Ministry of Higher Education and Scientific Research
University of Al-Mustaqbal
College of Health and Medical Technologies

General Physics

Frist Stage

A Lecture ONE Title / Practical

Ohm's Law

AN

By

Dr. Ahmed Najm Obaid

ahmed.najm.obaid@uomus.edu.iq

ORCID: [0000-0001-6120-243X]

2025-2026

General guidelines:

- **Keep your mobile phone on silent mode during the lecture.**
- **Maintain quiet and avoid noise inside the hall.**

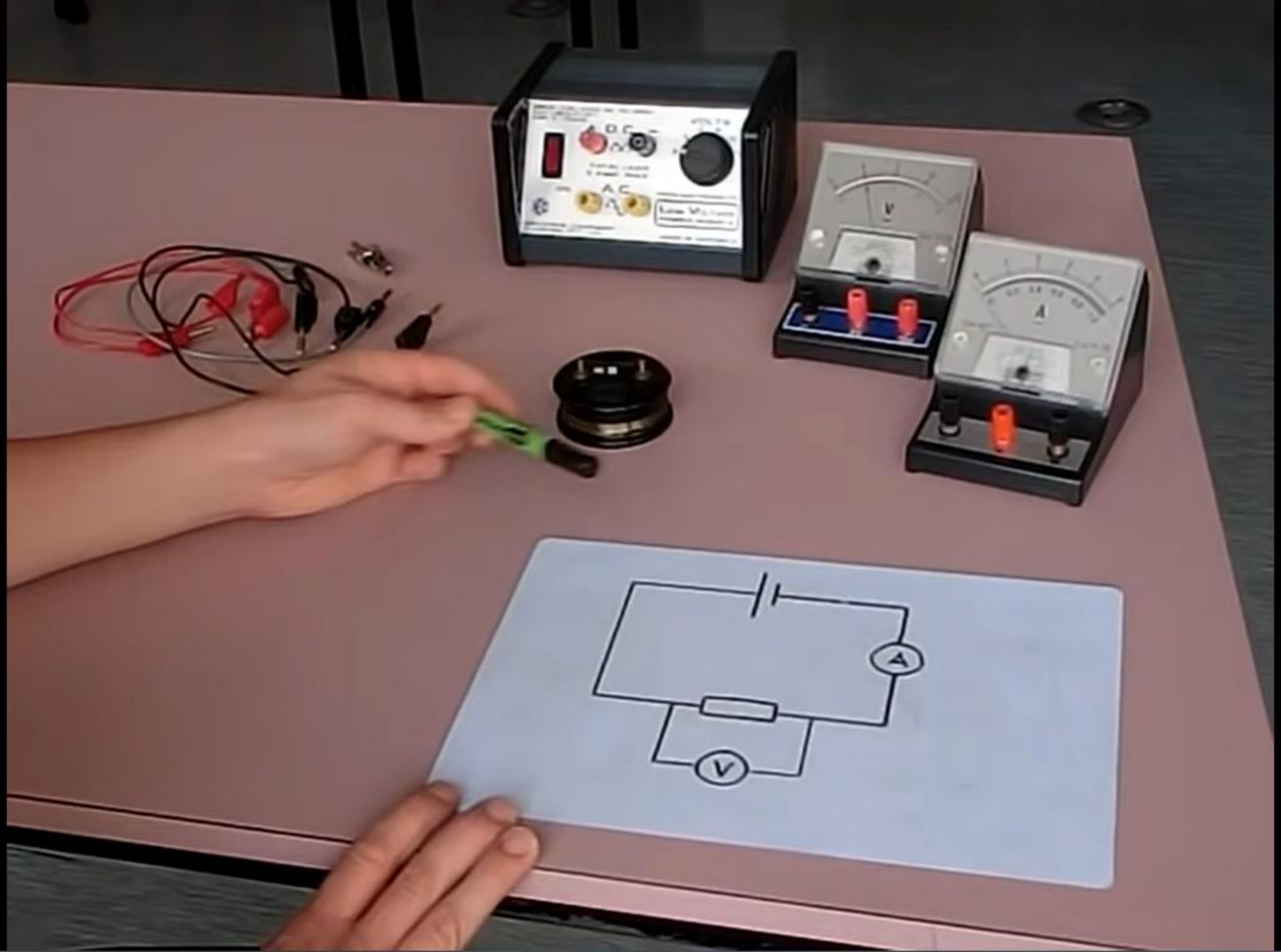
Structure Path

General Objective of the Lecture

The general objective of this lecture is to enable students to understand the fundamental concept of Ohm's Law, identify the relationships between voltage, current, and resistance, and apply this knowledge to interpret circuit behavior and basic electrical measurements.

