LAB NO: 06

ANALYZING A DC CIRCUIT USING SOURCE TRANSFORMATION TECHNIQUE

OBJECTIVE:

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THEORY:

SOURCE TRANSFORMATION:

Source Transformation simply means replacing one source by an equivalent source. A practical voltage source can be transformed into an equivalent practical current source and similarly a practical current source into voltage source. Any practical voltage source or simply a voltage source consists of an ideal voltage source in series with an internal resistance or impedance (for an ideal source this impedance will be zero), the output voltage becomes independent of the load current. Cells, batteries and generators are the example of the voltage source.

For any practical current source or simply current source, there is an ideal current source in parallel with the internal resistance or impedance, for ideal current source this parallel impedance is infinity.

Conversion of Voltage Source to Equivalent Current Source:

From the above discussion a voltage source can be converted or transformed into a current source by interchanging a series resistor to parallel as shown in the figure below:

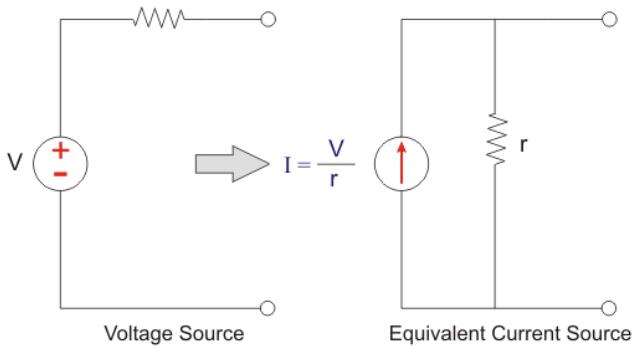

Figure 6.1: Conversion of Voltage Source to Equivalent Current Source

Conversion of Current Source to Equivalent Voltage Source:

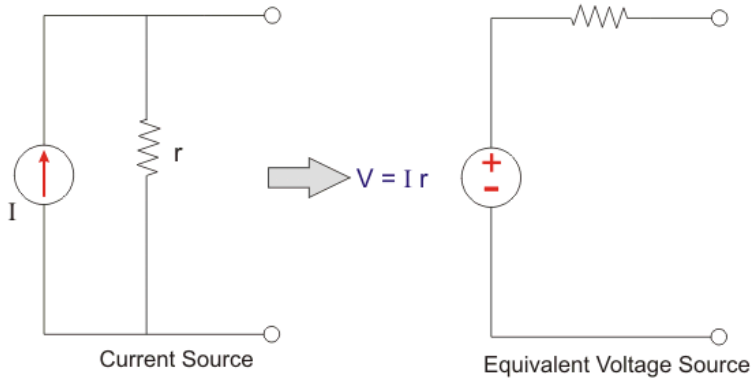

Figure 6.2: Conversion of Current Source to Equivalent Voltage Source

APPARATUS:

- Digital multi-meter
- DC power supply
- Resistors
- Connecting wires

SCHEMATIC DIAGRAM:

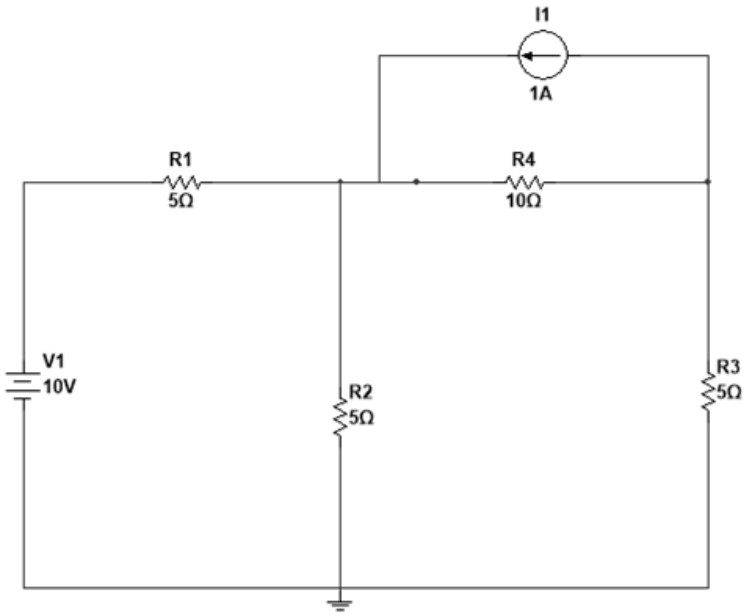

Figure 6.3: Circuit Diagram

PROCEDURE:

CALCULATIONS:

Current Through R_2 When	**I(Theoretical)**	**I(Measured)**
$R_2 = 5\Omega$		
$R_2 = 6\Omega$		

Table 6.1

CONCLUSION:

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POST LAB QUESTIONS:

1. Why the internal resistance of an ideal voltage source is zero?

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2. Why the internal resistance of an ideal current source is infinite?

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3. What is the difference between dependent and independent current sources?

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Teacher Remarks:

Obtained Marks: _____ / 10