Experiment Details

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| Department Name | Electrical Dept |
| Class | S.Y.Btech |
| Semester | III |
| Subject Name | Electrical Circuit Analysis |
| Experiment No. | 1 |
| Experiment Name | KCL & KVL |

Version History

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| --- | --- | --- | --- | --- |
| Sr. No. | Version Number | Created By | Approved By | Date |
| 1 | v1.0 | Priya Yadav | Mrs. Sushmita Sharma | 12/10/2020 |
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AIM:

To verify Kirchhoff’s Voltage Law (KVL) and Kirchhoff’s Current Law (KCL) in a Passive Resistive Network.

THEORY:

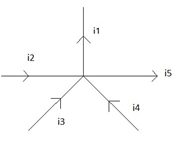
Kirchhoff's Current Law states that the sum of all the currents entering a node is zero. A common mistake in applying this law is to not carefully show the direction of each current entering the node. Kirchhoff's Voltage Law states that the sum of all the voltages around a circuit loop must equal to zero. When applying this law, be sure to indicate the polarity of the voltage across each circuit element using + and - signs.

Circuit Diagram:



PRE TEST:

1. Relation between currents according to KCL is,



1. i1=i2=i3=i4=i5
2. i1+i4+i3=i5+i2
3. i1-i5=i2-i3-i4
4. **i1+i5=i2+i3+i4**
5. The basic laws for analyzing an electric circuit are :-
6. Einstein’s theory
7. Newtons laws
8. **Kirchhoff’s laws**
9. Faradays laws
10. A junction where two (or) more than two network elements meet is known as a \_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. **Node**
12. Branch
13. Loop
14. Mesh
15. Inductor is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ element.
16. Active
17. **Passive**
18. Linear
19. Polar

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1. Nodal analysis is based on
2. **KCL**
3. KVL
4. Both
5. Law of conservation of energy

PROCEDURE:

**To Verify KVL:**

1. Connect the circuit as shown in Figure 1.

2. Switch ON the supply

3. Apply the voltage (say 5v) and note the voltmeter readings.

4. Gradually increase the supply voltage in steps.

5. Note the readings of voltmeters.

6. sum up the voltmeter readings (voltage drops) , that should be equal to applied voltage .

7. Thus KVL is verified practically.

**To Verify KCL:**

1. Connect the circuit as shown in Figure 1.

2. Switch ON the supply

3. Apply the voltage (say 5v) and note the Ammeter readings.

4. Gradually increase the supply voltage in steps.

5. Note the readings of Ammeters.

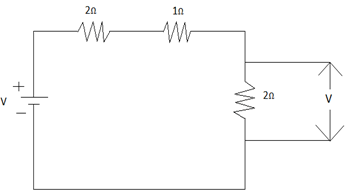
6. Sum up the Ammeter readings (I1 and I2) , that should be equal to total current (I).

7. Thus KCL is verified practically

POST TEST:

1. Five volts is applied to two 2 ohm resistors in series. The resulting current is
2. 5A
3. 2.5A
4. **1.25A**
5. 10A
6. \_\_\_\_\_\_\_\_\_\_ carries negative charge and \_\_\_\_\_\_\_\_\_\_\_\_ carries positive charge.
7. Proton, Eletron
8. Electron, Neutron
9. **Electron, Proton**
10. Nucleus, Electron
11. Where voltage division problem arises
12. **Series connected resistors**
13. Parallel connected resistors
14. When resistors are equal
15. Both series and parallel resistors.
16. Calculate Voltage across 2Ω Resistor where supply v= 10volts.  
    a) 2V  
    b) 3V  
    c) 10V

d) **4V**



1. A 100 Ω resistance is directly switched on across a 10V battery. How much is the power loss? Also find energy consumed in 5 sec.
2. **P=1W, Energy Consumed= 5 Joules**
3. P=5W, Energy Consumed= 5 Joules
4. P=5W, Energy Consumed= 10 Joules
5. P=10W, Energy Consumed= 10 Joules

REFERENCES:

1. A.Chakrabarti, “Circuit Theory (Analysis & Synthesis)”, IIIrd Edition (Unit I,II) Dhanpat Rai & Co.
2. . A. Sudhakar, Shyammohan S.Palli, “Circuit & Network – Analysis & Synthesis”, IIIrd Edition – Tata McGraw Hill Publication (Unit II, IV, VI).