


PARTICULARS OF THE EXPERIMENTS PERFORMED

S.No.	EXPERIMENTS	DATE	PAGE	REMARKS
1.	Calibration of energymetre	08-08-17	1-7	
2.	verification of Ohm's law	22-08-17	9-14 873	
3.	Calibration of Ammeter	22-08-17	15-20	26/9/17
4.	Calibration of voltmeter	29-08-17	22-27	
5.	measurement of power consumption in load as voltage changes	05-09-17	29-33	
6.	To calibrate the wattmeter with the help of voltmeter and ammeter.	9-10-17	61-66	7/11/17
7.	To find voltage current relat^{n} in R-L series ckt and to determine the power-factor of the ckt.	16-10-17	~~61-66~~ 35-39	


PARTICULARS OF THE EXPERIMENTS PERFORMED

S.No.	EXPERIMENTS	DATE	PAGE	REMARKS
8.	Verification of KCL	24-10-17	41-45	
9.	Verification of KVL	24-10-17	47-52	
10.	Calculation of fusing current and fuse constant	31-10-17	53-57	

Serial No. .....

EXP = 01

Dated .....

Aim :-

To find out energy dissipated in one revolution of energymeter (Calibration of energymeter)

Apparatus used :-

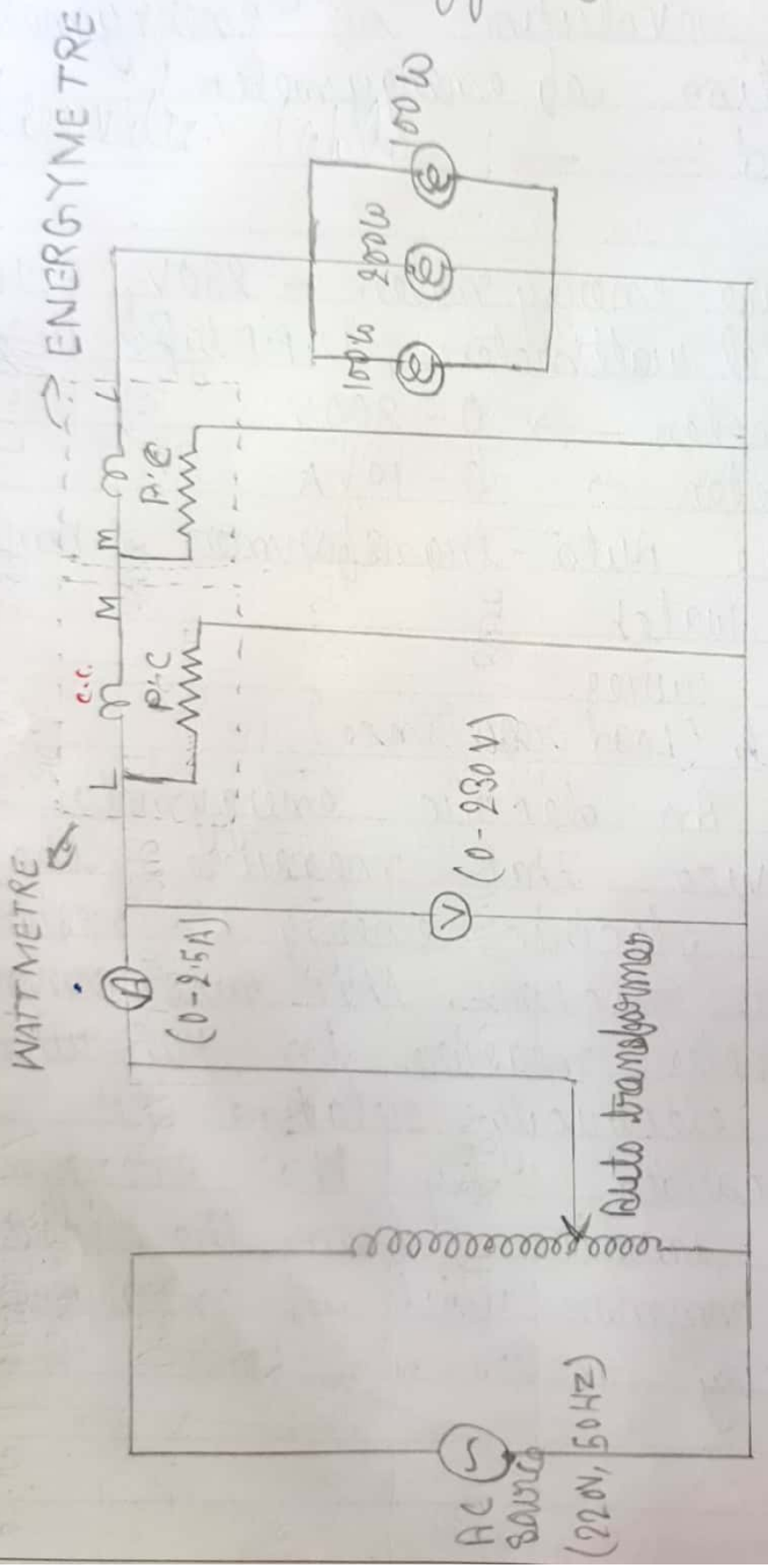
(1.) 1-Phase energy meter - 230V, 5-10A
(2.) Digital wattmeter, U.P.F type 0-300Kw
(3.) Voltmeter → 0-300V
(4.) Ammeter → 0-10VA
(5.) 1-Phase Auto-transformer 2 AmPS
(6.) Stop watch
(7.) Some wires
(8.) 3 bulb (Load resistance)

Theary :- An electric energymeter is a device that measure the amount of electric energy to residence, business or machine, that most common type of meter measure in Kwh when used in electricity retailing the utilities recarded by the energymeter to generate invoice from the electricity. The most common unit of measurement an electricity meter in Kwh

Serial No. .....

Dated .....

Aim :- To find out calibration of single phase energymeter



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Serial No. ..... Dated .....

Typo

* Procedure :→

(1.) Take a Autotransformer and connect voltmeter is parallel and ammeter in series.

(2.) We add wattmeter in series whose M connected with ameter & voltmeter & C connected with second end of voltmeter

(3.) L of wattmeter connected with energy meter and the energymeter other ends connected with load resistance & voltmeter

(4.) Keep the varaic in zero position and switch on the power supply.

(5.) Increase the varaic voltage slowly up to the rated voltage. Switch on a particular load.

(6.) Note the reading of ammeter, voltmeter and wattmeter

Serial No. .....

Observation table

S.No	Ammetre	voltmeter	wattmeter	time	no. of rev	load	Energy
1.	0.7A	178V	14.5W	15.7S	1	300Ω	2619.33
2.	0.8A	194V	52W	13.45	1	300Ω	2613.0
3.	0.85A	218V	65W	10.6S	1	300Ω	2583.75

$E = \frac{1}{1500}$ kWH = 2400 WS

Calculation

(i) V = 178V, P = 14.5W, t = 15.7 sec

$E = P \times t = 14.5 \times 15.7 = 698.65$ J $\times 3.75 = 2619.33$ J

% error = $\frac{2619.33 - 2400}{2619.33} \times 100 = 8.37\%$

(ii) P = 52W, t = 13.45 S

$E = P \times t = 52 \times 13.4 = 696.8$ J

% error = $\frac{2613 - 2400}{2613} \times 100 = 8.15\%$

(iii) P = 65W, t = 10.6 S

$E = P \times t = 65 \times 10.6 = 689$ J

% error = $\frac{2583.75 - 2400}{2583.75} \times 100 = 7.11\%$

Signature

Serial No. ..... Dated .....

(7.) Also note the time in which one revolution of the energy meter disc rotates.

(8.) Repeat the experiment for different voltages & record it

Conclusion :-

At last we connect and verified the value of power through the single phase energymeter.

Precaution :-

(i) connection of wire should be tight. so as to avoid short ckt.

(ii) The reading of time must be accurate. In other case reading will differ from actual reading

Significance :-

(i) By this experiment we know the % of error present in measurement of energy meter

Conclusion :- At last we connect and verified the value of power through the single phase energymeter

Signature

Serial No. .....

EX - 02

Dated 22-08-2017

Aim :-

Verification of Ohm's law.

