WORKS. 4 Series and parallel circuits. Calculating the main quantities

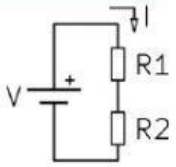
Remember :

When connecting receptors in a circuit, there are three possibilities, connecting them in series, in parallel or combining both ways in the same circuit (combined or mixed circuits)

- ***Series circuit***

The current (I) that flows through any receptor is the same. $I_{total} = I_1 = I_2$

The voltage (V) is shared among the elements and depends on their resistance. It is calculated using the Ohm's law. $V_{total} = V_1 + V_2$



The total resistance is the sum of the resistance in each receptor . $R_{total} = R_1 + R_2$

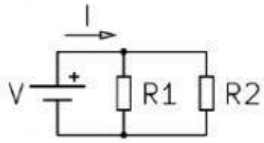
- ***Parallel circuit***

The voltage (V) es the same in each of the receptors:

$V_{total} = V_1 = V_2$

The current (I) that flows through each receptor is independent.

$I_{total} = I_1 + I_2$

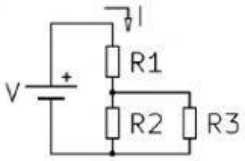


The total resistance is calculated using the equation:

$1/Rt = 1/R1 + 1/R2$

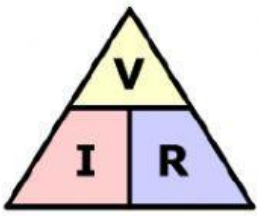
- ***Mixed circuit***

In this case, some of the receptors are connected in series and some others in parallel. To calculate the quantities we need to make groups with the different elements according to the way they are connected and follow the steps applied for series or parallel elements in each case.



Ohm's law

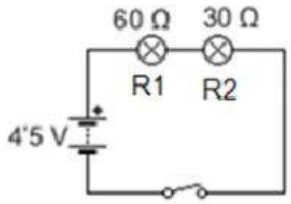
$$V = I \cdot R$$



1. **In the following circuit calculate:**
   a. Type of circuit ***series/ parallel***
   b. R total:

      Formula

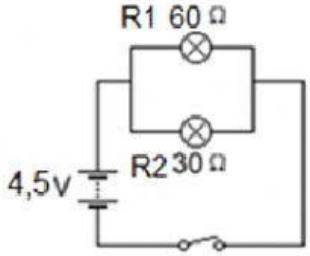
      Solution Rtotal =_____Ω



2. **In the following circuit calculate:**
   a. Type of circuit ***series/ parallel***
   b. R total:

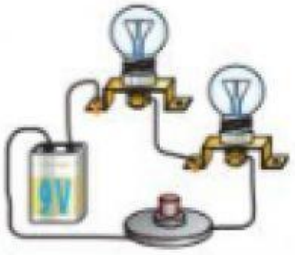
      Formula

      Solution Rtotal =_____Ω



3. **In the following circuit calculate:** *Data: R1 = R2= 100 Ω V battery = 9 V*
   a. Type of circuit ***series/ parallel***
   b. R total: _____Ω
   c. I total: Formula

      Itotal= _____A , as it is a very small value we can pass it to miliampers _____ mA

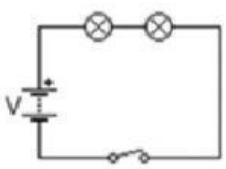


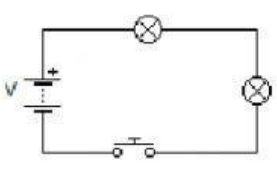
   d. The current that flows through each bulb:

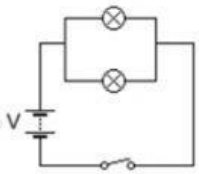
      In the _____ circuits the current _____

      I_1 = I_2=

   e. Click on the correct diagram of the circuit that correspond to de picture above:

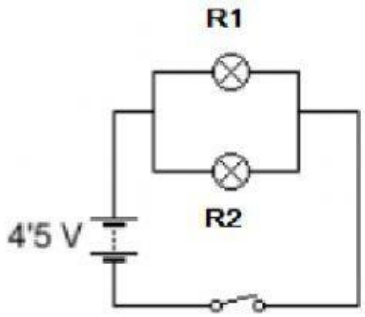






4. In the following circuit calculate:

Data: *R1 = R2= 900 Ω* *V battery = 4,5 V*



a. Type of circuit ***series/ parallel***

b. R total:

Formula:

R*total* _____Ω

c. Total current (I *total*):

Fórmula:

I *total* = _____ A , _____ mA

d. The current that flows through each bulb:

In a _____ circuit the current _____ in each branch of the circuit.

As the resistance in each elelment is the same value, the current through each bulb will be _____.

Consequently the total current is _____ in the two branches of the circuit.

I_1_____ A I_2_____ A