

**Sèrie 3****Exercici 1**

Q1 c Q2 c Q3 a Q4 c Q5 d

**Exercici 2**

$$a) I = \frac{U}{R_1 + R_2} = 3 \text{ A}$$

$$b) I = \frac{U}{R + \frac{R_2(R_3 + R_4)}{R_2 + R_3 + R_4}} = 4 \text{ A}$$

$$c) V_2 = U - R_1 I = 20 \text{ V}$$

$$V_1 = V_2 \frac{R_4}{R_3 + R_4} = 10 \text{ V}$$

## OPCIÓ A

**Exercici 3**

$$a) \eta = 100 \frac{P}{UI} = 90\%$$

$$b) n = 1000 \text{ min}^{-1} \Rightarrow \omega = 104,72 \frac{\text{rad}}{\text{s}}; T = \frac{P}{\omega} = 5,157 \text{ Nm}$$

$$T = k I \Rightarrow k = 0,2063 \frac{\text{Nm}}{\text{A}}; U = R I + k \omega \Rightarrow R = 0,096 \Omega$$

$$c) T' = T/2 \Rightarrow I' = \frac{I}{2} = 12,5 \text{ A}; \omega' = \frac{U - R I'}{k} = 110,54 \frac{\text{rad}}{\text{s}} \quad n' = 1056 \text{ min}^{-1}$$

**Exercici 4**

$$a) f d p = 1 \Rightarrow \varphi = 0 \Rightarrow X_L = X_C \Rightarrow 2\pi f L = \frac{1}{2\pi C} \Rightarrow f = 339,3 \text{ Hz}$$

$$b) P = \frac{U^2}{R} = 529 \text{ W}$$

$$c) X_{C50} = \frac{1}{2\pi 50C} = 14,47 \Omega; X_L = 2\pi 50L = 0,314 \Omega; Z = \sqrt{R^2 + (X_L - X_C)^2} = 101 \Omega;$$

$$I = \frac{U}{Z} = 2,277 \text{ A};$$

$$Q = (X_L - X_C)I^2 = -73,4 \text{ VAr}$$

**OPCIÓ B****Exercici 3**

$$a) I = \frac{U/\sqrt{3}}{\sqrt{R^2 + X^2}} = 21,44 \text{ A}$$

$$b) P = 3RI^2 = 13790 \text{ W}$$

$$c) Q = 3XI^2 = 5516 \text{ VAr}$$

$$d) S = \sqrt{3}UI = 14852 \text{ VA}; \cos \varphi = \frac{P}{S} = 0,9285$$

**Exercici 4**

$$a) I = \frac{P}{U} = 10 \text{ A};$$

$$b) \frac{5}{100}U = 2R_{\max}I \Rightarrow R_{\max} = 0,575 \Omega; R_{\max} = \rho \frac{L}{S_{\min}} \Rightarrow S_{\min} = 1,86 \text{ mm}^2$$

$$c) 2,5 \text{ mm}^2$$

## Sèrie 1

## Exercici 1

Q1 c Q2 a Q3 c Q4 a Q5 b

## Exercici 2

$$a) R_3 = \frac{V_3}{A_3} = 2\Omega$$

$$b) U_2 = R_2(A_3 - A_1) + V_3 = 16V$$

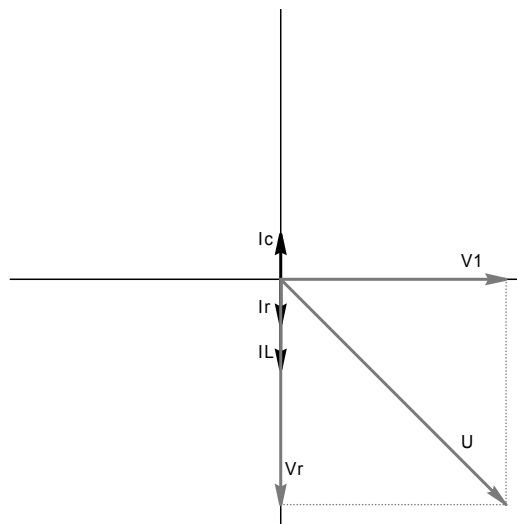
$$c) U_1 = R_1 A_1 + V_3 \Rightarrow R_1 = 1\Omega$$

## OPCIÓ A

## Exercici 3

$$a) I_L = \frac{V_1}{X_L} = 9A; I_C = \frac{V_1}{X_C} = 4,5A$$

$$b) I_R = I_L - I_C = 4,5A$$



$$c) U = \sqrt{V_r^2 + V_1^2} = \sqrt{(RI)^2 + V_1^2} = \sqrt{(40 \cdot 4,5)^2 + 180^2} = 254,6V$$

**Exercici 4**

$$d) \eta = 100 \frac{P}{\sqrt{3}UI \cos\varphi} = 90,56\%$$

e) 3 parells de pols

$$f) n = 975 \text{ min}^{-1} \Rightarrow \omega = 102,1 \frac{\text{rad}}{\text{s}}; T = \frac{P}{\omega} = 156,7 \text{ Nm}$$

g) Estrella;  $I_1 = 30 \text{ A}$

## OPCIÓ B

**Exercici 3**

$$e) Z = \sqrt{R^2 + X^2} = 10,77 \Omega; I_B = \frac{U}{Z} = 37,14 \text{ A}$$

$$f) I_L = \sqrt{3}I_B = 64,33 \text{ A}$$

$$g) P = 3RI_B^2 = 41381 \text{ W}$$

$$h) Q = 3XI_B^2 = 16553 \text{ VAr}$$

$$i) S = \sqrt{3}UI = 44569 \text{ VA}; \cos\varphi = \frac{P}{S} = 0,928$$

**Exercici 4**

$$d) P = UI \Rightarrow I = 17,39 \text{ A}$$

$$e) R = \rho \frac{2l}{S} = 0,1339 \Omega; \Delta U(\%) = 100 \frac{RI}{U} = 1,01\%$$

f) 20 A