Electricity

Assess Yourself

Q. 1. Which kind of charge moves: positive charges (protons) or negative charges (electrons)?

Answer: Negative charge moves while protons can't move because they are stuck in the nucleus so they can't move due to "strong nuclear force".

Q. 2. Is electric current a scalar or vector quantity? Sate the smaller unit of current.

Answer: Electric current is a scalar quantity because it is the measure of how much charge flow through a particular area.

Smaller unit of current is Ampere denoted by A.

Q. 3. What is electric potential?

Answer: The **electric potential,** or **voltage,** is the difference in potential energy per unit charge between two locations in an electric field.

Q. 4. Calculate the work done in moving a charge of 5 coulombs from a point at 20 to another at 30 V.

Answer: Given;

Charge (Q) = 5C;

Potential difference = 30 – 20 = 10V;

Work done = Charge × Potential difference

⇒ Work done = 5 × 10 = 50 J.

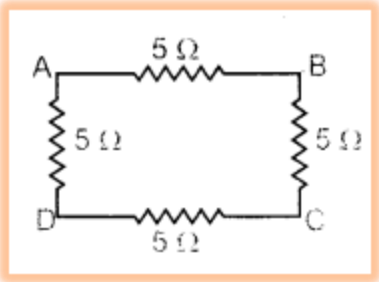
Hence the work done is 50 Joule.

Q. 5. Electrons are responsible for conduction in a conductor. The speed of electron is not very high. Then, how the bulb is on immediately even through the switch and bulb are far away from each other in a household circuit?

Answer: This is because the number of the free electrons constituting current in a typical conductor is very large of order 10^{18} or more. This large electron number density keeps the good amount of current flowing through.

Q. 6. A wire of resistance 20 Ω is bent to form a closed square. What is the resistance across a diagonal of the square?

Answer: Since the wire is bend in form of the square and we know that sides of square are equal so each side will have same resistance i.e 5 ohm. Now if we make diagonal two faces in each side of the diagonal will have two sides and resistance will be 10 ohm. As shown below.



So total resistance will be $\frac{1}{R_{eq}} = \frac{1}{10} + \frac{1}{10} = \frac{2}{10}$

⇒ R_{eq} = 5 ohm

Hence equivalent resistance is 5 ohm.

Q. 7. How does the resistance of an ohmic conductor depend on the applied voltage?

Answer: Resistance do not depend on the voltage it depends on the material of the resistor whether the intermolecular force of attraction is strong or loose which decides the resistance.

Q. 8. An electric fan/motor becomes warm when continuously used for a long time. Why?

Answer: In the electric fan motor the

Electrical energy is transferred into the mechanical energy, due to which some amount of the energy is lost in form of heat energy and is dissipated into the surroundings. That is why appliances like electric fan/motor become warm after continuous usage.

Q. 9. State difference between the wire used in the element of an electric heater and in a fuse wire.

Answer:

Fuse Wire	Heater Wire
It has low melting point.	It has high melting point.
Fuse wire has negligible resistance.	Heater wire has very high resistance
It is safety device.	It is heating device.

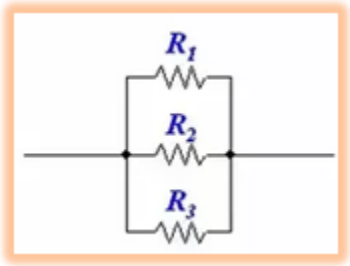
Q. 10. A 9 Ω resistance is cut into three equal parts and connected in parallel. Find the equivalent resistance of the combination.

Answer: When the wire is cut into three equal parts the length of each part will be l/3.

And resistance is directly proportional to the length.

∴ The resistance of each part will be 9/3 = 3.

Now we have three resistors each of 3Ω connected parallel as shown in figure below.



By formula for resistors in parallel.

$$\frac{1}{R_{eq}} = \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$$

$$\Rightarrow \frac{1}{R_{eq}} = \frac{1+1+1}{3} = \frac{3}{3} = 1$$

⇒ R_{eq} = 1 Ω.

Hence the equivalent resistance of the combination is 1 Ω

Q. 11. An electrical appliance draws a current of 0.5 A when applied potential difference across it is 220V. Calculate the amount of charge flowing through it in 30 minutes.

Answer: Given that;

Current = 0.5 A

Voltage = 220 V

Time = 30 min = 30 × 60 sec = 1800 sec

∵ 1 min = 60 sec)

We know that

$$\text{Current} = \frac{\text{Charge}}{\text{Time}}$$

⇒ Charge = Current × Time

⇒ Charge = 0.5 × 1800 C

⇒ Charge = 180 × 5 C

⇒ Charge = 900 C

Hence the charge flowing through appliance in 30 minutes is 900 Coulomb.

Q. 12. The resistivity of copper is 1.7×10^{-8} Ωm. What length of copper wire of diameter 0.1 mm will have a resistance of 34Ω?

