# SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

**An Autonomous Institution**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

## COURSE NAME : 19EE01 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

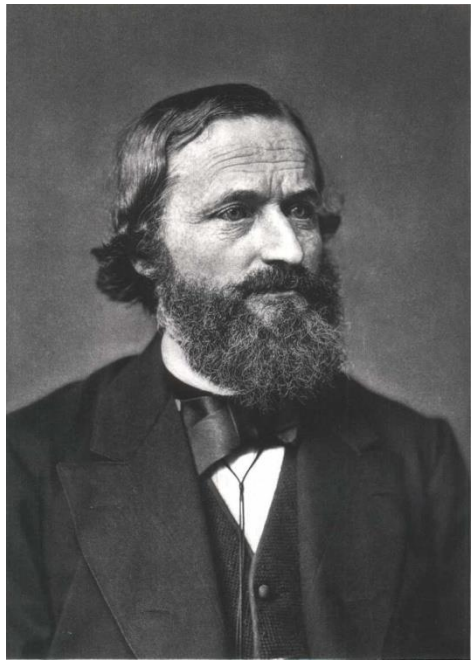
I YEAR /II SEMESTER COMPUTER SCIENCE & TECHNOLGY

Unit 1: Electrical Circuits & Measurements

Topic 3: Kirchhoff's Law

# KIRCHHOFF'S LAW

In 1845, a German physicist, **Gustav Kirchhoff** developed a pair or set of rules or laws which deal with the conservation of current and energy within electrical circuits.

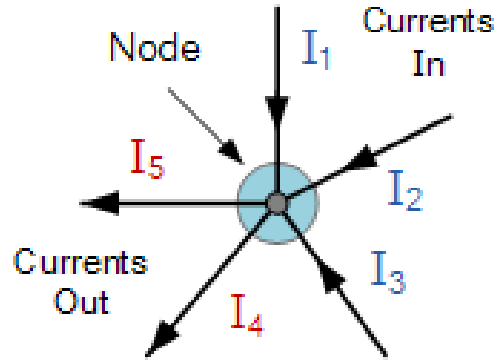


These two rules are commonly known as: Kirchhoffs Circuit Laws with one of Kirchhoffs laws dealing with the current flowing around a closed circuit, **Kirchhoffs Current Law, (KCL)** while the other law deals with the voltage sources present in a closed circuit, **Kirchhoffs Voltage Law, (KVL)**.

# KIRCHHOFF'S CURRENT LAW

The algebraic sum of ALL the currents entering and leaving a node must be equal to zero, $I_{(exiting)} + I_{(entering)} = 0$.

Currents Entering the Node
Equals
Currents Leaving the Node

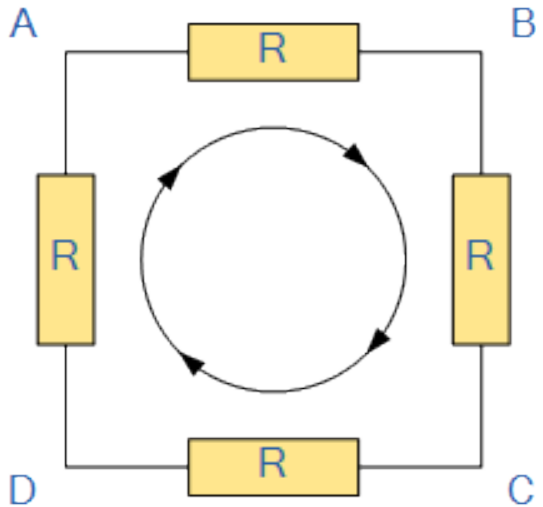



$$I_1 + I_2 + I_3 + (-I_4 + -I_5) = 0$$

# KIRCHHOFF'S VOLTAGE LAW

"In any closed loop network, the total voltage around the loop is equal to the sum of all the voltage drops within the same loop"

