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Exp :- 5

Aim :- Mesurment of primary and Secondary Voltage & Current and power in Single phase Transformer.

Required Apparatus :-

Sno.	Material Required	Specification Rating	quantity
(1)	Transformer Panel	1- Phase	1
(2)	Variable Resistivie Load	0 - 1500W	1
(3)	Connecting leads	1mm Square	As per Req.

Theory :- The transformer is the Static device which work on the principal of electromagnetic Induction. It is used for Transferring the electrical Power from one circuit to another Cercuit without any Variation in their frequency.

Working of Transformer :- Transformer one winding (also known as a coil) is Supplied by an alternating electrical Source. The alternating Current through the winding produce a Continully Changing and alternating flux that Surrounds the winding

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If another winding is brought close to winding, Some Portion of this alternating flux will link with Secondary winding. As the flux is continually changing in its amp & dir, there must be changing flux linkage in Secondary winding or coil.

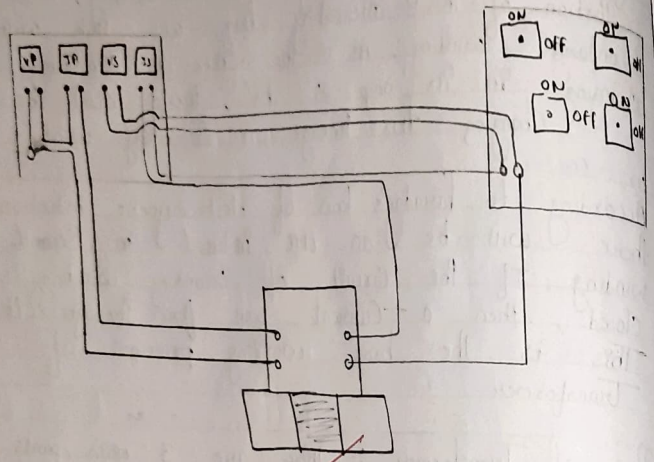
According to Faraday's law of electromagnetic induction there will be an EMF induced in Second winding. If the circuit of Secondary winding is closed, then a current will flow through it This is the basic working principal of Transformer.

Parts of Transformer :- There are 3 main parts

- Primary winding of Transformer : It produce Magnetic flux when it is connected to an AC electric Source.

- Magnetic Core Transformer : The Magnetic flux produce by primary winding, that will pass through this low reluctance path linked with Secondary winding & Create a close Magnetic Circuit.

- Secondary winding of Transformer : The flux, Produced by primary winding, passes through the Core, will link with the Secondry



Single phase Transform.

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winding. This winding also rounds on the same core and give the desirved output to load.

Losses in Transformer: All types of losses are.

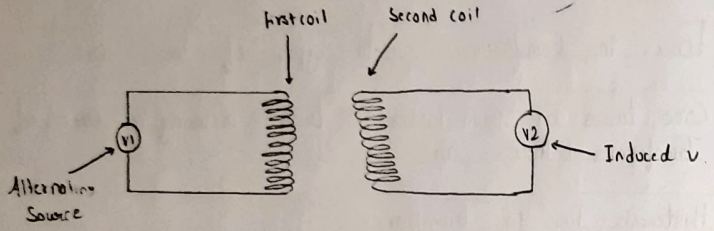
→ Core losses or Iron losses :- Losses occuring in core of Tranformer. These are.

→ Hysteresis loss in Transformer:

Hysteresis loss occurs when there is reversal in the process of magnetization in the Transformer core. This loss depends upon the volume and grade of iron, value of flux density and freq of Mag. Reversal

→ Eddy Current Loss in Transformer

In Transformer, Ac is Supplied to the primary winding it produce Set up alternating Magnetizing flux when this flux links with Secondary winding.



Flux

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Copper loss :- Copper loss occurs due to resistance of windings of the Transformer for primary winding, it is $I_1^2R_1$ and for Secondary winding, it is I_2R_2 where I_1 & I_2 are primary Current & Secondary Current Repectively, R_1 & R_2 are Primary winding Resistance and Secondary winding Resis. Repect

Ideal Transformer :- An Ideal Transformer is a Transformer which has

- No copper loss
- No Iron loss
- No leakage flux
- 100 % efficiency.

Relation of Voltage, current and No. of Turns of winding

$$\frac{V_1}{V_2} = \frac{N_1}{N_2} = \frac{I_2}{I_1}$$

V_1 & V_2 = Voltage across Pri, Sec winding.

I_1 & I_2 = Current winding in Pri, Sec.

N_1 & N_2 = No. of Turns in Pri & Sec winding

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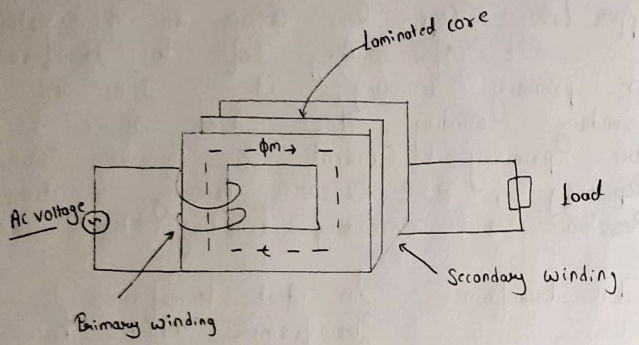

Electrical Transformer.

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Types of Transformer

Set up and Set down Transformer

Step up - $V1 < V2$ or $N1 < N2$ or $I1 < I2$
Step down - $V1 > V2$ or $N1 > N2$ or $I1 > I2$

Observation Table.

load	VP	Ip	VS	Is
No load	100	0.01	4.1	0.00
load 1	98	0.93	46	1.87
load 2	98	0.74	46	1.56

Result :- We have measured the primary & Secondary voltage currents, Single pole - phase Transformer with diffrent loding conditions.

Viva questions. →

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Viva question.

(1) What is Transformer ?

It is a Static device which is used to change the level of voltage or current without changing the frquency & Power.

(2) What do you mean by Turns ratio of Transformer.

= It is Ratio of primary Turns & Secondary Turns.

(3) What is Transformation Ratio of Transformer ?

= Ratio of Secondary Side Turns to primary Side T.

(4) Types of Transformer ?

= Step up T and Step down Transformer.

(5) Why core of Transformer is laminated ?

= To reduce eddy current loss.

(6) Ideal Transformer ?

= Transformation which has no losses and 100 % effciency.

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(7) What is Copper losses in Transformer?

= Heat loss in winding of Transformer due to flow of in these

(8) What is Iron loss in Transformer?

= Heat loss in Core of Transformer.

(9) what are diffrent polarities of Transformer

= Positive and negative.

(10) What is working principal of autoTransformer?

= Electromagnetic Induction.

Yes
10/4/24

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