Answer: Given

Resistivity (ρ) = 1.7×10^{-8} Ωm

Diameter (d) = 0.1 mm = 0.1×10^{-3} m

(∵ 1m = 1000 mm)

Resistance(R) = 34 Ω

Area of cross section (A) = $\frac{\pi d^2}{4}$

A = $\frac{3.14 \times (0.1 \times 10^{-3})^2}{4}$

⇒ A =

Now

$$R = \rho \frac{l}{A}$$

$$\Rightarrow 34 = \frac{1.7 \times 10^{-8} \times l}{\frac{3.14 \times (0.1 \times 10^{-3})^2}{4}}$$

$$\Rightarrow \frac{34}{1.7 \times 10^{-8}} \times \frac{0.0314 \times 10^{-6}}{4} = l$$

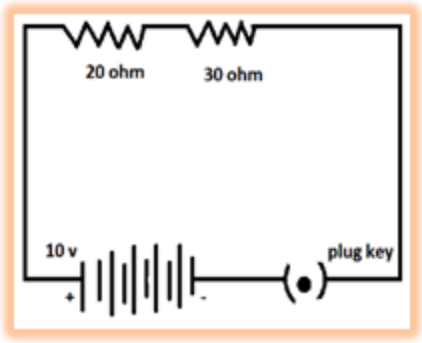
$$\Rightarrow l = \frac{17}{17 \times 10^{-9}} \times \frac{31.4 \times 10^{-9}}{2}$$

$$\Rightarrow l = \frac{31.4}{2} = 15.7$$

Hence the length of the wire is 15.7 m.

Q. 13. Draw a schematic diagram of an electric circuit consisting of battery of five 2V cells, a 20 Ω resistor, a 30 Ω resistor, a plug key, all connected in series. Calculate the value of current flowing through the 20 Ω resistor and the power consumed by the 30 Ω resistor.

Answer: The schematic diagram is shown below.



Current Flowing Through 20Ω resistor

$$\text{Current(I)} = \frac{\text{Voltage(V)}}{\text{Resistance(R)}}$$

$$\Rightarrow \text{Current} = \frac{10}{20} = \frac{1}{2} = 0.5\ \text{A}$$

Hence the current flowing is 0.5 Ampere.

Power consumed by the 30 Ω resistor

Power = Voltage × current.

Given Voltage = 10V; current = 0.5A

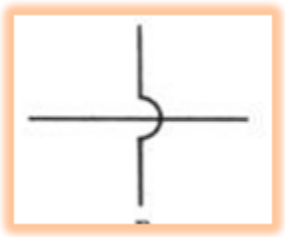
⇒ Power = 10 × 0.5 = 5W

Hence power consumed by 30 Ω resistor is 5W.

Q. 14.A. What do the following circuit symbols represent?

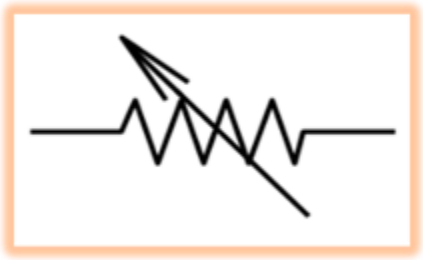
(*i*) (*ii*)

Answer: (i) The above symbol represents that the two wires are not joined. As shown in the figure below.

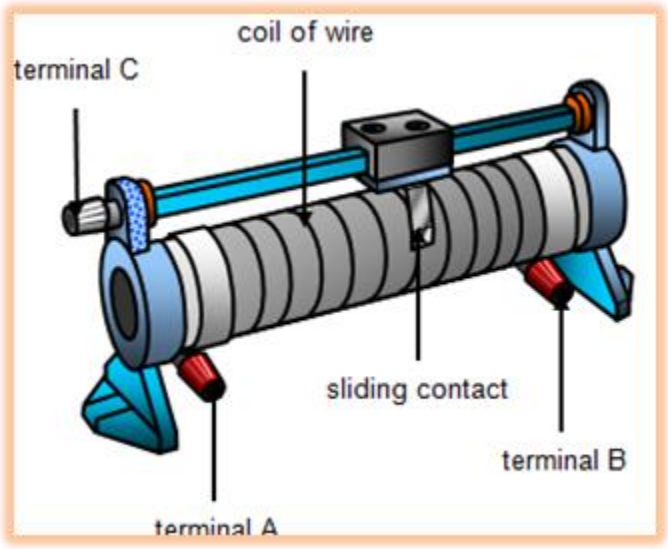


Such symbol is used when there are two or more wires in the circuit.

(ii) The above symbol represents the Rheostat or variable resistance as Shown in figure below.



The Rheostat is used when there is need to vary the current or resistance in the circuit. The original rheostat used in the circuit is shown below in the figure below.



Q. 14.B. The potential difference between the terminals of an electric heater is 60V when it draws a current of 4A from the source. Find the resistance of heater when in use.

