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

LABORATORY WORK SHEET

Name of the Student: MADKI SAI CHARAN

Class: CSM-'C' Semester: I ST

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

Course Code: AEE003 Course Name: Electrical and Electronics Engineering Laboratory

Name of the Course Faculty: Ms. M. VARA LAKSHMI Faculty ID: IARE 11072

Exercise Number: 01 Week Number: 01 Date: 13 October 2023

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	4	4	20

Signature of Faculty

START WRITING FROM HERE : OHM'S LAW

Aim : To verify ohm's law for a given resistive network.

Apparatus :

Serial Number	Apparatus Name	Range	Type	Quantity.
01.	RPS	(0-30V)	Digital	01
02.	Ammeter	(0-200mA)	Digital	01
03	Voltmeter	(0-30V)	Digital	01
04.	Resistor	unknown	Carbon	03.
05.	Bread board	-	-	01
06	Rheostat	(0-20K)	-	01
07.	Connecting wires	-	-	As required.

Procedure :

① Make the connections as per circuit diagram.

② Switch ON the power supply to RPS and apply a voltage (say 10V) and take the reading of voltmeter and ammeter.

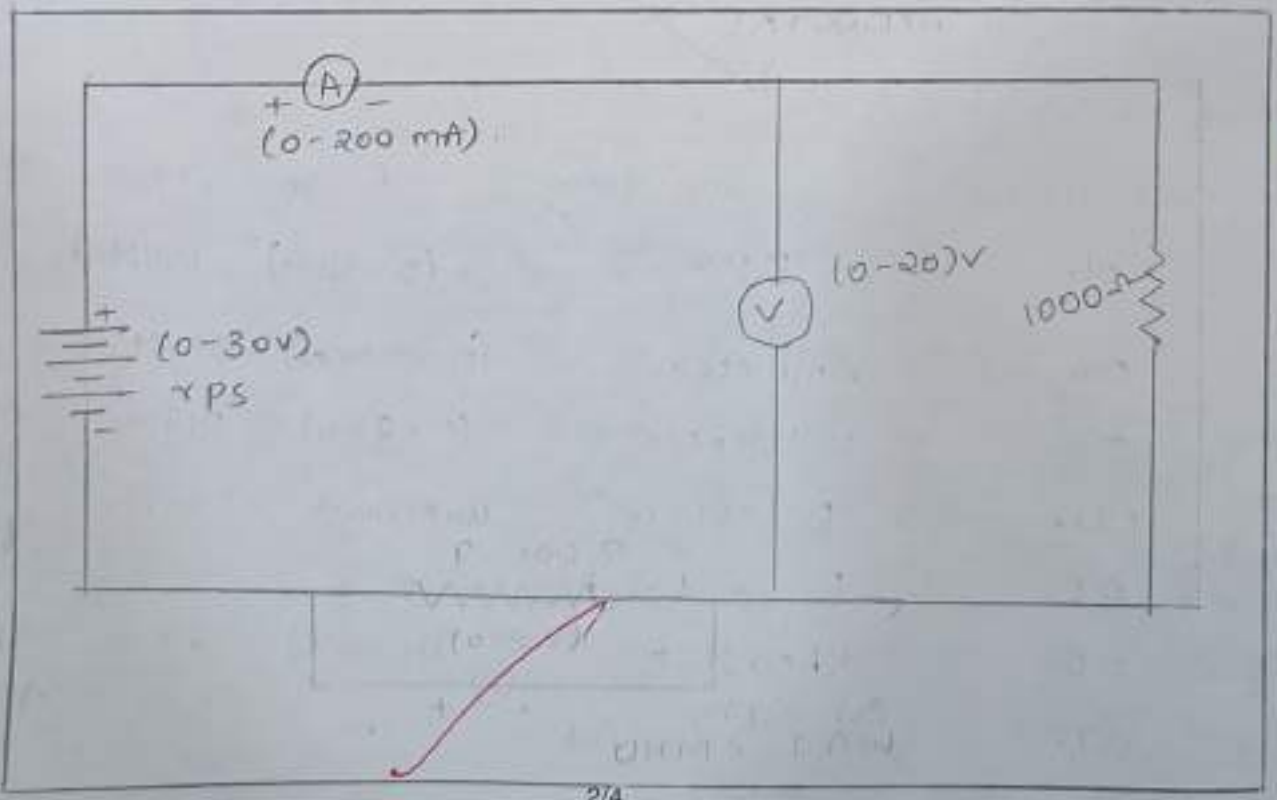
③ Adjust the rheostat in steps and take down the readings of ammeter and voltmeter.

