Transformer Questions

19th October 2021

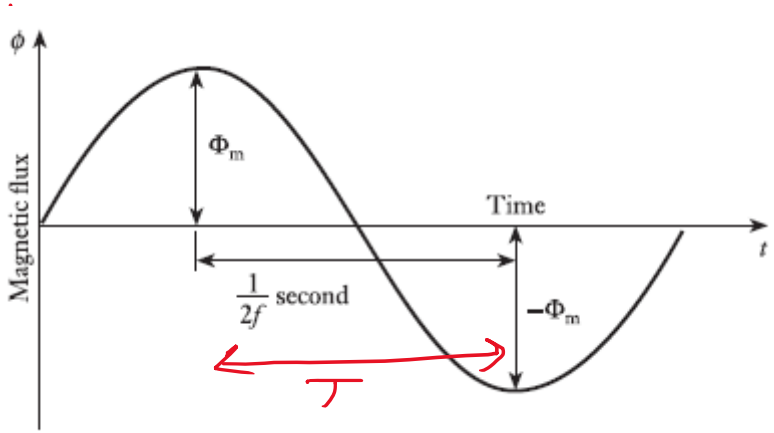
Questions

1. What kVA rating is required for a transformer that must handle a maximum load current of 8 A with a secondary voltage of 2 kV?
2. A single-phase transformer is rated 4,160-V primary and 250-V secondary. It has 1,500 turns in the primary. What should be the number of turns in the secondary winding?
3. If the relative permeability of the core is 1350 what is the permeability?
4. A 250 kVA, 11 000 V/400 V, 50 Hz single-phase transformer has 90 turns on the secondary. Calculate:
   a. The primary and secondary currents
   b. The number of primary turns
   c. The maximum value of flux, given that the ratio of rms to average of a sinusoidal wave is 1.11.

Answers

1. 16 kVA (8 x 2000)
2. Ns=90
3. $\mu=\mu_o\ \mu_r$=1.7 mH/m
4. a) I_s=625 A, b) Np=2475

3, part c



Average rate of change of flux = $\frac{2\phi_m}{T} = \frac{2\phi_m}{1/2f} = 4f\phi_m$

Where f is the frequency.

since EMF= $\frac{d\phi}{dt}$ we can say that average EMF=$4f\phi_m$ Volts

Therefore, the RMS value of EMF=$4.44f\phi_m$ Volts per turn.

Since we have 90 turns in the secondary:

$400=4.44\times50\times90\times\phi_m$

$\therefore \phi_m = 20$ mWb