EXPERIMENT NO. 2.a

Objective: To verify Kirchhoff's Current Law (KCL)

Apparatus Required:

S/N	Apparatus	Quantity	Range/ Remark
1	D.C. Supply	1	(……..) V, (……) A
2	D.C Voltmeter	-	-
3	DC Ammeter	3	(…….)A, (……..)mA, (…….)mA
4	Rheostat	2	R_1=……, R_2=…….
5	Multimeter	1	To Measure Resistance
6	Connecting wires	--	--

Circuit Diagram:

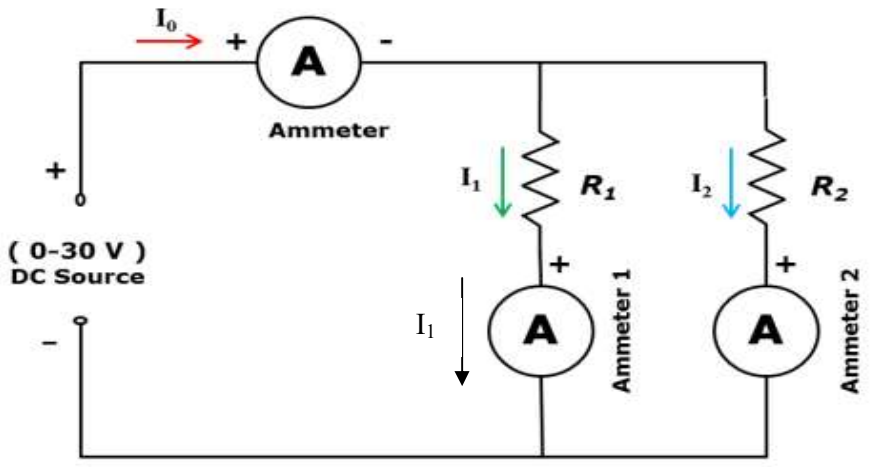


Fig.1 -Kirchhoff's Current Law (KCL) Circuit Diagram

Observation Table:

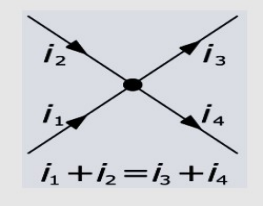
S/N	Current (A/ mA)			I'= I_1+I_2	%Error= $(\frac{I-I'}{I})$x100
	I (A)	I_1 (mA)	I_2(mA)		
1					
2					
3					
4					
5					

Theory:

It states that “in any electrical network, algebraic sum of the currents meeting a point is zero”.

In another way, it simply means that the total current leaving a junction is equalto the total current entering that junction. It is obviously true because there is noaccumulation or depletion of current at any junction of the network.

Consider the case of a few conductors meeting at a node as in fig.



Some conductors have currents leading to node whereas some have currents leadingaway from node. Assuming the incoming currents to be positive and the outgoing currentsnegative, applying KCL at node we have,

$$I_1+I_2=I_3+I_4$$

Procedure:

1. Connect the circuit as shown in the diagram.
2. Switch On the DC power supply
3. By varying the voltage supply, take the reading of I_1, I_2& I
4. Repeat the same procedure for different observations.
5. Measure the values of R_1 and R_2 using multimeter
6. Calculate percentage error.

Result: The KCL has been verified.

Precaution:

1. Make the connections properly.
2. Note the readings of voltmeters and ammeters properly avoid parallax
3. Connect the DC supply and ammeter with correct polarity.
4. Avoid loose connections and don’t touch wire with wet hand.

EXPERIMENT NO. 2.b

Objective: To verify Kirchhoff's Voltage Law (KVL)

Apparatus Required:

S/N	Apparatus	Quantity	Range/ Remark
1	D.C. Supply	1	(……..) V, (……..)A
2	D.C Voltmeter	3	Power Supply Voltmeter, (……..)V, (……..)V
3	DC Ammeter	-	--
4	Rheostat	2	R_1=……, R_2=…….
5	Multimeter	1	To Measure Resistance
6	Connecting wires	--	--

Circuit Diagram:

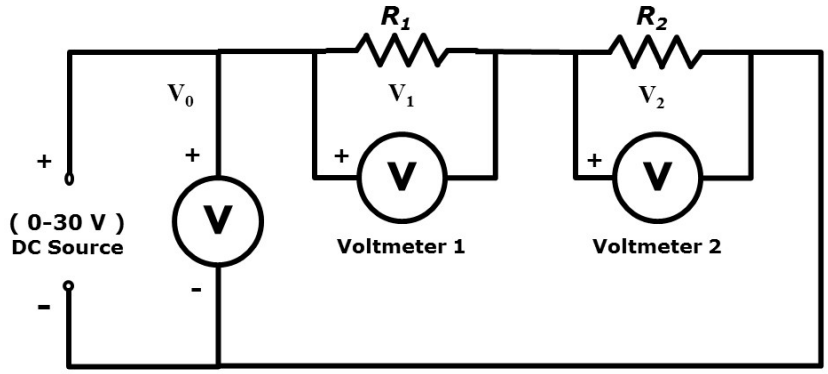


Fig. 1 - Kirchhoff's Voltage Law (KVL) Circuit Diagram

Observation Table:

S/N	Voltage (V)			V'= V_1+V_2 (volts)	%Error= $(\frac{V-V'}{V}) * 100$
	V_0(volts)	V_1 (volts)	V_2(volts)		
1					
2					
3					
4					
5					

Theory:

It states that “the algebraic sum of products of currents and resistances in each of theconductors in any closed path in a network plus the algebraic sum of the e.m.fs in thatpath is zero”.

In other words, $\sum IR + \sum e.m.f. = 0$

It should be noted that algebraic sum is the sum which takes into account the polaritiesof the voltage drops

Procedure:

1. Connect the circuit as shown in the diagram.
2. Switch On the DC power supply
3. By varying the voltage supply, take the reading of V_1, V_2 & V
4. Repeat the same procedure for different observations.
5. Measure the values of R_1 and R_2 using multimeter
6. Calculate percentage error.

Result: The KVL has been verified.

Precaution:

1. Make the connections properly.
2. Note the readings of voltmeters and ammeters properly avoid parallax
3. Connect the DC supply and ammeter with correct polarity.
4. Avoid loose connections and don’t touch wire with wet hand.