Apparatus used :-

(i) Auto transformer (1) (0-270V)
(ii) Ammeter (1) - (0-2.5 A)
(iii) voltmeter (1) - (0-240 V)
~~(iv) load resistor~~
(v) Some wires
(vi) BPLL Element (50Ω, 2.3A

Theory :-

Ohm's ~~found~~ stated a law about ckt. that voltage difference across any resistor is directly proportional to current flowing through it.

$$V \propto I$$

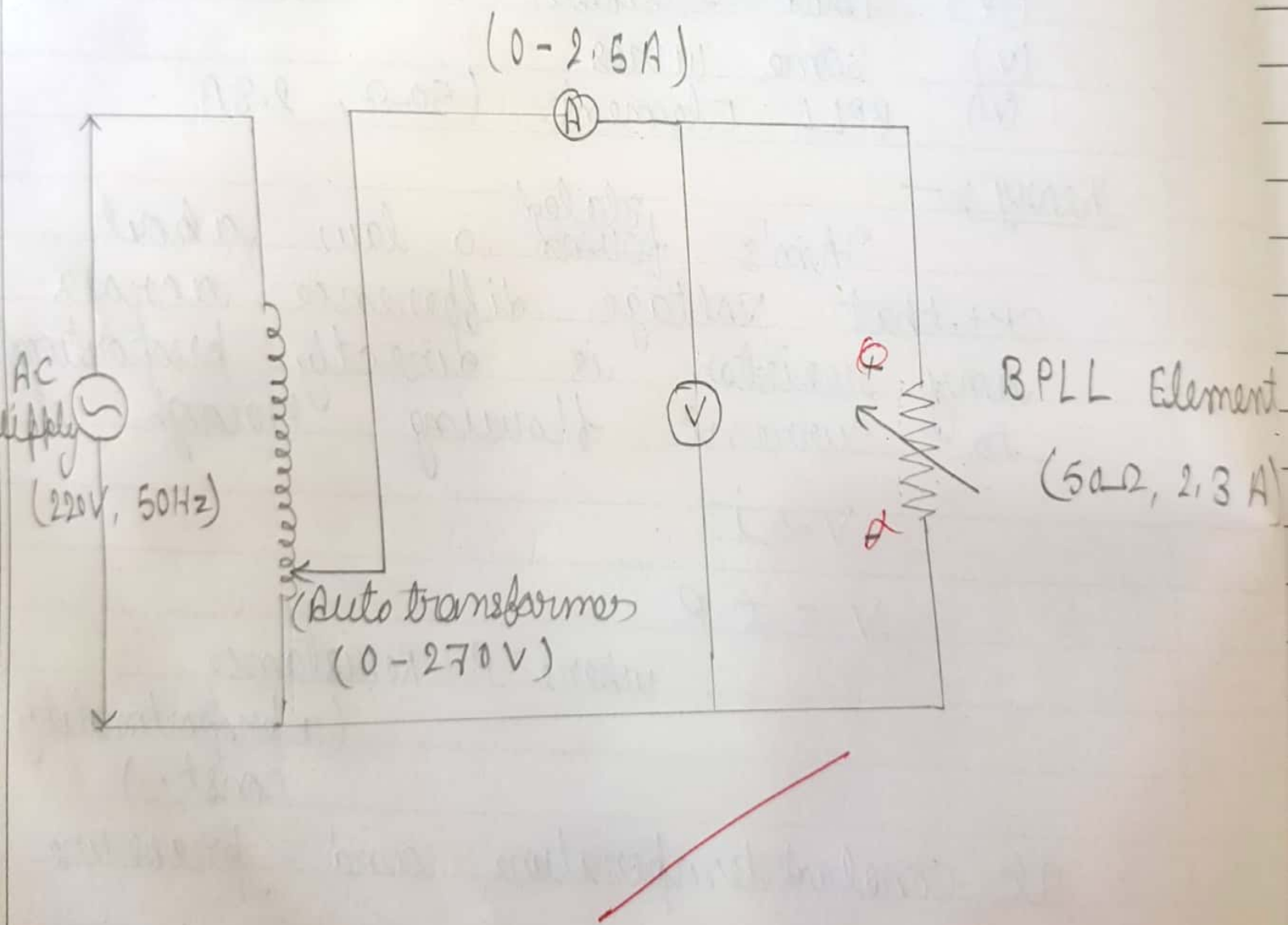
$$V = IR$$

where R = Resistance (a proportionality const.)

At constant temperature and pressure

9

Aim:- Verification of ohm's Law



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Serial No. .....

Dated .....

* Procedure :-

(1.) Take an autotransformer and we connect it with source supply.

(2.) We connect Ammeter in series with one wire of autotransformer.

(3.) After that we connect voltmeter in series & then we add BPLL Element.

(4.) Keep the varaic inzero position and switch on the supply.

(5.) Increase the varaic voltage slowly up to the different voltages.

(6.) Note down the reading of Ameter and voltmeter.

(7.) Repeat the experiment 1 to 5 times.

Observation table :—

S. NO	Ammeter	voltmeter	$R = (V/I)$
1.	1.12 A	60 V	53.57 Ω
2.	1.49 A	80 V	53.69 Ω
3.	1.68 A	90 V	53.57 Ω
4.	1.30 A	70 V	53.57 Ω
5.	1.86	100 V	53.57 Ω
6.	1.21	65 V	53.71 Ω

Calculation

(1) $I = 1.12\,A$, $V = 60\,V$, $R = \frac{V}{I} = 53.57\,\Omega$

(2) $I = 1.49\,A$, $V = 80\,V$, $R = \frac{V}{I} = 53.69\,\Omega$

(3) $I = 1.68\,A$, $V = 90\,V$, $R = \frac{V}{I} = 53.57\,\Omega$

(4) $I = 1.30\,A$, $V = 70\,V$, $R = \frac{V}{I} = 53.57\,\Omega$

(5) $I = 1.86\,A$, $V = 100\,V$, $R = \frac{V}{I} = 53.57\,\Omega$

(6) $I = 1.21\,A$, $V = 65\,V$, $R = \frac{V}{I} = 53.71\,\Omega$

Signature

al No. .....

Dated .....

* Conclusion

The Ohm's law verified i.e $V \propto I$ and if we draw the graph b/w voltage and current we get a straight line passes through origin.

Precaution :-

(i) Connection of wire should be tight to avoid short ckt.

(ii) Temperature and pressure should be constant because if temperature changes then resistance will changes as $R = R_0(1 + \alpha \Delta T)$

(iii) The reading should be correct. If it is not then we can not get straight line

Significance :→

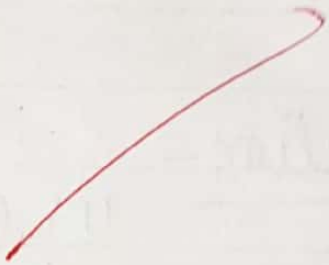
By Ohm's law verification we get a relation between V (potential difference) and current. which is very important for any circuit solution.

Result :- The ohm's law verified

i.e

$V \propto I$

and the graph of V vs I is straight line passes through origin whose slope is constant



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No. .....

EXP = 3

Dated 22-08-20

Aim:- To measure the calibration of Ammeter

Apparatus:-

	Range	Quantity
1) Autotransformer	0-270V	1
2) Voltmeter	0-220V	1
3) Ammeter	0-2.5A	1
4.) Rehastato	0-156 Ω	1
5.) Connecting wires		8

Theary:-

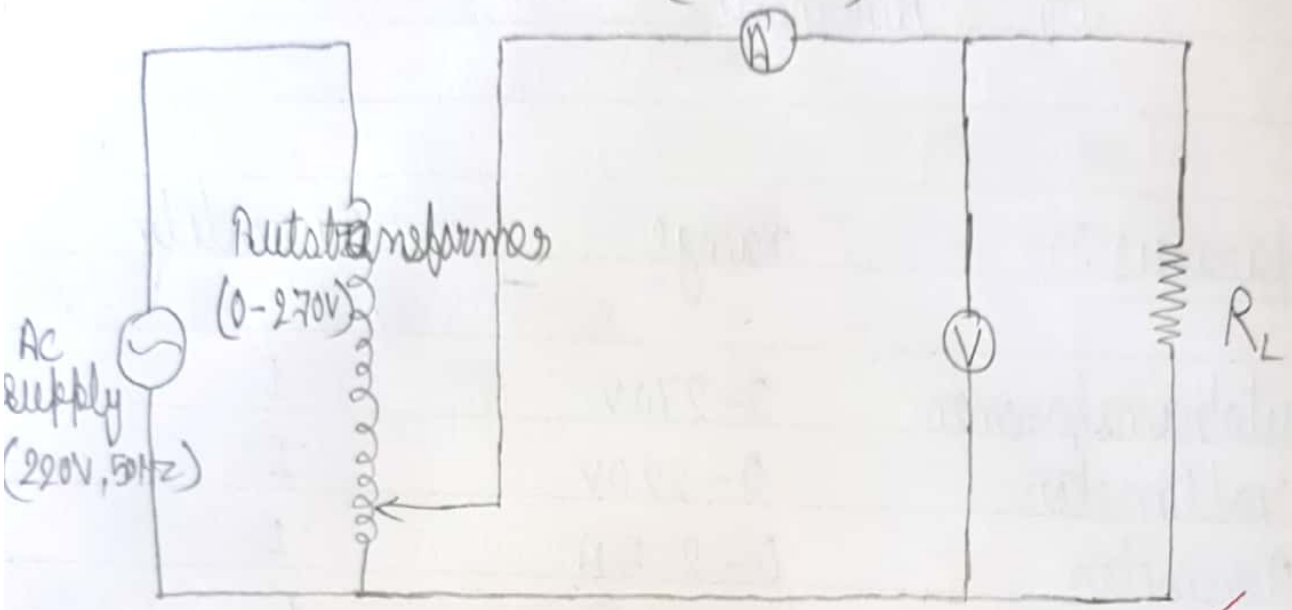
When we supply voltage 'V' through auto-transformer in load of resistance R then current flown through the CKt should be $I = \frac{V}{R}$

But, when we measure the current by ammeter then it is different (let i'). This difference in current appear due to its internal resistance and the error will come out.