The sum of all the Voltage Drops around the loop is equal to Zero

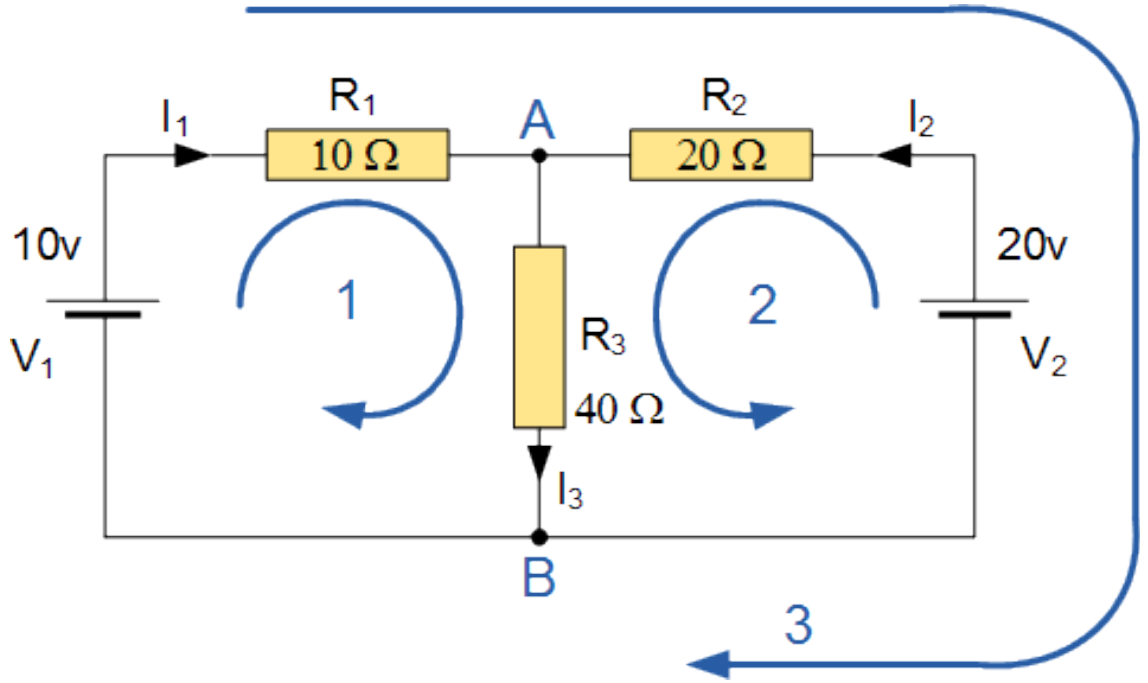



$$V_{AB} + V_{BC} + V_{CD} + V_{DA} = 0$$

# CHALLENGE

Find the current flowing in the 40Ω Resistor, $R_3$

Mesh Loop Method

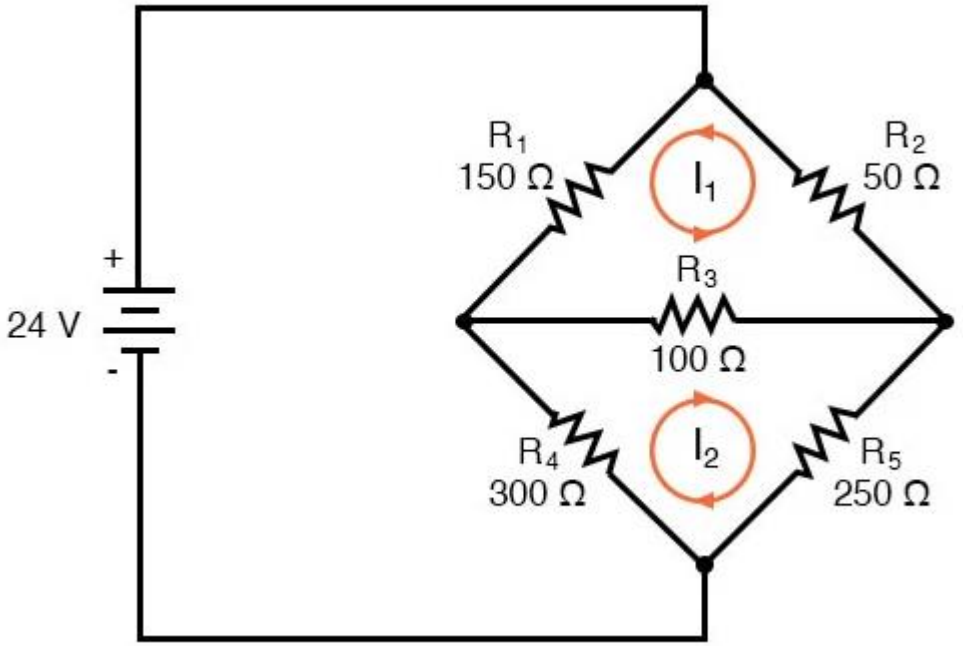



The current flowing in resistor $R_3$ is given as : -0.143 + 0.429 = 0.286 Amps

voltage across the resistor $R_3$ is given as : 0.286 x 40 = 11.44 volts

# YOUR CHALLENGE-ASSESSMENT

Find the current flowing through  150 ohm Resistor R1



# REFERENCES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2. Bhattacharya. S.K, “Basic Electrical and Electronics Engineering”, Pearson Education , (2017) – UNIT I – IV
3. Mehta V K, Mehta Rohit, “Principles of Electrical Engineering and Electronics”, S.Chand & Company Ltd, (2010)- UNIT I and II
4. Mehta V K, Mehta Rohit, “Principles of Electronics”, S.Chand & Company Ltd, (2005)- UNIT IV and V


# THANK YOU