

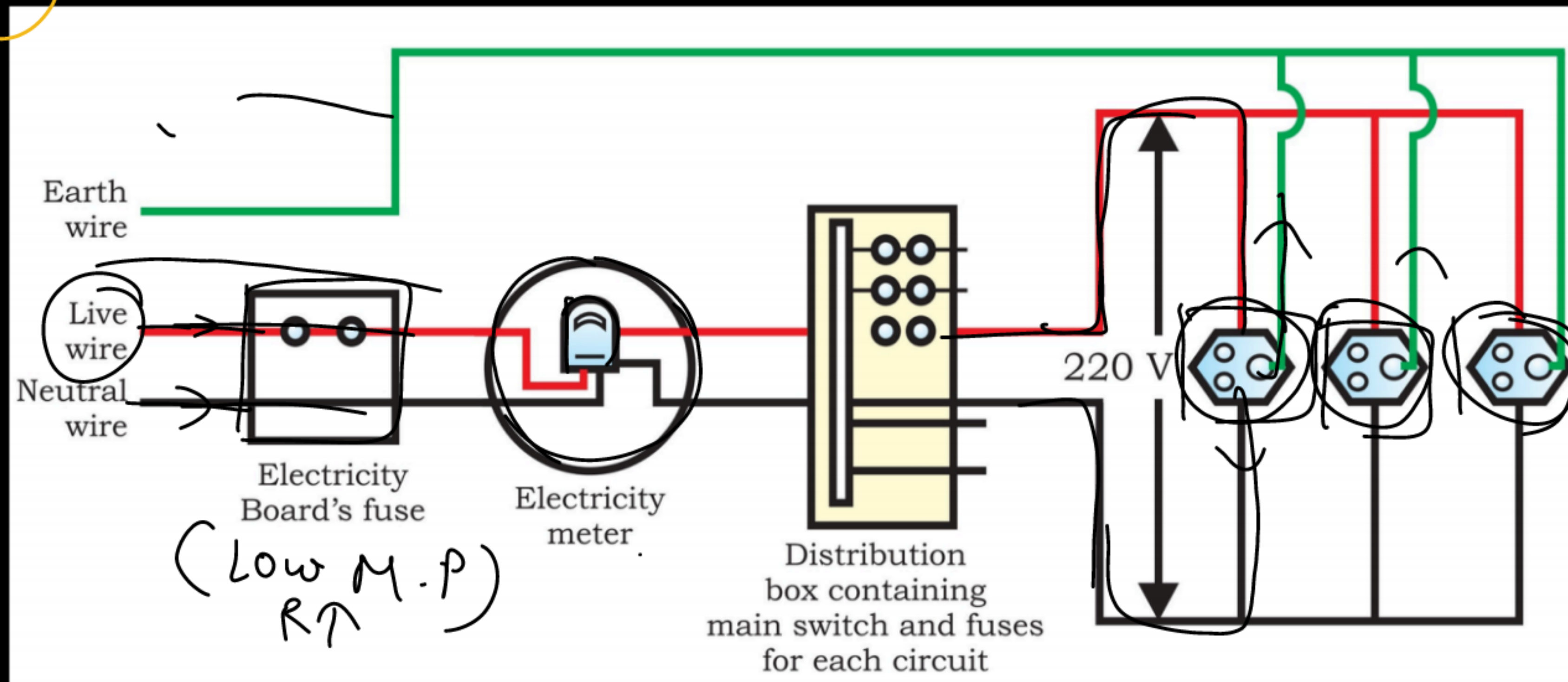
Q.State the direction of magnetic field in the following case

