IARE

IARE
INSTITUTE OF AERONAUTICAL ENGINEERING
(An Autonomous Institute affiliated to JNTUH, Hyderabad)
Dundigal, Hyderabad - 500 043

LABORATORY WORK SHEET

Name of the Student : Abdul Basith Khan

Class CSE (AIML) Semester I

Roll Number									
2	3	9	5	1	A	6	6	0	1

Course Code : AEE001 Course Name :

Name of the Course Faculty Dr L. Rajashekhar Goud Faculty ID : IARE 11067

Exercise Number : 01 Week Number : Date :

DAY TO DAY EVALUATION:

Marks	Aim / Preparation	Algorithm / Procedure / Performance in the Lab	Source Code / Calculations and Graphs	Program Execution / Results and Error Analysis	Viva - Voce	Total
Max. Marks	4	4	4	4	4	20
Obtained	4	4	4	3	4	19

Signature of Faculty

START WRITING FROM HERE :

AIM:-

To verify Ohm's Law for a given resistive network

APPARATUS:-

S.No	Apparatus Name	Range	Type	Quantity
1.	RPS	(0-30 V)	Digital	01
2.	Ammeter	(0-200mA)	Digital	01
3.	Voltmeter	(0-20V)	Digital	01
4.	Resistor	unknown	Carbon	03
5.	Bread Board	-	-	01
6.	Connecting wires	-	-	As required

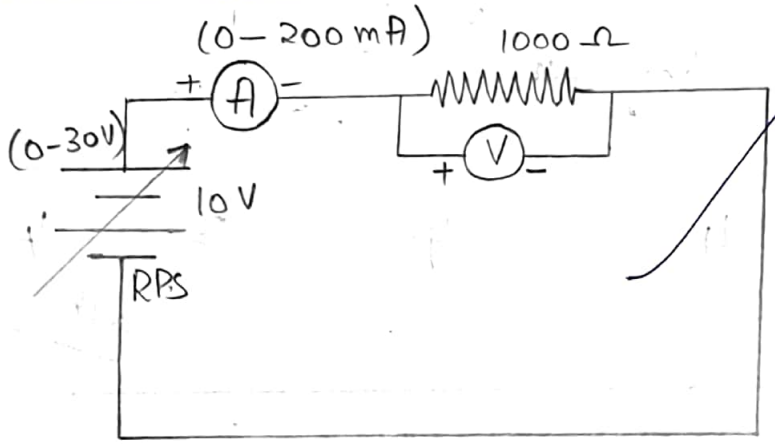
ROLL NUMBER :

THEORY:-

At constant temperature potential difference 'V' across the ends of a conductor is proportional to the current 'I' flowing through the conductor

