

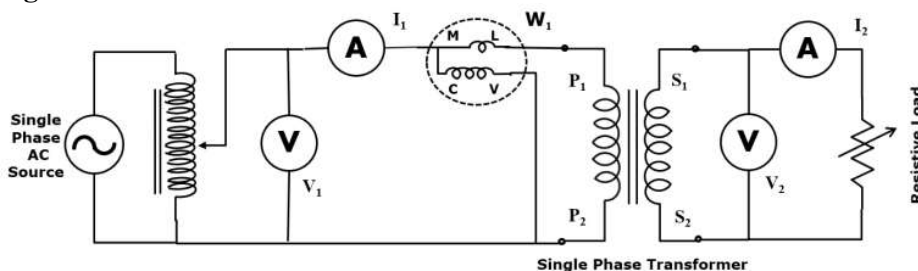
## EXPERIMENT NO. 10

**Objective:** To perform a load test on single transformer and find efficiency and voltage regulation at full load and unity power factor load.

**Apparatus Required:**

Sr. No.	Apparatus	Quantity	Range/ Remark
1	Single phase AC supply	1	(.....) V
2	Variac	1	(i/p-230V, o/p-0-270V, 15A)
3	Single phase	1	2KVA, i/p-0-230-119-115V, o/p-0-230V, i/p and
4	Wattmeter	1	(.....)W
5	AC Voltmeter	2	(.....)V, (.....)V
6	AC Ammeter	2	(.....)A, (.....)A
7	Connecting wires	--	--

**Circuit Diagram:**



**Observation Table:**

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S.N.	W <sub>1</sub> (Input)	V <sub>2</sub> (volt)	I <sub>2</sub> (A)	V <sub>2</sub> I <sub>2</sub> (Output)	Efficiency $= \frac{V_2 I_2}{W_1}$	Voltage Regulation $= \frac{E-V}{V}$

**Theory:**

For this experiment, a load resistor is connected at the output terminals of the transformer. The input to the transformer is measured in the Wattmeter connected as W<sub>1</sub>. The output of transformer is the product of V<sub>2</sub> and I<sub>2</sub>. As the load is resistive, power factor is unity.

$$\% \text{ efficiency } \eta = \frac{V_2 I_2}{W} \times 100$$

With the increase in load on the transformer, there is a change in its terminal voltage. The voltage falls if the load power factor is lagging. It increases if the power factor is leading. The change in secondary voltage from full load to no load expressed as a percentage of full-load voltage is called percentage voltage regulation of the transformer.

If  $E_2$  is the no-load terminal voltage and  $V_2$  is the full load terminal voltage, then % voltage regulation

$$\% \text{ V.R.} = \frac{E_2 - V_2}{E_2} * 100$$

**Procedure:**

1. Connections are made as per the circuit diagram.
2. Increase the supply voltage with the help of variac till the input voltage  $V_1$  is rated voltage.
3. Now adjust the rheostat so that  $I_2$  reads rated current.
4. Take the reading of  $W_1$ ,  $V_2$  and  $I_2$ .

**Result:** The load test on single phase transformer has been successfully conducted.

**Precaution:**

1. Make the connections properly.
2. Note the readings of voltmeters properly avoid parallax
3. Avoid loose connections and don't touch wire with wet hand.
4. Before connecting all instruments check their zero reading
5. Variac should be in minimum position at start.