

Mid Term Exam 2017-18

(Sub: EE 206, Electrical Machines I)

Q 1. Derive an emf equation of a transformer. What is transformation ratio of a transformer? ①

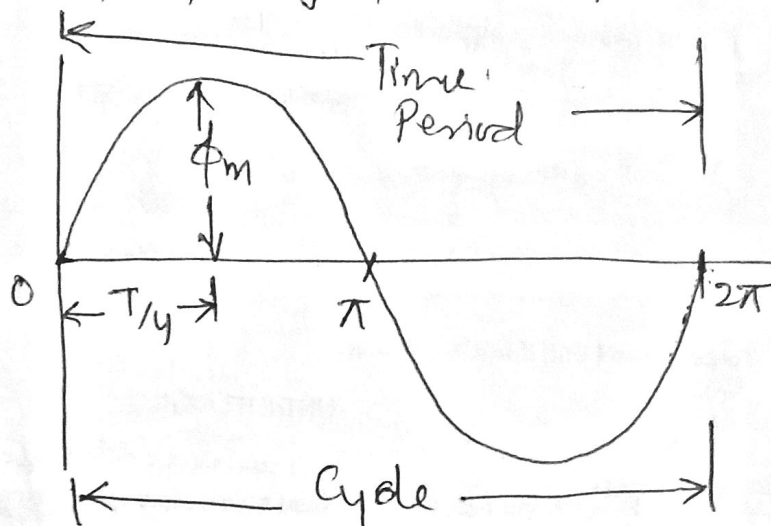
Ans. EMF equation of a transformer

N_1 - No. of turns in primary

N_2 - No. of turns in secondary

ϕ_m - maximum flux in core

f - frequency of AC input in Hz.



As shown in figure flux increases from its zero value to maximum value ϕ_m in one quarter of cycle. i.e. in $\frac{1}{4f}$ seconds

$$\therefore \text{Average rate of change of flux in one turn} = \frac{\phi_m}{\frac{1}{4f}} \text{ wb/sec}$$

$$= 4f \phi_m \text{ volts}$$

$$\therefore \text{Average rate of change flux in coil}$$

$$= 4f \phi_m N$$

N = no. of turns

$$\text{Now form factor} = \frac{\text{RMS value}}{\text{Average value}} = 1.11$$