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paper # Dc mac and trans

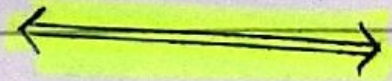
Ans No :-> 1

(Part A)

Definition :-> The shape of this transformer is rectangular and it includes three essential parts like one core and two windings which are shown in the following figure. It has two windings namely primary and secondary.

The arrangement of these windings can be done in one limb.

Explanation :-> In core type of the transformer, winding is done by normal method; while in the shell type transformer, winding is sandwiched between corresponding shells of core material. Hence it is sandwich type.

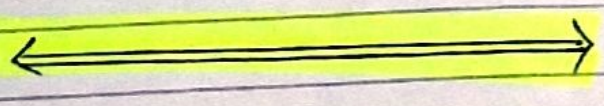


(Part B)

Ans :→ No 1

The shell type transformer has three limbs or legs.

The central limb carries the whole of the flux, and the side limb carries the half of the flux. Hence the width of the central limb is about to double to that of the outer limbs. The primary and secondary both the windings are placed on the central limbs.



Q NO :-> 2

In a transformer when primary voltage is stepped up primary current is stepped down. Moreover, The efficiency of distribution transformer is 60 to 70% and not 100%. justify these statement.

Ans:-> In transformer when primary voltage is stepped up and primary current stepped down. A step down transformer has less turns on the secondary coil that the primary coil. the indeed voltage across the secondary coil is less the applied voltage across the primary coil or in other words the voltage is 'stepped-down'.

in a distribution transformer the efficiency if 60 to 70 %. not 100 %.

difference between power and

distribution

transformer is distribution transformer is designed for maximum efficiency at 60% to 70% load as normally doesn't aperate at full load all the time its load depends on distribution demaned.

QNO :-> 03

Given data:

=> Frequency = f = 50Hz
=> Cross - Sectional Area = 120cm²
=> voltage is Vp = 3000V
=> voltage Vs. = 200V

=> no of turn = Ns = 50 on low voltage side

Calculate:.

(1) => no of turn = Np on high voltage side
(2) => Max - flux density = Φ = ?

Sol:.

As we know that

i) => $\frac{Vp}{Vs} = \frac{Np}{Ns}$

=> $\frac{3000}{200} = \frac{Np}{50}$

=> $\frac{50 \times 3000}{200} = Np$

=> $\left[Np = \frac{1500}{2}\right]$

=> Np = 750

ii) Now Φ = ?

=> Vl = 4.44 f Φ Nl

=> $\Phi = \frac{Vl}{4.44 \times F \times Nl}$

$$\Rightarrow \phi = \frac{3000}{4.44 \times 50 \times 750}$$

$$\Rightarrow \phi = \frac{30}{1665}$$

$$\Rightarrow \phi = 0.02 \text{ Testla}$$

NOW

$$\Rightarrow V_2 = 4.44 f \phi N_2$$

$$\Rightarrow \phi = \frac{V_2}{4.44 \times f \times N_2}$$

$$\Rightarrow \phi = \frac{220}{4.44 \times 50 \times 50}$$

$$\Rightarrow \phi = \frac{2}{111}$$

$$\Rightarrow \phi = (0.02) \text{ Testa} \therefore$$

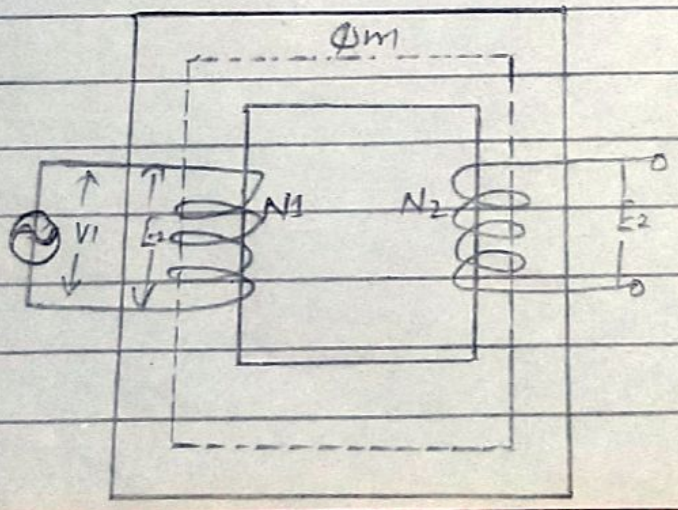
Q No :-> 4 (part A)

(1) The resistance of their primary and secondary winding become zero.

(2) The core of the ideal transformer has infinite permeability. The infinite permeable means less magnetizing current realuies for magnetizing their core.

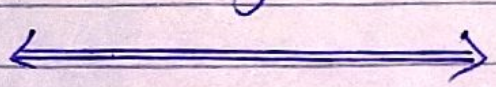
(3) The leaking flux of the transformer becomes zero. ie the whole of the flux induces in the core of the transformer links with their primary and secondary winding.

(4) The ideal transformer has 100 percent efficiency. i.e the transformer is edely free from hysteresis and current loss.



Ans :-> No 4 (Part B)

The function of the magnetizing component is to produce the magnetizing flux, and thus, it will be in phase with the flux. Induced emf in the primary and the secondary winding lags the flux ϕ by 90 degrees.



Q No :-> 5 part (A)

In DC machine, one is pole core and second is pole shoe.

Functions are as below.

Pole core basically carries a field winding which is necessary to produce the flux.

It directs the flux produced through air gap to armature core, to the next pole.

Pole shoe enlarges the area of armature core to come across the flux, which is necessary to produce the flux.

It directs the flux produced through air gap to armature core, to the next pole.

Pole shoe enlarges the area of armature core to come across the flux, which is necessary to produce large induced e.m.f. To achieve this, pole shoe has been given a particular shape.

Ans No :-> 5 (part B)

The function of commutator is to lead current from external stationary leads to the rotating coils of the armature winding in case of motor and to draw current from armature winding to external circuit in case of generator.

basically it act as a rectifier as it converts sinusoidal (ac) signal into (signal).