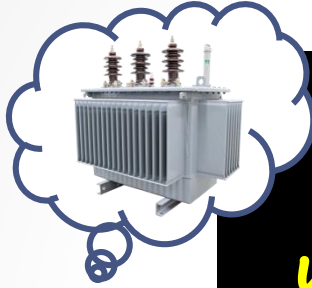
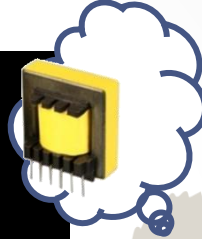




Machine
Teacher



Does Transformer
work on DC supply?



YES!
No
Problem



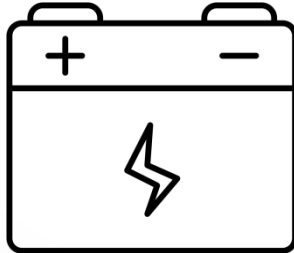
Power
Electronics
Teacher

Presented By: Mo-Suhel Shaikh

Transformer

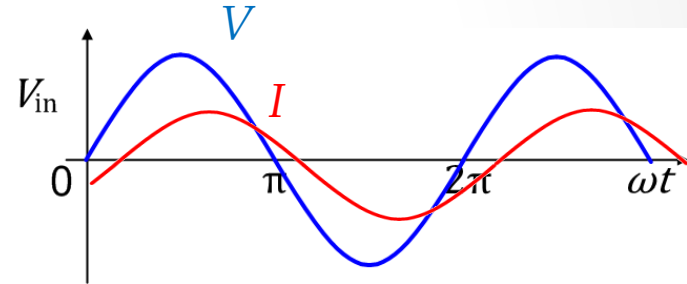
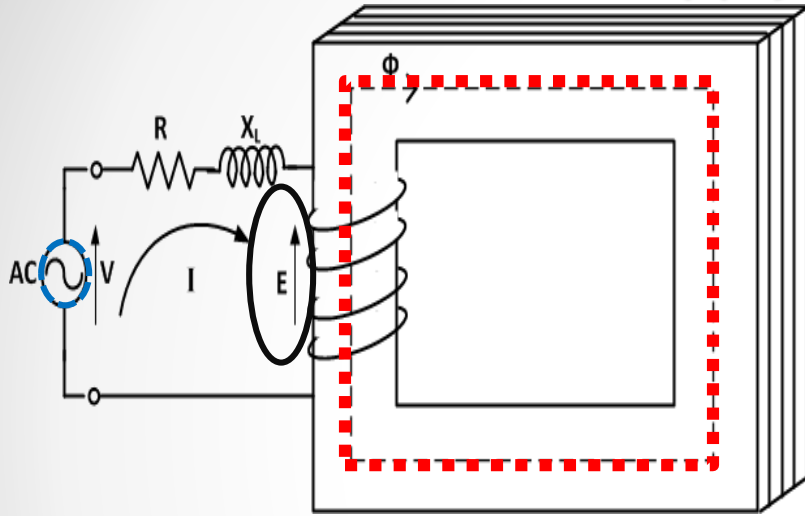


DC Supply



Ask Why?

Transformer and AC supply.



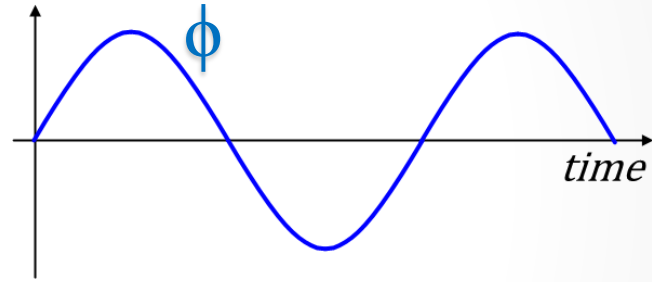
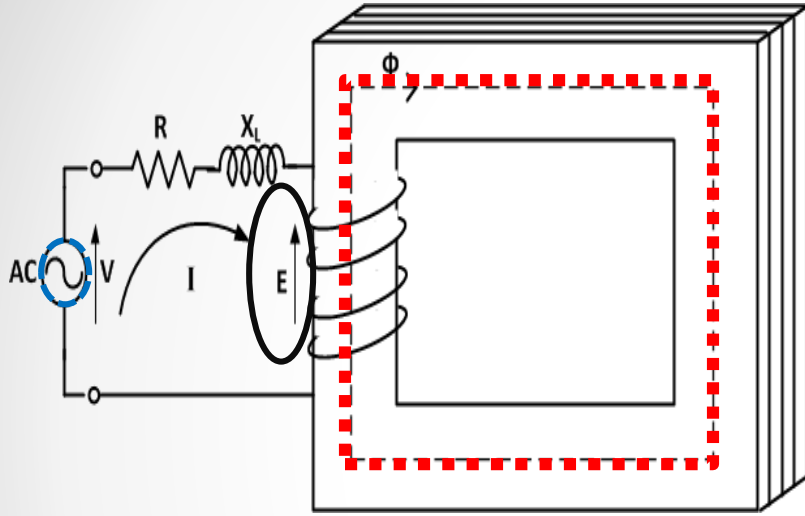
$$\Rightarrow V = E + IR + jIX_L$$

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

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

X_L is the function of frequency

Transformer and AC supply.

