	DEHRADUN INSTITUTE OF TECHNOLOGY		LABORATORY MANUAL
	PRACTICAL INSTRUCTION SHEET		
	EXPERIMENT TITLE : Efficiency and V.R. of 1- Φ transformer by load test		
	EXPERIMENT NO. :	ISSUE NO. :	ISSUE DATE :
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DEPTT. : Electrical Engineering	LABORATORY : Intro to Electrical & Electronics Lab EA1210	SEMESTER : I / II	

Objective: - To determine the efficiency and voltage regulation of a single phase transformer by load test.

Apparatus Used: - One 1- Φ transformer, one 1- Φ auto-transformer, one voltmeters (0-300V), one ammeters (0-10A), one wattmeter (0-10A, 0-300V), one 1- Φ load and connecting wires.

Theory: - In a practical transformer there are two types of losses:

- (1) Cu loss
- (2) Core/Iron loss.

Therefore output of a transformer is always less than input of the transformer.

Here transformer is loaded with a variable resistive load. Input to the transformer can be found out by using a wattmeter and output can also be measured by a wattmeter or with the help of voltmeter and ammeter.

Input power to transformer = Reading of wattmeter

Output power from transformer = $V_2 I_2$ [$\because \cos\Phi_2 = \text{load P.F} = 1$]

$$\begin{aligned} \% \text{ efficiency } \eta &= (\text{Output Power} / \text{Input Power}) \times 100\% \\ &= (V_2 I_2 / W_1) \times 100\% \end{aligned}$$

Voltage regulation(V.R) is the change in the magnitude of secondary voltage from no load to desired load. This change is expressed as a percentage of the no load voltage.


$$\begin{aligned} \% \text{ V.R.} &= \frac{\text{No load voltage} - \text{Desired (any) load voltage}}{\text{No load voltage}} * 100 \% \\ &= \frac{E_2 - V_2}{E_2} * 100 \% \end{aligned}$$

where :- E_2 = No load voltage

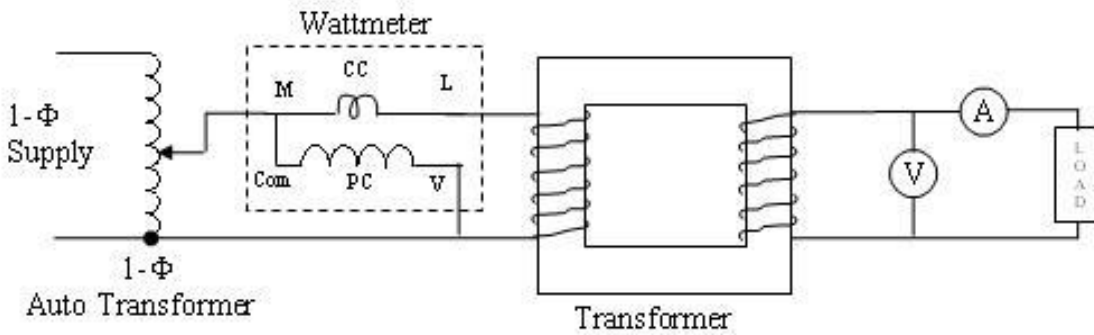
V_2 = Any load voltage

This voltage regulation is because of resistance and leakage reactance of the transformer.

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Circuit Diagram:-



Observation table:-


S.No.	Input power W_1	Output voltage V_2	Output current I_2	$\eta = \frac{V_2 I_2}{W_1} * 100$	$\%VR = \frac{E_2 - V_2}{E_2} * 100$

Calculation:-

$$\text{Multiplying Factor (M.F.)} = \frac{VI \cos\Phi}{\text{Full scale deflection(FSD)}} \quad \cos\Phi = 1$$

Result: - Efficiency and voltage regulation has been calculated at different load and shown in the table.

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Precautions:-

1. Make sure that auto transformer is at zero position.
2. The main switch should be at off position before doing the connections.
3. All connection should be tight and clean.
4. The reading in instruments should not exceed from their permissible limit.
5. Don't touch the necked terminals as voltage is high.
6. Always wear shoes when working in the lab. Avoid wearing loose clothes, hanging chains etc.

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