Answer: According to the question

Potential Difference (V) = 60V

Current drawn (I) = 4A

By Ohm's Law

V = IR

$\Rightarrow 60 = 4 \times R$

$\Rightarrow R = \frac{60}{4} = 15$

Hence the resistance is 15Ω.

Q. 15. A wire of 3Ω resistance and 15cm in length is stretched to 45 cm length. Calculate (i) New resistance.

Assuming the wire has uniform cross section area.

Answer: Given:

Resistance R = 3Ω

Original length L_1 = 15cm = 0.15m

New length, L_2 = 45 cm = 0.45 m

Formula Used:

$$\text{Resistance, } R = \frac{\rho L}{A}$$

Where, ρ is resistivity of the wire

L is the length of the wire

A is the area of the wire.

$$\text{Now, } \frac{R_1}{R_2} = \frac{\rho L_1 \times A}{A \times \rho L_2}$$

$$\Rightarrow \frac{3\ \Omega}{R_2} = \frac{0.15\ \text{m}}{0.45\ \text{m}}$$

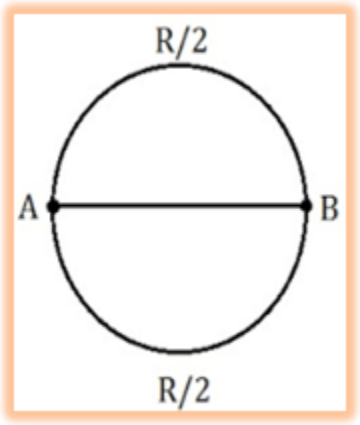
$$\Rightarrow R_2 = \frac{3\Omega \times 0.45\ \text{m}}{0.15\text{m}}$$

$\Rightarrow R_2 = 9\ \Omega$

Hence, the new resistance is 9 Ω

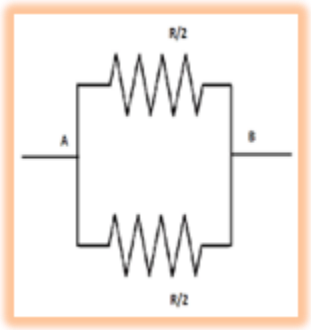
Q. 16. A wire of resistance 10Ω is bent in the form of a closed circle. What is the effective resistance between the two points at the ends of any diameter of the circle?

Answer: When the wire is bent in form of a closed circle, the wires will be connected in parallel. As shown in the figure below.



Also, the resistance will become half because resistance is directly proportional to the length and the length is halved.

Resistance of each part connected in parallel = 5Ω. As shown below.



Resistance of parallel combination

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\Rightarrow \frac{1}{R_{eq}} = \frac{1}{5} + \frac{1}{5} = \frac{2}{5}$$

$$\Rightarrow R_{eq} = \frac{5}{2} = 2.5\Omega$$

Hence the resistance between ends of the diameter is 2.5Ω.

Q. 17.A. An electric lamp is marked 26 W, 220V. It is used for 10 hours daily. Calculate its resistance while glowing.

Answer: Given

Power (P) = 26W

Voltage (V) = 220V

We know that

$$P = \frac{V^2}{R}$$

$$\Rightarrow R = \frac{V^2}{P}$$

$$\Rightarrow R = \frac{220 \times 220}{26}$$

$$\Rightarrow R = \frac{48400}{26} = 1861.53$$

Hence the resistance is 1861.53Ω

Q. 17.B. An electric lamp is marked 26 W, 220V. It is used for 10 hours daily. Calculate energy consumed in kWh per day.

Answer: Energy = Power × time

⇒ Energy = 26 × 10 = 260 W

We divide by 1000 for converting in Kw

Energy Consumed = $\frac{260}{1000} = 0.26\ Kw$

Hence the energy consumed is 0.26 KW

Q. 18. The electric power consumed by a device may be calculated by the using either of the two expressions $P = I_2R$ or $P = V_2/R$. The first expression indicates that it is directly proportional to R whereas the second expression indicates inverse proportionality. How can the seemingly different dependence of P on R in these expressions be explained.

Answer: Both the expressions are correct. In the first case where $P = I^2R$ current (I) remains constant. Whereas in the second expression where $P = V^2/R$ the Voltage (V) remains constant.

Therefore $P = I^2R$ is used where the resistors are connected in series because in the series connection the current in each resistance is constant.

$P = V^2/R$ is used where the resistors are connected in parallel because in the parallel connection the voltage in each resistance is constant. So power becomes inversely proportional to resistance.

Q. 19.A. A simple circuit consists of a resistor, a battery, and connecting wires.

How must a voltmeter be connected to a resistor in order to read the potential difference across it?

Answer: The voltmeter must be connected in parallel to the resistor to read the potential difference across the resistor

Voltmeter has very high resistance to ensure that it's connection do not change the flow of current in the circuit. Now if it is connected in series then no current will be there in the circuit due to its high resistance. Hence it is connected in parallel to the load across which potential difference is to be measured.