$$V \propto I \quad , \quad V = IR$$

CIRCUIT DIAGRAM:-

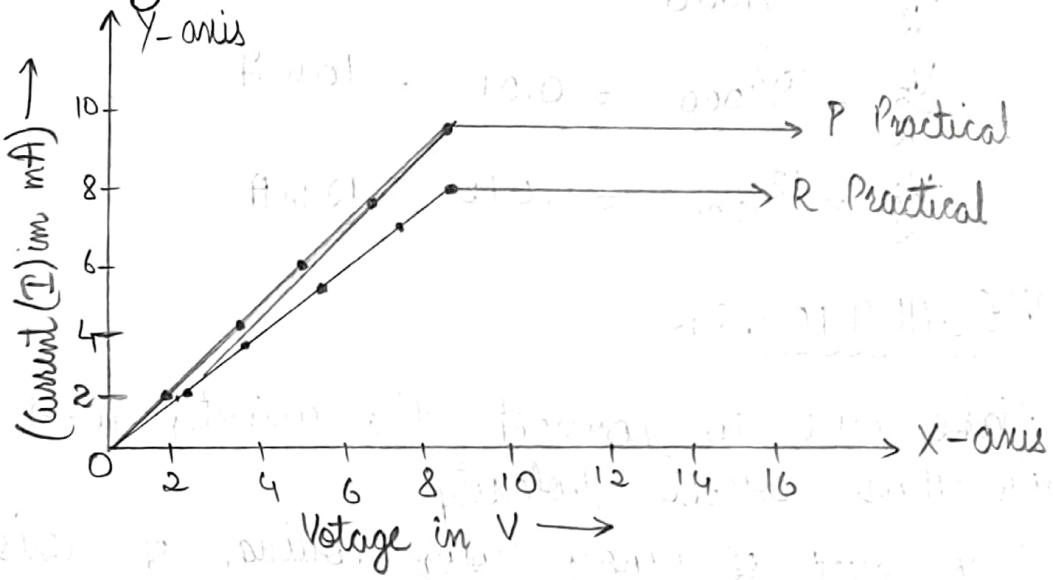


OBSERVATION:-

S. No.	RPS	V, K Ω (V)		I, K Ω (mA)(A)		P (K Ω) (ω)	
		Theoritical	Practical	Theoritical	Practical	Theoritical	Practical
1.	2	2	2.19	2.1	2.1	0.004	4.818
	4	4	4.2	4.3	4.3	0.016	18.06
	6	6	6.2	0.006	6.3	0.036	39.68
	8	8	8.3	0.008	8.5	0.064	70.55
	10	10	10.3	0.01	10.7	0.1	110.21
	12	12	12.4	0.012	12.6	0.14	156.24

ROLL NUMBER :

MODEL GRAPH :-



PROCEDURE :-

1. Make the connections as per circuit diagram
2. Switch ON the power supply to RPS & apply a Voltage (say 10V) and take the reading of Ammeter.
3. Plot a graph with V along x-axis and I along Y-axis
4. The graph will be a straight line which verifies the Ohm's law.
5. Determine the slope of V-I graph. The reciprocal of V-I graph gives resistance of wire.

CALCULATIONS :-

$R = 1000\,\Omega$

$V = IR$ SO $I = V/R$

$\frac{V_1}{R} = 2/1000 = 0.002 = 2\,MA$

$\frac{V_2}{R} = 4/1000 = 0.004 = 4\,MA$

$\frac{V_3}{R} = 6/1000 = 0.006 = 6\,mA$

$\frac{V_4}{R} = 8/1000 = 0.008 = 8\,mA$

$\frac{V_5}{R} = 10/1000 = 0.01 = 10\,mA$

$\frac{V_6}{R} = 12/1000 = 0.012 = 12\,mA$

PRECAUTIONS :-

* Take care to connect the ammeter and voltmeter with thier correct polarity.
* Make sure of proper color coding of resistors.
* The terminal of the resistance should be properly connected.

RESULT :-

$V = IR$

Hence, Ohm's Law is verified.

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Course Code : AEE001 Course Name : EEE Laboratory

Name of the Course Faculty : Dr L. Rajashekhar Goud Faculty ID : IARE 11067

Exercise Number : 01 Week Number : Date :

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Signature of Faculty

START WRITING FROM HERE :

AIM :-

To verify Kirchoff's Voltage law (KVL) & Kirchoff's Current law (KCL) in a positive Network

APPARATUS :-

S.No.	Apparatus Name	Range	Type	Quantity
1	RPS	(0-30 V)	Digital	01
2	Ammeter	(0-200mA)	Digital	03
3	Volt meter	(0-20V)	Digital	03
4	Resistors	220Ω, 150Ω 100Ω	Carbon	03
5	Bread Board	-	-	01
6	Connecting wires	-	-	As required

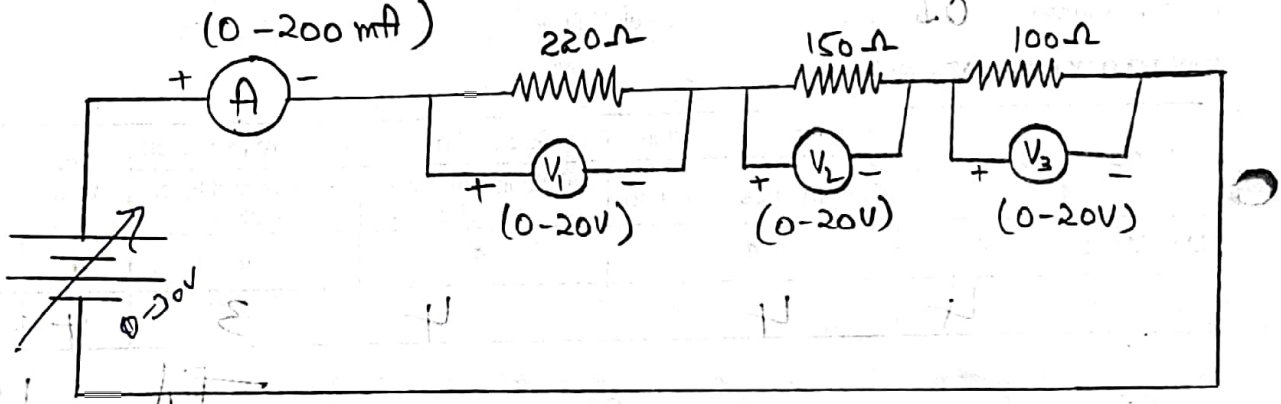
ROLL NUMBER :

THEORY:-

KVL:- Algebraic sum of all voltages and a closed path or closed loop is Zero $\Sigma V = 0$

KCL:- Sum of current flowing in the loop is equal to current leaving the loop.

