DEPT. OF ELECTRICAL & ELECTRONICS ENGINEERING

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY, Kattankulathur – 603 203

Title of Experiment	: **4**. **LOAD TEST ON SINGLE PHASE TRANSFORMER**
Name of the candidate	:KUNA VENKATA SAI SATHVIK
Register Number	:RA2111028010078
Date of Experiment	:19/10/2021

Sl. No.	Marks Split up	Maximum marks (50)	Marks obtained
1	Pre Lab questions	5	
2	Preparation of observation	15	
3	Execution of experiment	15	
4	Calculation / Evaluation of Result	10	
5	Post Lab questions	5	
Total		**50**	

Staff Signature

PRE LAB QUESTIONS

1. **Explain the working principle of transformer**

   A)*A transformer works on the principle of mutual induction. Mutual induction is the phenomenon by which when the amount of magnetic flux linked with a coil changes, an E.M.F. is induced in the neighboring coil.*

2. **What are the main parts of a transformer?**

   A)*an iron core which serves as a magnetic conductor*
   a primary winding coil and
   a secondary winding coil

3. **What are the types of transformers?**

   A)*(1)Power Transformers. A power transformer transfers electricity between a generator and the distribution primary circuits. ...*
   (2)Autotransformers. Now, let's make things even more complicated. ...
   (3)Generator Step-Up Transformers. Moving right along to GSUs or generator step-up transformers. ...
   (4)Auxiliary Transformers

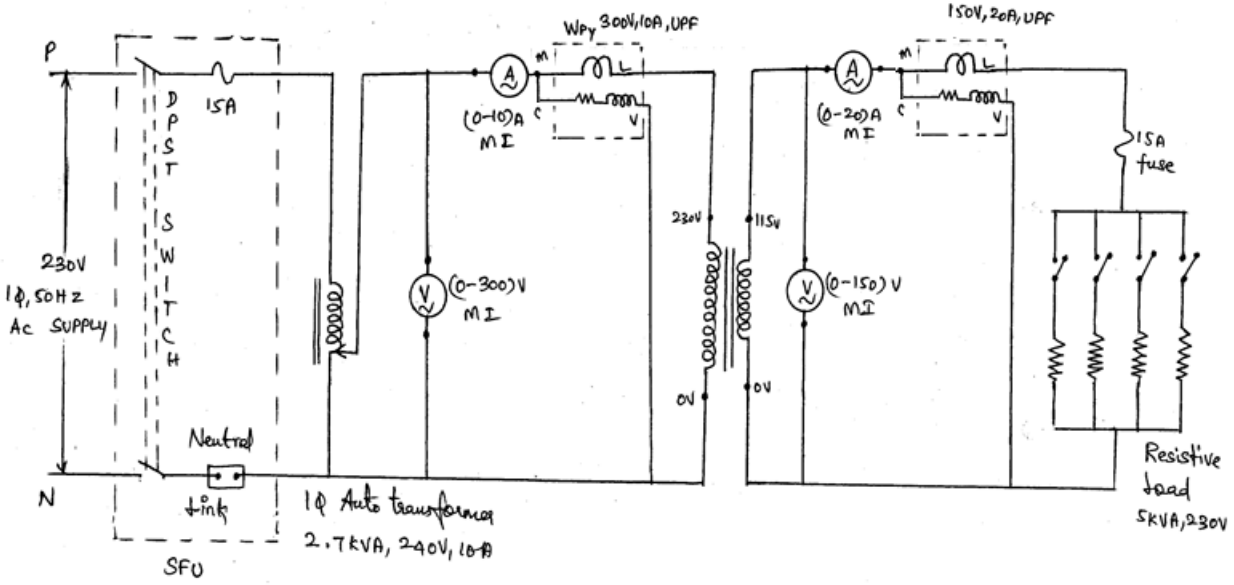
4. **What is the meaning of KVA rating of transformer?**

   A)*kVA stands for Kilovolt-Ampere and is the rating normally used to rate a transformer. The size of a transformer is determined by the kVA of the load*

5. **What is the necessity of the load test for a transformer?**

   A)*The purpose of load test is to determine the parallel operation and calculate the efficiency, thermal stability and dynamic stability of power transformer through measuring the short circuit loss and impedance voltage of power transformer.*

CIRCUIT DIAGRAM :



Experiment No. 4 Date :19/10/2021	**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
1.	Voltmeter	(0-150)V (0-300) V	MI MI	1 1
2.	Ammeter	(0-10)A (0-20) A	MI MI	1 1
3.	Wattmeter	150V,20A 300V,10A	UPF UPF	1 1
4.	Auto transformer	240 V, 2.7 KVA,10A		1

Formula Used:

Formulae:

1.Percentage Regulation = $(V_{o2}-V_2)\ /V_{o2}*100$

Where V_{o2} = Secondary voltage on no load

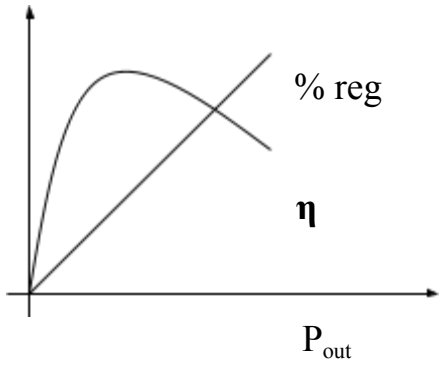
V_o = Secondary voltage at a particular load

2. Percentage efficiency = Pout/Pin*100

Where Pout = Secondary power in Watts

Pin = Primary power in Watts.

Model Graph:



Procedure

1.Connections are given as per the circuit diagram.

2.Verify whether the autotransformer is kept at zero voltage position.