Also the voltage in the parallel connection is constant; therefore we will not get any error while measuring the voltage across resistor.

Q. 19.B. A simple circuit consists of a resistor, a battery, and connecting wires.

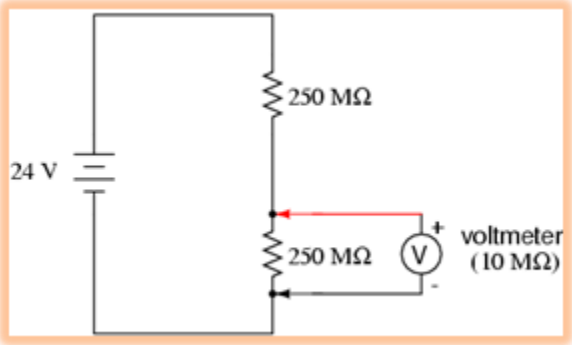
How must an ammeter be connected in a circuit to correctly read the current?

Answer: The ammeter must be connected in the series to read the current correctly. Ammeter has very low resistance If it is connected in parallel across any load then all current in circuit will choose lower resistive path (i.e ammeter) which will cause the circuit to be damaged. Hence it is used in series. Also the current in the series is always same.

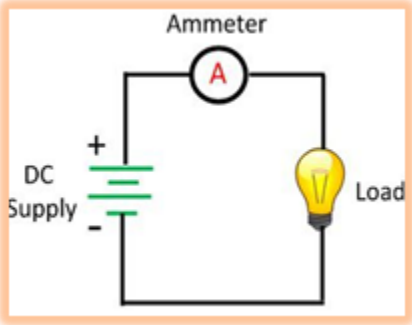
Q. 19.C. A simple circuit consists of a resistor, a battery, and connecting wires.

Draw the circuit diagram.

Answer: Below is the circuit diagram for the voltmeter.



Below is the circuit diagram for ammeter.



Q. 20.A. A wire of given material having length l and area of cross-section A, has a resistance of 2 Ω. Find the resistance of another wire of same material having length 2l and are of cross-section A/2.

Answer: Given

Resistance (R) = 2Ω

Area of cross-section = A

Length = l

We know that $R = \rho \frac{l}{A}$

$\Rightarrow 2 = \rho \frac{l}{A} \ldots\ldots\ldots\ldots\ldots\ldots$

New Area = A/2

New Length = 2l

New Resistance = R'

$\Rightarrow R' = \rho \frac{2l}{\frac{A}{2}}$

$\Rightarrow R' = \rho \frac{4l}{A}$

$\Rightarrow R' = 4\rho \frac{l}{A}$

$\Rightarrow R' = 4 \times 2 = 8.$ from (1).

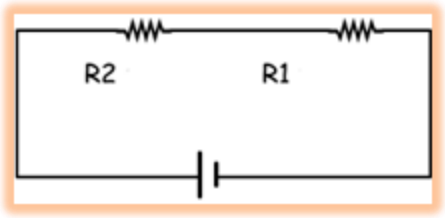
Hence the new resistance will be four times the previous resistance i.e. 8Ω.

Q. 20.B. Calculate the ratio of the equivalent resistance of the above two wires in parallel combination to that in series combination.

Answer: The resistance of the two wires are

$R_1 = 2\Omega$ and $R_2 = 8\Omega$

<u>When they are connected in series.</u>

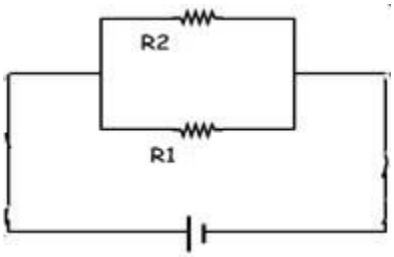


Equivalent resistance = $R_1 + R_2$

$\Rightarrow R_{eq} = 2 + 8 = 10\ \Omega$.

R_{eq} in series = 10 Ω.

When they are connected in parallel.



Equivalent resistance = $\frac{1}{R_1} + \frac{1}{R_2}$

$$\Rightarrow \frac{1}{R_{eq}} = \frac{1}{2} + \frac{1}{8}$$

$$\Rightarrow \frac{1}{R_{eq}} = \frac{4+1}{8} = \frac{5}{8}$$

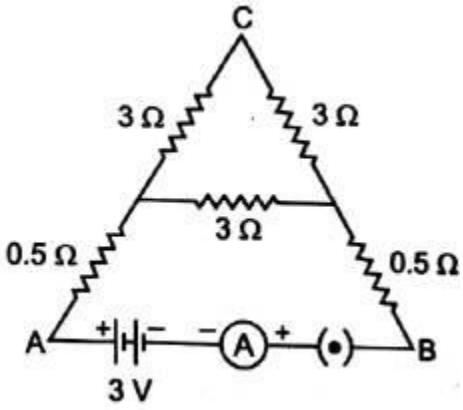
$$\Rightarrow R_{eq} = \frac{8}{5}$$

R_{eq} in Parallel = 8/5 Ω.

