



Basic Electrical Technology

Mesh Current Analysis



Objective

Application of KVL for the analysis of DC circuits



Introduction

Mesh

- A closed path for the flow of current

Kirchhoff's Voltage Law (KVL)

- The algebraic sum of voltages in a mesh is zero

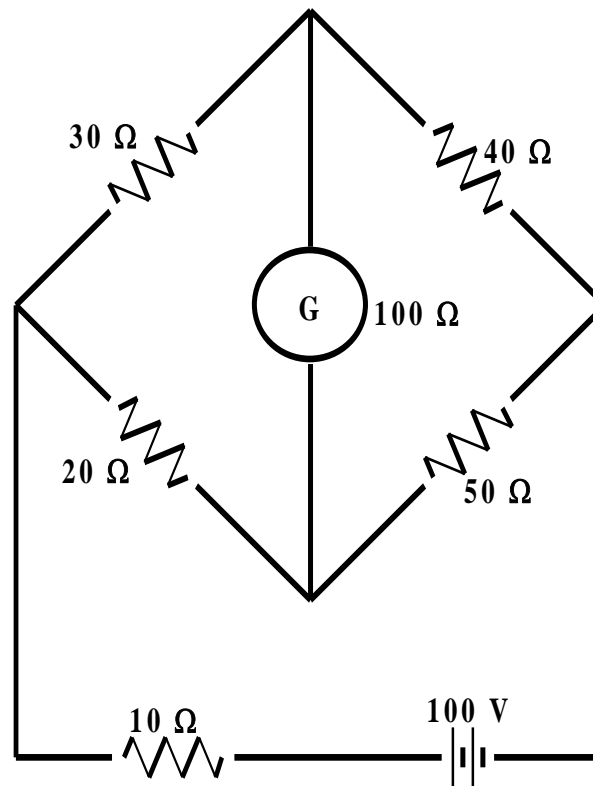


Mesh Current Analysis Method

- Transform all the current sources present in the circuit to voltage sources
- Mark different currents in all the independent meshes of the given network
- Write KVL equations for these independent meshes
- Solve for the currents

Illustration 1

Determine the current through the galvanometer “G”



Answer : 84 mA

Illustration 1 contd...

How to write the network equations by inspection?

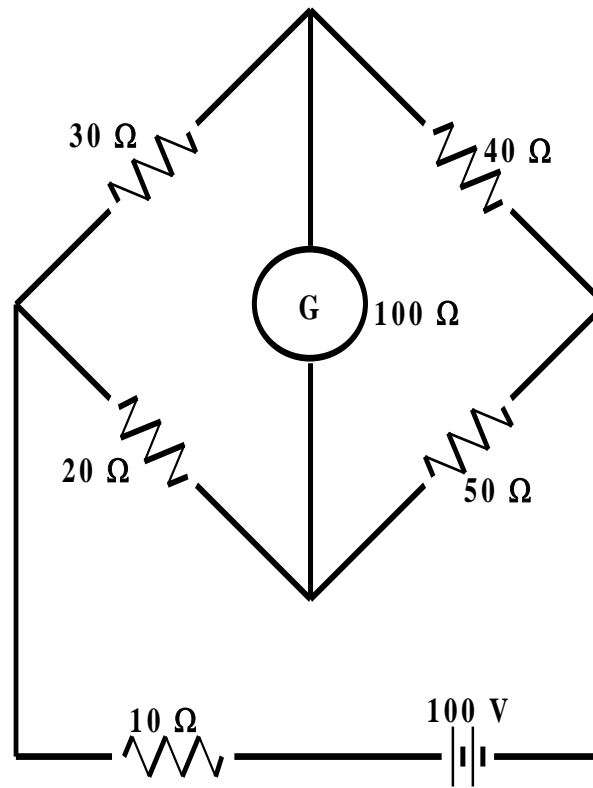
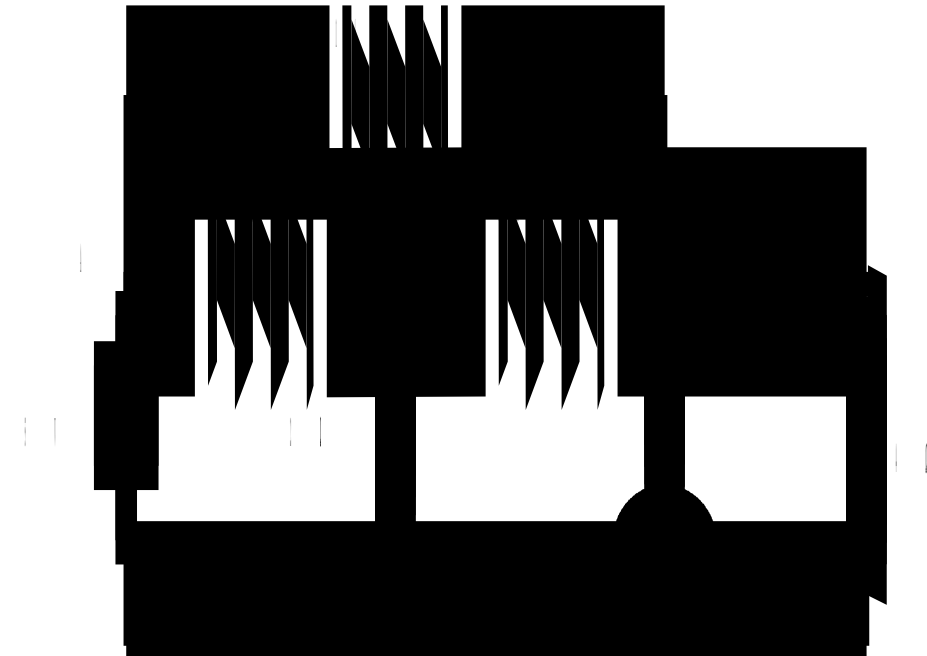