This error is measured by $\frac{i' - I}{I}$

$\therefore$ % error $= \frac{i - I}{I} \times 100$

Aim :- To measure the calibration of Ammeter (0-2.5A)



Observation table

(R_L = 156 Ω)

S.No.	Ammeter reading (I_R)	voltmeter reading	current ($I'_R = V/R$)	Error	% error $\frac{I'_R - I_R}{I'_R} \times 100$
1.	0.58 A	100 V	0.64 A	0.06	9.375 %
2.	0.70 A	120 V	0.76 A	0.06	7.89 %
3	0.80 A	140 V	0.89 A	0.09	10.11 %
4.	0.46A	80V	0.51 A	0.05	9.45 %
5	0.52 A	90 V	0.57	0.05	8.77 %

Signature

erial No. .....

Dated .....

Procedure :-

(i) Take an autotransformer and we connect it with source supply.

(ii) We connect ammeter in series ~~by~~ one wire of autotransformer.

(iii) After that we add voltmeter in parallel with load resistance

(iv) Keep the varaic in zero position and switch on the supply.

(v) Increase the varaic voltage slowly upto different voltage and note down the reading of ammeter and voltmeter.

(vi) Repeat the process 4-5 times.

Conclusion :-

The error present in the ammeter will be come out & i.e equal to approx 0.5 to 0.6

And its %. error is equals to approx 3.5 %.

Serial No. ..... Dated .....

Calculation:- (1) $I_R = 0.58A$ $I'_R = \frac{100}{156} = 0.64A$

Error $= I'_R - I_R = 0.06$

% error $= \frac{I'_R - I_R}{I'_R} \times 100 = \frac{0.06}{0.64} \times 100 = 9.3\%$

(2.) $I_R = 0.70A$ $I'_R = \frac{120}{156} = 0.76A$

Error $= I'_R - I_R = 0.06$

% error $= \frac{I'_R - I_R}{I'_R} \times 100 = \frac{0.06}{0.76} \times 100 = 7.8\%$

(3.) $I_R = 0.80A$, $I'_R = \frac{140}{156} = 0.89A$

Error $= I'_R - I_R = 0.89 - 0.80 = 0.09$

% error $= \frac{I'_R - I_R}{I'_R} = \frac{0.09}{0.89} \times 100 = 10.11\%$

(4.) $I_R = 0.46A$, $I'_R = \frac{80}{156} = 0.51A$

Error $= I'_R - I_R = 0.51 - 0.46 = 0.05$

% error $= \frac{I'_R - I_R}{I'_R} = \frac{0.05}{0.51} \times 100 = 9.15\%$

(5.) $I_R = 0.52A$, $I'_R = \frac{90}{156} = 0.57A$

Error $= I'_R - I_R = 0.57 - 0.52 = 0.05$

% error $= \frac{I'_R - I_R}{I'_R} \times 100 = \frac{0.05}{0.57} \times 100 = 8.77\%$

Signature

Precaution :-

(i) Connection of wire should be tight to avoid short ckt.

(ii) We should take connection wire of minimum resistance to avoid errar or, we should take a connection wire of known resistance so that we can calculate actual value of current flown through the ckt.

(iii) The reading should be correct.

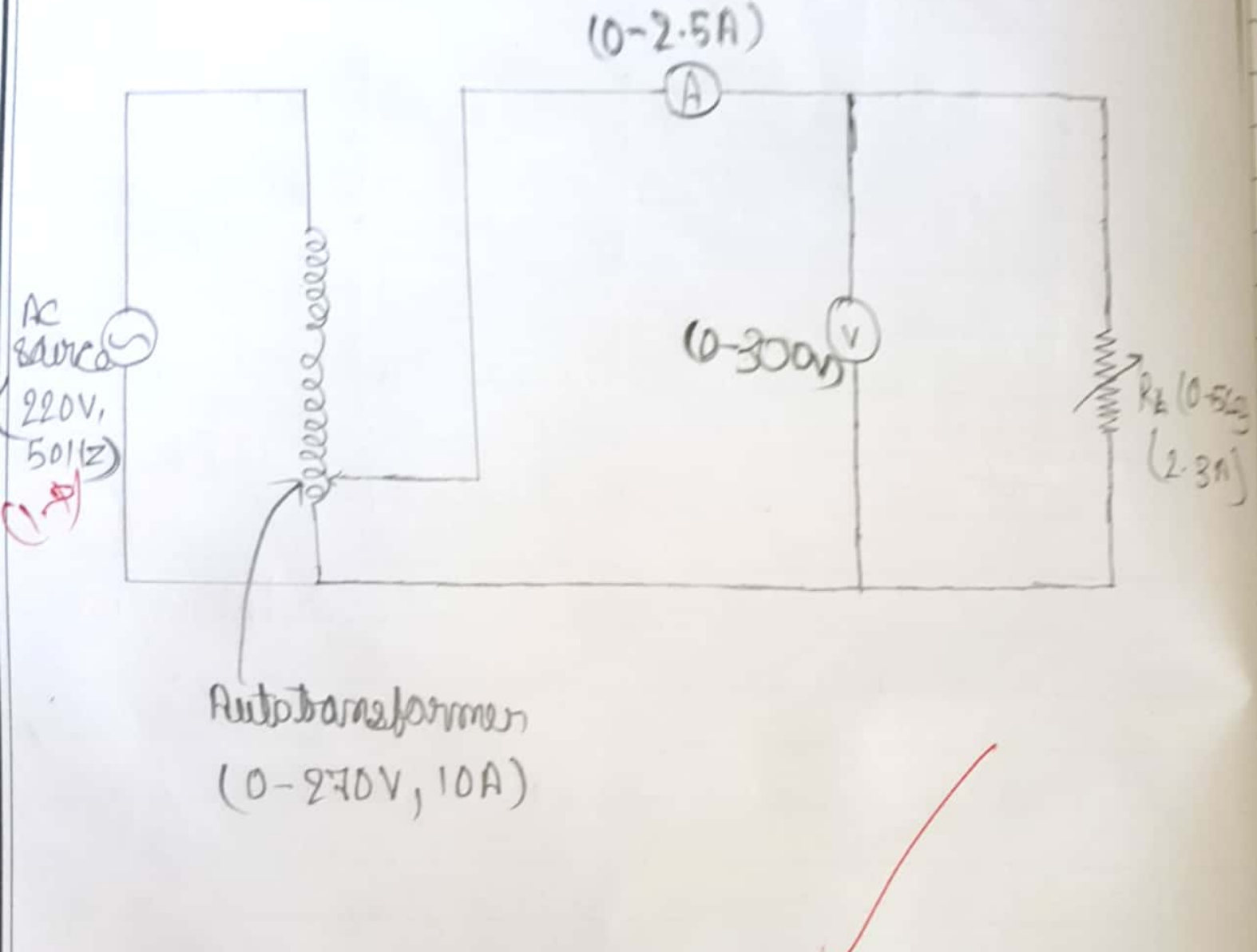
Significance :-

If we know the errar of ammeter used in ckt then we can find the actual current flow through the ckt and actual voltage drop across an element.

Result :- The error present in the ammeter comes out and the % error in ammeter is approx 9.5%

Serial No.

Aim :— Calibration of voltmeter



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Serial No. .....

EXP = 04

Dated .....

Aim :- Calibration of voltmeter

Apparatus :-

		Range	Quantity
1)	Autotransformer	0-270V	1
2)	voltmeter	0-220V	1
3)	Ammeter	0-2.5A	1
4)	Rehostate	0-56Ω & 2.3A	1
5)	Connecting wire		

Theory :-

when we supply voltage in ckt by source through autotransformer then voltage reading in autotransformer. voltmeter is different from actual voltage difference across load. Let actual voltage is V'

$$V' = I R_L$$

There is an error which is equal to

$$V - V'$$

$$\% \text{ error} = \frac{V - V'}{V} \times 100$$

Observation table :-

($R = 56\Omega$)

Sr. No.	Ammeter reading	voltmeter reading (V)	($V' = IR$)	error ($V - V'$)	% error $\frac{V-V'}{V} \times 100$
1.	1.03 A	60V	57.6V	2.32V	3.86%
2.	1.17 A	70V	65.52V	4.48V	6.4%
3.	1.35 A	80V	75.6V	4.4V	5.5%
4.	1.47 A	90V	82.32V	7.68V	8.53%
5.	1.64A	100V	91.84V	8.16V	8.16%

Calculation :-

(1) $I = 1.08A$, $V = 60V$, $R = 56\Omega$

$V' = IR = 57.6V$

error $= V - V' = 2.32V$

% error $= 3.86\%$

(2) $I = 1.17A$, $V = 70V$, $R = 56\Omega$

$V' = IR = 65.52V$

error $= V - V' = 4.48V$

% error $= \frac{V-V'}{V} \times 100 = 6.4\%$

Signature

erial No. .....