Behavioral (Performance/Learning) Objectives: By the end of this research/presentation, the candidate is expected to demonstrate the ability to:

- (Remembering) that the student recalls the definition of Ohm's Law by the end of the lecture.
- (Understanding) That the student explains the three main electrical quantities (Voltage, Current, Resistance by the end of the lecture
- (Applying) That the student applies the power formula (P = IV) and Ohm's Law (V = IR) to calculate power by the end of the lecture.


DC
AC
V
A
A
V

Setting Up Your Circuit

1

1. Gather Materials

power Source, a resistor, a voltmeter, ammeter, and connecting wires.

2

2. Connect the Power Source

Attach the positive terminal of the power source to the positive rail of the breadboard and the negative terminal to the negative rail.

3

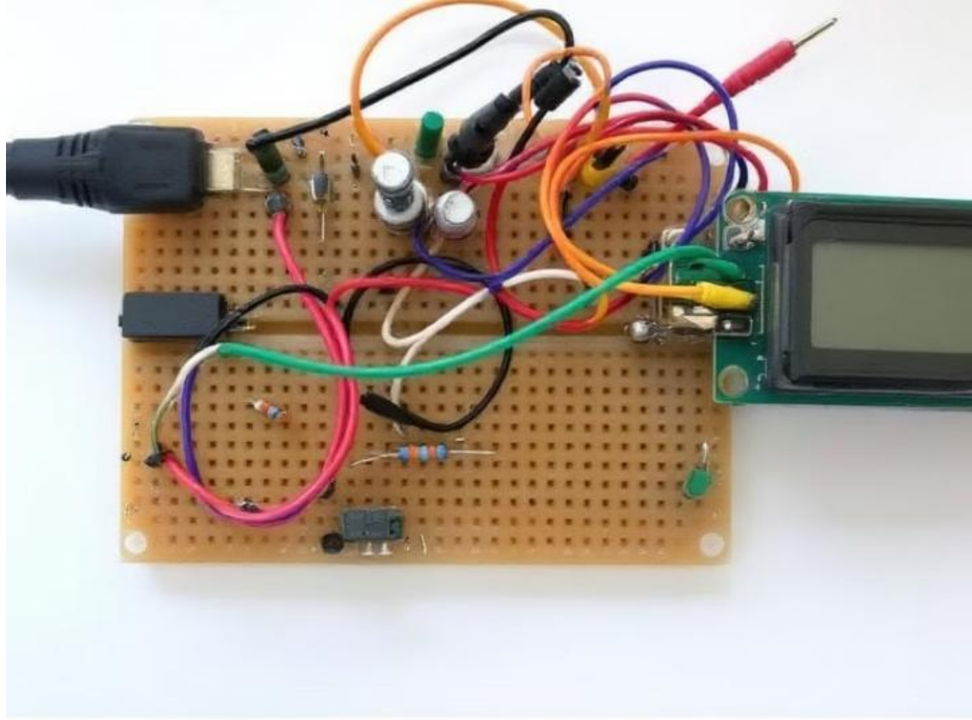
3. Connect the Resistor

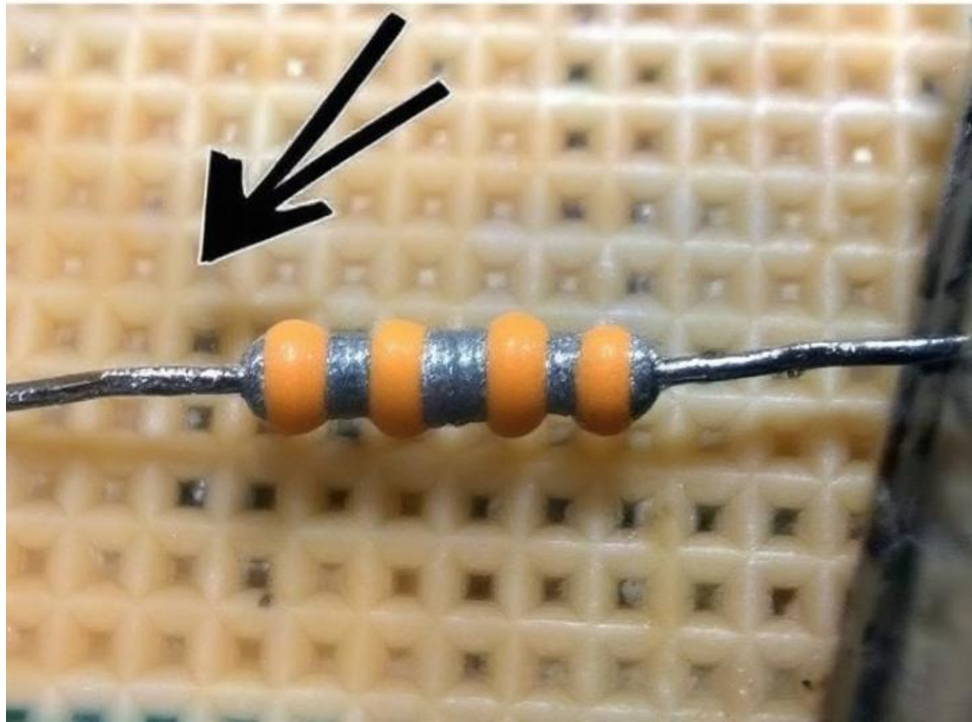
Place the resistor on the breadboard and connect its ends to the positive and negative rails of the breadboard.

4

4. Connect the Voltmeter

Connect the positive probe of the voltmeter across the resistor (one probe on each end), and connect the negative probe to the negative rail of the breadboard.





Quick Quiz – 3 Minute! (Individual activity)

Total score: 0.5 point

Scan → Think → Submit

Scan Me

Google forms

Question (1) ❓ After watching the video that demonstrates how to connect the electrical circuit, which of the following steps is essential to ensure the circuit works correctly?

1-Connecting the resistor in parallel only with the power supply
2-Connecting the Current in parallel only with the power supply
3-Connecting the Voltage in parallel only with the power supply
4-Ensuring all components are connected in a closed path (closed circuit).

The Three Pillars of Ohm's Law

Voltage (V)

Voltage represents the electrical potential difference between two points in a circuit. It's like the pressure driving the flow of electrons, measured in Volts (V).

Electric Current (I)

