DATE: 04/09/2025
EXP. NO: 01

VERIFICATION OF KIRCHOFF'S LAW

AIM :-

To verify kirchoff's voltage law and current law both theoritically and porctically for a given DC circuit

APPARATUS REQUIRED :-

S.No	APPARATUS	SPECIFICATION	QUANTITY
1	Regulated Power Supply	(0-30V)	1
2	Voltmeter	(0-30V)	3
3	Ammeter	(0-10 mA)	3
4	Resistor	1 KΩ	3
5	Bread Board	-	1

PROCEDURE :-

(*) Give connections as per the circuit diagram.

(*) Switch on the supply. Vary the RPS and set a particular input voltage

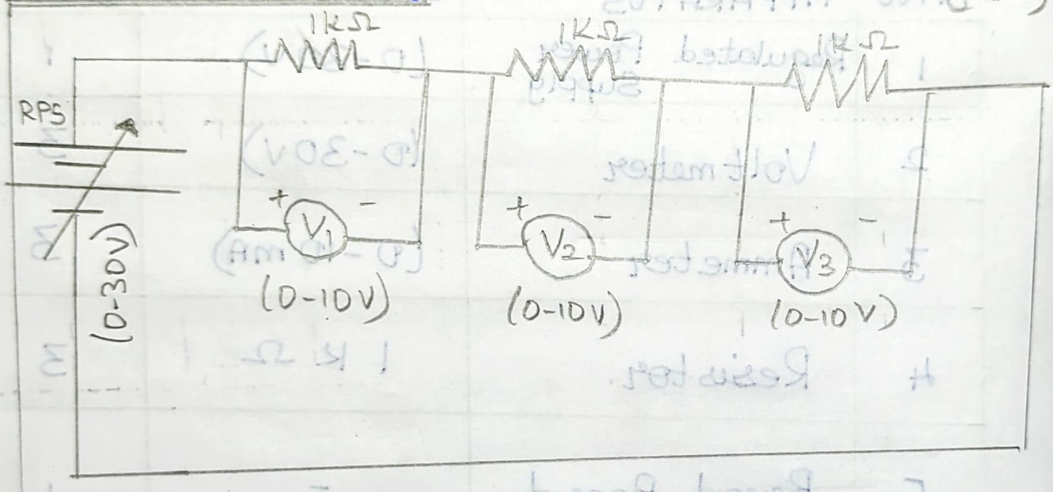
(*) Note down the readings of voltmeters and ammeters and tabulate them

(*) Vary the RPS for different input voltmeter and note down the reading of all meters

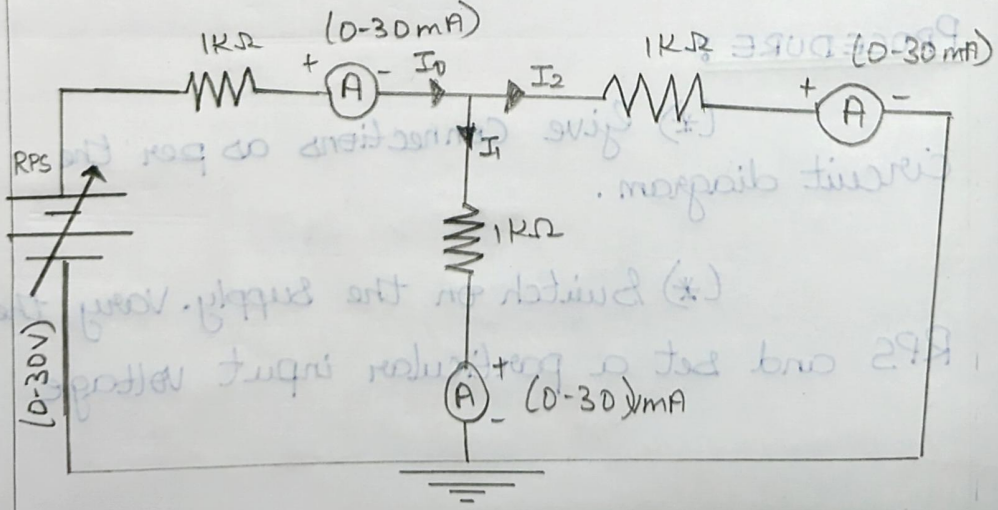
(*) Reduce the RPS to its minimum value and switch off the supply

CIRCUIT DIAGRAM :-

(KVL)



(KCL)



OBSERVATION :-

V	V_1	V_2	V_3	$V=V_1+V_2+V_3$	I	I_1	I_2	I_3	$I=I_1+I_2+I_3$
3	0.91	0.93	0.91	2.74	6.0	3.07	3.07	0	6.15
6	2	1.98	6.63	12.00	2.01	5.99	5.99	0	11.98
9	3.15	3.21	9.35	17.7	3.15	8.93	8.96	0	17.83

CALCULATION :-

By ohms law,

$$I = \frac{V}{R} = \frac{3}{1.5} = 2\ mA$$

$$I_1 = I \times \frac{R_1}{R_1+R_2} = 2 \times \frac{1}{2}$$

$$= 1\ mA$$

$$I_2 = I \times \frac{R_2}{R_1+R_2}$$

$$= 2 \times \frac{1}{2}$$

$$= 1\ mA$$

(*) Practical verification :-

V/I should be constant

(ohms law) V should be equal to $(I_2 + I_3)$

(*) Theoretical verification :-

By ohms law,

1) $I = V_1/R \rightarrow 3/3\times10^3 = 1mA$

2) $I = V_2/R \rightarrow 6/3\times10^3 = 2\ mA$

3) $I = V_3/R \Rightarrow 9/3\times10^3 = 3\ mA$

IN KCL

Parallel resistance

$$R_{eq} = \frac{R_B R_C}{R_B + R_C} = \frac{1\times10^3}{2\times10^3} = 0.5\ K\Omega$$

Total resistance:

$$R_A + R_{eq}$$
$$= 1 + 0.5$$
$$= 1.5\ K\Omega$$

RESULT :-

Thus Kreichhoff's current low and voltage law are verified practically and theoritically.