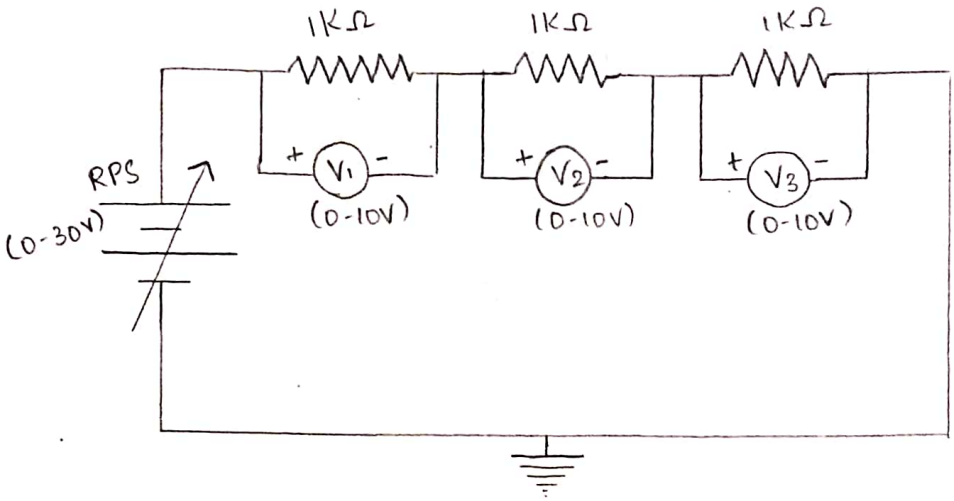
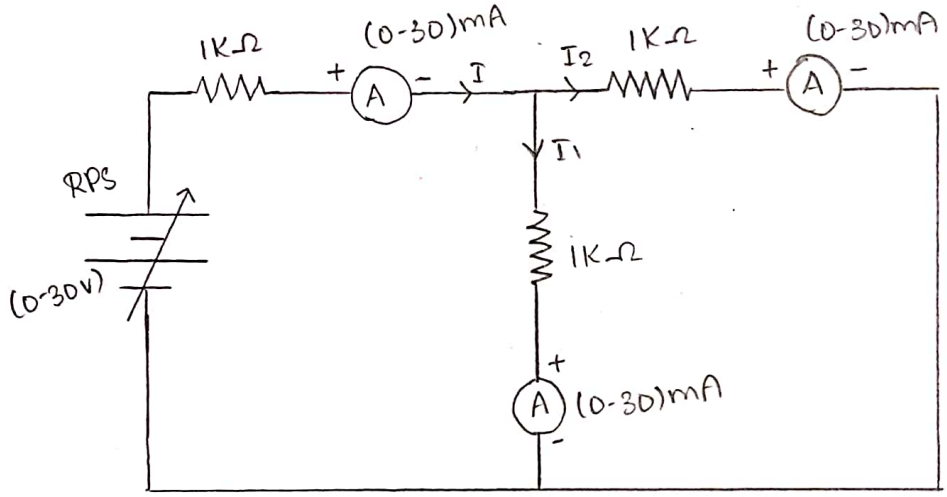
CIRCUIT DIAGRAM:-



KVL



KCL

EXP NO:

DATE:

VERIFICATION OF KIRCHOFF'S LAWS.

AIM:

To verify Kirchoff's voltage law and Kirchoff's current law both theoretically and practically for a given DC circuit.

APPARATUS REQUIRED:

SL-NO	APPARATUS	SPECIFICATION	QUANTITY
1.	Regulated Power supply (RPS)	(0-30V)	1
2.	Voltmeter	(0-30V) MC	3
3.	Ammeter	(0-10mA) MC	3
4.	Resistors	1K Ω	3
5.	Bread board	–	1

PROCEDURE:

1. Give connections as per the circuit diagram.
2. Switch on the supply, vary the RPS (Regulated Power Supply) and set a particular input voltage.
3. Note down the readings of ammeters and voltmeters and tabulate them.
4. Vary the RPS for different input voltages and note down the readings of all the meters.
5. Reduce the RPS to its minimum value and switch off the supply.

TABULAR COLUMN:-

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

CALCULATION:

By ohm's law :-

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

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

$$I_2 = I \times \frac{R_1}{R_1+R_2} = 1\,mA.$$

Practical verification :-

* V/I should be constant (ohm's law)
* V should be equal to $(V_1+V_2+V_3)$
* I_1 should be equal to (I_2+I_3)

6. Using the tabulated values, verify Kirchoff's laws practically, and verify it theoretically.

Theoretical verification :-

By ohm's law, $V_1 = 3V$

$$I = \frac{V_1}{R} = \frac{3}{3} \times 10^{-3}$$

$$I = 1mA.$$

$$I = \frac{V_2}{R} = \frac{5}{3} \times 10^{-3}$$

$$I = 2mA.$$

$$I = \frac{V_3}{R} = \frac{9}{3} \times 10^{-3}$$

$$I = 3mA.$$

In KCL parallel resistance :

$$Req = \frac{RBRc}{RB + Rc} = \frac{1 \times 10^{-3}}{2 \times 10^{-3}} = 0.5\ K\Omega.$$

Total resistance : $RA + Req.$

$$= 1 + 0.5$$

$$= 1.5\ K\Omega.$$

RESULT:

Thus Kirchoff's current law and Kirchoff's voltage law are verified practically and theoretically.