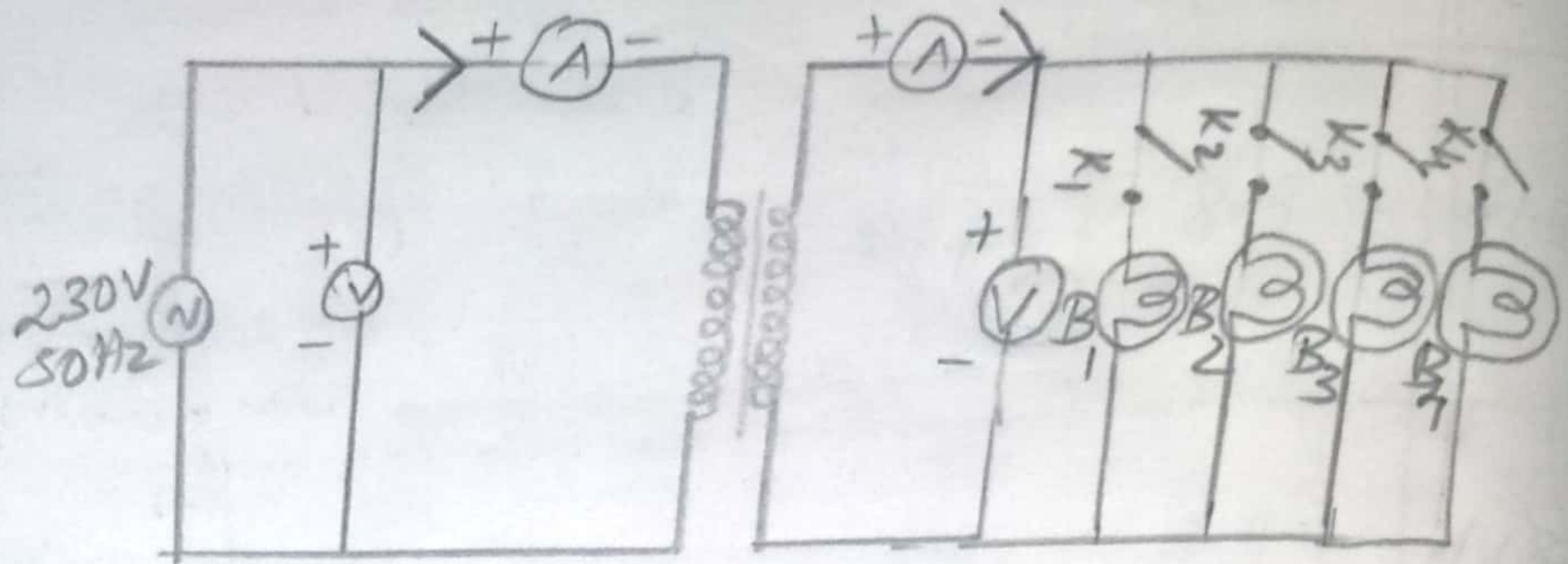


Circuit diagram:



Expt 04

## LOAD TEST ON SINGLE PHASE TRANSFORMER

AIM:

To conduct the load test on the given a single phase transformer for finding the efficiency and its regulation.

APPARATUS REQUIRED:

S.No	APPARATUS	RANGE	TYPE	QUANTITY
01)	Voltmeter	(0-150)V	MD	1
		(0-300)V	MD	1
02)	Ammeter	(0-10) A	MD	1
		(0-20) A	MD	1
03)	Wattmeter	150 V, 20 A	UPF	1
		300 V, 10 A	UPF	1
04)	Auto transformer	240V, 2.7KVA, 10A		1

FORMULA USED:

01) Percentage Regulation =  $\frac{(V_{02} - V_2)}{V_{02}} \times 100$

Where,  $V_{02}$  = Secondary voltage on no load.

$V_2$  = Secondary voltage at a particular load.

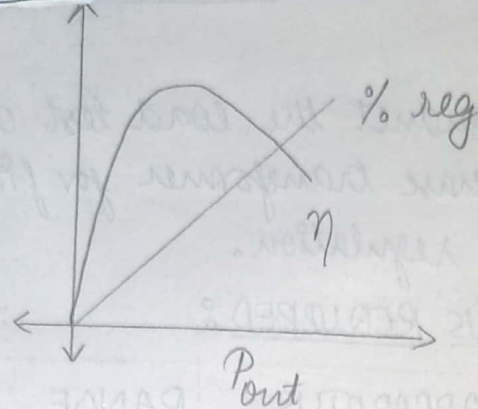
02) Power factor =  $P_{out} / V_2 I_2$

Where,  $P_{out}$  = Secondary wattmeter reading (watts)

$V_2$  = Secondary voltage in Volts

$I_2$  = Secondary current in Amps

### MODEL GRAPH:



### TABULATION:

S. No	Primary Voltage $V_1$ (V)	Primary Current $I_1$ (A)	Primary watt meter $W_1$ (W)	Secondary Voltage $V_2$ (V)	Secondary Current $I_2$ (A)	Secondary watt meter $W_2$ (W)	Power Factor $\cos \theta$	% Regulation %	$\eta$ %
1)	230.23	0.558	128.47	115	0.901	103.61	1	92.12	80.2
2)	230.23	0.626	144.72	115	1.006	121.90	1	92.12	84.6
3)	230.23	2.79	642.34	115	5.51	633.65	1	92.12	98.5
4)	230.23	0.845	194.54	115	1.51	173.65	1	92.12	89.2
5)	230.23	3.72	856.15	115	7.29	838.35	1	92.12	97.9

### MODEL CALCULATION:

$$\text{Power factor} = \frac{P_{out}}{V_2 \times I_2} = \frac{633.65}{115 \times 5.51} = 1$$

$$\begin{aligned} \% \text{ Regulation} &= \frac{(V_{02} - V_2)}{V_{02}} \times 100 \\ &= \frac{1460 - 115}{1460} \times 100 = 92.12\% \end{aligned}$$

$$\begin{aligned} \text{Efficiency} &= \frac{P_{out}}{P_{in}} \times 100 = \frac{633.65}{642.34} \times 100 \\ &= 98.5\% \end{aligned}$$



03) Percentage efficiency =  $\left( P_{out} / P_{in} \right) \times 100$

Where,  $P_{out}$  = 2<sup>nd</sup> wattmeter reading in watts.

$P_{in}$  = 1<sup>st</sup> wattmeter reading in watts.

#### PROCEDURE:

- 01) Connections are given as per circuit diagram.
- 02) Verify whether the autotransformer is kept at zero voltage position.
- 03) By closing the DPST switch, 230V, 1 $\phi$ , 50Hz AC supply is given to the transformer.
- 04) At no load, the readings from the meters are noted down.
- 05) the load is applied to the transformer in step upto 125% of the rated value of the primary current by using rheostatic load.
- 06) the corresponding values from the meters are tabulated for different loads.
- 07) then the load is removed gradually, autotransformer is brought to its minimum position and the supply is switched off.
- 08) From the recorded values, the regulation, power factor and efficiency are calculated.

#### RESULT:

Thus the single phase transformer is constructed and its performance is noted.