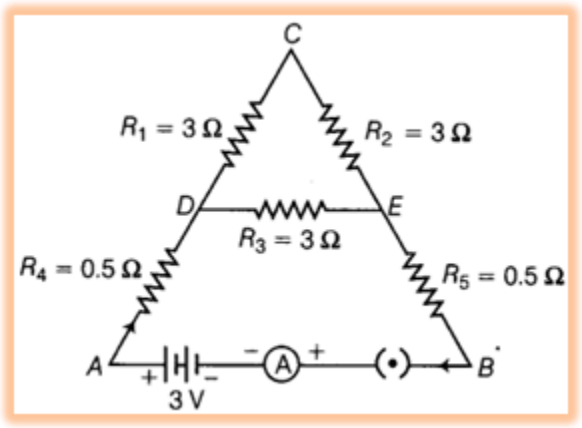
Ratio of Parallel to series = $\frac{\frac{8}{5}}{10} = \frac{8}{50} = \frac{4}{25}$

Hence the ratio of the Equivalent resistances in parallel to series is 4/25

Q. 21. Five resistors are connected in a circuit as shown. Find the ammeter reading when circuit is closed.



Answer: Labelling each of the resistance as shown in the figure below.



Resistance R_1 and R_2 are in series

$\Rightarrow R_{s1} = R_1 + R_2$

$\Rightarrow R_{s1} = 3 + 3 = 6\Omega$

Now R_{s1} and R_3 are in parallel.

$$\Rightarrow \frac{1}{R_p} = \frac{1}{R_{S1}} + \frac{1}{R_3}$$

$$\Rightarrow \frac{1}{R_p} = \frac{1}{6} + \frac{1}{3}$$

$$\Rightarrow \frac{1}{R_p} = \frac{1+2}{6} = \frac{3}{6}$$

$$\Rightarrow R_p = \frac{6}{3} = 2$$

$$\Rightarrow R_p = 2\Omega.$$

Now R_4, R_p and R_5 are in series.

$$\Rightarrow R_{eq} = R_4 + R_5 + R_p$$

$$\Rightarrow R_{eq} = 0.5 + 2 + 0.5 = 3\Omega$$

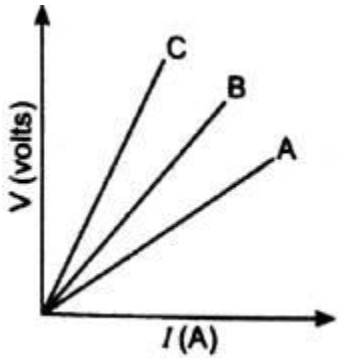
Hence the Equivalent resistance of the circuit is 3Ω.

For Ammeter Reading

Current (I) = $\frac{V}{R} = \frac{3}{3} = 1A$

Hence the current reading in ammeter is 1A.

Q. 22. Three V-I graphs are drawn individually for two resistors and their series combination. Out of A, B, C which one represents the graph for series combination of the other two? Give reason for your answer.



Answer: By Ohm's Law $V = IR$

$\Rightarrow R = \frac{V}{I}$ = slope of V-I graph

Therefore, the slope of the V-I graph represents the effective resistance.

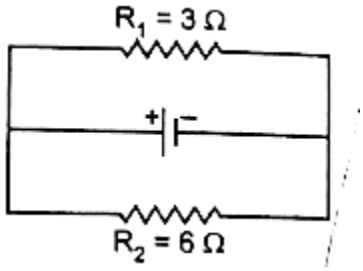
Now in series combination of the resistance all the resistances get summed up

$R_{eq} = R_1 + R_2 + R_3$ + ……+ R_n.

Therefore, the series combination will have the maximum resistance than the other resistors.

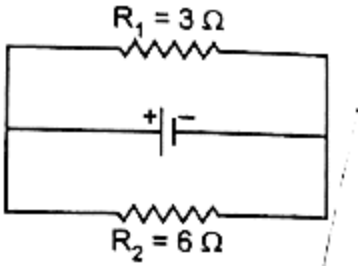
Hence the line with maximum slope (line C) will give the series combination of the other two resistors.

Q. 23.A. Identify the type of combination in which R_1 and R_2 are connected in the given circuit diagram.



Answer: The resistors R_1 and R_2 are connected in the parallel combination because the potential difference across both the resistors is same.

Q. 23.B. Find the effective resistance of the combination.



Answer: Effective resistance = $\frac{1}{R_1} + \frac{1}{R_2}$

$$\Rightarrow \frac{1}{R_{eq}} = \frac{1}{3} + \frac{1}{6}$$

$$\Rightarrow \frac{1}{R_{eq}} = \frac{2+1}{6} = \frac{3}{6}$$

$$\Rightarrow R_{eq} = \frac{6}{3} = 2$$

Effective resistance of the combination is 2Ω.

