

Khwaja Yunus Ali University

***Lab Report -03***

**Name of the Department: Computer Science and Engineering**

**Course Code: CSE 0713-1104**

**Course Title: Electrical Circuit Lab**

**Experiment No: 03**

**Name of the Experiment: Verification of Kirchhoff’s Voltage Law (KVL)**

**Date of Experiment: 26-01-2025**

**Date of Submission: 02-02-2025**

**Instructor Signature & Date**

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| **Submitted by –** |  | **Submitted to –** |

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Khwaja Yunus Ali University

**No of Experiment:** 03

**Name of the Experiment:** Verification of Kirchhoff’s Voltage Law.

**Objective:** To verify Kirchhoff’s Voltage Law (KVL) usingdigital simulator.

**Theory:** Kirchhoff's Voltage Law (KVL) states that the sum of all electrical voltages around any closed loop is zero. Simply put, in a closed circuit, the total voltage gains equal the total voltage drops.

Mathematically, for a loop with n elements:

KVL helps in analyzing complex circuits by allowing the calculation of unknown voltages and currents, leading to insights into the overall behavior of the system.

**Circuit Diagram:**

A diagram of a circuit

Description automatically generated

Circuit diagram of KVL in a circuit

**List of apparatus:**

A working computer.

Software: Proteus 8 professional.

Tools: 1. Resistor, 2. Cell, 3. Grounding, 4. Wires, 5. DC Voltmeter

**Procedure:**

1. We connected two resistors R1 & R2 in a series connection with a DC voltage source.
2. We added two DC Voltmeter parallel to the resistor R1 & R2.
3. We measured the voltage across each resistor using DC Voltmeter.
4. We calculated the algebraic sum of the voltages and verified the sum is zero.
5. We compared the calculated result with measured result.

**Calculation:**

Given that,

R1 =25 Ω

R2 =35 Ω

V = 60 v

We know that,

=

=

= 25 v

Again,

=

=

= 35 v

Total voltage drop, = 25+35 = 60v

**Table:**

| SL No | Input Voltage (V) | (V) | (V) | Total Voltage (V) (calculated) | Total Voltage Drop () (Theoretical) |
| --- | --- | --- | --- | --- | --- |
| 1 | 60 | 25 | 35 | 60 | 60 |
| 2 | 100 | 60 | 40 | 100 | 100 |
| 3 | 160 | 120 | 40 | 160 | 160 |
| 4 | 360 | 150 | 210 | 360 | 360 |

**Result and Discussion:**

After throw observation and calculation we can see that the total voltage input (observed & calculated) in the circuit is equal to the total voltage drop(observed & calculated) which is 60v.

**Conclusion**: In a closed circuit, the algebraic sum of all the voltage drop is zero, hence Kirchhoff's voltage law is verified.