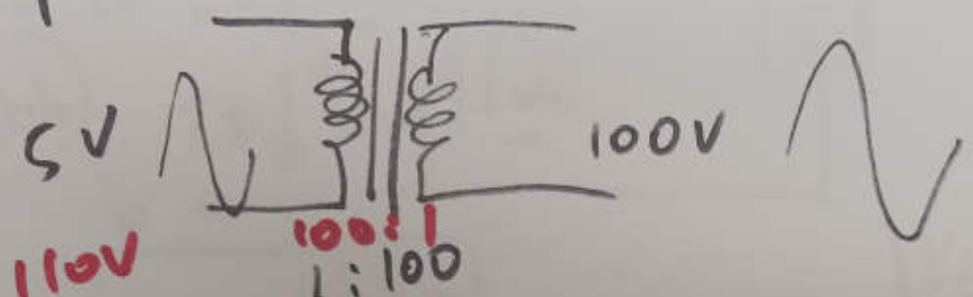
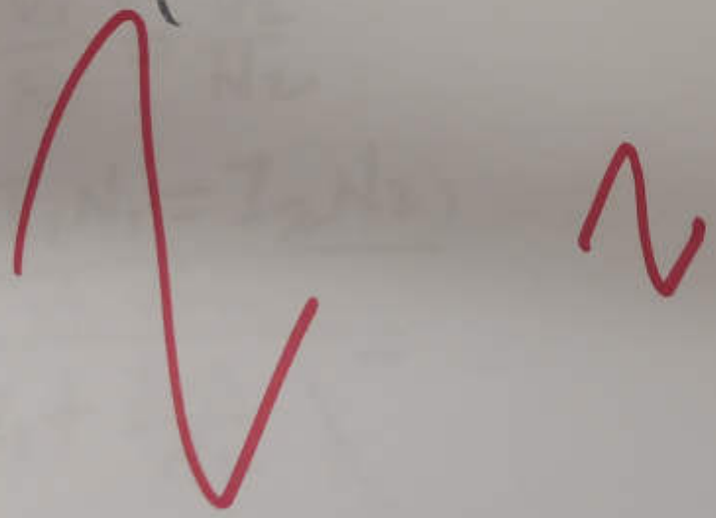
primary secondary

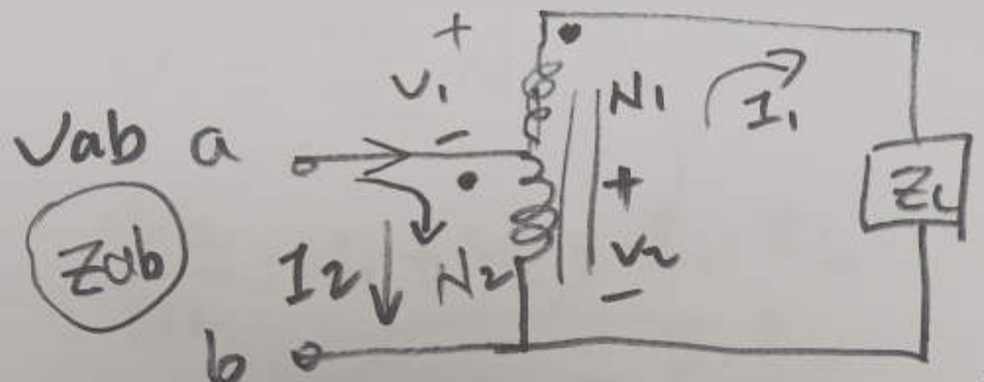


$$\left|\frac{V_1}{N_1}\right| = \left|\frac{V_2}{N_2}\right|$$

$$\left|\frac{V_1}{V_2}\right| = \left|\frac{N_1}{N_2}\right|$$



(1)



$$Z_{ab} = \frac{V_{ab}}{I_1 + I_2}$$

$$V_{ab} = V_2$$

$$V_1 + V_2 = I_1 \cdot Z_L$$

$$\frac{V_1}{N_1} = \frac{V_2}{N_2}$$

$$I_1 N_1 = I_2 N_2$$

$$Z_{ab} = \frac{V_2}{I_1 + \frac{I_1 N_1}{N_2}} =$$

$$\left|\frac{V_1}{N_1}\right| = \left|\frac{V_2}{N_2}\right| \qquad |I_1 N_1| = |I_2 N_2|$$