Q. 24. Bulb is rated at 200 V, 100 W. Calculate its resistance. Five such bulbs are lighted for 4 hours daily. Calculate the units of electrical energy consumed per day. What would be the cost of using these bulbs per day at the rate of Rs. 4.00 per unit?

Answer: We know that for an electric appliance

$$P = \frac{V^2}{R}$$

Resistance will be given as

$$R = \frac{V^2}{P}$$

Now, here

P = 100 W

V = 200 volts

$$\text{So, } R = \frac{200^2}{100}$$

$$R = \frac{40000}{100} = 400\Omega$$

Thus, resistance of the bulb is R = 400 Ω

Now, electric energy consumed will be

E = power of each unit × time.

⇒ E = p × t.

Here

P = 100 W

t = 4 hours

So,

E = 100 x 4 = 400 Watt per hour

Dividing by 1000 to convert into Kilo Watt per hour

$$E = \frac{400}{1000} = 0.4 \text{ kWh}$$

Electrical energy consumed is 0.4 kWh

The total cost of electricity = total unit of energy consumed x cost per unit =

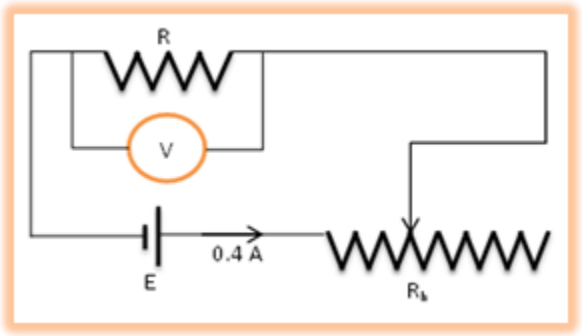
Cost = 0.4kWh x 4 Rs/kWh = Rs1.6

Thus, total cost (daily) = Rs. 1.6

Q. 25.A. When a high resistance voltmeter is connected directly across a resister its reading is 2 V. An electric cell is sending the current of 0.4A, (measured by an ammeter) in the electric circuit in which a rheostat is also connected to vary the current.

Draw an equivalent labelled circuit for the given data.

Answer: An equivalent labelled circuit for the given data is given below.



Q. 25.B. When a high resistance voltmeter is connected directly across a resister its reading is 2 V. An electric cell is sending the current of 0.4A, (measured by an ammeter) in the electric circuit in which a rheostat is also connected to vary the current.

Find the resistance of the resister.

Answer: Since the voltmeter reading shows 2V. Thus V = 2.

Also, Current send by electric cell = 0.4A

Thus I = 0.4A

By Ohm's law V = IR

$\Rightarrow 2 = 0.4 \times R$

$\Rightarrow R = \frac{2}{0.4} = \frac{20}{4} = 5\Omega$

The resistance of the resistor is 5Ω.

Q. 25.C. When a high resistance voltmeter is connected directly across a resister its reading is 2 V. An electric cell is sending the current of 0.4A, (measured by an ammeter) in the electric circuit in which a rheostat is also connected to vary the current.

Name and state the law applicable in the given case. A graph is drawn between a set of values of potential difference (V) across the resister and current (I) flowing through it. Show nature of graph thus obtained.

Answer: The law applicable here is Ohm's Law.

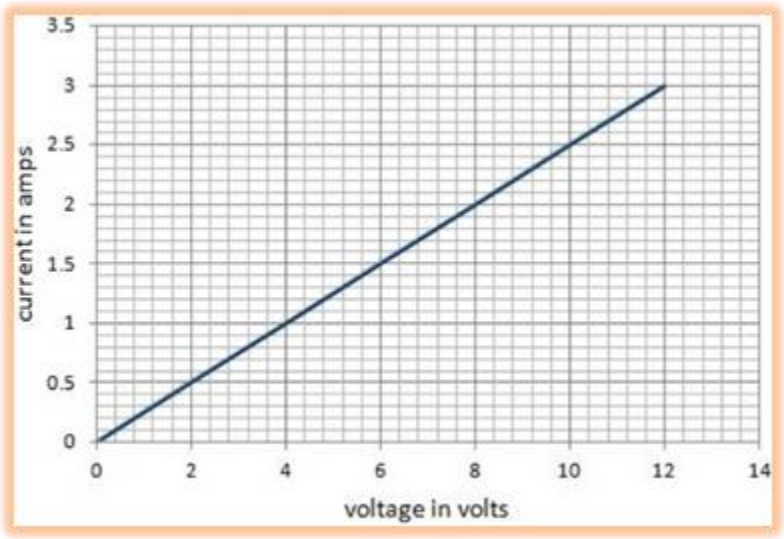
It states that the current flowing through a conductor is directly proportional to the potential difference across the conductor

$I \propto V.$

The proportionality constant is the resistance of the conductor; it is constant for the known range of the temperature.

V = IR.

The Graph obtained is the straight line with positive slope passing through the origin as shown in the figure below.