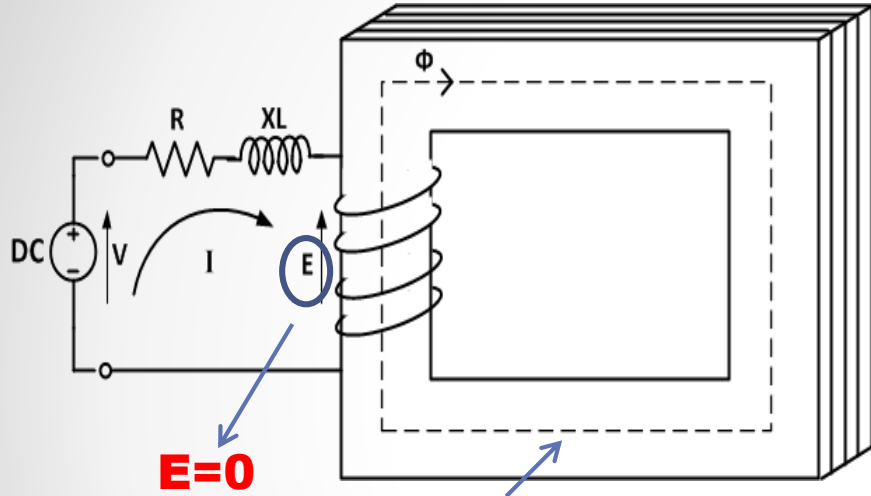


$$\rightarrow I = \frac{230V - 210V}{R + jX_L} = 2A \rightarrow$$

The equation shows the current I calculated from the difference between the supply voltage (230V) and the induced EMF (210V), divided by the total impedance ($R + jX_L$). The result is 2A. The denominator $R + jX_L$ is circled in blue, and an arrow points from it to the value 10Ω .

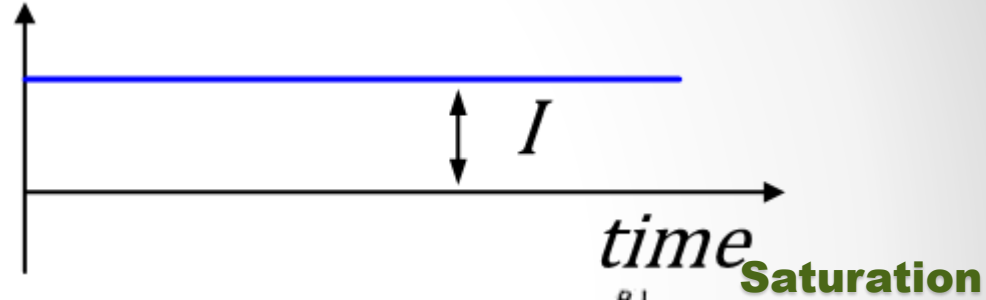
Presence of 'E' term in equation will save transformer

Transformer and DC supply.