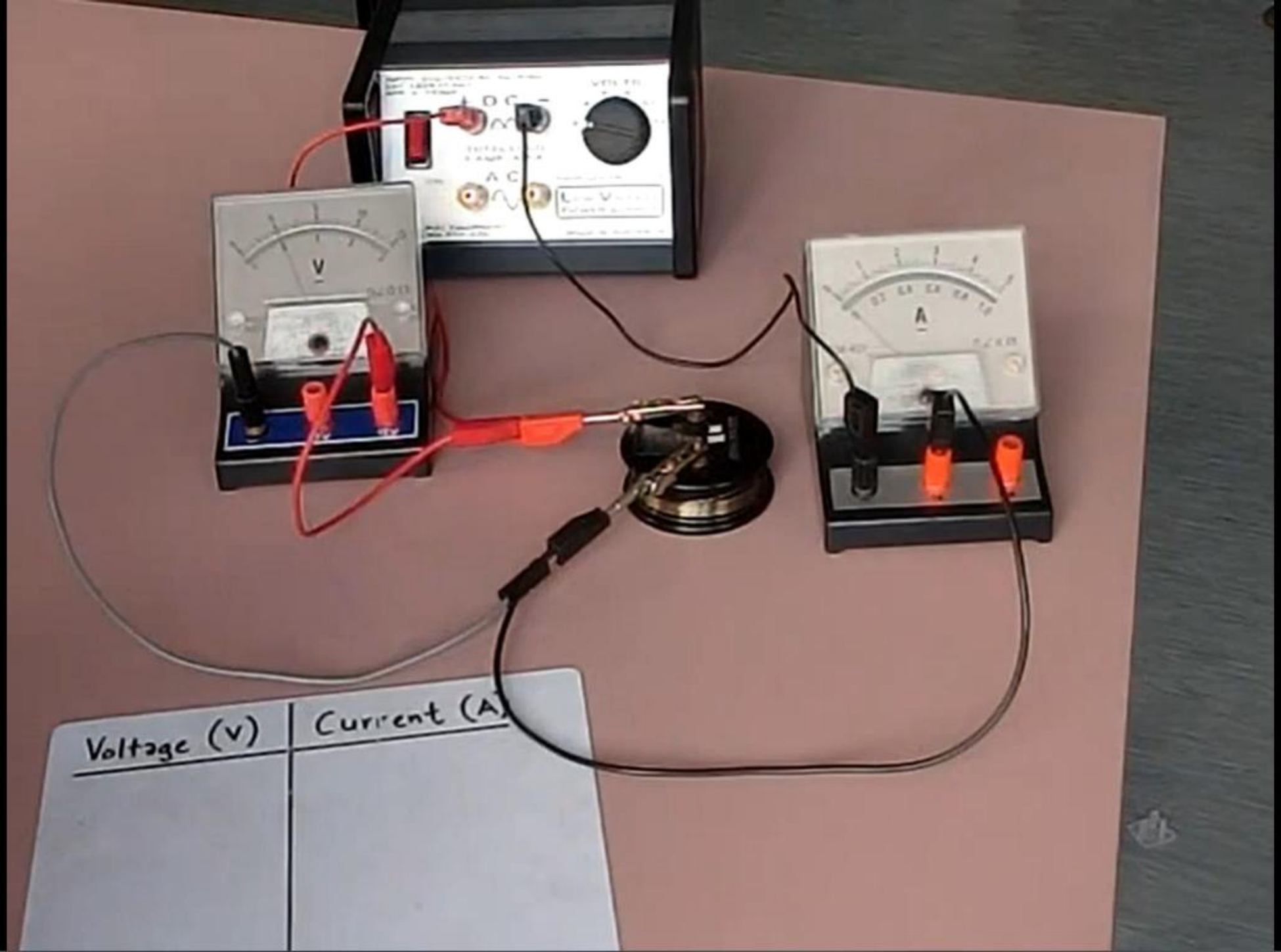
Current measures the rate of flow of electric charge through a conductor. It's like the amount of water flowing through a pipe, measured in Amperes (A).

Resistance (R)

Resistance is the opposition to the flow of electric current. It's like the size of the pipe restricting the water flow, measured in Ohms (Ω).

Ohm's Law Equation

$$R = V / I$$


V
A
Voltage (v)
Current (A)

Calculating Resistance

R

Resistance (R)

Use Ohm's Law (R = V / I) to calculate the resistance of your resistor. Divide the measured voltage by the measured current.

Q/ A light bulb has a resistance of 60 Ω and is connected to a 240 V power supply. What is the current flowing through the bulb?

Answer:

$$R = V / I$$

$$60 = 240 / I$$

$$I = 4 \ A$$

Quick Quiz – 3 Minutes! (Group activity)

