Assignment

Course title:- DC Machines and Transformers
Instructor:- Engr. Waleed jan
Module: 2nd (BTech)
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Q1: A transformer, when operated at 100V in the primary, the current in the primary is 4A. Find the current in the secondary winding if the voltage is stepped up to 600V.

Solution:-

Given Data:-

$V_1 = 100V$

$V_2 = 600V$

$A_1 = 4A$

Required Data:-

$A_2 = ?$

Solution:-

$$P = AV$$

$$A_1V_1 = A_2V_2$$

$$A_2 = \frac{A_1 V_1}{V_2} \Rightarrow \frac{4(100)}{600} = \frac{4}{6}$$

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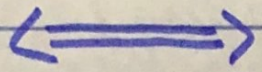
OR

= 0.667A



Q2: A 3300/250V, 50 Hz single phase transformer is built on an iron core having an effective cross sectional area of 125 cm^2 and 70 turns low voltage winding. calculate:

a) The value of maximum flux density.

b) The number of turns on the high voltage winding.

Solution:

Given Data

$E_1 = 3300V$ $E_2 = 250V$

$f = 50Hz$ $A = 125cm^2 = 125 \times 10^{-4} m^2$

$N_2 = 70$ tons

Required

(a) $B_M = ?$ (b) $= N_1 = ?$

Solution

(a) The emf induced on secondary side is give by:-

$E_2 = 4.44 \phi_m f N_2 = 4.44 B_m A f N_2$

$\left(As\ B = \frac{\phi}{A}\right)$

$$B_m = \frac{E_2}{4.44 A f N_2} = \frac{250}{4.44 (125 \times 10^{-4})(50)(70)}$$

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$\boxed{B_m = 1.289\ T}$ Ans.

(b) $\frac{E_2}{E_1} = \frac{N_2}{N_1} \Rightarrow N_1 = \left(\frac{E_1}{E_2}\right) N_2 = \frac{3300}{250} \times 7$

$= \boxed{N_1 = 924 \text{ Turns}}$ Ans

Q3: A transformer with 800 primary turns and 200 secondary turns is supplied from a 100v Ac supply. calculate the secondary voltage and the volts per turn.

Solution:

$N_p = 800$ turn

$V_p = 100$ volt

$N_s = 200$ turn

$V_S = ?$

we Know that

$\frac{V_S}{V_p} = \frac{N_S}{N_p}$

$V_S = \frac{N_S}{N_p} \times V_p$

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$$VS = \frac{200}{800} \times 100$$

$$VS = 25 \text{ volt}$$

$$\text{Now } \frac{V}{N} = \frac{25}{200}$$

$$V/N = 0.125$$