



## WORKS. 1

## OHM'S LAW AND POWER

## Main electrical quantities

**Voltage or tension (V)**

**Voltage is the energy necessary to move the electrons through the circuit.**

This energy can be supplied by a cell, a battery, an electric generator or a socket.

The voltage or tension is measured in **volts (V)**.

**Current (I)**

**Current (I)** is the number of electrons that flow through a given point of the circuit every second. It is like the traffic of electrons on the roads of the electric circuit.

Since this traffic is huge, we measure it in amperes (A), which is equivalent to about 6 trillion electrons per second.

**Resistance (R)**

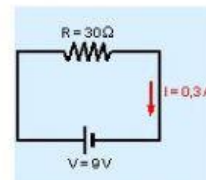
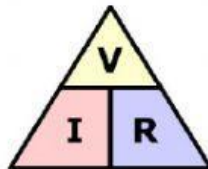
All the components of a circuit (cable, lamp, heater, motor, ...) present a greater or lesser opposition to the flow of the current, since the electrons collide from time to time with the atoms of the material through which they circulate.

This opposition is defined as electrical resistance (**R**) and it is measured in **ohms ( $\Omega$ )**.

These three quantities are related by the **OHM'S LAW**

**Ohm's law**

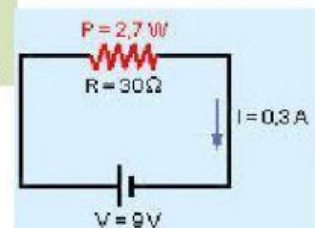
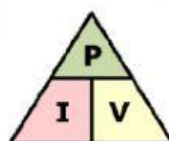
$$V = I \cdot R$$

**Power (P)**

Lamps, heaters, motors, transform electrical energy into light, heat, movement ... The amount of energy that a device consumes in one second is the electrical power (P) and is measured in watts (W)

The more power a device has, the more energy it will consume during the time it is on, the brighter a light bulb will shine, the more heat a heater will give,...

The power consumed by a device is calculated knowing the voltage to which it is connected and the intensity of the current that passes through it.




$$\frac{1}{R_t} = \frac{1}{R_1} + \frac{1}{R_2}$$

1. Complete the table:

Quantity	Symbol	Unit of measurement	Symbol of unit
Current	/	amperes	***
Voltage	***	volts	***
Resistance	$R$	***	***


$$I = V \div R$$

2.  Calculate the current that passes through a 10 ohms light bulb when a tension of 5 V is applied

Data:

$R =$        $\Omega$       Ohm's law      Solution       $I =$       A

$V =$       V

3.  A 23 ohms iron is connected to a 230V outlet. Calculate the current that passes through it.

Data:

$R =$       Ohm's law      Solution       $I =$       A

$V =$

4. Calculate the resistance of an iron knowing that 1.5 A of current flow when connecting it to a 230V tension.



Data:

$I =$       Ohm's law      Solution       $R =$        $\Omega$

$V =$

5. Complete the table using the Ohm's law, note that you have to put the value and the unit.

Voltage	Current	Resistance
***	0,75 mA	6 k $\Omega$
9 V	***	18 $\Omega$
1,5 V	1 mA	***