Total score: 0.5 points

Scan → Decide → Submit

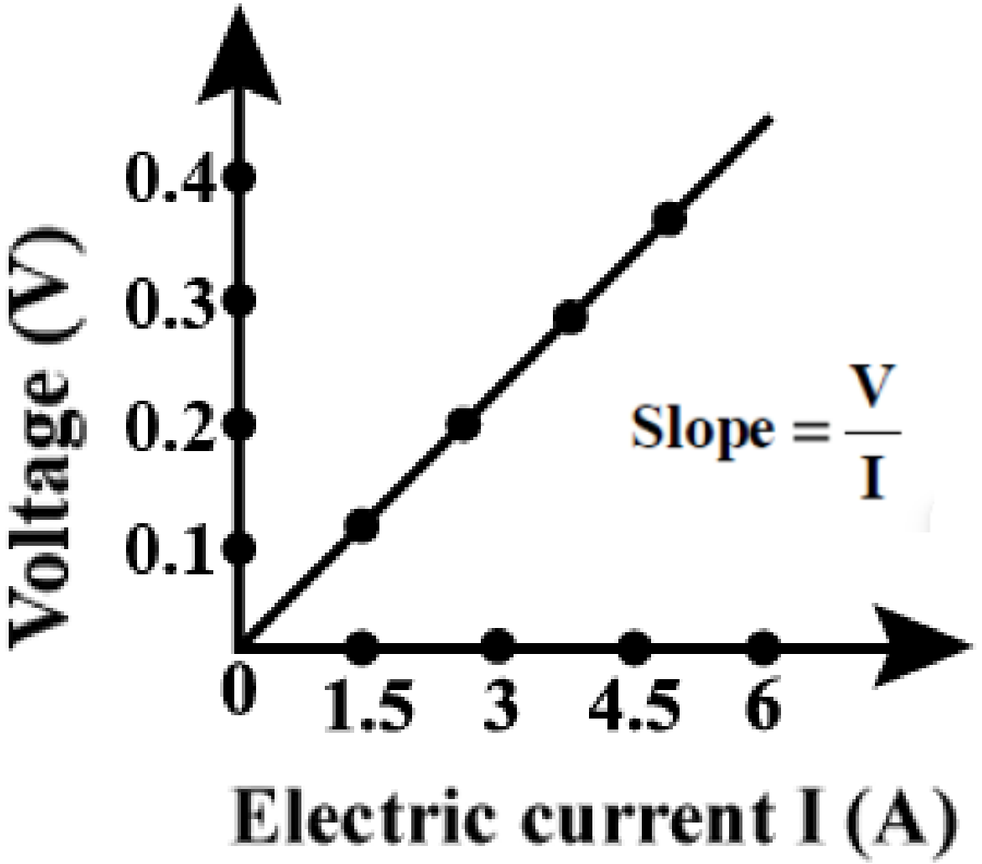
Scan Me

Google forms

Question (2) ❓ A circuit has a resistance of 10 Ω and a current of 2 A. What is the voltage across the circuit?

Plot a graph

Suppose you apply several different voltages across a circuit and measure the current that runs through the circuit. A plot of your results is shown in Figure (1). Draw the best straight line fit of the data. Determine the slope of the straight line which is the resistance in this case.



$$Slope = \frac{\Delta y}{\Delta x} = \frac{V}{I} = R$$

Summary

Topic	Key Point
Ohm’s Law	Defines the relationship between Voltage (V), Current (I), and Resistance (R): (V = I \times R)
Voltage (V)	Electrical potential difference that drives current through a circuit
Current (I)	Flow of electric charge through a conductor
Resistance (R)	Opposition to the flow of current; measured in Ohms (Ω)
Electrical Circuit Connection	Circuit must be closed and connections verified to ensure proper operation

Any

Question

Homework // Q//Choose the correct answer for all of the following and submit your answer via the Classroom platform

1. **The first sign refers to ……..**

(Current, Resistance, Voltmeter, Ammeter, Voltage supplier)

2. **The second sign indicates?**

(Resistance, Voltmeter, Key, Ammeter, Voltage supplier)

3. **The third sign indicates……..**

(Current, Voltmeter, Key, Ammeter, Voltage supplier)