Illustration 2

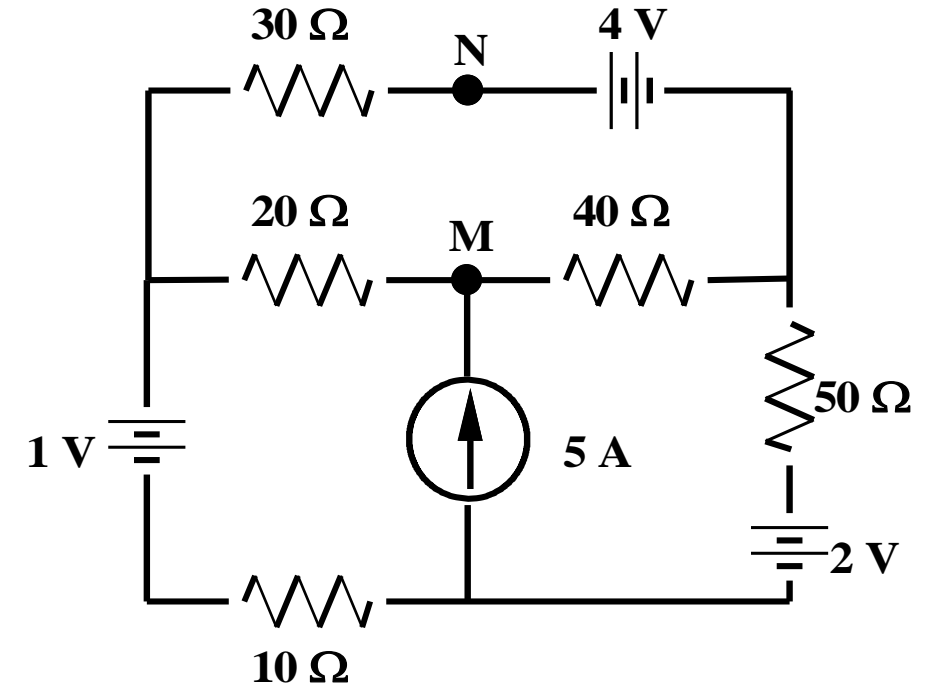
Determine the current and its direction through the $2\ \Omega$ resistor. Also, determine the potential difference between A & B



Answer : $I_{2\Omega} = 0.575\text{ A}$ (downwards)
 $V_A - V_B = +2.7\text{ V}$

Illustration 3

Find the power supplied by the 5 A current source. Also, determine the voltage between the points M & N.



Answer : $P_{5A} = 556.5 \text{ W}$

$V_M - V_N = 55.8 \text{ V}$



Summary

- Mesh currents are determined
- Other operating conditions can be determined using the mesh currents
- Concept of super-mesh: If there is a current source between two meshes