \cdot 2 = 64,02 \text{ V}$

c) $V_2 = I \cdot X_L = 2 \cdot 20 = 40 \text{ V}$

d) $Q = V_2 \cdot I = 40 \cdot 2 = 80 \text{ var}$

Exercici 4

a) $\eta(\%) = 100 \frac{P_{\text{mec.}}}{P_{\text{elèc.}}} = 100 \frac{P_{\text{mec.}}}{U \cdot I} = 100 \frac{200}{40 \cdot 6} = 83,33\%$

b) $P_{\text{pèrdues}} = UI - P_{\text{mec.}} = 40 \cdot 6 - 200 = 40 \text{ W}$; $R_i = \frac{P_{\text{pèrdues}}}{I^2} = \frac{40}{6^2} = 1,111 \Omega$

c) En les condicions nominals: $E_N = U - R_i \cdot I = 40 - 1,111 \cdot 6 = 33,33 \text{ V}$

En les condicions actuals: $E = U - R_i \cdot I = 30 - 1,111 \cdot 6 = 23,33 \text{ V}$

$$n' = n_N \frac{E}{E_N} = 800 \frac{23,33}{33,33} = 560 \text{ min}^{-1}$$

OPCIÓ B

Exercici 3

$$a) \eta(\%) = 100 \frac{P}{\sqrt{3}UI \cos \varphi} = 100 \frac{55000}{\sqrt{3} \cdot 230 \cdot 187 \cdot 0,79} = 93,46\%$$

$$b) p = 4 \text{ parells de pols}$$

$$c) \Gamma = \frac{P}{\omega} = \frac{55000}{741 \frac{2\pi}{60}} = 709 \text{ Nm}$$

d)

$$Q = \sqrt{S^2 - P^2} = \sqrt{(\sqrt{3} \cdot U \cdot I)^2 - (\sqrt{3} \cdot U \cdot I \cdot \cos \varphi)^2} = \sqrt{3} \cdot U \cdot I \cdot \sqrt{1 - \cos^2 \varphi}$$
$$Q = \sqrt{3} \cdot 230 \cdot 187 \cdot \sqrt{1 - 0,79^2} = 45,67 \text{ kvar}$$

Exercici 4

$$a) V_O = V_1 \frac{R_3}{R_2 + R_3} = 10 \frac{100}{100 + 100} = 5 \text{ V}$$

$$b) V_O = V_2 = 10 \text{ V}$$

$$c) V_O = V_1 \frac{R_3}{R_1 + R_2 + R_3} = 10 \frac{100}{100 + 100 + 100} = 3,333 \text{ V}$$

$$d) V_O = V_2 = 10 \text{ V}$$

$$e) P = \frac{V_O^2}{R_3} = \frac{10^2}{100} = 1 \text{ W}$$