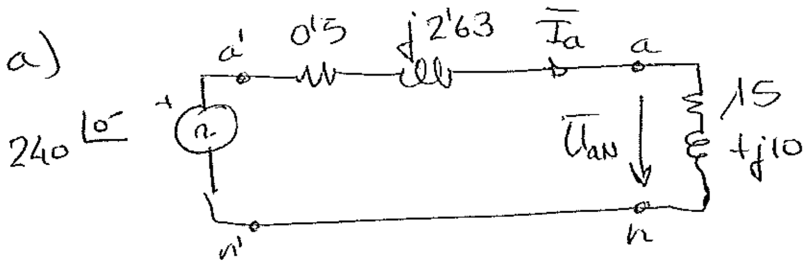
(15')
Alumno.

a)



$\overline{U}_{L_C} \Rightarrow \overline{U}_{ab} = \overline{U}_{an}\cdot(\sqrt{3}\angle 30^\circ) = 374{,}809\angle 24{,}5157^\circ$ V.

$$\overline{U}_{aN} = \frac{240\angle 0^\circ}{0'5+j2'63+15+j10}\cdot(15+j10) = 215{,}41 - j20{,}682 = 216{,}3961\angle -5{,}484$$

↓

$\overline{I}_a = 9{,}3054 - j7{,}5824 = 12{,}0035\angle -39'1744^\circ$

b) ¿W? $W\cdot\sqrt{3} = Q_T$

$$W = \frac{Q}{\sqrt{3}} = \frac{(I_a^2\cdot j10)\cdot 3}{\sqrt{3}} = \sqrt{3}(I_a^2\cdot j10) = 2495{,}60829 \text{ W}$$

c) $P_T = I_a^2\cdot R\cdot 3 = 6483{,}78$ W $\quad tg\,\varphi = \frac{Q_T}{P_T} \Rightarrow 33{,}69 = \varphi \Rightarrow tg\,\varphi = 0'6666$

$Q_T = 3\cdot I_a^2\cdot X_L = 4322{,}52$ VAr.

~~cos φ~~ $Q_C = P_T(tg\,\varphi_{ini} - tg\,\varphi_{final}) = 6483{,}78\,(0{,}6666 - 0{,}32868) =$
$= 2191'3613$ VAr

$$\frac{Q_C}{3} = U_{AN}^2\cdot W\cdot C_\lambda \Rightarrow C_\lambda = \frac{Q_C}{3\cdot U_{AN}^2\cdot\omega} = \frac{Q_C}{3\cdot 2\pi\cdot f\cdot U_{AN}^2}$$

$$C_\lambda = \frac{2191'3613}{3\cdot 2\pi\cdot 50\cdot 216{,}3961^2} = 4{,}96528\cdot 10^{-5}\text{ F}$$

49,6528 μF

d) Por ser un sistema equilibrado la $\overline{U}_{N'N} = 0$.

Justificación:

a) Si se observa el equivalente monofásico la $\overline{U}_N = \overline{U}_{N'}$

b) $240\angle 0^\circ - \overline{I}_a\cdot(0'5+j2'63+15+j10) = 0$

Total (1'5')

a) ¿P y Q? en las resistencias en función de la U. (1')

$P_{R_1} = \left(\frac{U}{10}\right)^2 \cdot \frac{1}{5} = \frac{U^2}{500}$ W $\qquad Q_{R_1} = 0$

$P_{R_2} = \frac{U^2}{400} \cdot \frac{1}{10} = \frac{U^2}{4000}$ W $\qquad Q_{R_2} = 0$

$P_{R_3} = \frac{U^2}{225} \cdot \frac{1}{2} = \frac{U^2}{450}$ W $\qquad Q_{R_3} = 0$

b) $I_T = \frac{U}{10^2 \cdot 5} + \frac{U}{20^2 \cdot 10} + \frac{U}{15^2 \cdot 2} =$ (4')

$50 = \frac{U}{500} + \frac{U}{4000} + \frac{U}{450}$

$50 = U \left(\frac{1}{500} + \frac{1}{4000} + \frac{1}{450}\right) = U \cdot (4'47222 \cdot 10^{-3})$

$U = 11180'1242$ V.

c) $\varepsilon = c \cdot (\varepsilon_{Rcc} \cdot \cos\varphi + \varepsilon_{Xcc} \cdot \underbrace{\operatorname{sen}\varphi}_{0 \text{ carga resistiva}})$ (10')

$c = \frac{P_2/\cos\varphi}{S_{NT}} = \frac{31248'8}{100.000} = 0'31248$

$\varepsilon_{Rcc} = \frac{50 \cdot 0'8944}{11180'124} \cdot 100 = 0'4 \qquad \cos\varphi_{cc} = \frac{400}{\cancel{20} \cdot 8'9444} = 0'8944$ (50)

$$\boxed{\begin{array}{l} I_{N_1} = 8'94224 \text{ A.} \\ U_{cc} = 50 \text{ V.} \end{array}}$$

$\varepsilon = 0'31248 \cdot (0'4 \cdot 1) = 0'12499$ %.

$$\boxed{U_2 = 559'006 - 0'6987 = 558'301 \text{ V}}$$