4. **The fourth sign indicates**

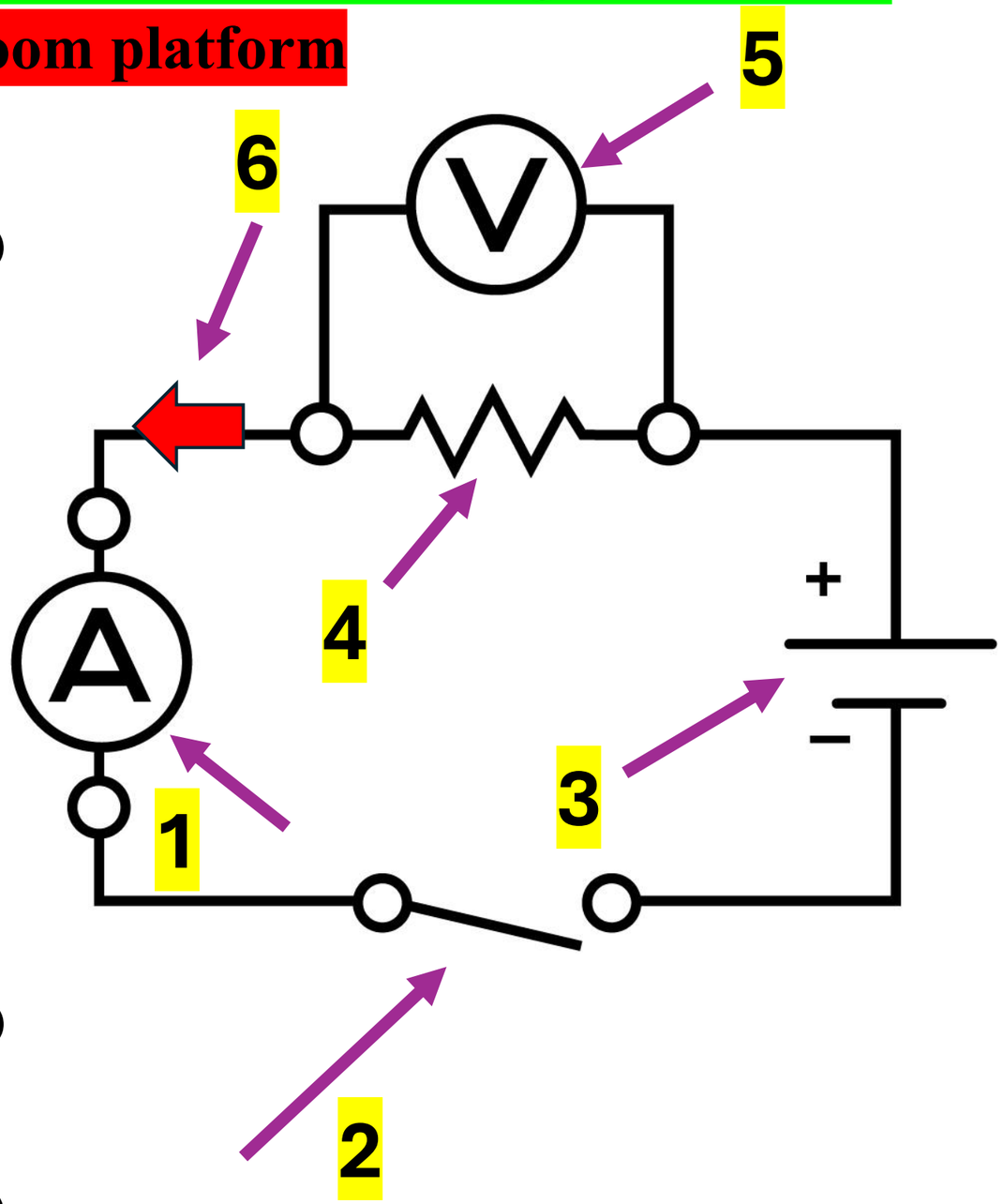
(Current, Resistance, Voltmeter, Key, Ammeter)

5. **The fifth sign indicates**

(Current, Resistance, Voltmeter, Ammeter, Voltage supplier)

6. **The sixth sign indicates**

(Current, Resistance, Voltmeter, Ammeter, Voltage supplier)



References

- Science Introduction to Physics in Modern Medicine, (Suzanne Amador 2002), Radiation Physics for Medical Physicists (Ervien B, Poodgorasak.2006)
- Physics Utah Science Standards, 2019
- Science Direct, Google Scholar. Web of Science

Thank you for listening