SÈRIE 4

Primera part

Exercici 1

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

Exercici 2

a) $V_{ab} = \sqrt{3} \cdot V_{cn} = \sqrt{3} \cdot \sqrt{R^2 + X_C^2} \cdot A_1 = \sqrt{3} \cdot \sqrt{50^2 + 20^2} \cdot 7{,}4 = 690{,}23\ \text{V}$

b) $P = 3 \cdot R \cdot A_1^2 = 3 \cdot 50 \cdot 7{,}4^2 = 8214\ \text{W}$

$Q = 3 \cdot X_C \cdot A_1^2 = 3 \cdot 20 \cdot 7{,}4^2 = 3285{,}6\ \text{var}$

$S = \sqrt{3} \cdot V_{ab} \cdot A_1 = \sqrt{3} \cdot 690{,}23 \cdot 7{,}4 = 8846{,}8\ \text{VA}$

c) $A_n = 0;\ fdp = \frac{P}{S} = \frac{8214}{8846{,}8} = 0{,}9285$

Segona part

OPCIÓ A

Exercici 3

a) $A_1 = \frac{U_1}{R_1 + R_2} = \frac{36}{12+30} = 0{,}857\ \text{A}$

b) $V_{GF} = V(R_1) = R_1 \cdot A_1 = 12 \cdot 0{,}857 = 10{,}28\ \text{V}$

c) $V_{FH} = \frac{\frac{R_2 \cdot R_4}{R_2 + R_4}}{\frac{R_2 \cdot R_4}{R_2 + R_4} + R_1} \cdot U_1 = \frac{\frac{30 \cdot 120}{30+120}}{\frac{30 \cdot 120}{30+120} + 12} \cdot 36 = 24\ \text{V}$

$A_2 = \frac{V_{FH}}{R_4} = \frac{24}{120} = 0{,}2\ \text{A}$

Exercici 4

a) $\Gamma = k \cdot I \longrightarrow k = \frac{\Gamma}{I} = \frac{600}{120} = 5\ \frac{\text{Nm}}{\text{A}}$

$E = k \cdot \omega \longrightarrow \omega = \frac{E}{k} = \frac{432}{5} \cdot \frac{60}{2\pi} = 825{,}1\ \text{min}^{-1}$

b) $U = R_i I + E \longrightarrow R_i = \frac{U - E}{I} = \frac{510 - 432}{120} = 0{,}65\ \Omega$

c) $\eta(\%) = 100\,\frac{P_{mec.}}{P_{elèc.}} = 100\,\frac{\Gamma\omega}{UI} = 100\,\frac{600 \cdot \frac{432}{5}}{510 \cdot 120} = 84{,}71\ \%$

OPCIÓ B

Exercici 3

a) $A_2 = \frac{V_2}{R_2} = \frac{26{,}84}{10} = 2{,}684\ \text{A}; \qquad A_3 = \frac{V_2}{X_3} = \frac{26{,}84}{5} = 5{,}368\ \text{A}$

b) $A_1 = \sqrt{A_2^2 + A_3^2} = \sqrt{2{,}684^2 + 5{,}368^2} = 6\ \text{A}$

c) $P = R_1 A_1^2 + R_2 A_2^2 = 7 \cdot 6^2 + 10 \cdot 2{,}684^2 = 324{,}04\ \text{W}$
$Q = X_3 A_3^2 = 5 \cdot 5{,}368^2 = 144{,}08\ \text{var}$

Exercici 4

a) $R_{\text{Conductor}} = 150 \cdot 10^{-3} \cdot 3 = 0{,}45\ \Omega$
$X_{\text{Conductor}} = 150 \cdot 10^{-3} \cdot 1 \cdot 10^{-3} \cdot 2\pi 50 = 0{,}047\ \Omega$

$$I = \frac{U_{\text{Xarxa}}}{Z} = \frac{U_{\text{Xarxa}}}{\sqrt{(2 \cdot R_{\text{Conductor}} + R_{\text{Consum}})^2 + (2 \cdot X_{\text{Conductor}} + X_{\text{Consum}})^2}} = \frac{230}{\sqrt{(2 \cdot 0{,}45 + 10)^2 + (2 \cdot 0{,}047 + 3)^2}} = 20{,}3\ \text{A}$$

b) $U = Z_{\text{Consum}} \cdot I = \sqrt{10^2 + 3^2} \cdot 20{,}3 = 211{,}94\ \text{V}$

c) $\Delta U(\%) = 100\frac{U_{\text{Xarxa}} - U}{U_{\text{Xarxa}}} = 100\frac{230 - 211{,}94}{230} = 7{,}85\ \%$