Dated .....

Procedure :-

1) Take an autotransformer and we connect it with source supply

2) We connect ammeter in series by one wire of autotransformer.

3.) After that we add voltmeter in parallel with load resistance & ammeter in series.

4) Keep the varaic in zero position and switch on the supply.

5.) Increase the varaic voltage slowly upto different voltage and note down the reading of ammeter and voltmeter.

6) Repeat the process 4-5 times.

Conclusion :-

The error present in the ammeter will be come out & i.e equal to approx 4 to 4.5 V

& the percentage error will comes out approx 4 %

(3.) $I = 1.35\,A$, $V = 80\,V$, $R = 56\,\Omega$

$V' = IR = 75.6\,V$

error $= V - V' = 4.4\,V$

% error $= \frac{V - V'}{V} \times 100 = 5.5\,\%$

(4.) $I = 1.47\,A$, $V = 90\,V$, $R = 56\,\Omega$

$V' = IR = 82.32\,V$,

error $= V - V' = 7.68\,V$

% error $= \frac{V - V'}{V} \times 100 = 8.53\,\%$

(5.) $I = 1.64\,A$, $V = 100\,V$, $R = 56\,\Omega$

$V' = IR = 91.84\,V$

error $= V - V' = 8.16\,V$

% error $= \frac{V - V'}{V} \times 100 = 8.16\,\%$

Result :- The error present in voltmeter is approx 4 to 4.5 V

& % error is approx 4 %.

Precaution :-

(i) Connection of wire should be tight to avoid short ckt.

(ii) We should take connection wire of minimum resistance to avoid error or, we should take a connection wire of known resistance so that we can calculate actual value of voltage difference across load.

(iii) The reading should be correct

Significance :-

If we know the error of voltmeter ~~ammeter~~ used in ckt then we can find the actual voltage difference across the load resistance.

No. .....

EXP = 05

Dated .....

Aim :- To find for a filament lamp, variation of power with voltage.

Apparatus :-	Range	Quantity
1.) Autotransformer	(0-270 V)	1
2.) Voltmeter	(0-230 V)	1
3.) Ammeter	(0-2.5A)	1
4.) Load bulb	200 watt	1
5.) Connecting wire		

Theory :-

If we supply A.C voltage through load bulb then the power consumption in bulb varies as supply voltage varies across it as

$$P = V_s I$$

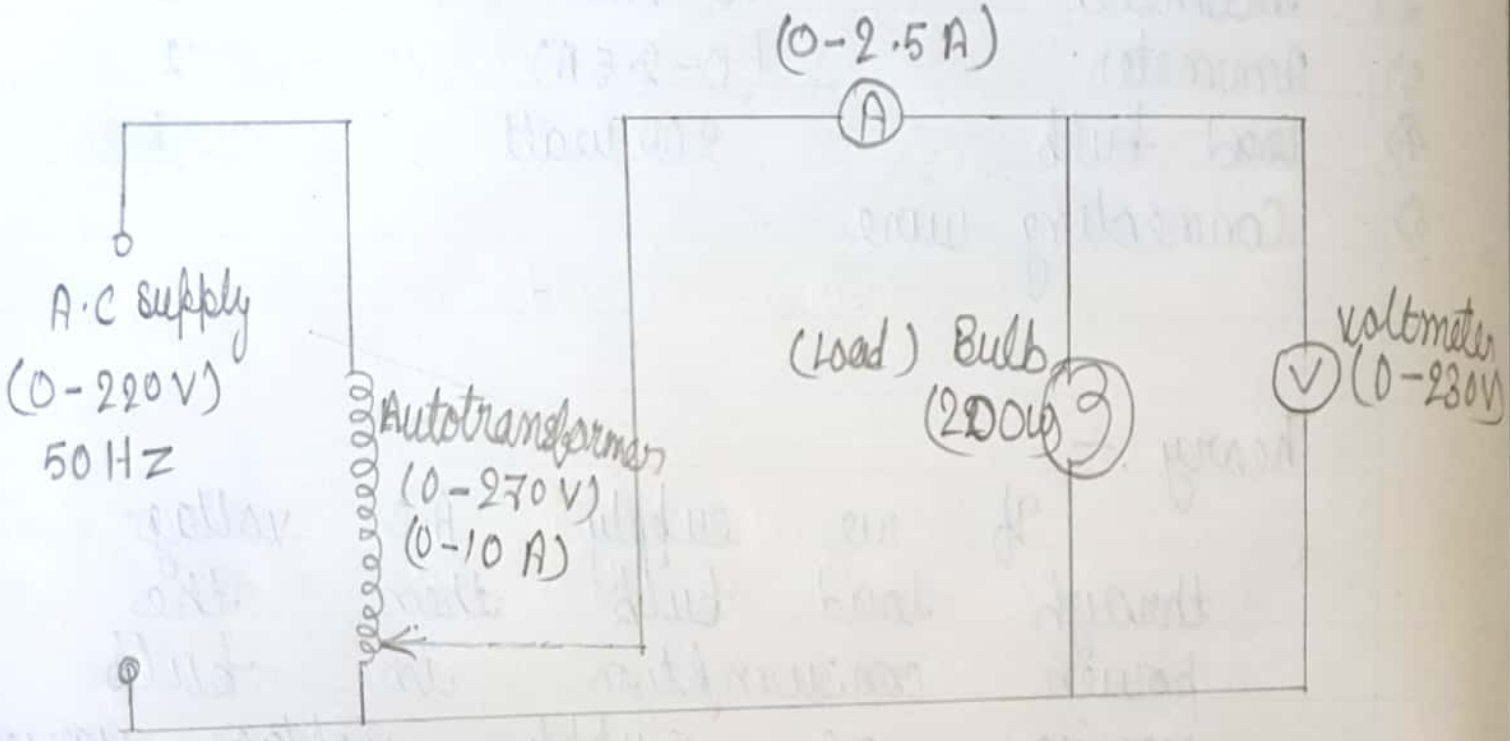
where P = Power consume

V_s = source voltage

I = Current flows through load

Aim :- To find for a filament lamp, variation of power with voltage.

CKt arrangement



Observation Table :-

Sr. No.	Voltmeter reading (V_s)	Ammeter reading (I)	Power = $V_s I$
1	70 V	0.30 A	70 × 0.3 = 21 W
2.	80 V	0.40 A	80 × 0.40 = 32.0 W
3.	90 V	0.42 A	90 × 0.42 = 37.8 W
4.	100 V	0.46 A	100 × 0.46 = 46.0 W
5.	110 V	0.48 A	110 × 0.48 = 52.8 W

Signature

Procedure :-

(i) We arrange the ckt. as shown

(ii) Take an autotransformer and we connect it with source supply.

(iii) We connect ammeter in series by one wire of autotransformer.

(iv) After that we add another wire of ammeter with load, so that ammeter comes in series with load

(v) We add voltmeter in parallel with load.

(vi) Increase the varaic voltage slowly upto different voltage and note down reading of ammeter and voltmeter.

(vii) Repeat the experiment 4 - 5 times.

Conclusion :- Power ~~coms~~ consumption in load build depends on voltage supply by source

Calculation :-

(1) $V_s = 70\,V$, $I = 0.30\,A$

$P = V_s \times I = 70 \times 0.30 = 21.00\,W$

(2.) $V_s = 80\,V$, $I = 0.40\,A$

$P_s = V_s \times I = 80 \times 0.40 = 32.00\,W$

(3.) $V_s = 90\,V$, $I = 0.42\,A$

$P = V_s \times I = 90 \times 0.42 = 37.80\,W$

(4.) $V_s = 100\,V$, $I = 0.46\,A$

$P = V_s \times I = 100 \times 0.46 = 46.00\,W$

(5.) $V_s = 110\,V$, $I = 0.48\,A$

$P = V_s \times I = 110 \times 0.48 = 52.80\,W$

Result :- As we increase the voltage supply across load power consumption through it increases.

Signature

and it increases as voltage supply increases as $P = VI$

Precaution :-

(i) Connection of wire should be tight to avoid short ckt.

(ii) we should care the range of ammeter, autotransformer and voltmeter.

(iii) the reading should be correct.