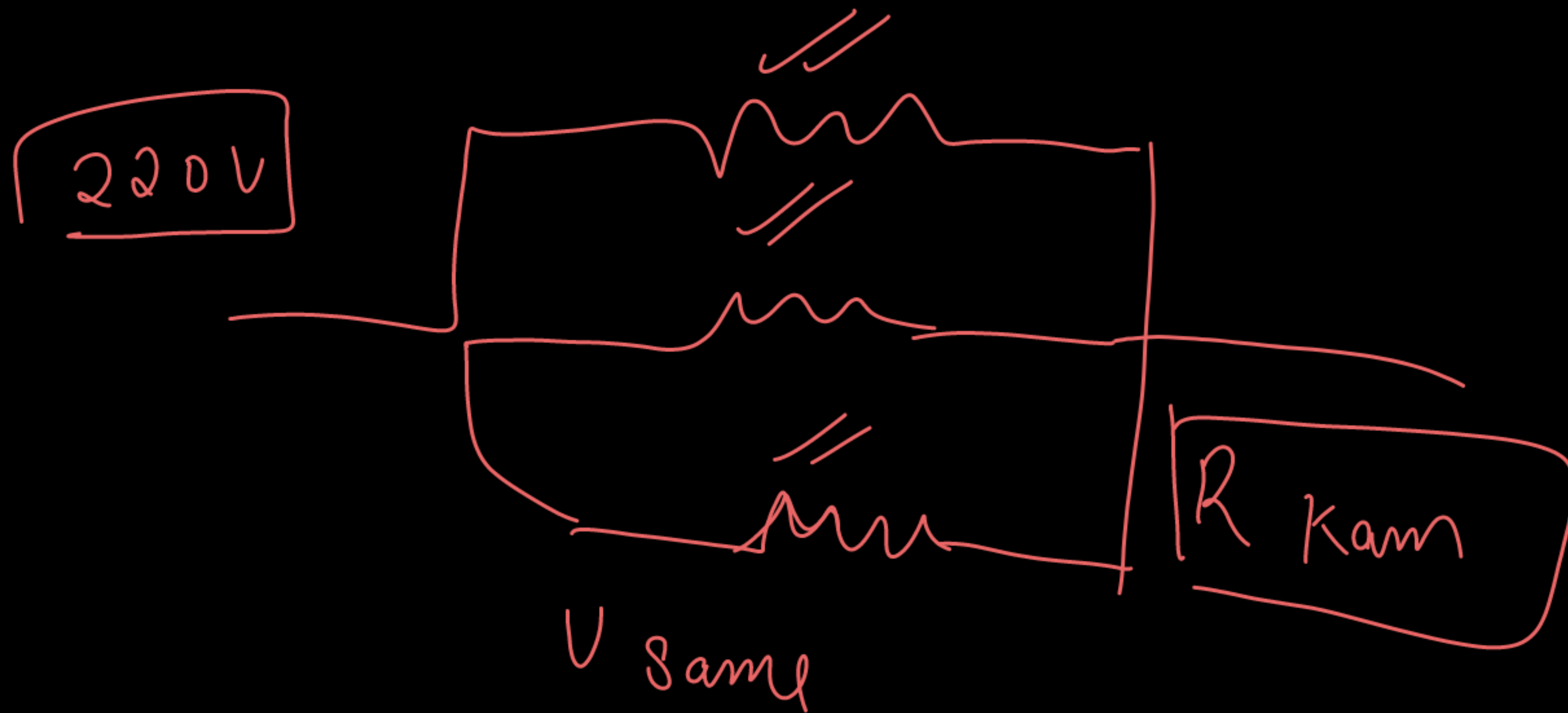


Using Fleming's left hand rule, the direction of magnetic field is out of the plane of paper.

