



# **SNS COLLEGE OF ENGINEERING**

Kurumbapalayam (Po), Coimbatore – 641 107

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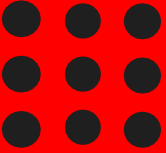
**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**COURSE NAME : 23EET01 BASIC ELECTRICAL AND ELECTRONICS  
ENGINEERING**

**I YEAR /II SEMESTER ARTIFICIAL INTELLIGENCE & DATA SCIENCE**

**Unit 1 – Electrical Circuits and Measurements**

**Ohms' Law**





# DEFINITION

- The potential difference (voltage) across an ideal conductor is proportional to the current through it. The constant of proportionality is called the "resistance", R.

- $I = V/R$

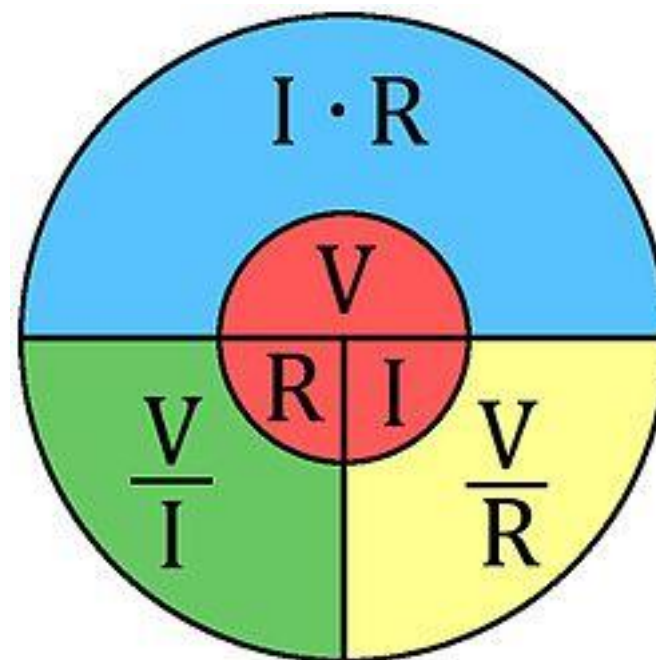
- $V = IR$

- $R = V/I$

I = Current

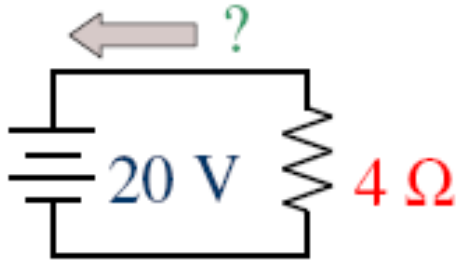
V = Voltage

R = Resistance

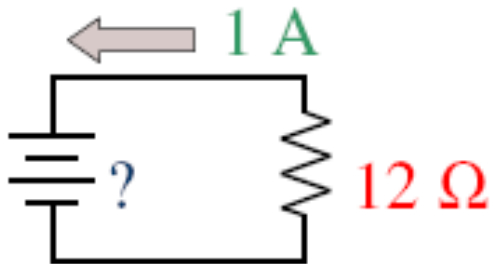




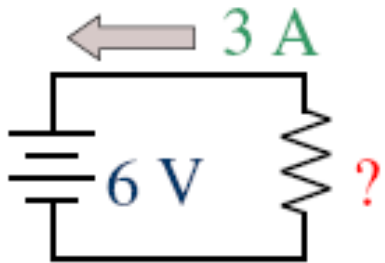
# Simple Circuits with Ohm's Law



$$I = (20/4) = 5 \text{ A}$$



$$V = 1 \times 12 = 12 \text{ V}$$



$$R = (6 / 3) = 2 \text{ ohms}$$



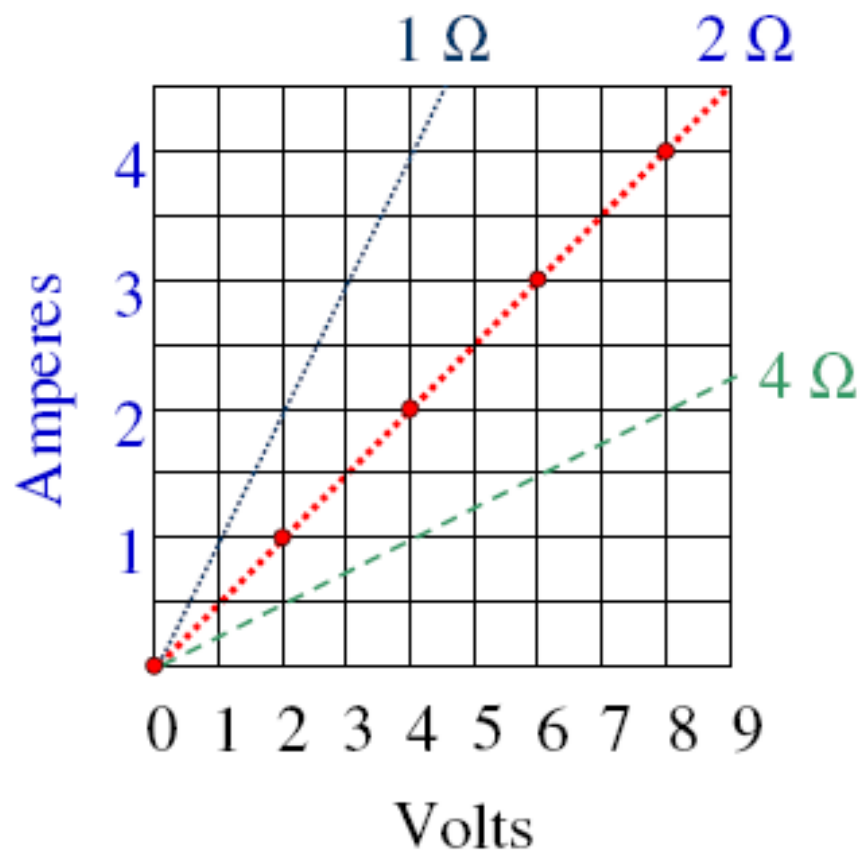
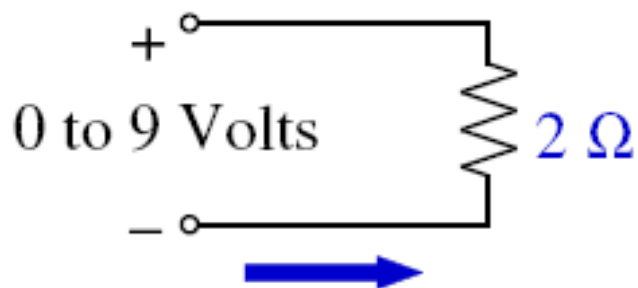