Significance :-

By this experiment we ~~know~~ get knowledge about that if we change voltage supply across a resistor then power dissipated in the resistor will also changes.

Serial No. .....

EXP=07

Dated .....

Aim:-

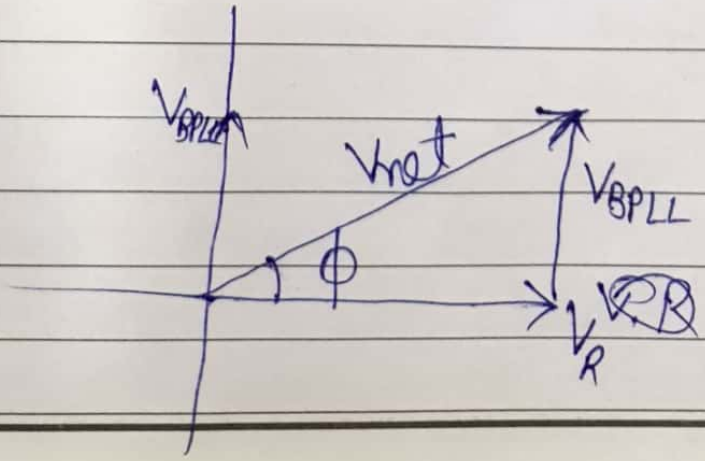
To find voltage current relation in R-L series ckt and to determine the power-factor of the ckt

Apparatus :-

		Range	quantity
(i)	Autotransformer	(0-270) V	1
(ii)	Ammeter	(0-2.5) A	1
(iii)	voltmeter	(0-300) V	3
(iv)	Resistor	156 Ω	1
(v)	BPLL		1
(vi)	wires		

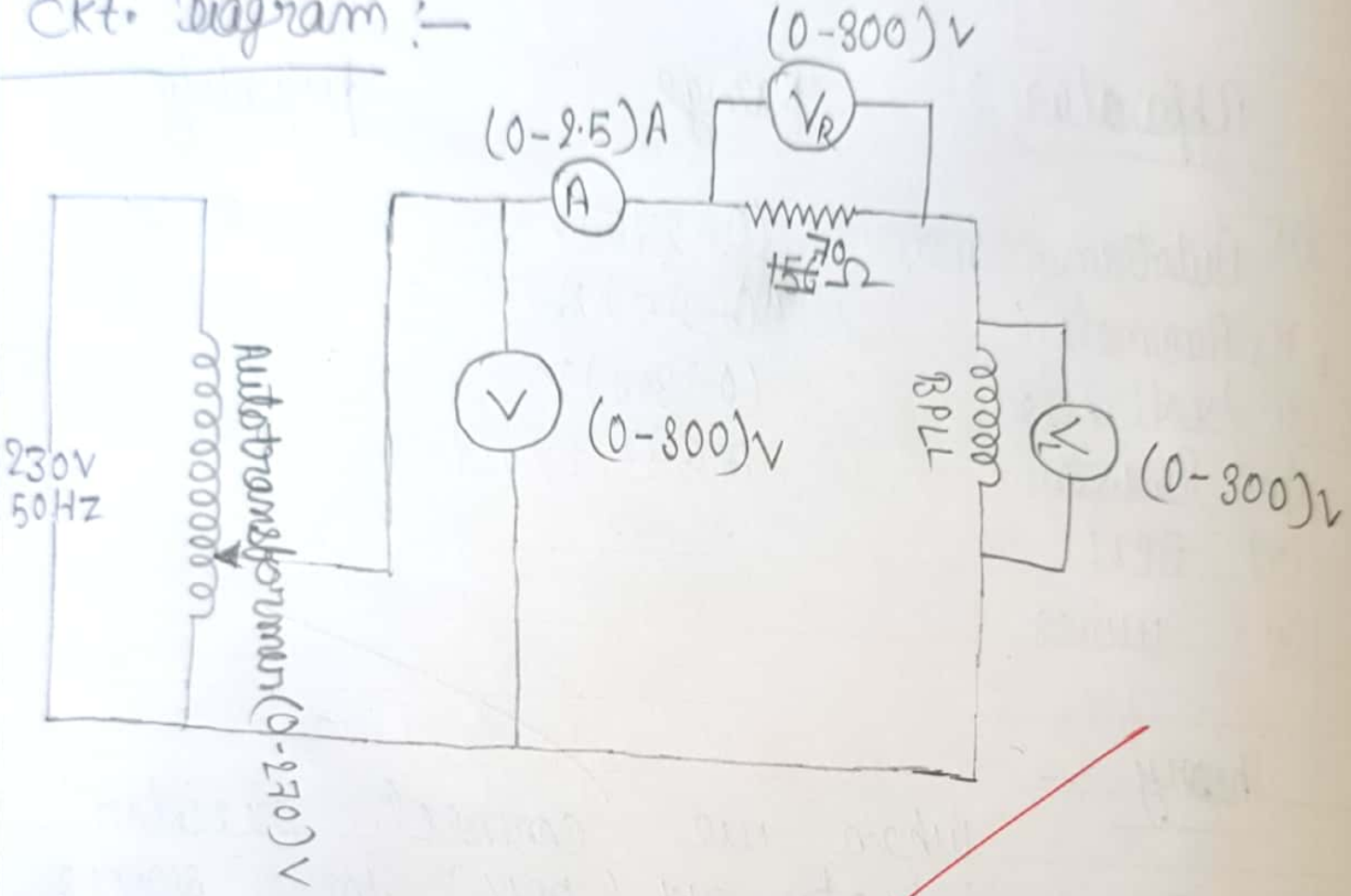
Theory :-

When we connect resistor R & inductor ckt (BPLL) in series then the voltage drop across inductor leads the voltage drop across resistor by 90°.



Aim :- To find the voltage current relation in R-L series ckt and to determine the power factor of the ckt.

Ckt. Diagram :-



OBSERVATION TABLE :-

S.NO.	Reading (A)	V	V_R	V_{RLL}	Z (Ω)	$\cos\phi \left(\frac{V_L}{V}\right)$
1.	0.4	100	28	12	250	0.28
2.	0.5	120	55	20	240	0.45
3.	0.8	140	68	24	175	0.48
4.	1.05	160	78	30	152.38	0.48
5.	1.15	180	88	36	156.52	0.48

Signature

Hence, V_{net} of the ckt is at some angle ϕ from the resistor voltage. And angle $\cos\phi$ is known as power factor of that ckt.

$$V_{net}\cos\phi = V_R \quad \text{or} \quad IZ\cos\phi = IR$$

$$\boxed{\cos\phi = \frac{V_R}{V_{net}}} \qquad \cos\phi = \frac{R}{Z}$$

where $Z = \sqrt{R^2 + X_L^2}$

Procedure :—

(i) We arrange the ckt as shown in ckt diagram.

(ii) Take an autotransformer and we connect it with source supply.

(iii) we connect ~~the~~ an ammeter in series of whole ckt.

(iv) we connect the resistor and inductor in series and we connect two voltmeter in parallel with both the element individually.

(v) And we connect a voltmeter in parallel with whole ckt.

(vi) Increase the variac voltage slowly upto different voltage & note

Calculation :-

(i) V_{net} 100 V $\quad V_R = 28$ V

$$\cos\phi = \frac{V_R}{V_{net}} = \frac{28}{100} = 0.28$$

or

$$\cos\phi = \frac{R}{Z} = \frac{V_R/I}{Z} = \frac{28/0.4}{250}$$

$$= 0.28$$

(ii) $V_{net} = 120$ V $\quad V_R = 55$ V

$$\cos\phi = \frac{V_R}{V_{net}} = \frac{55}{120} = 0.45$$

(iii) $V_{net} = 140$ V, $V_R = 68$ V

$$\cos\phi = \frac{68}{140} = 0.48$$

(iv) $V_{net} = 160$ V, $V_R = 78$ V

$$\cos\phi = \frac{V_R}{V_{net}} = \frac{78}{160} = 0.48$$

(v) $V_{net} = 180$ V, $V_R = 88$ V

$$\cos\phi = \frac{V_R}{V_{net}} = \frac{88}{180} = 0.48$$

Signature

Serial No. .....

Dated .....

down the reading of all apparatus

Conclusion :-

Since, the R & X_L (= ωL) is fixed. Hence, power factor of ckt is approx constant in all cases. which is equal to $\approx$ 0.48.

Precaution :-

(i) Connection of wire should be tight to avoid short ckt.
(ii) The reading should be correct.
(iii) We should be careful about the range of apparatus.

Significance :-

By this experiment we get the power factor of series R-L ckt. which is constant of if resistance and inductance is constant.

Sajal 7/11/17

EXP = 08

Dated .....