3.By closing the DPST switch, 230V,1φ,50HZ AC supply is given to the transformer.

4.At no load, the readings from the meters are noted down.

5.The load is applied to the transformer in steps upto 125% of the rated value of the primary

Current by using rheostatic load..

6.The corresponding values from the meters are tabulated for different loads.

7.Then the load is removed gradually, auto transformer is brought to its minimum position and

the supply is switched off.

8.From the recorded values, the regulation, power factor and efficiency are calculated.

TABULATION:

S. No	Primary Voltage V_1 (V)	Primary Current I_1 (A)	Primary power W_1 (W)	Secondary Voltage V2 (V)	Secondary Current I_2 (A)	Secondary power W_2 (W)	% Regulation %	η %
1	230	0	0	115	0	0	0	0
2	230	0.624	147	114.85	1.28	143.52	0.13	97
3	230	1.93	443.9	114.85	2.56	294.016	0.16	66
4	230	3.53	581.9	114.83	4.5	516.735	0.14	58
5	230	4.69	1078.7	114.87	5.11	586.98	0.11	54

Model Calculation:

Power regulation $= \frac{(V_{0L} - V_L)}{V_{0L}} \times 100$

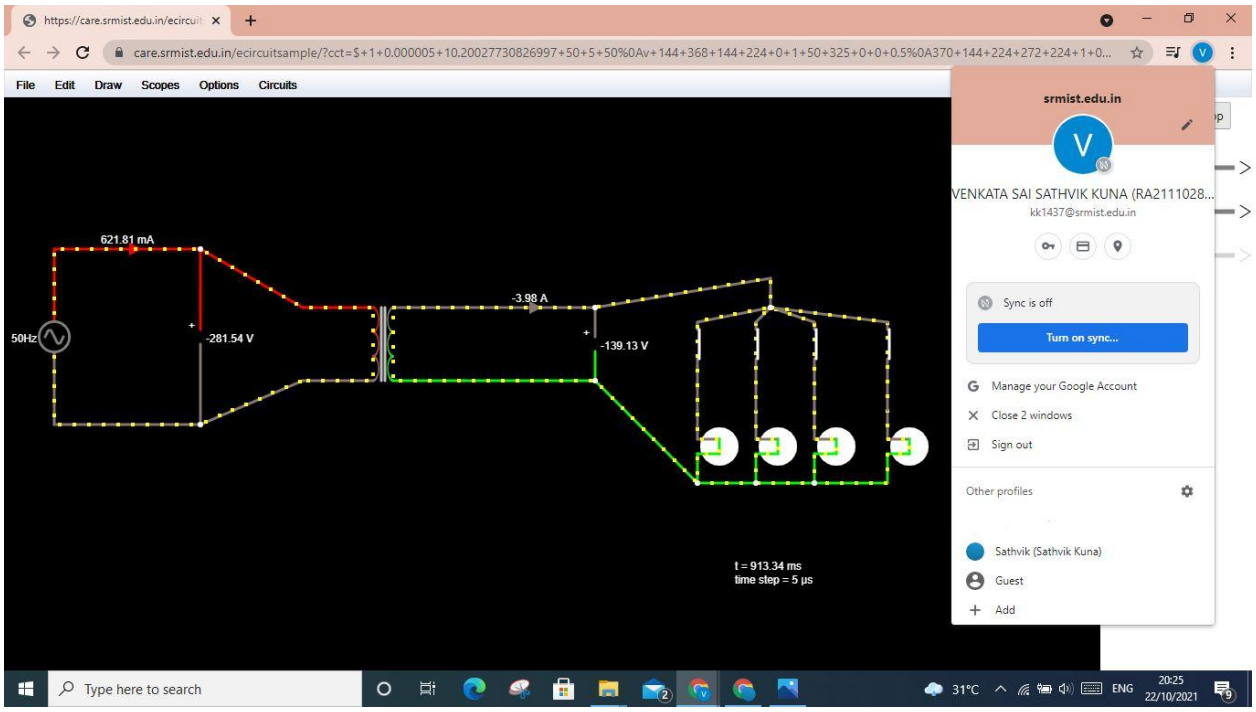
$= \frac{115 - 114.87}{114.87} \times 100 = 0.13$

Percentage of efficiency $= \frac{P_{out}}{P_{in}}$

$= \frac{143.52}{147}$

$= 97\%$

Result



POST LAB QUESTIONS

1. **What will happen if a DC voltage is given to the transformer primary?**
   A)*If DC supply is given to the primary of the transformer then DC current flows through primary winding which is constant. For production of emf in any winding the current flowing through that must be sinusoidal since e=L*(dI/dt). So in the given case ie, for DC input,no emf produced in primary winding*
2. **What are the losses in a transformer?**
   A)*They include heat losses and eddy currents in the primary and secondary conductors of the transformer. Heat losses, or I 2R losses, in the winding materials contribute the largest part of the load losses. They are created by resistance of the*

conductor to the flow of current or electrons

3. **How can we minimize the core losses in a transformer?**
   A)*Core losses majorly include Hysteresis loss and eddy current loss. Eddy Current loss can be reduced by increasing the number of laminations. The laminations provide small gaps between the plates.*
4. **What is meant by eddy current losses?**
   A)*Eddy current loss is conductive I2R loss produced by circulating currents induced in response to AC flux linkage, flowing against the internal resistance of the cor*
5. **How hysteresis loss can be reduced?**
   A)*Hysteresis loss can be reduce by using material having least hysteresis loop area. hence silicon steel or high grade steel is used for manufacturing of a transformer core as it is having very less hysteresis loop area. Hysteresis losses can be reduced by increasing the number of laminations*