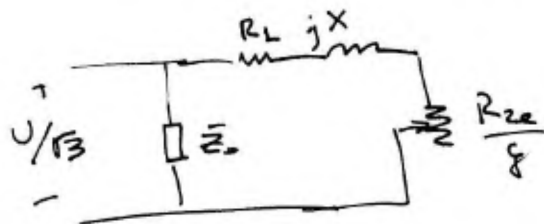


SOLUCIÓN PROB. 2

$$1) \bar{Z}_0 = \frac{220}{10\sqrt{3}} \angle \arccos \frac{800}{\sqrt{3} \cdot 220 \times 10} = 12.70 \Omega \angle 77.88^\circ$$



$$\begin{aligned} R_0 &= 2.667 \Omega \\ X_0 &= 12.42 \Omega \\ R_{0||} &= 60.50 \Omega \\ X_{0||} &= 12.99 \Omega \end{aligned}$$

$$\bar{Z}_{ca} = \frac{22}{76\sqrt{3}} \angle \arccos \frac{1800}{\sqrt{3} \cdot 22 \cdot 76} = 0.1671 \Omega \angle 51.57^\circ$$

$$R_L = \frac{12}{2 \times 70} = 0.08571 \Omega$$

$$\Rightarrow R_{ze} = 0.01819 \Omega$$

$$R_L + R_{ze} = 0.1039 \Omega$$

$$X = 0.1309 \Omega$$

$$2) 30k = g_N(1 - g_N) \times \frac{220^2}{0.01819} \Rightarrow g_N = 1.140 \%$$

$$\text{MPD: } \bar{I}_{zeN} = \frac{220}{\sqrt{3} \cdot 0.01819} \times 0.0114 = 79.60 \text{ A}$$

$$\bar{I}_0 = 10 \angle -77.88^\circ$$

$$\Rightarrow \bar{I}_N = 82.28 \text{ A} \angle -6.824^\circ, \cos \phi_N = \cos 6.824^\circ = 0.9929$$

$$P_{RED} = \sqrt{3} U_N I_N \cos \phi_N = 31131 \text{ W}, \eta = \frac{P_N}{P_{RED}} = 0.9637$$

$$3) \bar{I}_A = \frac{0.8 \times 220/\sqrt{3}}{0.1671 \times 3} \angle -51.57^\circ = 202.7 \text{ A} \angle -51.57^\circ$$

$$I_{RED} = 0.8 I_A = 162.2 \text{ A}$$

SE PODRÍA USAR I_N calculada en (2), pero no se admite MPD en la parte (3).

$$\Rightarrow I_{N \sin \text{MPD}} = \frac{220/\sqrt{3}}{\sqrt{(R_L + \frac{R_{ze}}{g_N})^2 + X^2}} = 75.32 \text{ A}$$

$$\Rightarrow \frac{I_{RED}}{I_{N \sin \text{MPD}}} = 2.153$$

$$\text{con MPD: } \frac{I_{RED}}{I_N} = 1.971$$

SE ACEPTA TAMBIÉN.

$$4) C_N = \frac{30k}{(1-g_N) \times \frac{2\pi \times 1500}{60}} = 193.2 \text{ Nm.}$$

$$C_A = \frac{3 R_{2e} I_A^2}{2\pi n_s / 60} = 14.27 \text{ Nm}$$

$$\left[\frac{C_A}{C_N} \right] = 0.07388 = \boxed{7.388 \%}$$

$$5) \frac{220^2 g}{0.01819} = 0.14 \times 1500^2 \times \frac{2\pi}{60} (1-g) \Rightarrow g = 1.225 \%$$

$$\Rightarrow \boxed{n = 1482 \text{ rpm}}$$

$$\text{MPD: } \bar{I}_{2e} = \frac{220 \times 0.01225}{\sqrt{3} \times 0.01819} = 85.54 \text{ A}$$

$$\bar{I}_{R_{2e}} = \bar{I}_{2e} + \bar{I}_0 = 88.18 \text{ A} \angle -6.366^\circ$$

$$\boxed{I_{\text{RED}} = 88.18 \text{ A}}$$