Aim:-

Verification of KCL

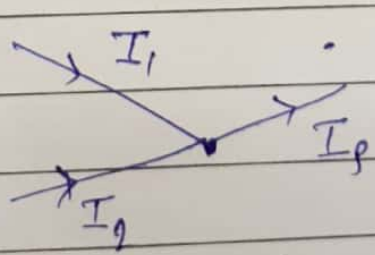
Apparatus :-

	Range	Quantity
(i) Autotransformer	(0-270)V/(0-10)A	1
(ii) Ammeter	(0-2.5)A	3
(iii) Wires		

Theory :-

Kirchoff's current law states that the total incoming current at a node is equal to total outgoing current from the node or, the algebraic sum of currents at node is equals to zero.

i.e



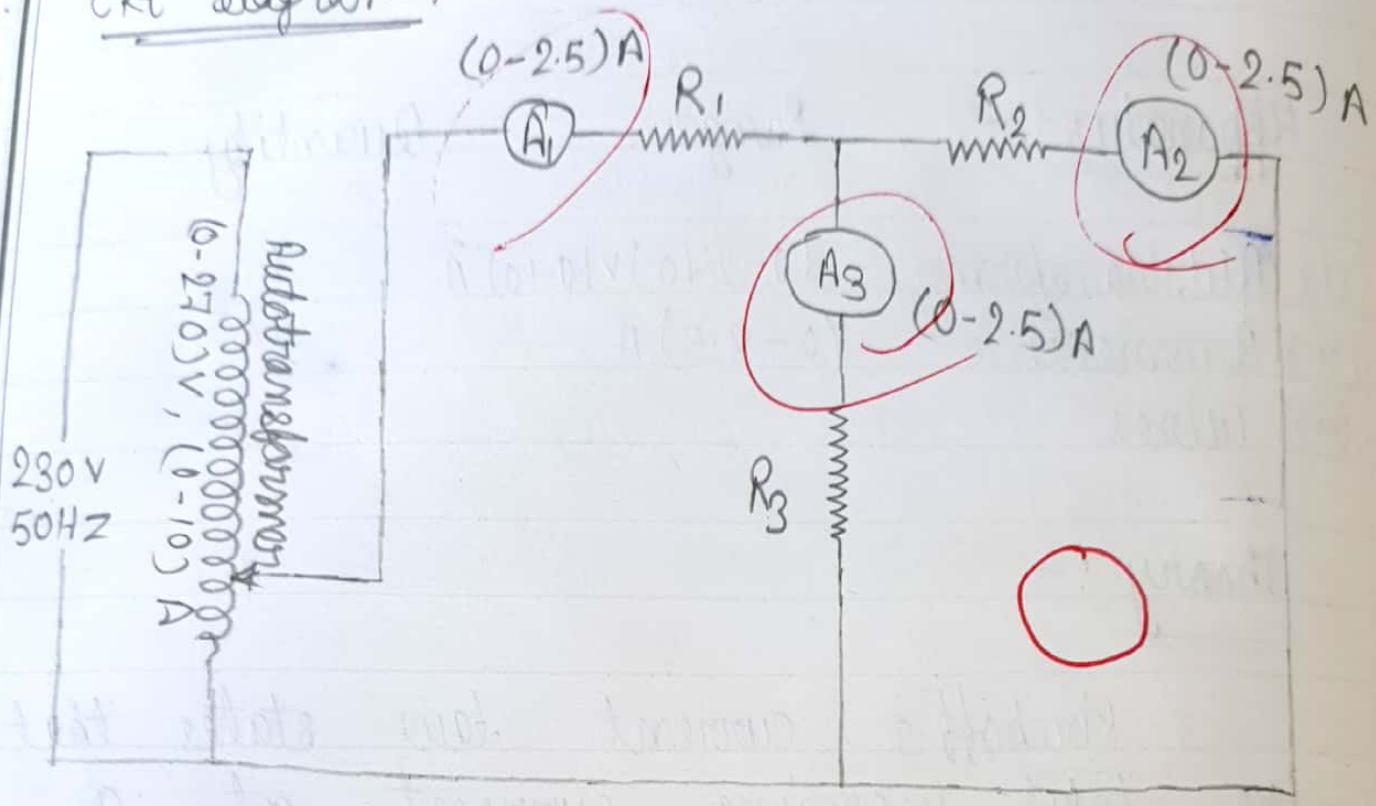
$$I_1 + I_2 + (-I_3) = 0$$

$$I_1 + I_2 = I_3$$

Serial No. .....

Aim :- verification of KCL

CKt diagram :-



OBS. Table :-

S.No.	A_1	A_2	A_3	$A_1' = A_2 + A_3$	% error $= \frac{A_1' - A_{1\,mea}}{A_1'}$
1.	1.26	0.4	0.61	1.01	19.84 %
2.	1.48	0.5	0.73	1.23	16.89 %
3.	1.63	0.6	0.8	1.4	14.11 %
4.	1.81	0.7	0.88	1.58	12.70 %

Signature

According to our figure

$$A_1 = A_2 + A_3$$

Procedure :-

(i) We arrange the ckt as shown in ckt. diagram.

(ii) Take an autotransformer & connect it with source supply.

(iii) We keep the resistance constant and ~~the~~ vary the voltage or, vice-versa.

(iv) Increase the variac voltage slowly upto different voltage & note down the reading of all ammeter.

Conclusion :-

We find $A_1 = A_2 + A_3$ by which KCL derived & there is some error which is equal to approx 19.8%.

Calculation :-

(i) $A_1 = 1.26$, $A_2 = 0.4$, $A_3 = 0.61$

$A_1' = A_2 + A_3 = 1.01$

$$\% \text{ error} = \frac{A_1' - A_1}{A_1'} \times 100 = \frac{0.25}{1.26} \times 100 = 19.8\%$$

(ii) $A_1 = 1.48$, $A_2 = 0.5$, $A_3 = 0.73$

$A_1' = A_2 + A_3 = 1.23$

$$\% \text{ error} = \frac{A_1' - A_1}{A_1'} \times 100 = 16.89\%$$

(iii) $A_1 = 1.63$, $A_2 = 0.6$, $A_3 = 0.8$

$A_1' = A_2 + A_3 = 1.4$

$$\% \text{ error} = \frac{A_1' - A_1}{A_1'} \times 100 = 14.11\%$$

(iv) $A_1 = 1.81$, $A_2 = 0.7$, $A_3 = 0.88$

$A_1' = A_2 + A_3 = 1.58$

$$\% \text{ error} = \frac{A_1' - A_1}{A_1'} \times 100 = 12.70\%$$

Signature

Dated .....

Page No. .....

Precaution :-

(i) Connection of wire should be tight to avoid short ckt.

(ii) Reading should be correct because in this experiment we are calculating error also.

7/11/12

Exp = 09

Dated .....

Aim :-

To verify the KVL

Apparatus :-

		Range	Quantity
(i)	Autotransformer	(0-270)V, (0-10)A,	1
(ii)	voltmeter	(0-300)V	3
(iii)	Ammeter	(0-2.5)A	1
(iv)	wires		

Theory :-

Kirchoff's voltage law states that the ~~volta~~ algebraic sum of voltage in a loop is equals to zero

