ISLAMIC UNIVERSITY OF TECHNOLOGY

Organization of Islamic Cooperation

Board Bazar, Gazipur

Course Name: Physics II Lab

Course No. PHY 4242

Experiment No. 02

Name of Experiment:

VERIFICATION OF KVL AND KCL

Date of Performance: 15 July, 2019

Date of Submission: 29 July, 2019

Task 2A

Name of Experiment:

Verification of KVL

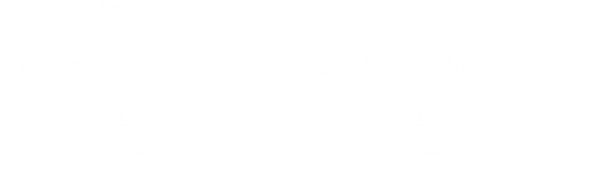
Objective:

This experiment is intended to verify Kirchhoff’s Voltage Law (KVL) with the help of series-parallel circuits.

Equipment Used:

Jumpers, Multi-meter, Ammeter, Bread Board, Variable Voltage Source, Resistors

Circuit Diagram:



Data Table:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Observation  No. | Source  Voltage | Voltage Across | | | |
|  |  |  |  |
| 1. Circuit A |  |  |  |  |  |
| 2. Circuit B |  |  |  |  |  |

Calculations:

According to KVL,

for loop

Percentage Error

Result:

The obtained data follows KVL.

Questions and Answers:

* If any discrepancy is found, then explain comparing theoretical and practical values.

The difference between theoretical and practical values is of only 0.01 𝑉. This discrepancy is most likely due to human errors and can safely be ignored.

* Can KVL be applied to an open circuit?

Yes, it can. KVL simply states that the voltage rise in a loop is equal to the voltage drop. This means any voltage remaining in the circuit after being dropped across all components will just be dropped at the open points.

Discussions:

All connections were thoroughly checked to avoid loose connections. All readings were checked multiple times.

Task 2B

Name of Experiment:

Verification of KCL

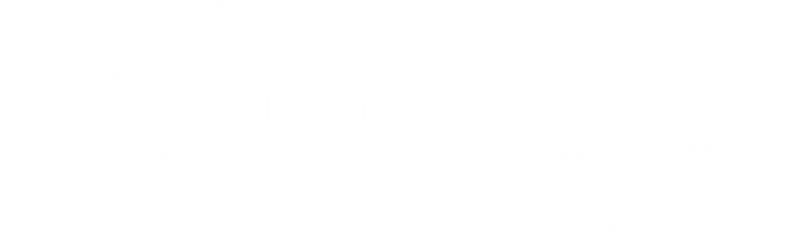
Objective:

This experiment is intended to verify Kirchhoff’s Current Law (KCL) with the help of series-parallel circuits.

Equipment Used:

Jumpers, Multi-meter, Ammeter, Bread Board, Variable Voltage Source, Resistors

Circuit Diagram:



Data Table:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Observation No. | / | / | / | / | / | / |
| 1. Circuit A |  |  |  |  |  |  |
| 2. Circuit B |  |  |  |  |  |  |

Calculations:

For Circuit A,

For Node 1,

For Node 2,

For Circuit B,

For Node 1,

For Node 2,

Result:

The obtained data agrees with KCL.

Questions and Answers:

* Verify whether the obtained data agrees with KCL for nodes 1 and 2.

As shown in the calculations section, the obtained data almost perfectly agrees with KCL. The slight error is most likely due to human errors.

* What do you understand by super node?

In nodal analysis, KCL is used to determine nodal voltages. The current through each branch must be known in order to do this. If a voltage source exists between to nodes, the current between them cannot be determined. This situation is called a super node. The two nodes in a super node are considered to be a single node. An equation is formed from this in the normal method, considering the corresponding voltages for the corresponding branches. A second equation is formed as the potential difference between the two nodes is equal to the voltage rise from the source. These two equations can be solved to find the nodal voltages.

Discussions:

All connections were thoroughly checked to avoid loose connections. All readings were checked multiple times.