④ plot a graph with 'V' along X-axis and 'I' along Y-axis.

⑤ The graph will be a straight line which verifies ohm's law.

⑥ Determine the slope of the V-I graph, the reciprocal of slope gives resistance of the wire.

Circuit Diagram :

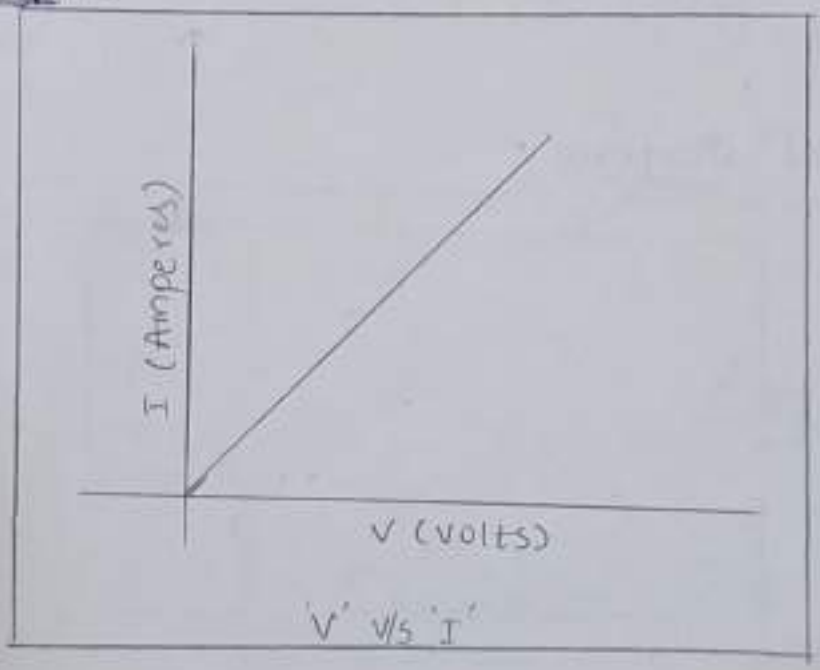


ROLL NUMBER : 23951A66F2

Observations :

S.NO	V_{supply}	I (Theoritical) (mA)	I (Practical) mA
(1)	2V	2mA	2.3 mA
(2)	4V	4mA	4.4 mA
(3)	6V	6mA	6.5 mA
(4)	8V	8mA	8.6 mA
(5)	10V	10mA	10.7 mA

Model graph :



Precautions :

① Take care to connect the ammeter and voltmeter with their correct polarities.

② Make sure of proper color coding of resistors.

③ The terminal of the battery should be properly connected.

ROLL NUMBER : 23951A66F2

Calculations :

$V = IR$; $\boxed{I = \frac{V}{R}}$

① $I = \frac{V_1}{R} = \frac{2}{1000} = 2\ mA$

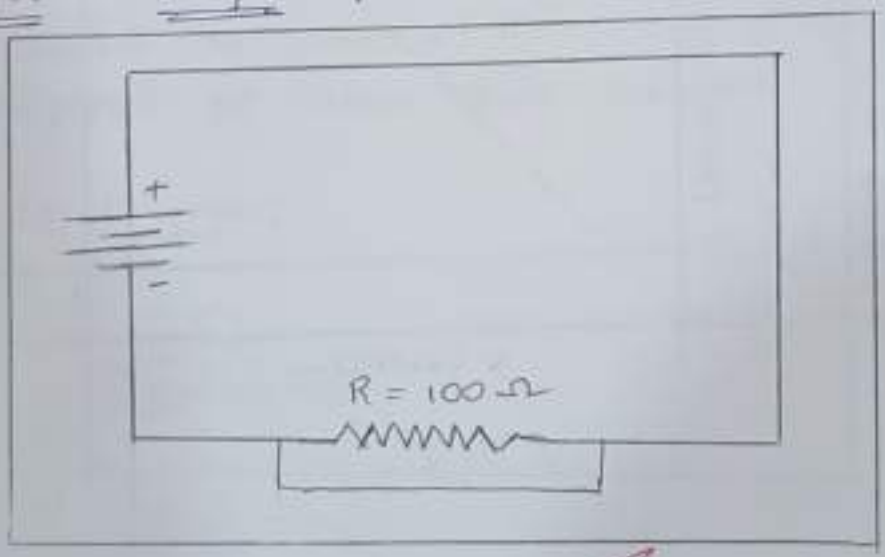
② $I = \frac{V_2}{R} = \frac{4}{1000} = 4\ mA$

③ $I = \frac{V_3}{R} = \frac{6}{1000} = 6\ mA$

④ $I = \frac{V_4}{R} = \frac{8}{1000} = 8\ mA$

⑤ $I = \frac{V_5}{R} = \frac{10}{1000} = 10\ mA$

Theoretical Diagram :



Result : Hence, Ohm's law is verified.