In our ckt

$$V_1 - V_2 - V_3 = 0$$

$$\boxed{V_1 = V_2 + V_3}$$

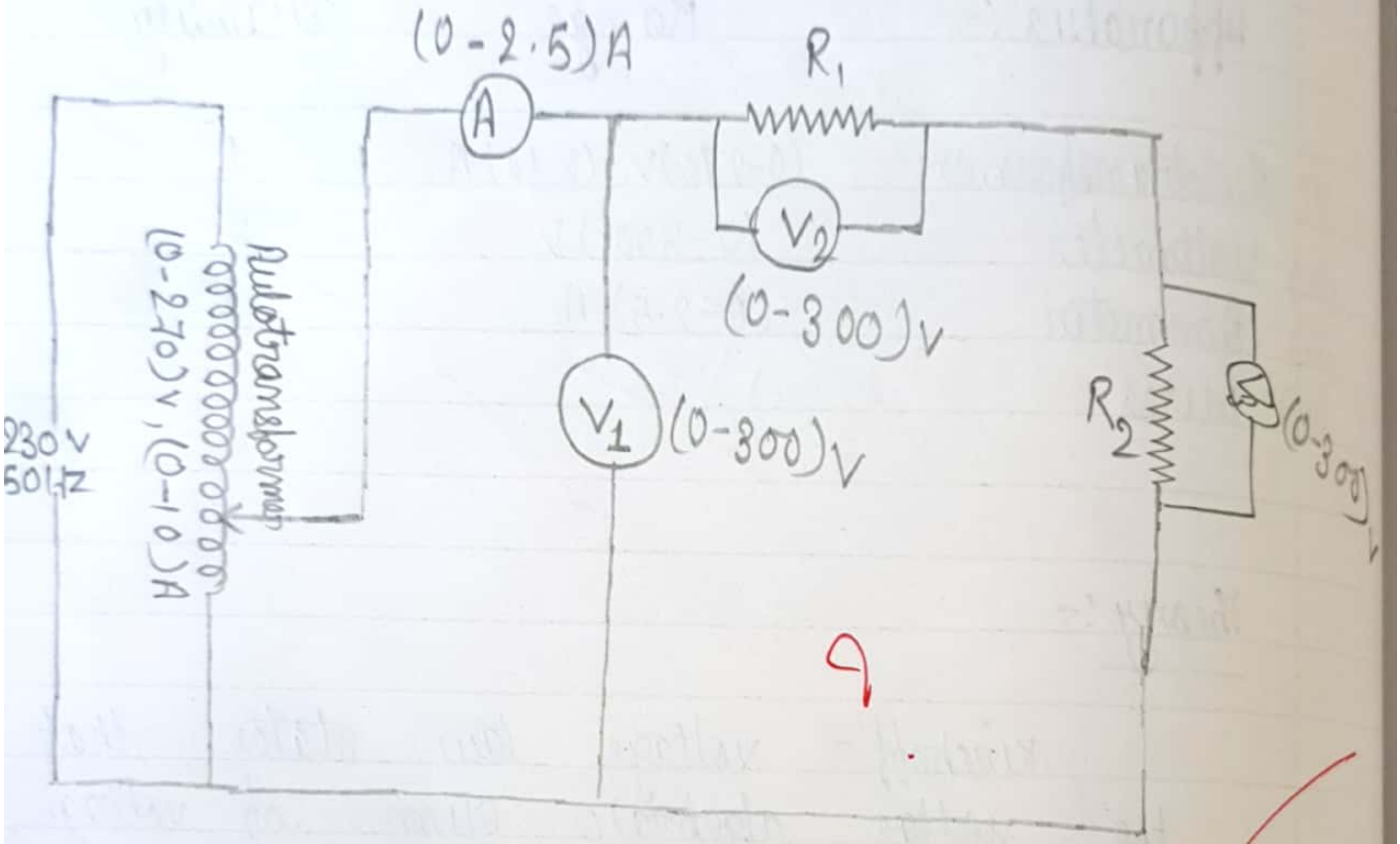
erial No. .....

Dated .....

Aim :-

To verify KVL

CKt diagram :-



S.NO.	A	V_1	V_2	V_3	$V_1' = V_2 + V_3$	% error $= \frac{V_1 - V_1'}{V_1} \times 100$
1	0A	108	40	62	102	5.55 %
2.	0.5	137	52	78	130	5.1088 %
3.	0.6	159	65	91	156	1.88 %
4.	0.7	187	77	105	182	2.67 %
5.	0.8	215	91	121	212	1.99 %

Signature

Procedure :-

(i) We arrange the ckt. as shown in ckt diagram

(ii) Take an autotransformer & we connect it with source supply.

(iii) We keep resistance constant and varry the voltage or, vice-versa.

(iv) Increase the varaic voltage slowly upto different voltage & note down the reading of all voltmeter.

Conclusion :-

We find $V_1 = V_2 + V_3$; by which KVL derived & there is some error in ckt which is of approximately equals to 3.34 %.

Calculation :-

(i) $V_1 = 108$, $V_2 = 40$, $V_3 = 62$

$V_1' = 100 V_2 + V_3 = 102$;

$$\% \text{ error} = \frac{V_1^{\circledast} - V_1'}{V_1} \times 100$$

$$= 5.55\ \%$$

(ii) $V_1 = 137$, $V_2 = 52$, $V_3 = 78$

$V_1' = V_2 + V_3 = 130$

$$\% \text{ error} = \frac{V_1 - V_1'}{V_1} \times 100 = 5.10\ \%$$

(iii) $V_1 = 159$, $V_2 = 65$, $V_3 = 91$

$V_1' = V_2 + V_3 = 156$

$$\% \text{ error} = \frac{V_1 - V_1'}{V_1} \times 100 = 1.88\ \%$$

(iv) $V_1 = 187$, $V_2 = 77$, $V_3 = 105$

$V_1' = V_2 + V_3 = 182$,

$$\% \text{ error} = \frac{V_1 - V_1'}{V_1} \times 100 = 2.67\ \%$$

Signature

Precaution :-

Dated .....

(i) Connection of wire should be tight to avoid CKt.

(ii) Reading should be correct b/c in this experiment we are calculating error also.

7/11/17

(Y) $V_1 = 215, \quad V_2 = 91, \quad V_3 = 121$

$V_1' = 212 = V_2 + V_3$

$$\% \text{ error} = \frac{V_1 - V_1'}{V_1} \times 100 = 1.39\ \%$$

Aim :-

To calculate fusing current and fusing constant of fuse wire.

Theory :-

If we have a fuse wire then we have to calculate its fusing current and fuse constant

Fusing current :-

minimum current flown through fuse wire at which fuse burns is known as fusing current

Rated current :-

maximum current ~~flow~~ which can flow through the fuse wire is known as rated current.

Rated current ≤ fusing current

And

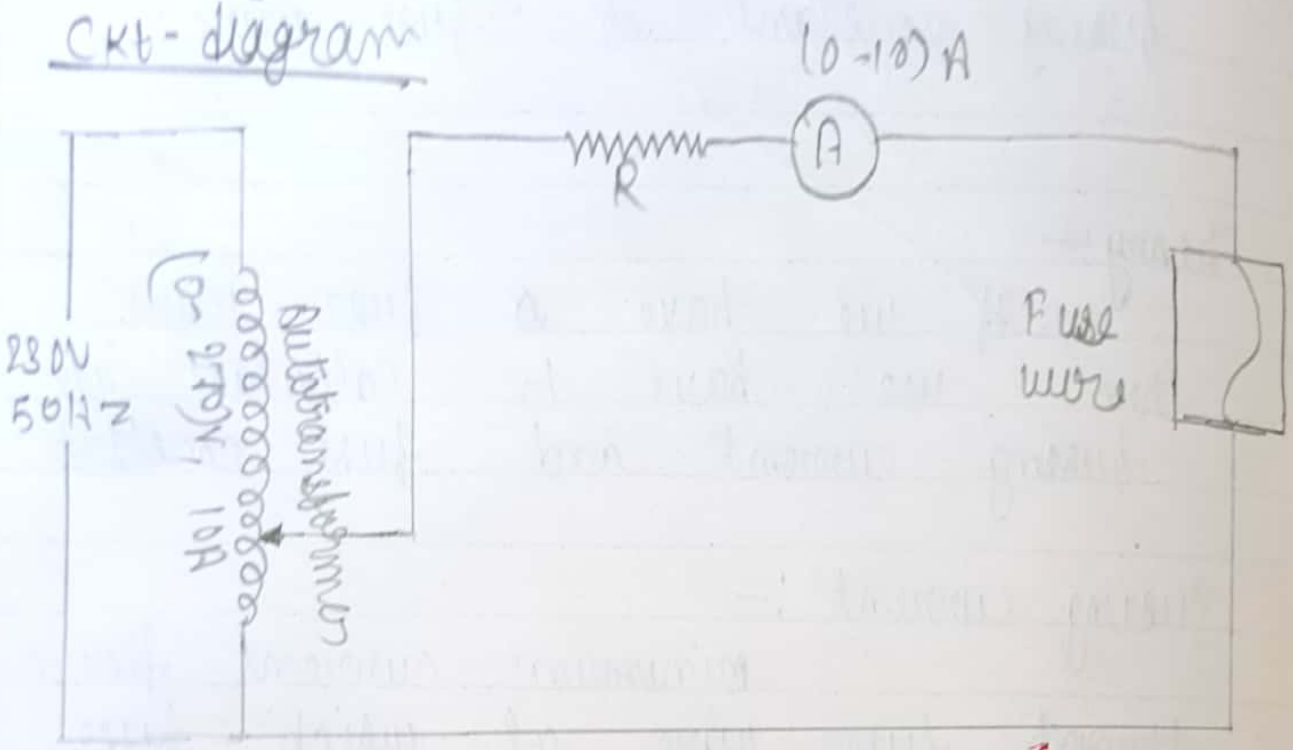
Fuse constant = $\frac{\text{fusing current}}{\text{Rated current}}$

Serial No. .....

Dated .....

Aim :- To determine the fusing current of fuse wire and constant of given fuse wire

Ckt - diagram



Obs. Table

S. No.	Position	Rated current	Fuse current	Fuse constant
1	Horizontal	5 A	6.4	1.28
2	vertical	5A	5.9	1.18

Signature

Apparatus :-

Apparatus	Range	Quantity
(i) Autotransformer	(0-270) V, (0-10) A	1
(ii) Resistor	(0-56) Ω	1
(iii) Ammeter	(0-10) A	1
(iv) Fuse wire		1
(v) Connecting wires		

Procedure :-

(i) Arrange the ckt as shown in ckt. diagram

(ii) We rotate varaic of autotransformer slowly.