DOMESTIC ELECTRIC CIRCUIT

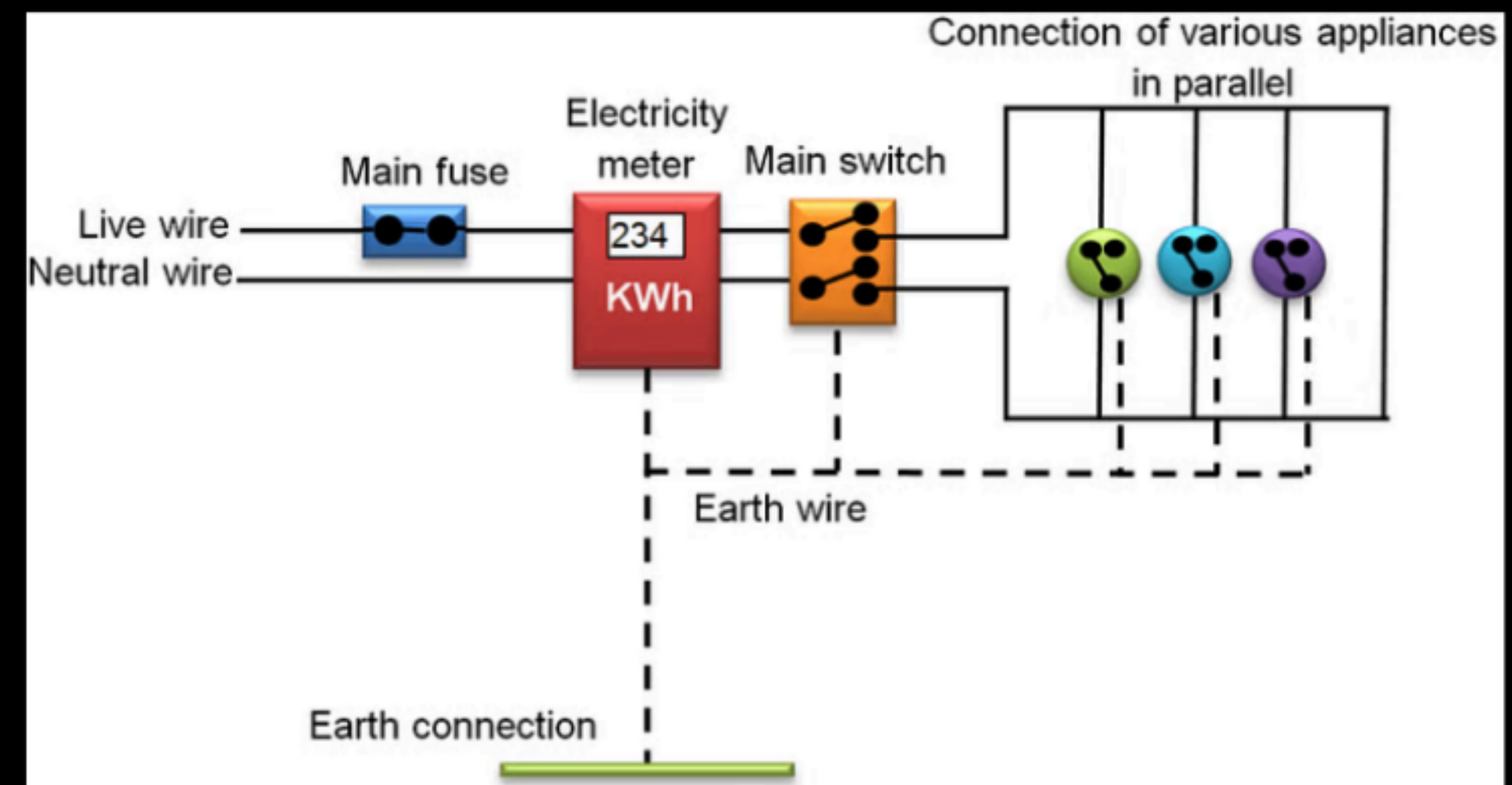
The domestic electric circuit is a system of wiring and devices that distribute electrical energy for household appliances and lighting.