Q. 26. In a household electric circuit, different appliances are connected in parallel to one another. Give two reasons

An electrician puts a fuse of rating 5A in that part of domestic electrical circuit in which an electrical heater of rating 1.5 kW, 220V is operating. What is likely to happen in this case and why? What change, if any, needs to be made?

Answer: The two reasons for connecting the appliances in parallel are as follows.

1. Each appliance will be at same potential (voltage).

2. If one of the appliances fails the other will still keep working.

Given

Voltage = 220V;

Power = 1.5kW = 1500W

(1kW = 1000W)

Now

P = VI

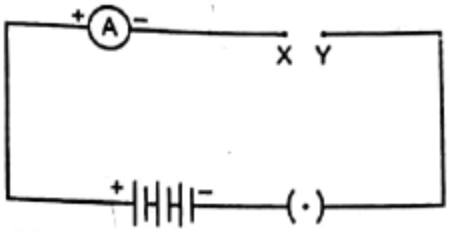
$$\Rightarrow I = \frac{P}{V} = \frac{1500}{220} = 6.8$$

The current in the circuit is 6.8A

Since the current in the circuit is more than the rating of the fuse (5A) the fuse will blow off.

A fuse of rating 10 A should be put off in the circuit

Q. 27.A. In the given circuit, connect a nichrome wire of length 'L' between points X and Y and note the ammeter reading.



(i) When this experiment is repeated by inserting another nichrome wire of the same thickness but twice the length (2L), what changes are observed in the ammeter reading?

(ii) State the changes that are observed in the ammeter reading if we double the area of cross-section without changing the length in the above experiment. Justify your answer in both the cases.

Answer: (i) The ammeter reading will decrease. This is because Resistance is directly proportional to the length; hence with the increase in the length the resistance of the wire will increase. So the current will decrease due to increase in the resistance (current is inversely proportional to the resistance).

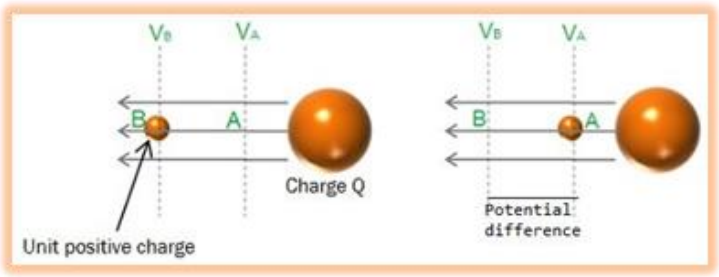
(ii) The ammeter reading will increase because. $R = \rho \frac{l}{A}$

Thus the resistance is inversely proportional to the area of the cross section, so with the increase in the area the resistance of the wire will decrease.

Therefore with the decrease in the resistance the current will increase (current is inversely proportional to the resistance).hence the ammeter reading will increase

Q. 27.B. "Potential difference between points A and B in an electric field is 1 V". Explain the above statement.

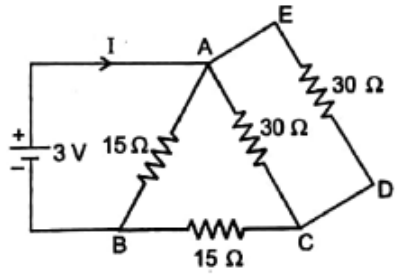
Answer: Given that the potential difference is 1 V. The potential difference is the Difference in the potential between two points that represents the work involved or energy released in transfer of a unit quantity of electricity from one point to the other. The figure below illustrates it



V_A = potential at A
V_B = potential at B

From the above definition of the potential difference the above statement means that 1Joule of work is being done to move a charge of 1 coulomb from point A to point B.

Q. 28.A. Find the value of current I in the circuit given below:



Answer: Resistors across AC and DE are in parallel i.e. R_{AC} and R_{DE} are in parallel.

So

$$\frac{1}{R'_p} = \frac{1}{R_{AC}} + \frac{1}{R_{DE}}$$

$$\Rightarrow \frac{1}{R'_p} = \frac{1}{30} + \frac{1}{30}$$

$$\Rightarrow \frac{1}{R'_p} = \frac{1+1}{30} = \frac{2}{30}$$

$$\Rightarrow R'_p = \frac{30}{2} = 15\Omega$$

Now R'_p and R_{BC} are I series.

$R's = R'_p + R_{BC}$

$\Rightarrow R'_s = 15 + 15 = 30\Omega$.

Again, R_{AB} and R'_s are in parallel.

$$\frac{1}{R''_p} = \frac{1}{R_{AB}} + \frac{1}{R'_s}$$

$$\frac{1}{R''_p} = \frac{1}{15} + \frac{1}{30}$$

$$\Rightarrow \frac{1}{R''_p} = \frac{1+2}{30} = \frac{3}{30}$$

$$\Rightarrow R''_p = \frac{30}{3} = 10\Omega$$

Equivalent resistance of the above circuit is 10Ω.

