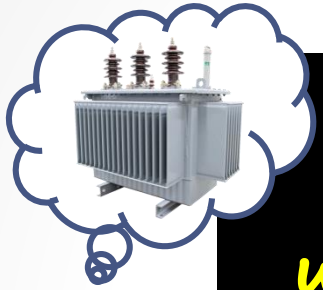
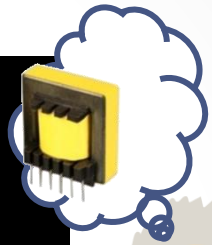
Does Transformer work on DC supply?

Machine Teacher



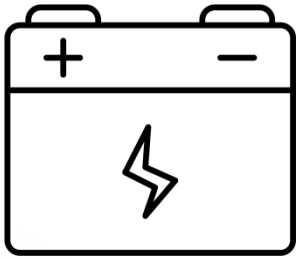


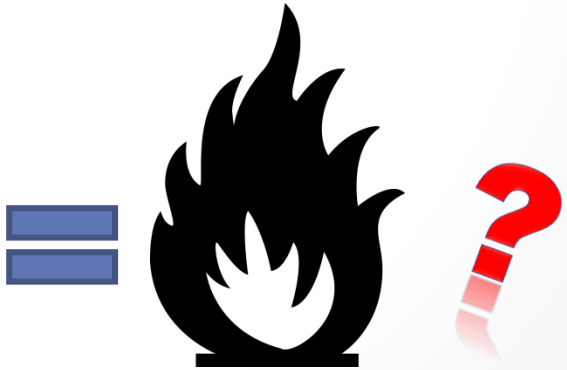
Power Electronics Teacher

Presented By: Mo·Suhel Shaikh

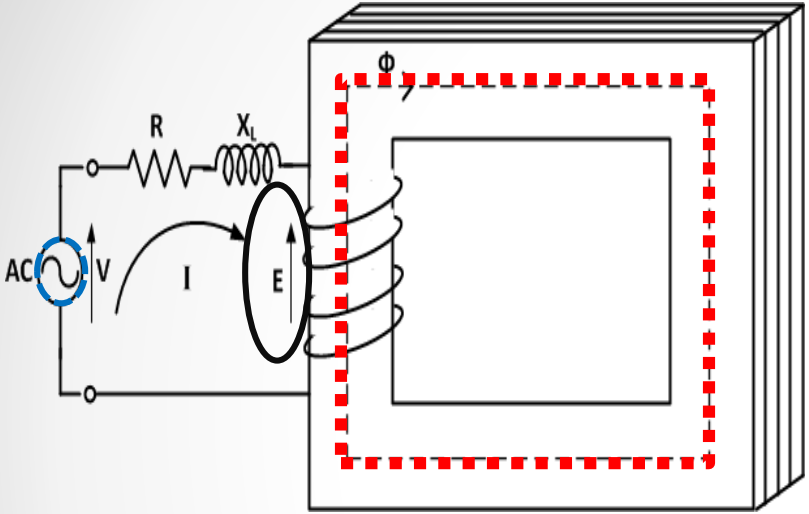
Transformer

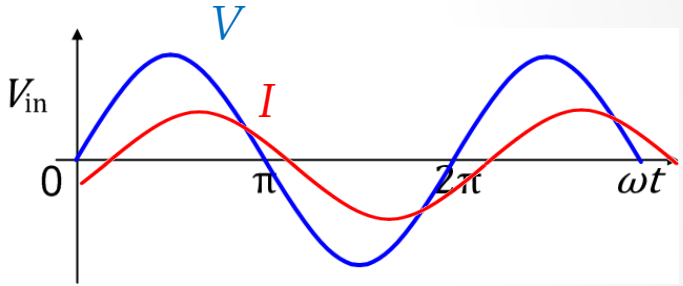
DC Supply





Transformer and AC supply·





➡ $V = E + IR + jIX_L$

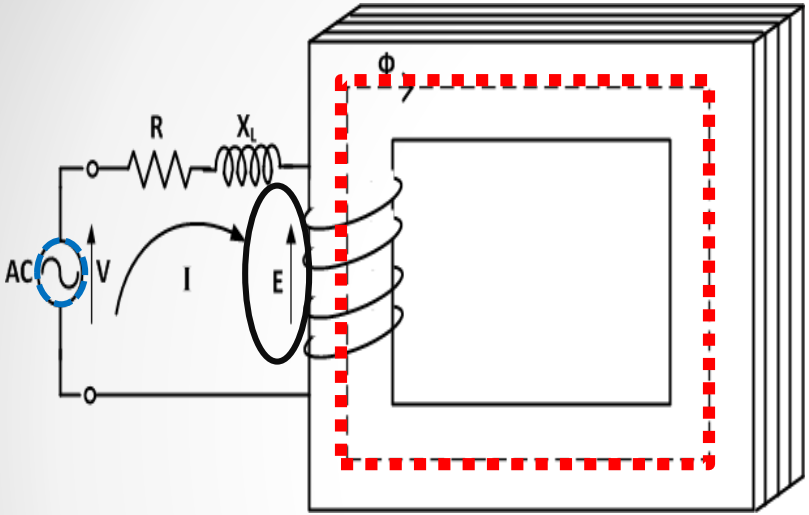