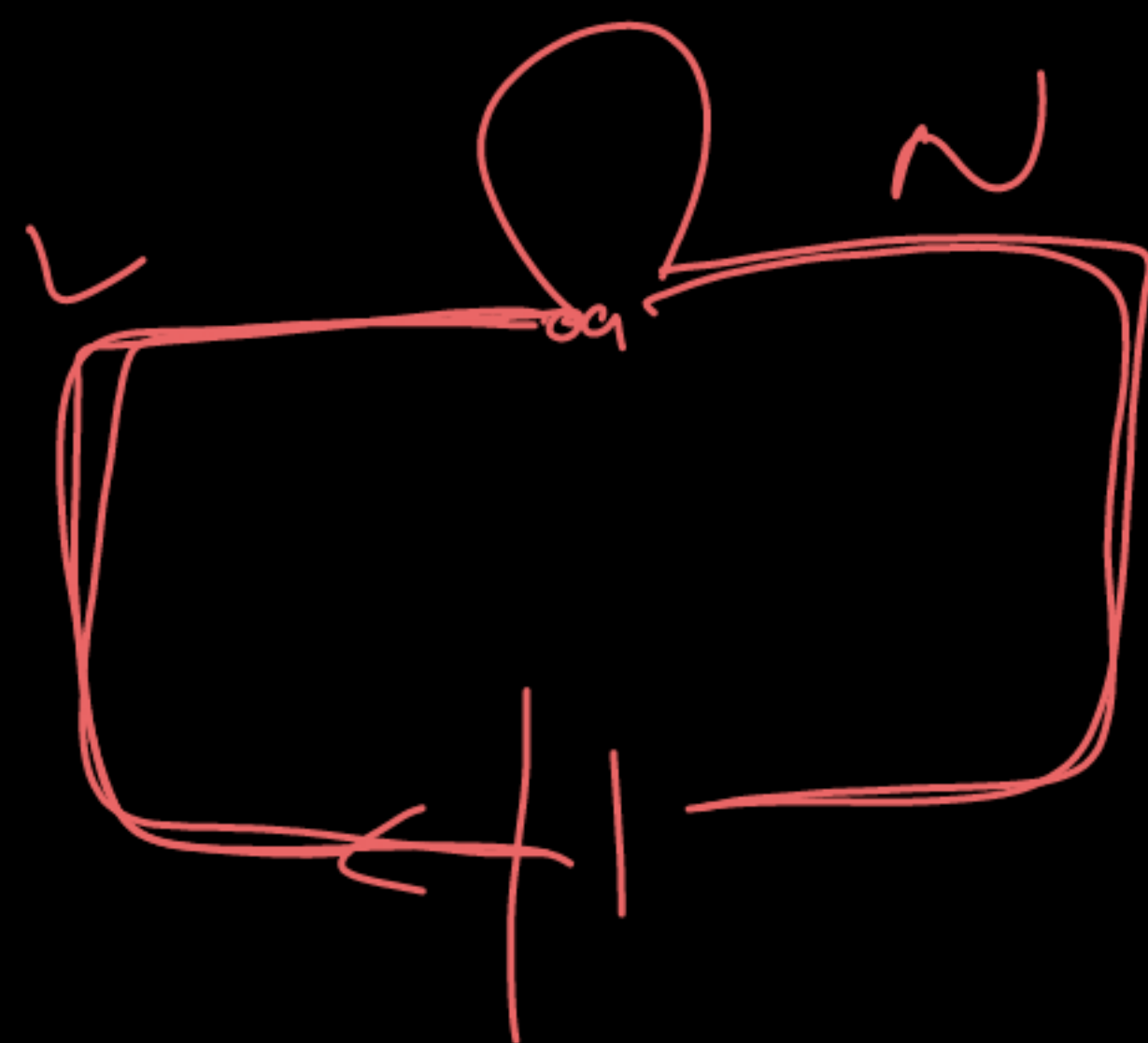




In Domestic Electric Circuit:

