



***THE HASHMITE UNIVERSITY  
ELECTRICAL ENGINEERING DEPARTMENT  
ELECTRICAL MACHINES LAP***

*Lab Sheet*

**Single Phase Transformer- II**

<b>Group number:</b>	<b>Students ID:</b>
<b>1-Essa Taiseer AL-hoor</b>	<b>1830278</b>
<b>2-Moslem Othman Naji</b>	<b>1733045</b>
<b>3</b>	
<b>4</b>	
<b>5</b>	
<b>6</b>	
<b>7</b>	

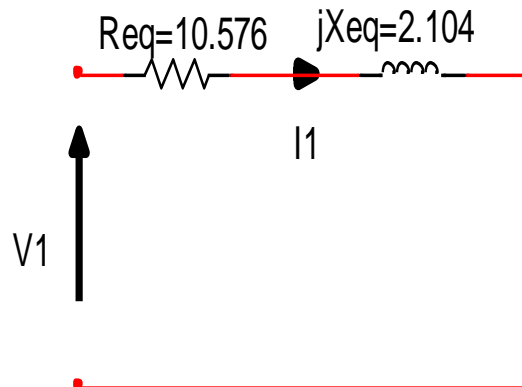
# Single Phase Transformer- II

## A) Short Circuit Test

Table 3 - A							
$I_{1(sc)}$ (A)	$V_{1(sc)}$ (V)	$W_{1(sc)}$ (W)	Calculated $\cos\theta_o$	Calculated $\sin\theta_o$	$Z_{eq}$	$R_{eq}$	$X_{eq}$
1.232	13.03	15.73	0.9798	0.199	10.576	10.362	2.104
1.018	10.82	10.74	0.9750	0.222	10.628	10.362	2.359
0.832	8.85	7.17	0.9737	0.228	10.637	10.357	2.425
0.641	6.82	4.25	0.9721	0.234	10.639	10.342	2.489

## Questions:

1. Why a short circuit test is done on the transformer with LV winding shorted and supply given to the HV winding side?  
Because we need a low current so that the core losses are low and the cost also low (less expensive power supply).
2. Draw the equivalent circuit of the transformer indicating the values of the parameters?



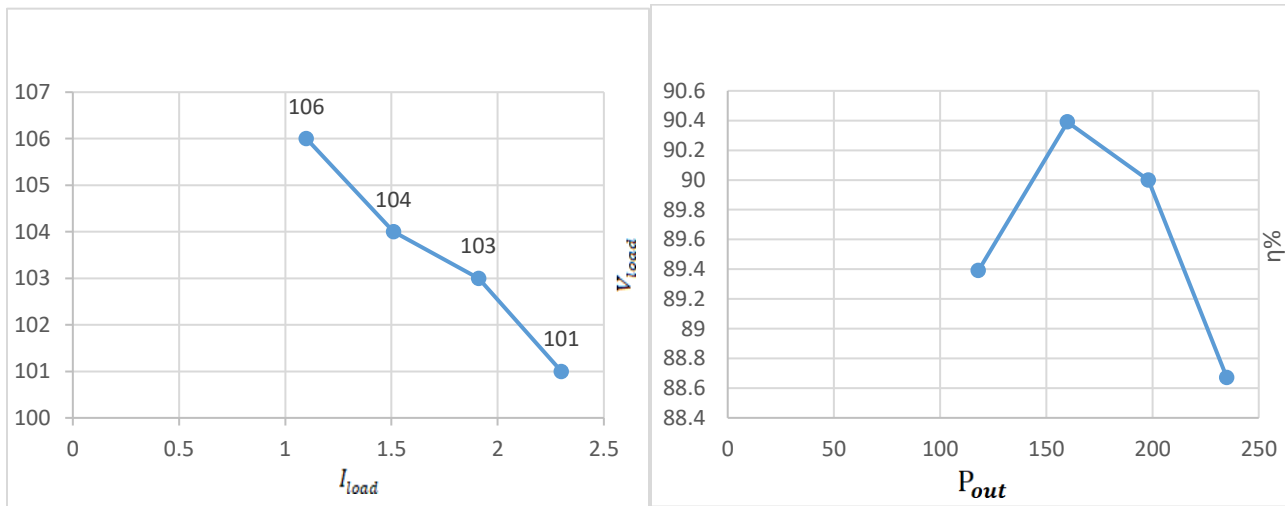
## B) Load Test

Table 3 – B

$I_1$ (primary current)	$P_1$ (input power)	$V_2$ (load voltage)	$I_2$ (load current)	$P_2$ (output power)	$\eta$ %
1.2	265	101	2.3	235	88.67
1.0	220	103	1.91	198	90
0.8	177	104	1.51	160	90.39
0.6	132	106	1.1	118	89.39

### Questions:

1. Plot the load voltage against the load current.
2. Plot the efficiency against the output power.



3. Is the active power  $P_1$  less than the active power  $P_2$ ? What is the function of the no load current?

$$No, I_0 = \frac{P_{loss} \times \cos \theta_0}{V_1} \text{ where } P_{loss} = P_{in} - P_{out} = 30Watt$$

4. Why will the transformer consume more current when it is loaded?

When we put load the power consumed will be higher because of when the load is high the copper coils induced inductance affect the power transferred

### Conclusions:

- 1-we use short circuit to find the  $R_{eq}$  and  $X_{eq}$
- 2-power directly proportional to the load
- 3- $P_{in} > P_{out}$  because of the losses
- 4-there is a phase angle between the primary and secondary because of the reactance of the windings and the magnetization branch