➡ $I = \dfrac{V - E}{R + jX_L}$

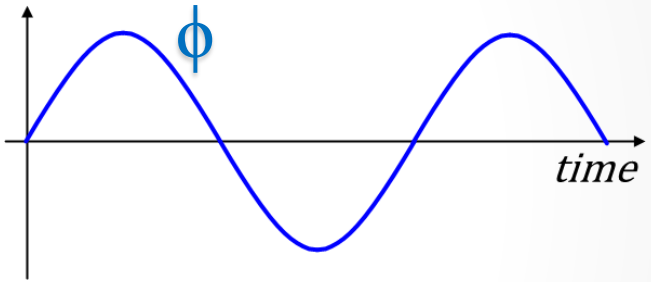
➡

E is the function of $f\left(\dfrac{d\Phi}{dt}\right)$

X_L is the function of frequency

Transformer and AC supply·





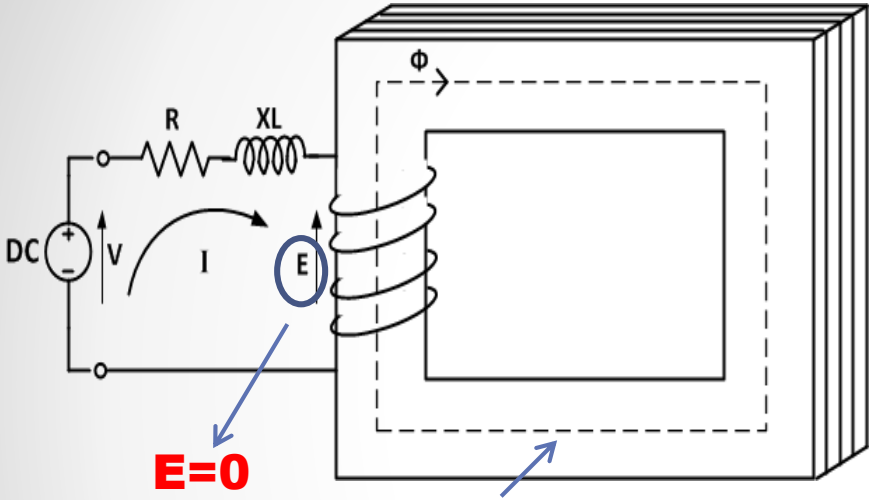
230V 210V

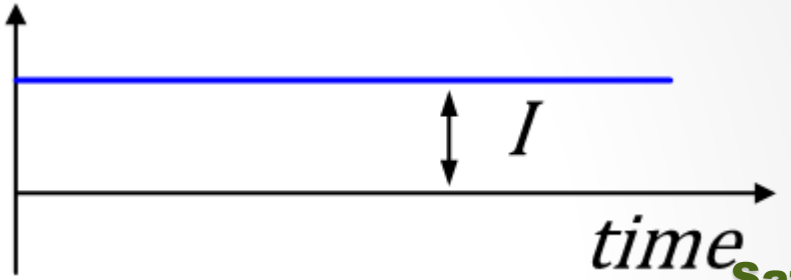
$$I = \frac{V - E}{R + jX_L} = 2A$$

10Ω

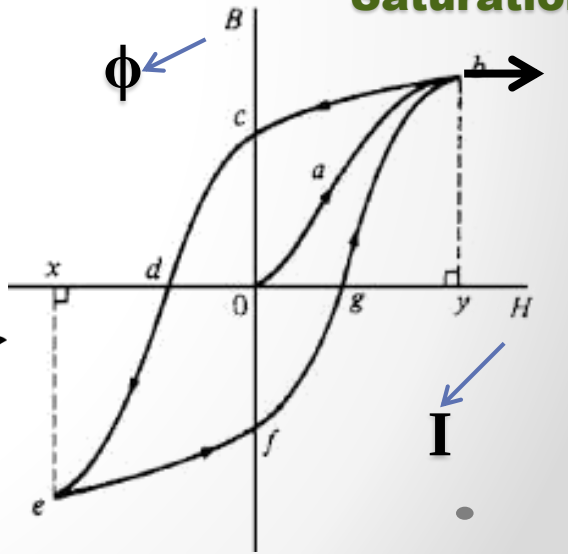
Presence of 'E' term in equation will save transformer

Transformer and DC supply.





