# 6. Current Electricity

## Let us assess

### 1. Question

Complete the table properly

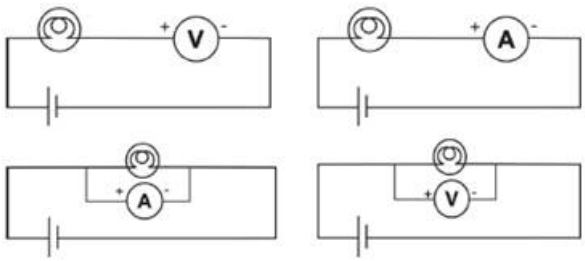
| Component | Measuring device | Unit | |
|---|---|---|---|
| Potential difference | | $\frac{\text{joule}}{\text{coulomb}}$ | |
| | Ammeter | | Ampere |

### Answer

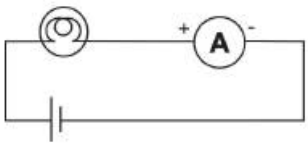
| Component | Measuring device | Unit | | Explanation |
|---|---|---|---|---|
| Potential difference | VOLTMETER | $\frac{\text{joule}}{\text{coulomb}}$ | Volts | To measure potential difference, we always use a voltmeter which is connected in parallel to the circuit. |
| Current | Ammeter | $\frac{\text{Coulomb}}{\text{time}}$ | Ampere | Current is measured using ammeter which is connected in series with the circuit. |

### 2. Question

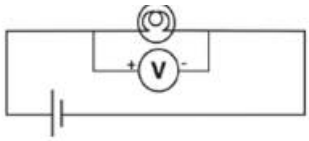
Given below are the diagrams showing the connection of ammeter and voltmeter in a circuit. Of these, which are correct?




### Answer




The above is the correct connection of Ammeter as ammeter is connected in series always as it has very minimum resistance.




The above is the correct connection of Voltmeter as voltmeter is connected in parallel always as it has a very high resistance.

### 3. Question

The resistance of a 10 cm long wire is 12 Ω. If this is folded into two parts of equal length and included in a circuit, how much will be the resistance produced?

### Answer

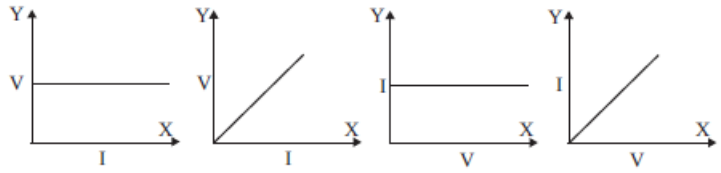
When we cut the wire into two part, each part will have 6Ω as Resistance is directly proportional to length. When the two are connected in

1) Series → Resistance will be 12Ω

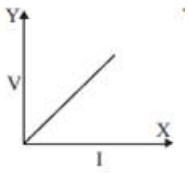
2) Parallel → Resistance will be 3Ω

**4. Question**

Of the following, which one correctly indicates Ohm's Law?




**Answer**




The above is the correct figure as V~I; Hence the figure is correct moreover we always change V and find the current then not vice versa hence V is always on the Y-Axis.

**5. Question**

A potential difference of 6 V is applied across a conductor having 12 Ω resistance. How much current will pass through it?

How many times will the current increase if length of the resistor is halved and potential difference is doubled?

**Answer**

Using V=IR where V is Voltage; I is the current and R is the resistance, the current that will pass is 0.5 Ampere.

Since resistance is directly proportional to length, if the length is halved then resistance will be halved; hence new resistance will be 6Ω.

Now, the potential difference is doubled i.e. 12V; So now the current changes to 2 Ampere.

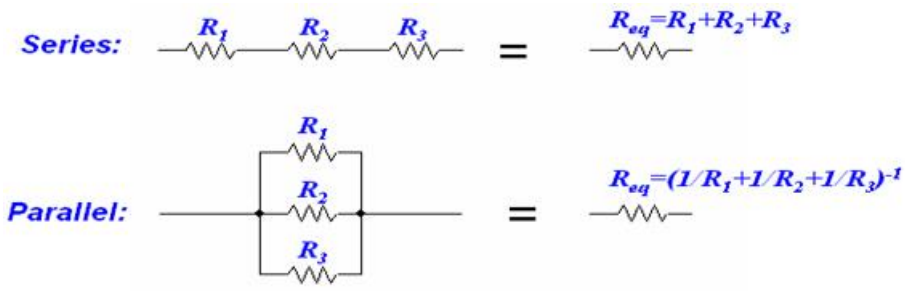
**6. Question**

What mode of connection of three resistors of 3 Ω each will produce minimum resistance? What will produce maximum resistance? Draw the diagram and calculate the effective resistance.

**Answer**

Minimum Resistance – When all three are connected in Parallel and net resistance changes to 1Ω.

Maximum Resistance – When all three are connected in series, and net resistance is 9Ω.




## Extended activities

**1. Question**

Draw the method of connecting four resistors of 2 Ω each to get $\frac{10}{3}\ \Omega$.

**Answer**

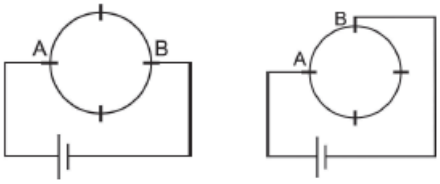
No possible Method

Since we have 4 resistors of 2Ω each; so maximum resistance that we can get is 8Ω and minimum is 2Ω. So, our first thought would be that we can solve the above problem.

And we try 1 resistor in series with other 3 in parallel and we don't get the above-given resistance. On trying other possible combination, we don't get; hence the above problem is not correct and there is no a possible method.

**2. Question**

The figure shows a conductor of resistance 8 Ω connected in a circuit in the circular shape.



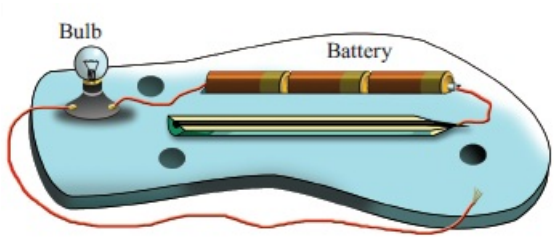

Of these, which gives minimum resistance? Justify your answer.

**Answer**

The second diagram gives minimum resistance as the resistance is directly proportional to length; in the second diagram the electrons have to travel through less resistance as the distance between A and B is less.

**3. Question**

Construct a pencil rheostat as shown in the figure. Arrange a science corner to exhibit a model using this to show the factors affecting the resistance of a conductor and to explain Ohm's Law.




Make a channel on the sole of a slipper so as to place three cells. Remove the wooden insulation from half the pencil length wise so that the graphite can be seen. Fix a bulb holder and the pencil on the sole using glue. Then arrange clips, safety pin, cells and bulb as shown in the figure.

**Answer**

The explain part is that when we connect the other wire to the near end of pencil (which is connected which other wire) the bulb grows brighter than we move away the wire to the far end. This works with the principle that resistance is directly proportional to length.