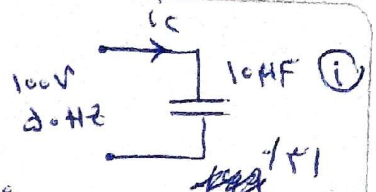


$$C = 10 \mu F \rightarrow X_C = \frac{1}{j\omega C} = \frac{1}{j \times 2\pi \times 11.8 \times 10^3 \times 10 \times 10^{-6}}$$

$$\rightarrow X_C = -j311.87 \Omega \quad \rightarrow \quad i_C = \frac{V}{X_C} = \frac{100}{-j311.87} = \frac{100}{-j}$$

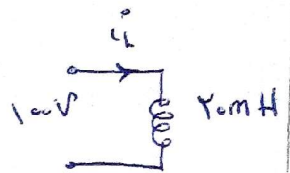


$$i_C = \frac{100}{-j}$$

$$i_C = 0.31j \text{ (A)}$$

$$X_L = j\omega L = 4.28j \Omega$$

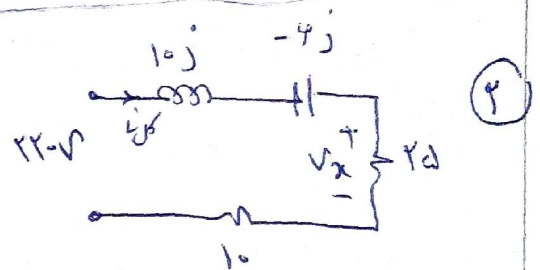
$$\rightarrow i_L = \frac{100}{4.28j} = -18.92j \text{ (A)}$$



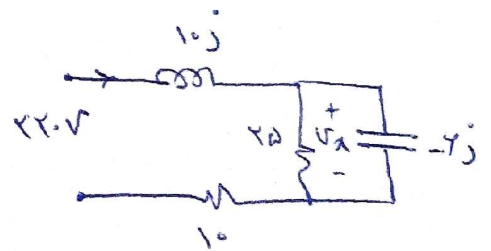
$$X_{\text{کل}} = 10j + (-4j) + 25 + 10 = 25 + 4j \Omega$$

$$i_{\text{کل}} = \frac{220V}{25 + 4j} = 9.2 - 0.71j \text{ (A)}$$

$$\rightarrow V_x = 25 \times i_{\text{کل}} = 155.1 - 17.7j \text{ (V)}$$



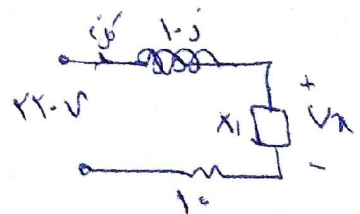
در این شکل V_x و V_2 و V_1 در هر مقاومت 25 اهم و X_1 است. اگر این دو را موازی کنیم و اسم آن X_1 باشد V_x همان وقت در هر X_1 است.



$$X_1 = (25) \parallel (-4j) = \frac{25 \times (-4j)}{25 - 4j} = 1.34 - 0.47j$$

$$X_{\text{کل}} = 10j + X_1 + 10 = 11.34 + 4.33j \Omega$$

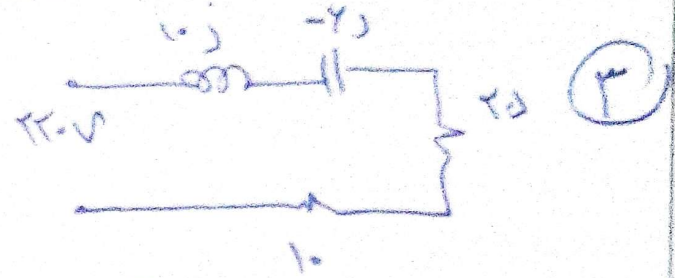
$$i_{\text{کل}} = \frac{220}{11.34 + 4.33j} = 14.9 - 4.24j \text{ (A)}$$



$$V_x = X_1 \cdot i_{\text{کل}} = (1.34 - 0.47j)(14.9 - 4.24j) = -13.52 - 10.851j \text{ (V)}$$

$$V = 220 \angle 0^\circ \text{ (V)}$$

$$I = 4.12 - 0.171j \text{ (A)}$$



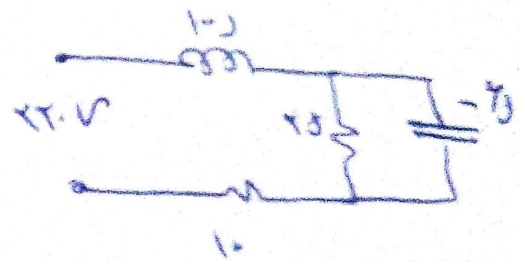
استخراج زاویه قدرت و زاویه فاز

$$I = 4.12 - 0.171j \text{ (A)} = 4.12 \angle -4.5^\circ \text{ (A)}$$

$$\begin{cases} P = V \cdot I \cdot \cos \theta = 220 \times 4.12 \times \cos(0 - (-4.5^\circ)) = 1343.9 \text{ (W)} \\ Q = V \cdot I \cdot \sin \theta = 220 \times 4.12 \times \sin 4.5^\circ = 155.4 \text{ (Var)} \end{cases}$$

$$V = 220 \angle 0^\circ \text{ (V)}$$

$$I = 11.9 - 4.22j \text{ (A)} = 12.7 \angle -20.14^\circ \text{ (A)}$$



$$\begin{cases} P = 220 \times 12.7 \times \cos 20.14^\circ = 2614.11 \text{ (W)} \\ Q = 220 \times 12.7 \times \sin 20.14^\circ = 1214.24 \text{ (Var)} \end{cases}$$