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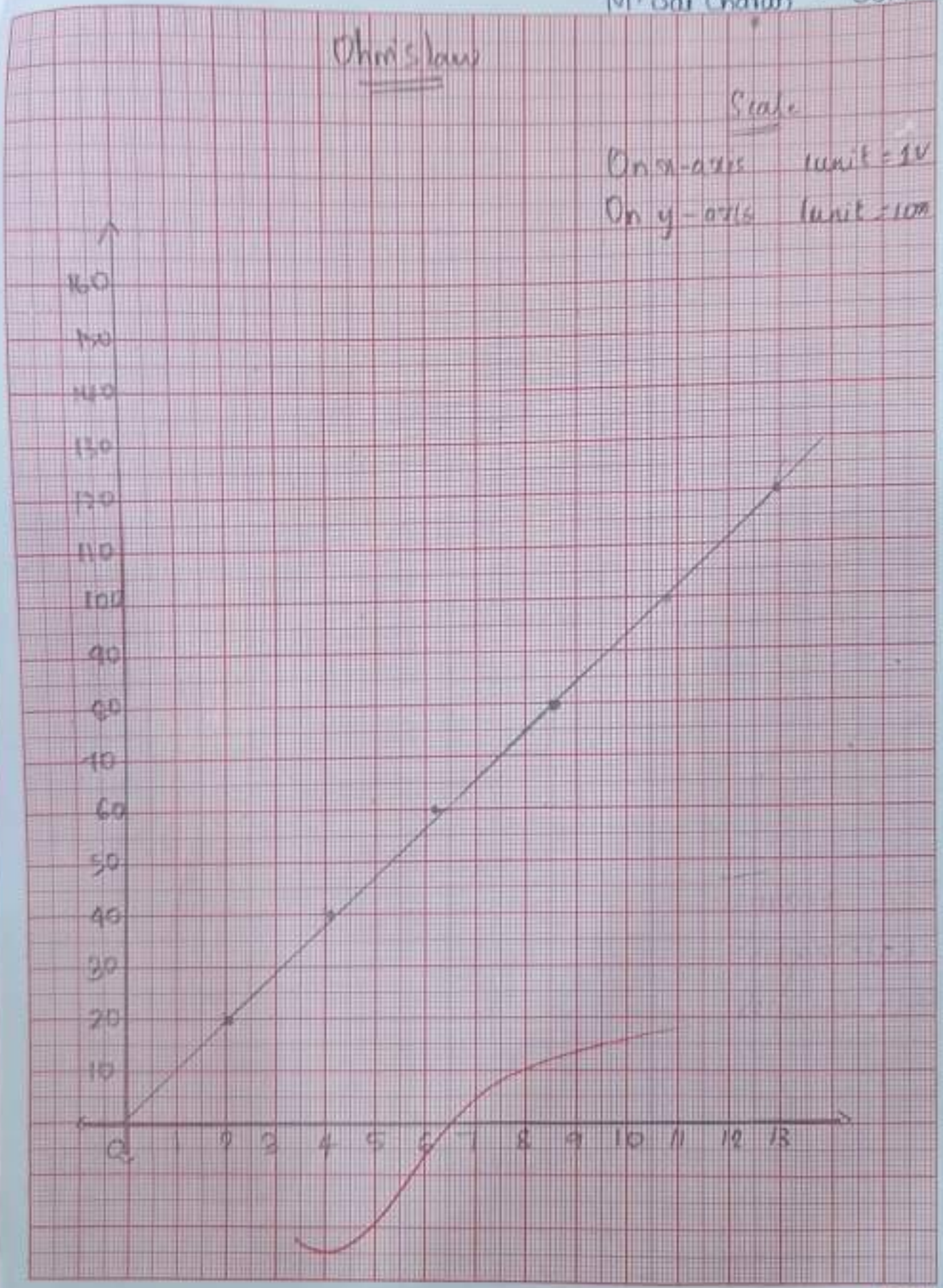
M. Sai Charan - CSM-'C'

Ohm's law

Scale

On x-axis 1 unit = 1V

On y-axis 1 unit = 10A



POOJA

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LABORATORY WORK SHEET

Name of the Student: MADKI SAI CHARAN

Class: CSM-C Semester: I st

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

Course Code: AEED03 Course Name: Electrical and Electronics Engineering laboratory.