E=0

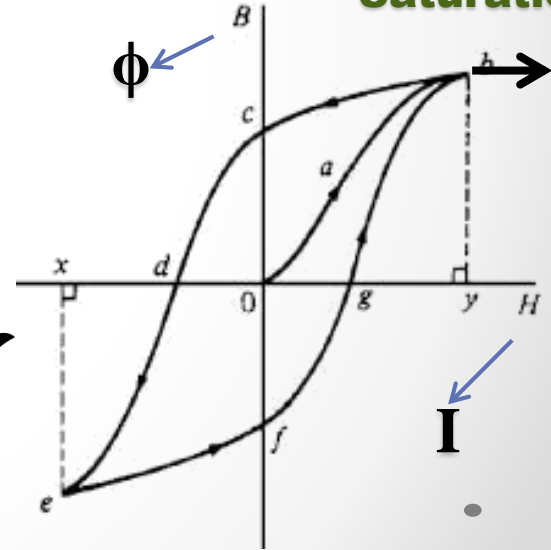
Φ is present but constant magnitude



230V **0V**

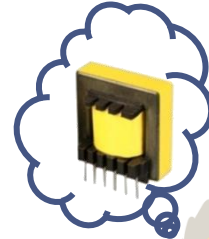
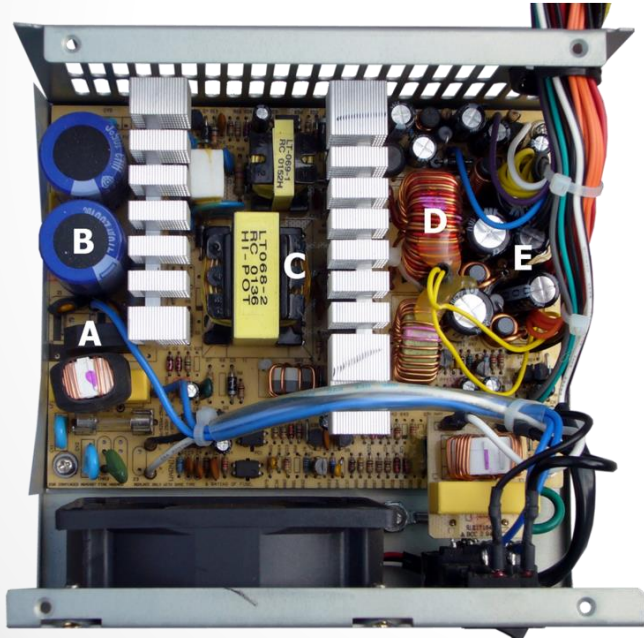
$$I = \frac{V - E}{R + jX_L} > 23A$$

<10Ω



Think?

**In SMPS application, i.e., DC-DC converter,
How transformer is used ?**

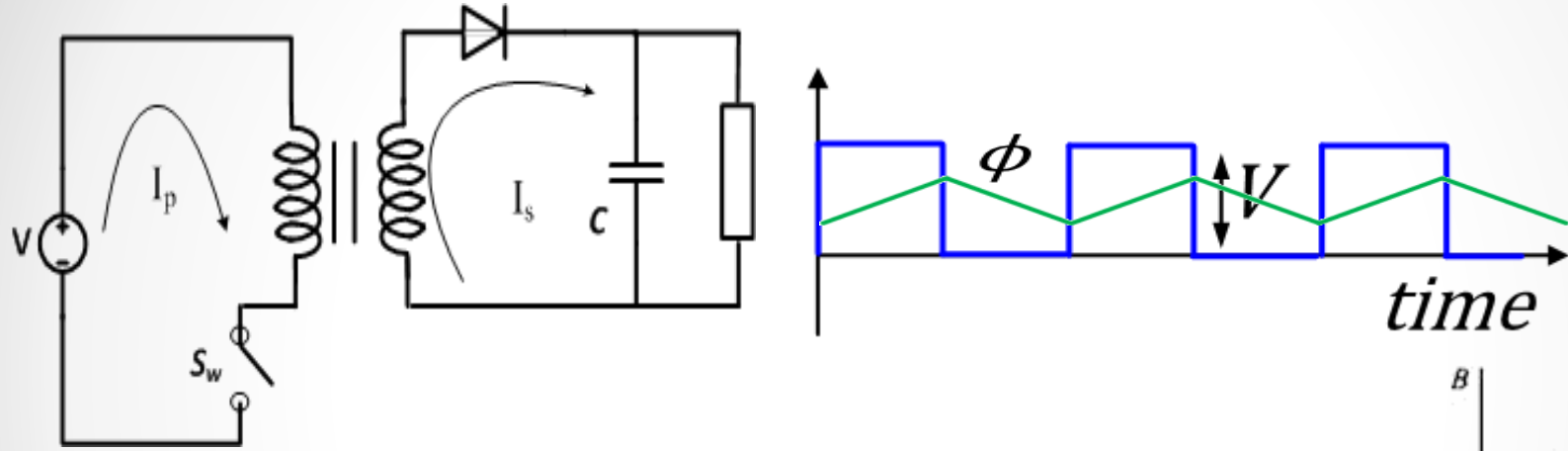


**YES!
No Problem**



Power
Electronics
Teacher

Transformer in SMPS application.



Φ is varying magnitude

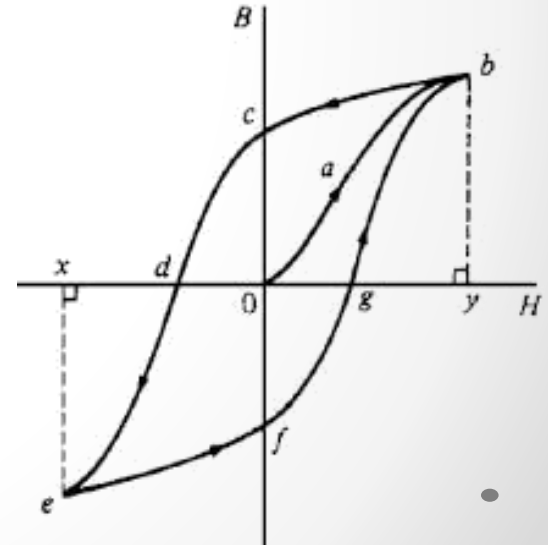
$E \neq 0$

FYI:

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

$$Q = 2.22 f B_m \delta K_w A_w A_i \cdot 10^{-3} \text{ KVA}$$

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



THANK YOU