a) $S_m = 200\,MVA$ $\quad d = 300\,km$ $\quad z_0 = \sqrt{\frac{L}{C}}$

$V_m = 220\,KV$ $\quad Z_0 = 400\,\Omega$ $\quad \beta = \omega\sqrt{LC}$ $\rightarrow \beta = \frac{\omega}{v}$

$f = 50\,Hz$ $\quad v = 300\,000\,Km/s$ $\quad v = \frac{1}{\sqrt{LC}}$

$\pi \approx 0 \rightarrow$ Linha sem perdas

$fp = 1$

$A = \cos(\beta d) = \cos\left(\frac{\omega}{v} \cdot d\right) = 0.951$

$B = j\, z_0\, \mathrm{sin}(\beta d) = j \cdot 123.6$

$C = j\, \mathrm{sin}(\beta d)\frac{1}{z_0} = j \cdot 0{,}77 \cdot 10^{-3}$

Logo $\begin{bmatrix} 0.951 & j\,123.6 \\ j \cdot 0{,}77 \cdot 10^{-3} & 0.951 \end{bmatrix}$

b) $V_R = \frac{220}{\sqrt{3}} \times 10^3\ V$

$I_R = \left(\frac{S}{3 V_R}\right)^* = \frac{200 \times 10^6}{3 \cdot \frac{220}{\sqrt{3}} \times 10^3} = \frac{\sqrt{3} \cdot 200 \times 10^3}{3 \cdot 220}\ A$

$$\begin{bmatrix} V_e \\ I_e \end{bmatrix} = \begin{bmatrix} 0.951 & j\,123.6 \\ j \cdot 0{,}77 \cdot 10^{-3} & 0.951 \end{bmatrix} \cdot \begin{bmatrix} V_R \\ I_R \end{bmatrix} \Rightarrow \begin{matrix} V_e' = 137.1\, e^{j\,28.24^\circ}\ kV \\ I_e = 508.6\, e^{j\,11.09^\circ}\ A \end{matrix}$$

Como eles pedem tensão composta: $V_e = \sqrt{3} \cdot V_e' = 237.5\, e^{j\,28.24^\circ}\ KV$