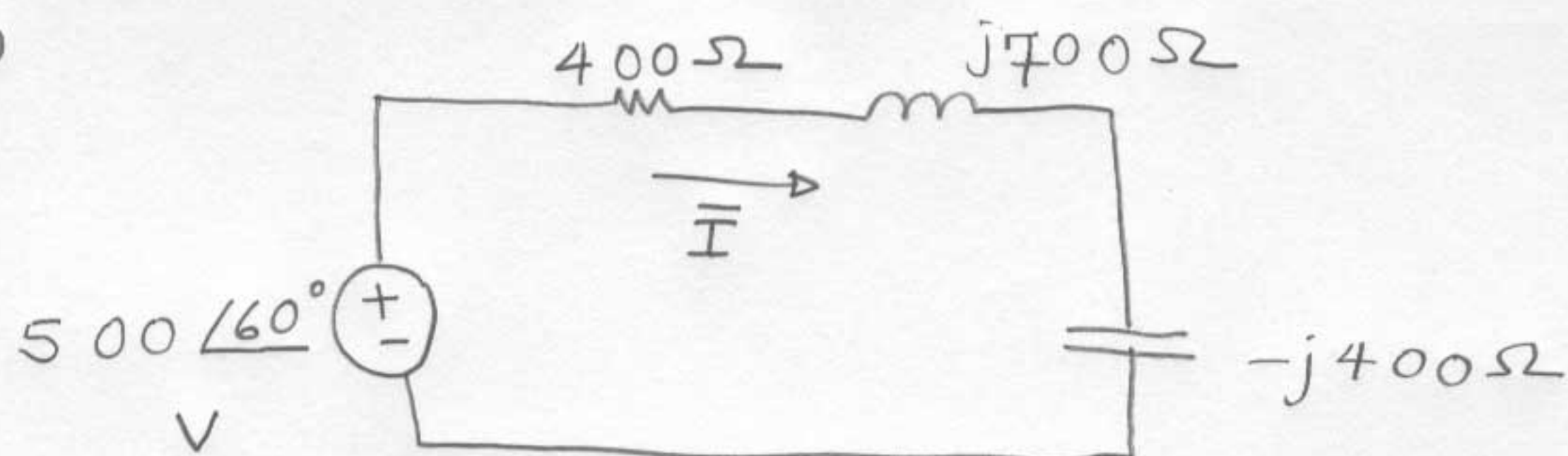


P9.10 a)



$$b) \bar{I} = \frac{500 \angle 60^\circ}{400 + j700 - j400} = 1 \angle 23.13^\circ \text{ A}$$

$$c) i(t) = 1 \cos(8000t + 23.13^\circ) \text{ A}$$

P9.11 a) 50 Hz.

$$b) \theta_v = 0^\circ.$$

$$c) \bar{I} = \frac{340 \angle 0^\circ}{j\omega L} = \frac{340}{\omega L} \angle -90^\circ = 8.5 \angle -90^\circ, \theta_i = -90^\circ.$$

$$d) \frac{340}{\omega L} = 8.5, \omega L = 40 \Omega.$$

$$e) L = \frac{40}{100\pi} = 127.32 \text{ m H}.$$

$$f) \bar{Z}_L = j\omega L = j40 \Omega.$$

P9.22 a)

$$\begin{aligned} \bar{Z}_{ab} &= j5\omega + \frac{(4000) \left(\frac{10^9}{j\omega 625} \right)}{4000 + \left(\frac{10^9}{j\omega 625} \right)} \\ &= j5\omega + \frac{4 \times 10^{12}}{2500 \times 10^3 j\omega + 10^9} \end{aligned}$$

$$= j5\omega + \frac{4 \times 10^7}{10^4 + j25\omega}$$

$$= j5\omega + \frac{4 \times 10^{11}}{10^8 + 625\omega^2} - j \frac{100 \times 10^7 \omega}{10^8 + 625\omega^2}$$

$$\therefore 5 = \frac{10^9}{10^8 + 625\omega^2}$$

$$5 \times 10^5 + 3125\omega^2 = 10^9$$

$$\omega = 4 \times 10^2 = 400 \text{ rad/s.}$$

$$b) \bar{Z}_{ab}(400) = j2000 + \frac{4000(-j4000)}{4000 - j4000} = 2 \text{ k}\Omega.$$

$$P 9.23 \quad \bar{Z}_1 = 10 - j40 \Omega$$

$$\bar{Z}_2 = \frac{(5 - j10)(10 + j30)}{15 + j20} = 10 - j10 \Omega$$

$$\bar{Z}_3 = \frac{20(j20)}{20 + j20} = 10 + j10 \Omega$$

$$\therefore \bar{Z}_{ab} = \bar{Z}_1 + \bar{Z}_2 + \bar{Z}_3 = 30 - j40 \Omega = 50 \angle -53.15^\circ \Omega.$$