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Experiment No :4

Experiment Name: Implement and analysis of a circuit using Superposition Theorem.

Objectives:

To verify experimentally the superposition theorem which is an analytical technique of determining currents in a circuit with more than one emf sources.

Required:

1.DC voltage source

2.Resistor

3.Ammeter

4.Multimeter

5.Connecting Wires

Background Theory:

Superposition theorem states that in a lumped , linear ,bilateral network consisting more number of sources each branch current(voltage) is the algebraic sum all currents (branch voltages), each of which is determined by considering one source at a time and removing all other sources .In removing the sources , voltage and current sources are replaced by internal resistance. The superposition theorem is very useful for finding the voltage and currents in a circuit with two or more sources of supply, and is usually easier to use than Kirchoff’s law equations.

Procedure:

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1. Connect the circuit as shown in figure
2. Measure values of **(I1,I2,)** and record the table
3. Connect the circuit below, when V1=on and V2 = short.
4. Measure values of (I1 ,I2)and record the table
5. Connect the circuit below ,when V1 =short and V2=on
6. Measure values of (I1 and I2) record the table
7. From results ,calculate the current pass through each resistor and voltage across each resistor.

Result analysis:

Table

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| R1 | R2 | R3 | V1 | V2 | | practical | | Mathematical | |
|  |  |  |  |  | I1 | | I1 | |
| I2 | | I2 | |
| I3 | | I3 | |

In this experiment we take both 5v and R1=100kΩ,R2=5.59KΩ and I1=0.03mA, I2=0.07mA. As it is a practical implement there should be some error.

Graph Representation:

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Precautions:

1. All connection should be tight.
2. Before connecting the instrument , check their zero setting.

Reference: <https://www.scribd.com/document/290392996/Verification-of-Superposition-Theorem-Lab-Report>

<https://www.pcepurnia.org/wp-content/uploads/2020/03/Verification-of-superposition-theorem-1.pdf>