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Experiment NO - 9.

→ Title : To perform short circuit test on transformer.

→ Objectives : To determine the series branch parameters of the equivalent circuit of a transformer.

→ Apparatus :

Sr. NO	Item	Rating	Quantity.
1.	1 phase dimmer stat	—	1
2.	AC ammeter	0-10 amp	2
3.	AC voltmeter	0-75 amp	1
4.	wattmeter	10A, 75V	1
5.	Transformer	—	1.

→ Theory :
The figure shows the circuit diagram for conducting the short circuit test on a transformer, one of the windings of the transformer is short circuited through an ammeter, while a low voltage is applied to other winding.

The applied voltage is slowly increased until full load current flows in this winding. As such full load current will then flow in the order winding also. Normally, the voltage applied is hardly 5-7 % of rated voltage of this winding.
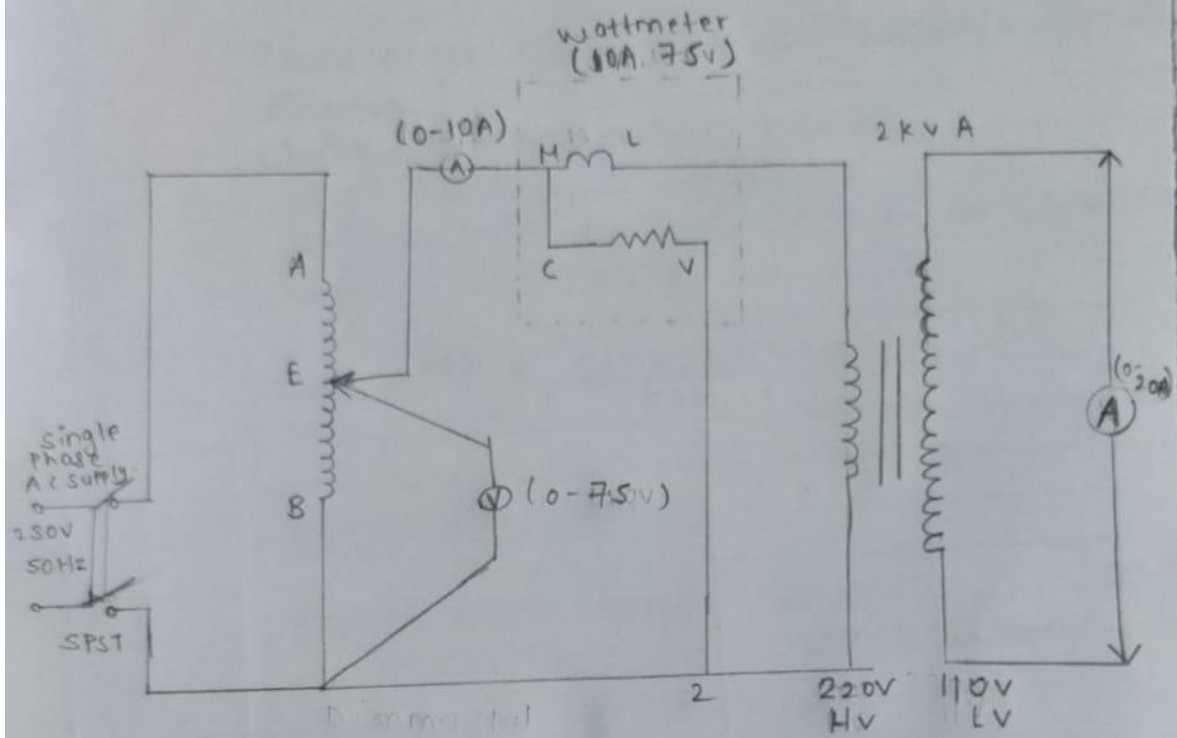
Flux eastablished in the core will be quite small and also iron losses occuring under this condition are negligible. W_{sc}, I_{sc}, V_{sc} will be readings of wattmeter, Ammeter and voltmeter.

$$W_{sc} = (I_{sc})^2 \, R_{eq}; \quad R_{eq} = \frac{W_{sc}}{(I_{sc})^2}$$

$$Z_{eq} = \frac{V_{sc}}{I_{sc}} \quad ; \quad X_{eq}^2 = (Z_{eq})^2 - (R_{eq})^2$$

circuit diagram.

wattmeter
(10A, 75v)

(0-10A)

2 k v A

(0-75v)

Single
Phase
A C supply
250V
50Hz
SPST

220V   110V
Hv   LV

→ Procedure :

1. connect the circuit as per provided circuit diagram.
2. check the connections twice.
3. start the main switch.
4. Adjust the required voltage on ~~demonst~~ demonstrate
5. Jake the readings.

$$MF = \frac{150 \times 10}{750} = 2.$$

→ Observation table.

Voltage (V_{sc})	current (I_{sc})	No load power. losses (W_{sc})
28	8.6	$120 \times 2 = 240$

→ Calculations

Equivalent loss, $W_{sc} = (I_{sc})^2 R_{eq}.$

Therefore, $R_{eq} = W_{sc} / (I_{sc})^2.$

Equivalent impedance, $Z_{eq} = V_{sc} / I_{sc}$

Equivalent reactance $X_{eq} = \sqrt{Z_{eq}^2 - R_{eq}^2}$

→ <u>conclusion</u> : The secondary side current is almost double to that of primary side current.