Saturation



E=0

Φ *is present but constant magnitude*

230V **0V**

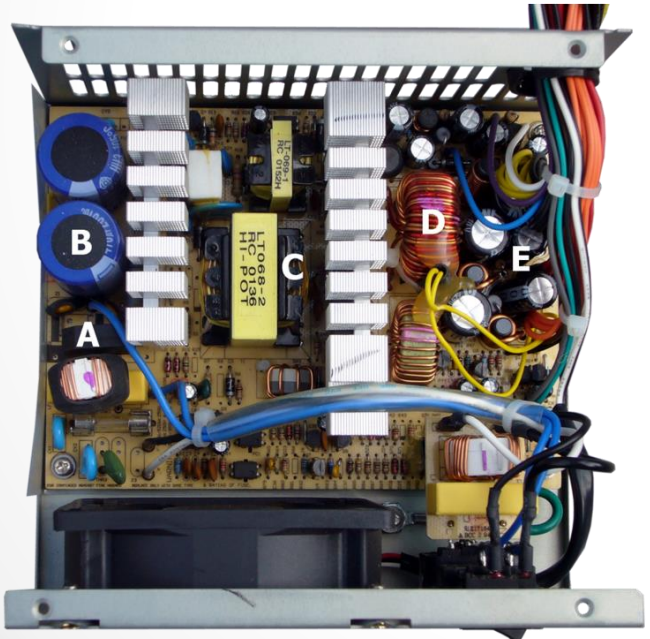
$$\Rightarrow I = \frac{V - E}{R + jX_L} > 23A$$

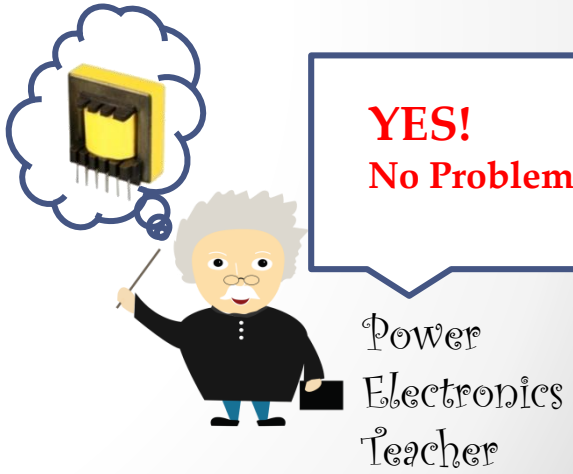
<10Ω

Think?

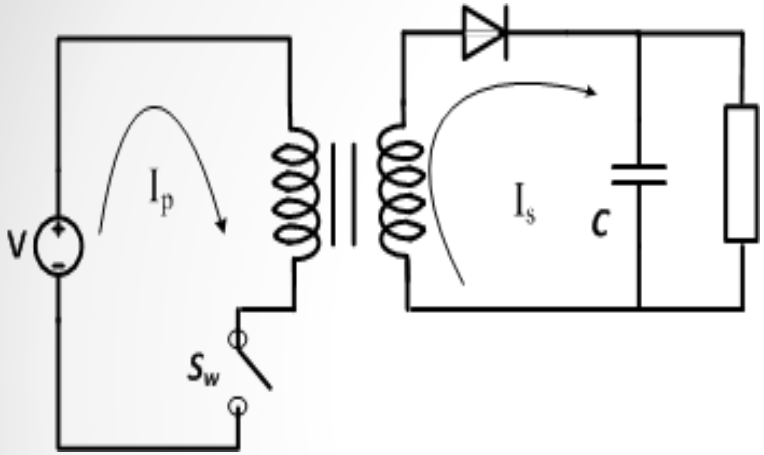
In SMPS application, i.e., DC-DC converter,

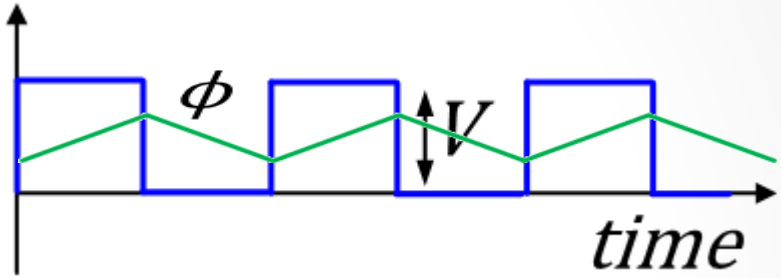
How transformer is used ?





Transformer in SMPS application·





Φ *is varying magnitude*

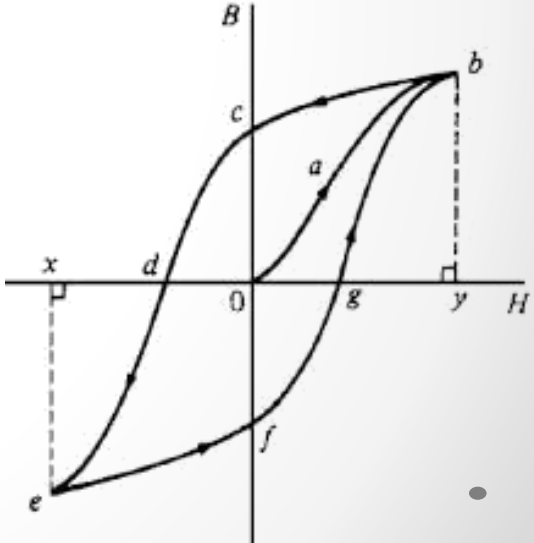
E≠0

$$I = \frac{V - E}{R + jX_L}$$

FYI:

$$Q = 2.22\, f B_m \delta K_W A_W A_i \cdot 10^{-3}\, KVA$$

$$E = N \frac{d\phi}{dt}$$



THANK YOU