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

c) $V_2 = I \cdot X_\text{L} = 2 \cdot 20 = 40\,\text{V}$

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

c) En les condicions nominals: $E_N = U - R_\text{i} \cdot I = 40 - 1{,}111 \cdot 6 = 33{,}33\,\text{V}$
En les condicions actuals: $E = U - R_\text{i} \cdot I = 30 - 1{,}111 \cdot 6 = 23{,}33\,\text{V}$
$n' = n_\text{N}\frac{E}{E_\text{N}} = 800\frac{23{,}33}{33{,}33} = 560\,\text{min}^{-1}$

OPCIÓ B

Exercici 3

a) $\eta(\%) = 100\dfrac{P}{\sqrt{3}UI\cos\varphi} = 100\dfrac{55\,000}{\sqrt{3}\cdot 230\cdot 187\cdot 0{,}79} = 93{,}46\,\%$

b) p = 4 parells de pols

c) $\Gamma = \dfrac{P}{\omega} = \dfrac{55\,000}{741\dfrac{2\pi}{60}} = 709\ \text{Nm}$

d)

$$Q = \sqrt{S^2 - P^2} = \sqrt{\left(\sqrt{3}\cdot U\cdot I\right)^2 - \left(\sqrt{3}\cdot U\cdot I\cdot\cos\varphi\right)^2} = \sqrt{3}\cdot U\cdot I\cdot\sqrt{1-\cos\varphi^2}$$

$$Q = \sqrt{3}\cdot 230\cdot 187\cdot\sqrt{1-0{,}79^2} = 45{,}67\,\text{kvar}$$

Exercici 4

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

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

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

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

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