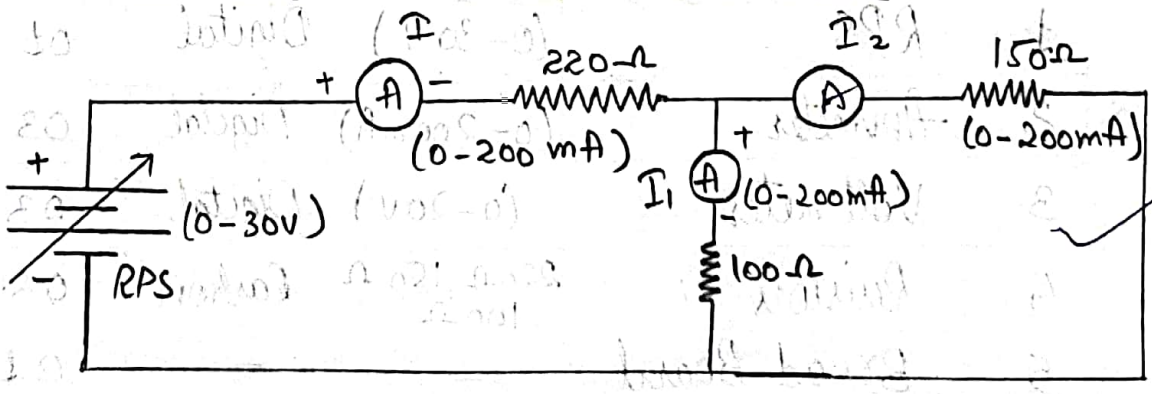
PRACTICAL KVL CIRCUIT DIAGRAM:-



Supply Voltage V_S = I =

S.No.	Resistor (Ω)	Theoritical Voltage = 10V	Practical Voltage (V) = 10V
1.	220	4.60 V	4
2.	150	3.18 V	3
3.	100	2.12 V	2.17
	Total Voltage	9.96 V	9.20

PRACTICAL KCL CIRCUIT DIAGRAM:-



OBSERVATIONS:-

ROLL NUMBER :

Applied Voltage = (Volts)	I (A)		I_1 (A)		I_2 A		$I_1 + I_2$ (A)	
	Theoritical	Practical	Theoritical	Practical	Theoritical	Practical	Theoritical	Practical
10 V	35.7mA	36.4mA	27.42mA	21.3A	14.28mA	14.3mA	37.5mA	36.1mA

PROCEDURE :-

To verify KVL :-

* Connect the circuit diagram as said in the figure
* Switch ON the supply to RPS
* Apply Voltage (say 10V) & note the voltage readings
* Gradually increase the supply voltage in steps
* Note the readings of Voltmeter
* Sum up the voltmeter readings (voltage drops) that should be equal to applied voltage.
* Thus, KVL is verified practically.

To verify KCL :-

* Connect the circuit diagram as shown in figure
* Switch ON the supply to RPS
* Apply the voltage (say 10V) & note the ammeter readings
* Gradually increase the supply voltage in steps.
* Note the readings of ammeter.
* Sum up the ammeter readings (I_1 & I_2), that should be equal to total current (I).
* Thus, KCL is verified successfull practically.

Calculation :-

ROLL NUMBER :

Theoritical Calculation for KVL

$$I = \frac{V}{R} = \frac{10}{4.70} = \frac{1}{4.7}$$

$$I = 0.0212\ A$$

$$V_1 = IR_1 = 0.0212 \times 220 \Rightarrow V_1 = 4.664\ V$$

$$V_2 = IR_2 = 0.0212 \times 150 \Rightarrow V_2 = 3.18\ V$$

$$V_3 = IR_3 = 0.0212 \times 100 \Rightarrow V_3 = 2.12\ V$$

$$V = V_1 + V_2 + V_3$$

$$V = 9.964$$

Theoritical Calculation KCL

$$I = V/R = 10/280 = 0.0357 \Rightarrow = 35.7\ mA$$

$$I = 10/280 = 35.7\ mA$$

$$I_1 = I\left[\frac{180}{150+100}\right] = \frac{35.7 \times 10^{-3} \times 150}{250} = 21.42\ mA$$

$$I_1 = \frac{100}{100+150} = \frac{35.7 \times 10^{-3} \times 100}{250} = 14.28\ mA$$

By using current division ,

$$Req = \frac{150}{100} + 220$$

$$= 60 + 220$$

$$= 280\ \Omega$$

Result :-

Hence, Kirchoffs Voltage law (KVL) and Kirchoffs Current law (KCL) is verified