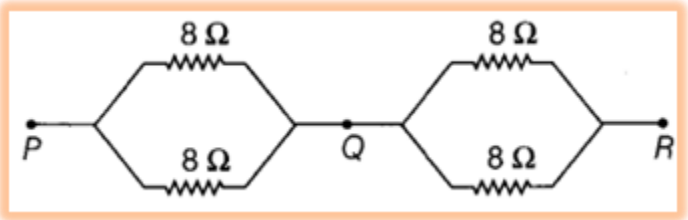
Now, current flowing through the circuit is

$$I = \frac{V}{R} = \frac{3}{10} = 0.3$$

The value of current is 0.3A

Q. 28.B.You have four resistors of 8 Ω each. Show how would you connect these resistors to have effective resistance of 8 Ω.

Answer: Two parallel combinations must be connected in series with each other to get the effective resistance of 8Ω. As shown in the figure below.



The effective resistance of each of the parallel combination is 4Ω. And this two 4Ω resistors are added together to get 8 Ω effective resistance.

Q. 29.A. Shushant was doing an experiment by using an ammeter. Unfortunately, it fell from his hand and broke. Fearing the scolding of teacher, his group mates advised him not to tell the teacher, but he told her. On listening to him patiently, the teacher did not scold him as it was just and accident and used the opportunity to show the whole class the internal structure of ammeter.

What are the values displayed by Shushant?

Answer: Shushant told his teacher that ammeter was broke by him he did not hide from his teacher this shows that Shushant is very honest and respectful towards his teacher. Also, in spite of his group mates telling him not to tell to the teacher he developed enough courage to tell everything to his teacher this show that he is courageous and confident student who accept his mistake.

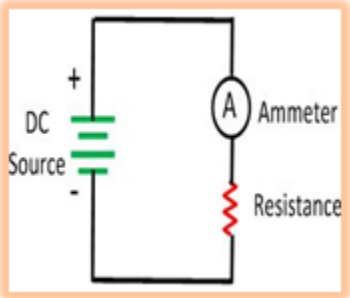
Q. 29.B. Shushant was doing an experiment by using an ammeter. Unfortunately, it fell from his hand and broke. Fearing the scolding of teacher, his group mates advised him not to tell the teacher, but he told her. On listening to him patiently, the teacher did not scold him as it was just and accident and used the opportunity to show the whole class the internal structure of ammeter.

What is the use of ammeter? How is it connected in the circuit?

Answer: An ammeter is used to measure the electric current in the unit of Ampere (A).It can also be used to verify the Ohm's law.

It is always connected in the series. The figure below shows the ammeter and its connection in the circuit.

Ammeter



Ammeter connected in series.

The ammeter is connected in the series because it has very low resistance If it is connected in parallel across any load then all current in circuit will choose lower resistive path (i.e. ammeter)

which will cause the circuit to be damaged. Hence it is used in series. Also the current in the series is always same.

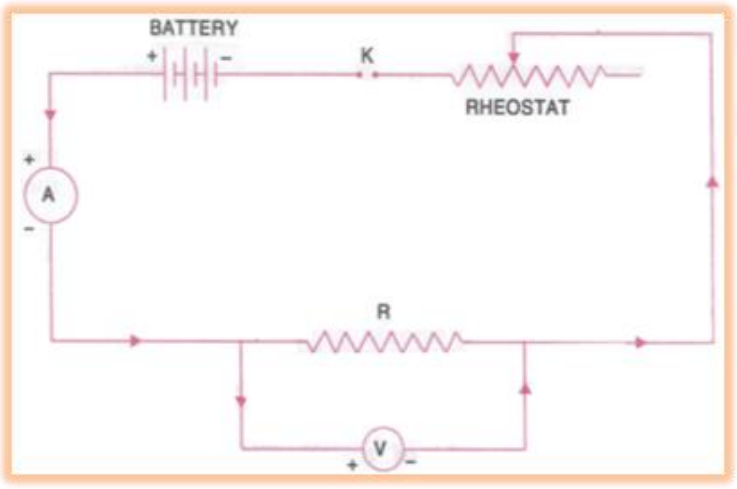
Q. 29.C. Shushant was doing an experiment by using an ammeter. Unfortunately, it fell from his hand and broke. Fearing the scolding of teacher, his group mates advised him not to tell the teacher, but he told her. On listening to him patiently, the teacher did not scold him as it was just and accident and used the opportunity to show the whole class the internal structure of ammeter.

State the aim of any one experiment where Shushant could have used the ammeter.

Answer: Shushant could have used the ammeter to verify the ohm's law which states that "current flowing through a conductor is directly proportional to the potential difference across the conductor"

$I \propto V.$

After setting up the circuit (as shown in figure below) and drawing the graph between V and I will get the straight line passing through origin.



The Ammeter will measure the current and the Voltmeter will measure the potential difference across the resistor and the ratio of voltage and current will give the resistance which is constant.