|  |  |  |  |
| --- | --- | --- | --- |
| **Course Name:** | **Elements of Electrical and Electronics Engineering** | **Semester:** | **I/II** |
| **Date of Performance:** | **08/11/2021** | **Batch No:** | **A3** |
| **Faculty Name:** | **Maruti Zalte** | **Roll No:** | **16010121051** |
| **Faculty Sign & Date:** |  | **Grade/Marks:** | **/ 25** |

**Experiment No: 3**

**Title:** **Thevenin’s Theorem & Norton’s Theorem.**

|  |
| --- |
| **Aim and Objective of the Experiment:** |
| * To Verify for Thevenin’s Theorem for the circuit * To Verify Norton Theorem for the Circuit. |

|  |
| --- |
| **COs to be achieved:** |
| **CO1:** Analyze resistive networks excited by DC sources using various network theorems. . |

|  |
| --- |
| **Circuit Diagram/ Block Diagram:** |
| **Circuit Diagram**  **Task 1: Circuit Diagram to measure VTh:**    **Task 2: Circuit Diagram to measure Isc=IN:**    **Task 3: Circuit Diagram to measure Rth=RN:** |

|  |
| --- |
| **Stepwise-Procedure:** |
| **Thevenin’s Theorm**  1. Connect the circuit as shown in the circuit diagram.  2. Set V1, V2 and measure open circuit voltage VTh across load terminals A and B.  3. Replace all voltage sources by Short circuit and measure RTh across terminals A and B as per the circuit diagram shown in the figure.  4. Draw Thevenin’s equivalent circuit and determine the value of load current from it.  5. Verify the results theoretically.  **Norton’s Theorem**  1. Connect the circuit as shown in the circuit diagram.  2. Set the voltages V1, V2  3. Remove the load resistance and measure the short circuit current ISC through A and B terminals.  4. Replace all the voltage sources by Short circuit and measure RTh across terminals A and B as per the circuit diagram shown in the figure.  5. Draw Norton’s equivalent circuit and determine the value of load current.  6. Verify the results theoretically |

|  |
| --- |
| **Observation Table:** |
| |  |  | | --- | --- | |  | **IRL** | | **Practical value** | **-0.2** | | **Theoretical value** | -0.2 |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | **Vth** | **Rth (Ω)** | **Isc (IN)** | **Irl**  **Thevenin** | **Irl ΩNorton** | | **Practical value** | **-258V** | **766.67** | **-0.34A** | **-0.2A** | **-0.21A** | | **Theoretical value** | -260 | 766.67 | -0.34 | 0.20 | 0.21 |  |  |  | | --- | --- | | Thevenin's equivalent circuit |  |   **Norton's Equivalent circuit**    Theoretical Calculation:  Vth : 10-Vth = Va+V1-Vth..........1  100 200  Va-Vth = 1 ..........................2  200  From 1 and 2  Vth = -260V  Rn = [1/ ( 1/R1+1 /R3)]+(R2 +R4) = 766.67  Isc = Vth/Rth = -0.34A  From Thevenin’s Equivalent Circuit  I (Thevenin) = Vth/[Rth + R(l)]  = -260/1266.67  = -0.2 A  From Norton’s Equivalent Circuit  V = Isc x [1/(1/Rth + 1/R(l))]  = -102.8949 V  I (Norton) = V/R(l)  = -102.8949/500  = -0.2057 A  Rth = (R2 +\_R3) +[(R1\*R2)/(R1+R2)]  Rth = 700 +(100\*200)/300  Rth = 700+66.67  Rth = 766.67 **Ω** |
|  |

|  |
| --- |
| **Conclusion:** |
| Practically Constructed a circuit and verified Norton’s and Thevenin’s Theorem |

|  |
| --- |
| **Signature of faculty in-charge with Date:** |