Name of the Course Faculty: MS. M. VARALAKSHMI Faculty ID: IARE 11072.

Exercise Number: 01 Week Number: 01 Date: 27 October 2023.

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						

Signature of Faculty

START WRITING FROM HERE :

Aim : To verify Kirchhoff's voltage law (KVL) and Kirchhoff's current law (KCL) in a passive resistive network.

Statement :

Kirchhoff's voltage law states that "The sum of all voltages (or) potential differences in an electrical circuit loop is zero."

$$\Sigma_K V_K = 0.$$

Kirchhoff's current law states that "The sum of all currents that enters an electrical circuit junction is zero." The currents enter the junction have positive sign and the currents that leave the junction have negative sign.

$$\Sigma_K I_K = 0.$$

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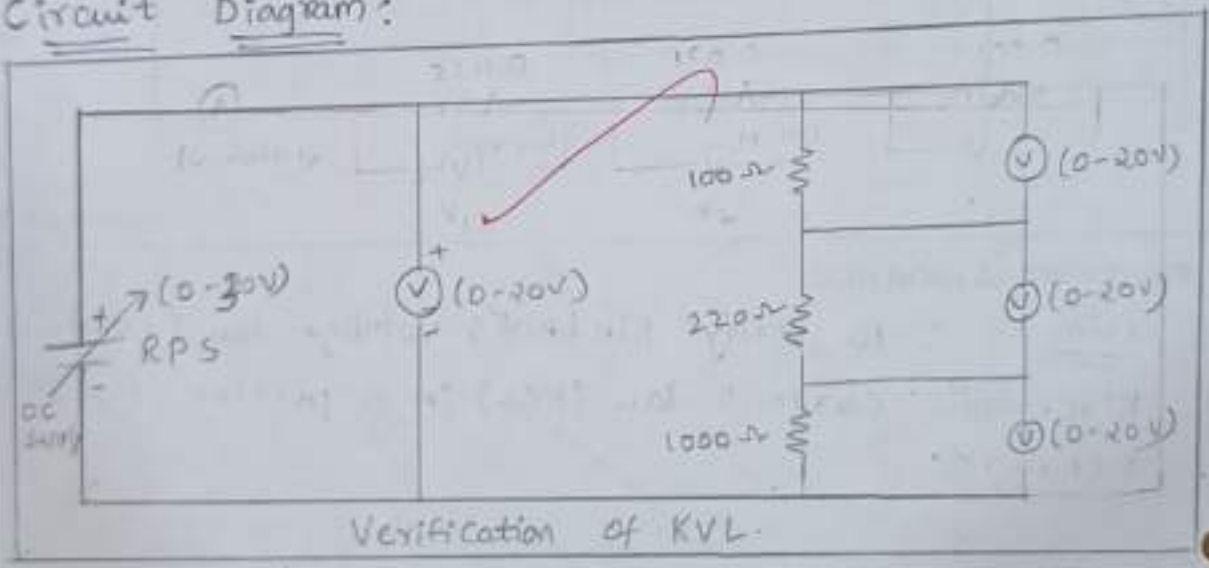
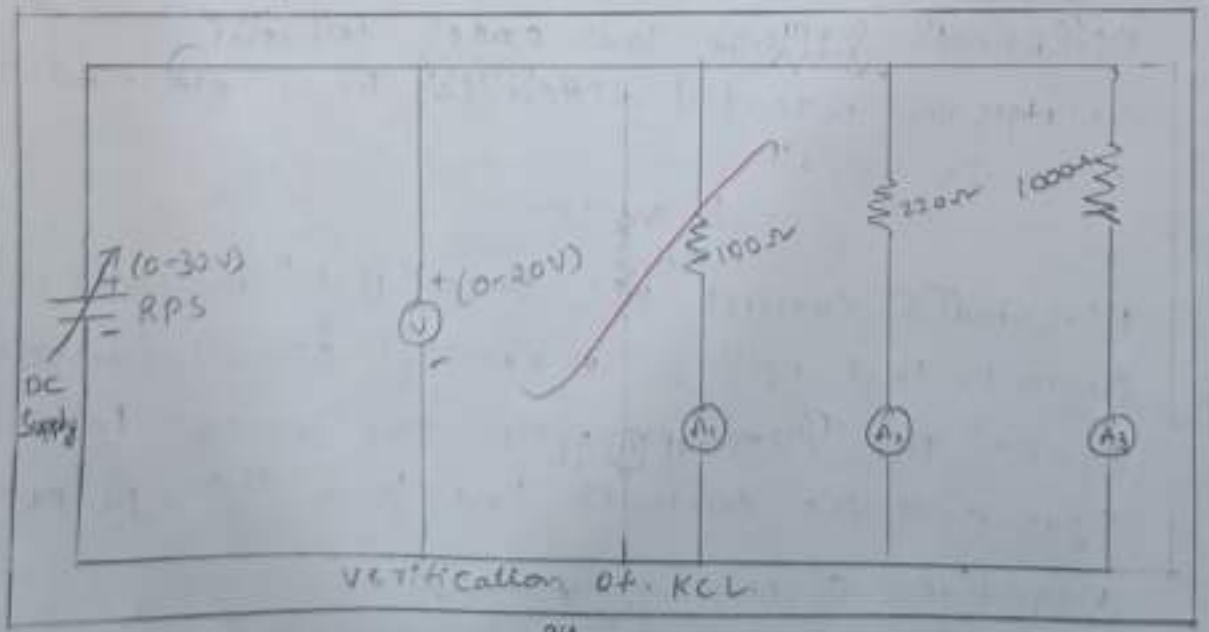
Apparatus :