(iii) We note down the reading of ammeter in different case i.e by keeping fuse horizontal and vertical. We get different value.

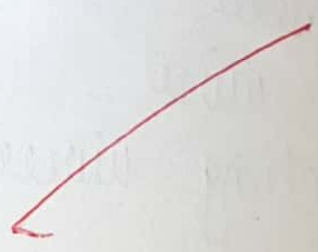
Dated .....

Conclusion :-

Fuse current in horizontal case is more than fuse current in vertical case

In horizontal case fuse current = 6.4 A

In vertical " " " = 5.9 A



Precaution :-

(i) The connection of wire should be tight to avoid short ckt.

(ii) We should carefully notice the reading of ammeter b/c when fuse wire burns ammeter suddenly goes at zero.

Significance :-

(i) By this we know how we should put fuse wire. (i.e vertical)

(ii) If we know the fusing current then, we can save our apparatus from overloading.

(iii) We connect fus such fuse wire in ckt which burns if more than apparatus capacity current is flown through wire.

7/11/17

EXP = 06

Dated .....

Aim :-

To calibrate given wattmeter by directly loading

Apparatus required :-

Apparatus	Range	Quantity
Autotransformer	(0-270) V	1
Bulb	100 W	3
Ammeter	(0-2.5) A	1
voltmeter	(0-300) V	1
wattmeter	(0-200) W	1
Connecting wires		

Theory :→

The wattmeter is an instrument for measuring the electric power in watt of given CKt. ~~The traditional~~

But if we connect an ammeter in series with resistor (or loaded bulb) and a voltmeter in parallel. Then, by relation of power with current and voltage we can also calculate power.

$$P = VI$$

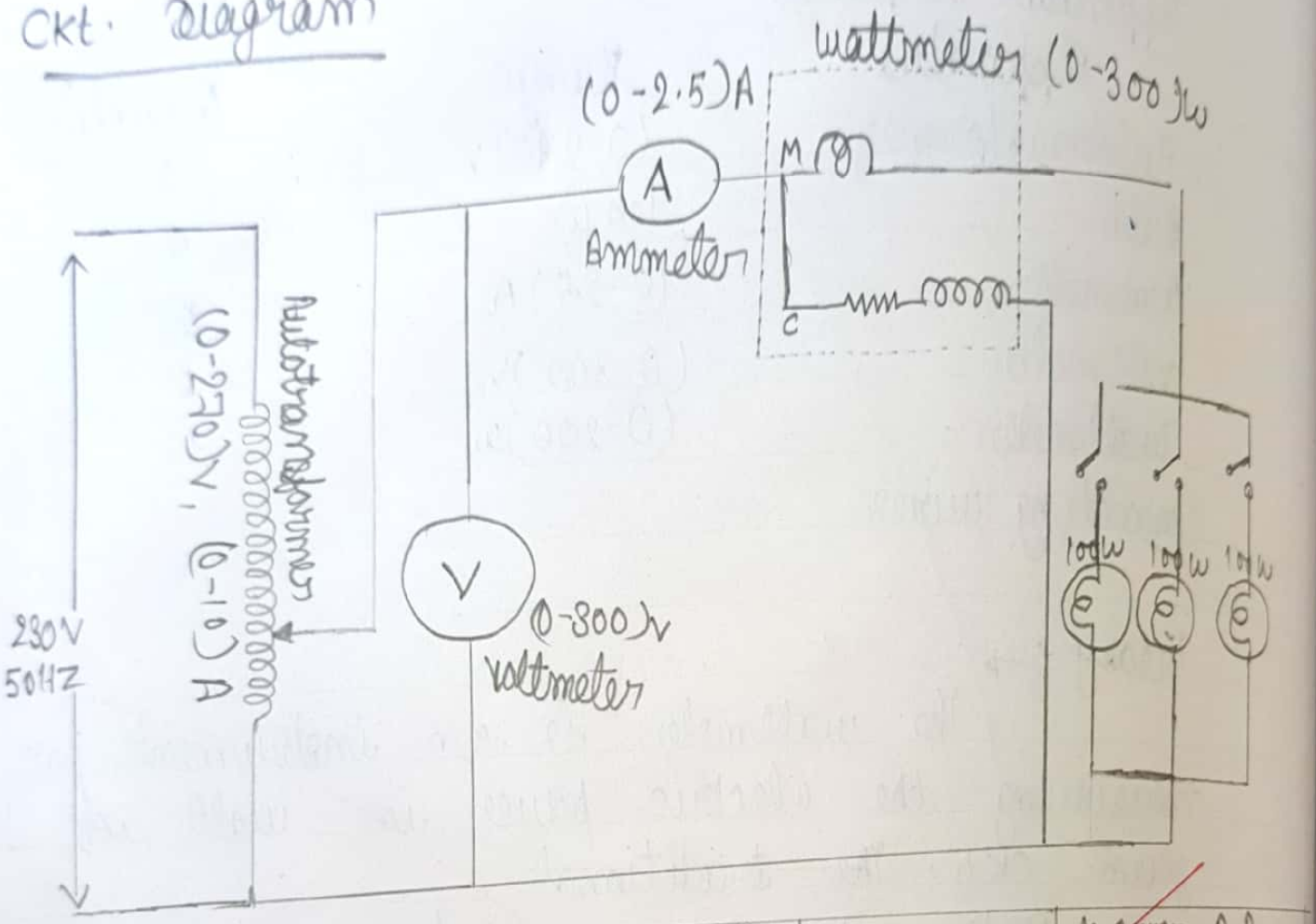
where P → Power in watt

V = voltage (volt) reading of voltmeter

I = current (Ampere) reading of ammeter

Aim :- To calibrate the wattmeter by direct loading.

Ckt. diagram



S. No.	voltmeter reading	Ammeter reading	P = VI	wattmeter reading	error (P - Pw)	% error = $\frac{P-P_w}{P} \times 100$
1	60 V	0.97A	58.2 W	54 W	4.2	7.2 %
2	80 V	1.12A	89.6 W	87.2 W	2.4	2.23 %
3	90 V	1.19A	107.1 W	103.4 W	3.7	3.45 %
4	100 V	1.25A	125 W	117 W	8	6.4 %
5	110 V	1.33A	146.3 W	139.4	6.9	4.71 %

Signature

Then we notice that there is some difference in magnitude of power measured by wattmeter and calculated by $P = VI$. The difference is known as error.

$$\% \text{ error} = \frac{\text{difference in power}}{\text{Actual power}} \times 100$$

Procedure :-

(i) We arrange the ckt. as shown in ckt diagram

(ii) Take an autotransformer & we connect it with supply.

(iii) We keep resistance (bulb) constant and change the voltage supply by autotransformer.

(iv) Increase the variac voltage slowly upto different voltage & note down the reading of voltmeter, ammeter and wattmeter.

Dated .....

Calculation :-

(i) $V = 60\ v$, $I = 0.97A$ $P_w = 54w$

$\therefore P = VI = 58.2\ w$

error $= P - P_w = 4.2\ w$

% error $= \frac{\text{error}}{P} \times 100 = \frac{4.2}{58.2} \times 100 = 7.2\%$

(ii) $V = 80\ v$, $I = 1.12\ A$. $P_w = 87.2\ w$

$P = VI = 89.6\ w$

error $= P - P_w = 2.4\ w$

% error $= \frac{\text{error}}{P} \times 100 = \frac{2.4}{89.6} \times 100 = 2.23\%$

(iii) $V = 90v$, $I = 1.19\ A$, $P_w = 103.4\ w$

$P = VI = 107.1\ w$

error $= 3.7\ w$

% error $= \frac{\text{error}}{P} \times 100 = \frac{3.7}{107.1} \times 100 = 3.45\%$

(iv) $V = 100v$, $I = 1.25\ A$, $P_w = 117\ w$

$P = VI = 125\ w$

error $= 8\ w$

% error $= \frac{8}{125} \times 100 = 6.4\%$

Signature

Conclusion :-

After calibration we get that the average % error calculated by given wattmeter is 4.79 %.

Precaution :-

(i) The connection of wires should be tight to avoid short ckt.

(ii) Reading should be correct b/c if there is error in reading then we get wrong % error.

Significance :-

(i) By this experiment we know how we calibrate a wattmeter.

(ii) If we shall know the % error of a wattmeter then, we can get that what it's actual reading (i.e what power actually dissipating across load).

7/11/17

(v) $V = 110V$, $I = 1.33\ A$, $P_w = 139.4\ w$

$P = VI = 146.3\ w$

$error = P - P_w = 6.9$

$\%\ error = \frac{6.9}{146.3} \times 100 = 4.71\ \%$

Average $\%$ error $= \frac{4.71 + 6.4 + 3.45 + 2.23 + 7.2}{5}$

$= 4.79\ \%$