# Can you solve?

1.  $V = 14 \text{ V}, I = 2 \text{ A}, R = ?$
2.  $V = 25 \text{ V}, I = 5 \text{ A}, R = ?$
3.  $V = 6 \text{ V}, I = 1.5 \text{ A}, R = ?$
4.  $V = 24 \text{ V}, I = 4 \text{ A}, R = ?$





# LINEAR PROPORTION BETWEEN V & I





# Power Dissipation in Resistance

- The amount of power dissipated in a resistance may be calculated using any one of three formulas, depending on which factors are known
- $P = I^2 \times R$
- $P = V^2 / R$
- $P = V \times I$



# Assessment 2

1. Solve for the power,  $P$ , dissipated by the resistance,  $R$

a.  $I = 1 \text{ A}$ ,  $R = 100\Omega$ ,  $P = ?$

b.  $I = 20 \text{ mA}$ ,  $R = 1\Omega$ ,  $P = ?$

c.  $V = 5 \text{ V}$ ,  $R = 150\Omega$ ,  $P = ?$

d.  $V = 22.36 \text{ V}$ ,  $R = 1\Omega$ ,  $P = ?$

2. How much power is dissipated by an  $8\Omega$  load if the current in the load is  $200 \text{ mA}$ ?



# Limitations of Ohm's Law

- 1) This law cannot be applied to unilateral networks.
- 2) Ohm's law is also not applicable for non - linear elements.







# REFERENCES

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## THANK YOU