S.NO	Apparatus Name	Range	Type	Quantity
01.	RPS	(0-30V)	Digital	01
02.	Ammeter	(0-200mA)	Digital	03
03.	Voltmeter	(0-30V)	Digital	03
04.	Resistors	unKnown	Carbon	03
05.	Bread Board	-	-	01
06.	Connecting wires	-	-	As required

Circuit Diagram:



Verification of KVL.



Verification of KCL

Procedure :

To verify KVL:

(1) Connect the circuit diagram as shown in fig 1.
(2) Switch ON the supply to RPS.
(3) Apply the voltage (say 5V) and note the voltmeter readings.
(4) Gradually increase the supply of voltage in steps.
(5) Note the readings of voltmeter.
(6) Sum up the voltmeter readings (voltage drops), that should be equal to applied voltage.
(7) Thus KVL is verified practically.

To verify KCL:

(1) Connect the circuit diagram as shown in fig 2.
(2) Switch ON the supply to RPS.
(3) Apply the voltage (say 5V) and note the Ammeter readings.
(4) Gradually increase the supply of voltage in steps.
(5) Note the readings of ammeter.
(6) Sum up the Ammeter readings (I_1 and I_2), that should be equal to total current (I).
(7) Thus KCL is verified practically.

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Observations :- For KVL :

Applied voltage (volts)	V_1 (volts)		V_2 (volts)		V_3 (volts)		$V_1+V_2+V_3$ (volts)	
	Theoritical	practical	Theoritical	practical	Theoritical	practical	Theoritical	practical
6 V	0.45V	0.47V	0.99V	1.02V	4.54V	4.62V	5.98V	6.11V

For KCL :

Applied voltage (volts)	I_1 (A)		I_2 (A)		I_3 (A)		$I_1+I_2+I_3$ (A)	
	Theoritical	practical	Theoritical	practical	Theoritical	practical	Theoritical	practical
6V	60mA	60.9mA	27.2mA	27.5mA	6mA	6.1mA	98.2mA	94.5 mA

Precautions : ① Check for proper connections before switching ON the supply.

② Make sure of proper colour coding of resistors.

③ The terminal of the resistance should be properly connected.

Calculations :- Theoretical Calculations :

For KVL :

$R_{eq} = R_1 + R_2 + R_3$

$= 100 + 220 + 1000$

$= 1320\ \Omega$

$I = V_s/R = 6/1320 = 0.0045$

$V_1 = I R_1 = 0.0045 \times 100 = 0.45\ V$

ROLL NUMBER: 23951A66FL

$V_2 = I R_2 = 0.0045 \times 220 = 0.99V$

$V_3 = I R_3 = 0.0045 \times 1000 = 4.5V$

$V_1 + V_2 + V_3 = 0.45 + 0.99 + 4.54 = 5.98V$

For KCL:

$V = I R_{eq}$

$R_{eq} = \frac{1}{100} + \frac{1}{220} + \frac{1}{1000} = 15.5 \times 10^{-3} = 15.5 m\Omega$

$I_1 = \frac{V_S}{R_1} = \frac{6}{100} = 60 mA$

$I_2 = \frac{V_S}{R_2} = \frac{6}{220} = 27.2 mA$

$I_3 = \frac{V_3}{R_3} = \frac{6}{1000} = 6 mA$

$I_1 + I_2 + I_3 = 60 + 27.2 + 6 = 93.2 mA$

Result: Hence KVL and KCL are verified.