INTRODUCTION TO ELECTRICITY 2º ESO

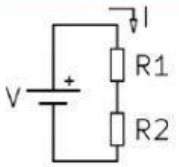
WORKS. 3 Asociación de receptores. Tipos de circuitos

When connecting receptors in a circuit, there are three possibilities, connecting them in series, in parallel or combining both ways (combined 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. $R_{total} = R_1 + R_2$

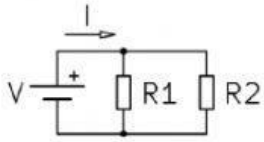
- ***Parallel circuit***

The **voltage** (V)is the same in all receptors:

$V_{total} = V_1 = V_2$

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

$I_{total} = I_1 + I_2$

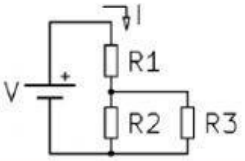


The **total resistance** is calculated using the equation:

1/Rt = 1/R1 + 1/R2; Rt = 1/(1/R1+1/R2)

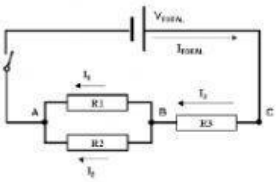
- ***Combined or mixed circuit***

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 different elements according to the way they are connected and follow the steps applied for series or parallel elements in each case.

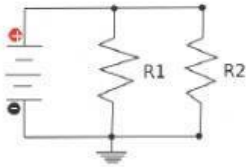


LIVEWORKSHEETS

1. **Identify the circuits** (series, parallel or combined?)



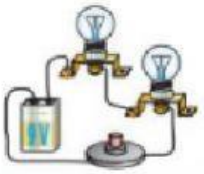
_____ circuit



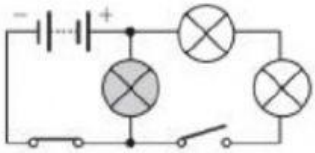
_____ circuit



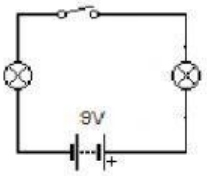
_____ circuit



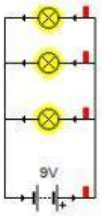
_____ circuit



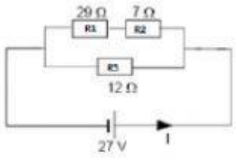
_____ circuit



_____ circuit



_____ circuit



_____ circuit

2. **Indicate the correct option:**

a. In a series circuit the current is _____.

b. In a series circuit the total resistance is_____.

c. In a parallel circuit the voltage (V) _____.

d. The total resistance (in a parallel circuit) _____ will always be lower than the individual ones.

e. The elements connected in parallel have in common _____.

f. The elements connected in series have in common _____.

g. The sum of the voltages of the elements in series will be_____.

h. In a series circuit the more bulbs you have _____ the light will be.

i. If we have 10 equal resistors connected in series, the total resistance will be_____.

j. If we have 10 equal resistors connected in parallel, the total resistance will be_____.

k. In a _____ circuit when a bulb blows the others stop working, they go off.

LIVEWORKSHEETS

3. **If we connect a 200 ohms and a 1500 ohms resistors in series, the total resistance is obtained using the equation:**

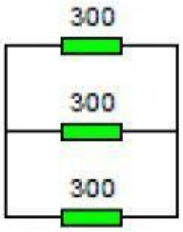


R total =



Therefore, in this particular case the total resistance will be: _____ Ω

4. **To calculate the total resistance in a parallel circuit we use the equation:**



R total



If we have three 300 ohms resistors in parallel, the total resistance will be _____

ohms

LIVEWORKSHEETS