$$\frac{V_1}{N_1} = \pm \frac{V_2}{N_2}$$

↓

Both + or − at the dot

$$\frac{V_1}{N_1} = \frac{V_2}{N_2}$$

$$I_1 N_1 = \pm I_2 N_2$$

↓

One current goes into, one goes out of the dot

$$I_1 N_1 = I_2 N_2$$

$$V_1 = \frac{V_2}{N_2} \cdot N_1$$

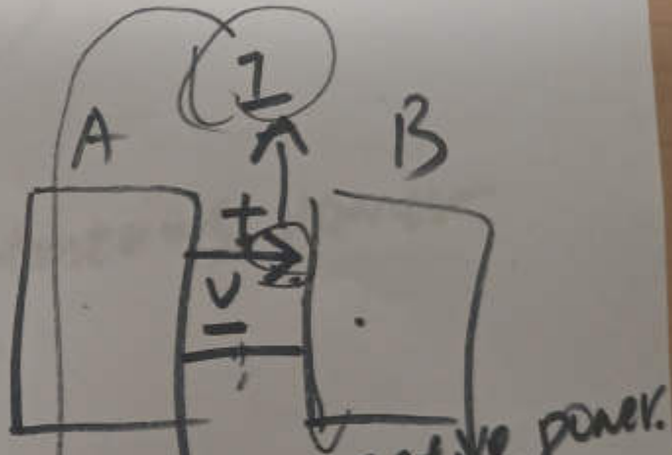
$$\frac{V_2}{N_2} \cdot N_1 + V_2 = I_1 \cdot Z_L$$

$$V_2 = \frac{I_1 Z_L}{1 + \left(\frac{N_1}{N_2}\right)}$$

Part B.

$$\frac{V_1}{N_1} = -\frac{V_2}{N_2}$$

$$I_1 N_1 = -I_2 N_2$$



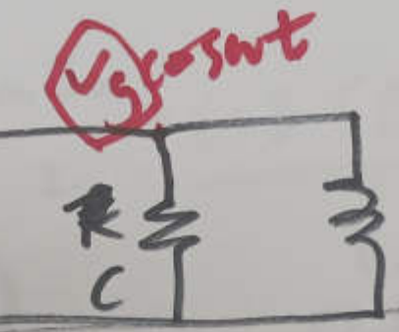
P10.1 $V = 120 \cos(\omega t - 45^\circ)$ V

$I = 25 \cos(\omega t + 15^\circ)$ A

reactive power: $\frac{V_m \cdot I_m}{2} \sin(-45 - 15)$

Average power: $\frac{V_m \cdot I_m}{2} \cos(-45 - 15)$

P10.7.



$V_g \cos \omega t$

$P = \frac{V_g}{\sqrt{2}} \cos\theta$

$= \frac{V_g^2}{2c}$

instantaneous power

$P_{max} = P + \sqrt{P^2 + Q^2}$

$P_{min} = P - \sqrt{P^2 + Q^2}$

Part A: Peak value of instantaneous power delivered by source.

Part B: absorbed

(4)

$$P = \frac{V_m I_m}{2} \cos(\theta_v - \theta_z)$$

$\cos(\theta_v - \theta_z)$ → Pf

$$\frac{V\angle\theta_v}{I\angle\theta_z} = Z\angle(\theta_v - \theta_z)$$

$0 \le Pf \le 1$

* Higher efficiency

$$Pf = \cos(\theta_v - \theta_z) = \frac{P}{\sqrt{P^2 + Q^2}} = \frac{P}{S}$$

$\theta_v - \theta_z$ → impedance angle

S → apparent power

(5)

$$S = \sqrt{P^2 + Q^2}$$

$$Pf = \frac{P}{\sqrt{P^2 + Q^2}} = \frac{P}{S} = \cos(\theta_V - \theta_I)$$

P10.41.