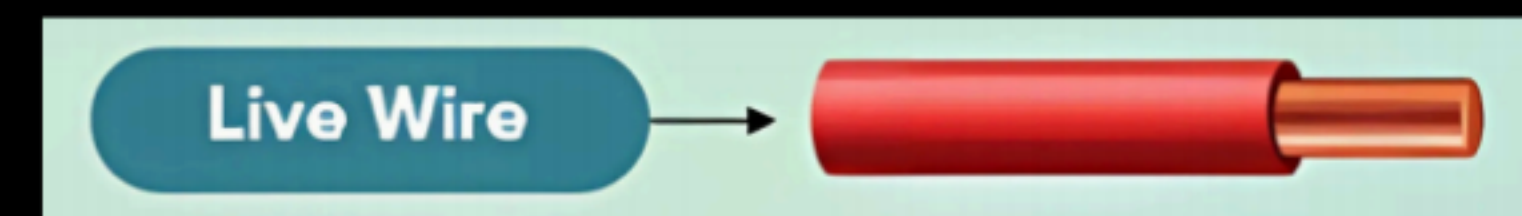
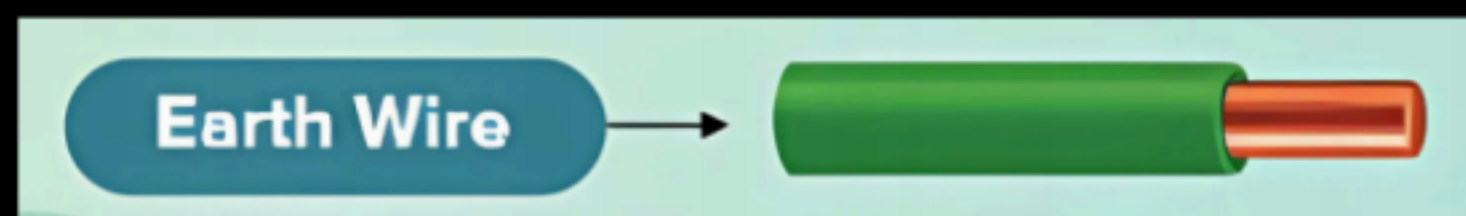
- The power supplied to homes through distribution lines is received at the mains.
- Electricity is supplied through two types of cables; Overhead cables or underground cables.
- The potential difference between live and neutral wire is 220 volts.





3 types of wires are involved in the domestic electric circuits, they are:

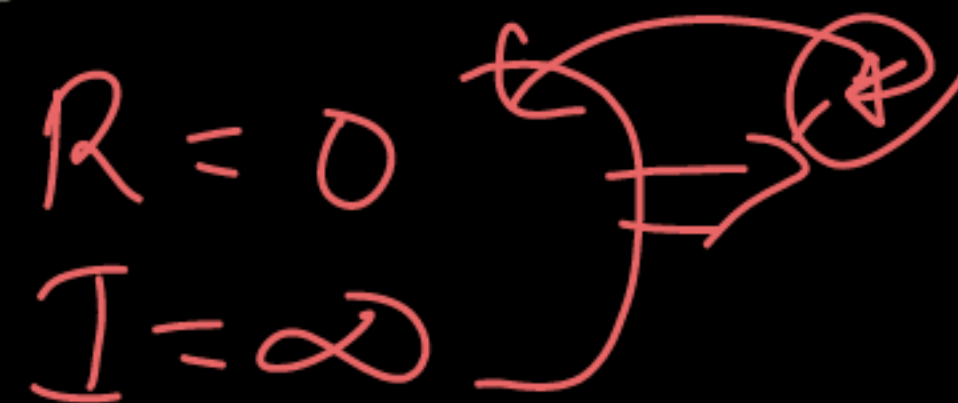
- **Earth wire** is green in colour. The earth wire is connected to metal plates placed in the earth near the house for safety purposes. It provides safety for all the appliances and devices connected at home which have a metallic body. This is done to prevent shock when leakage of charges happens in the metallic body. ✓
- **Live wire** is red in colour. It is a positive conductor that helps to break the circuit when excess current flows through the circuit.
- **Neutral wire** is black in colour. It is a negative conductor. ✓



Overloading:

Overloading occurs when too many appliances are used simultaneously, exceeding the circuit's capacity. In domestic parallel circuits, adding more appliances increases the current drawn. If this exceeds the wire's capacity, it overheats, causing overloading, often due to connecting multiple devices to a single socket.

Short-circuiting:


$$R = 0$$
$$I = \infty$$

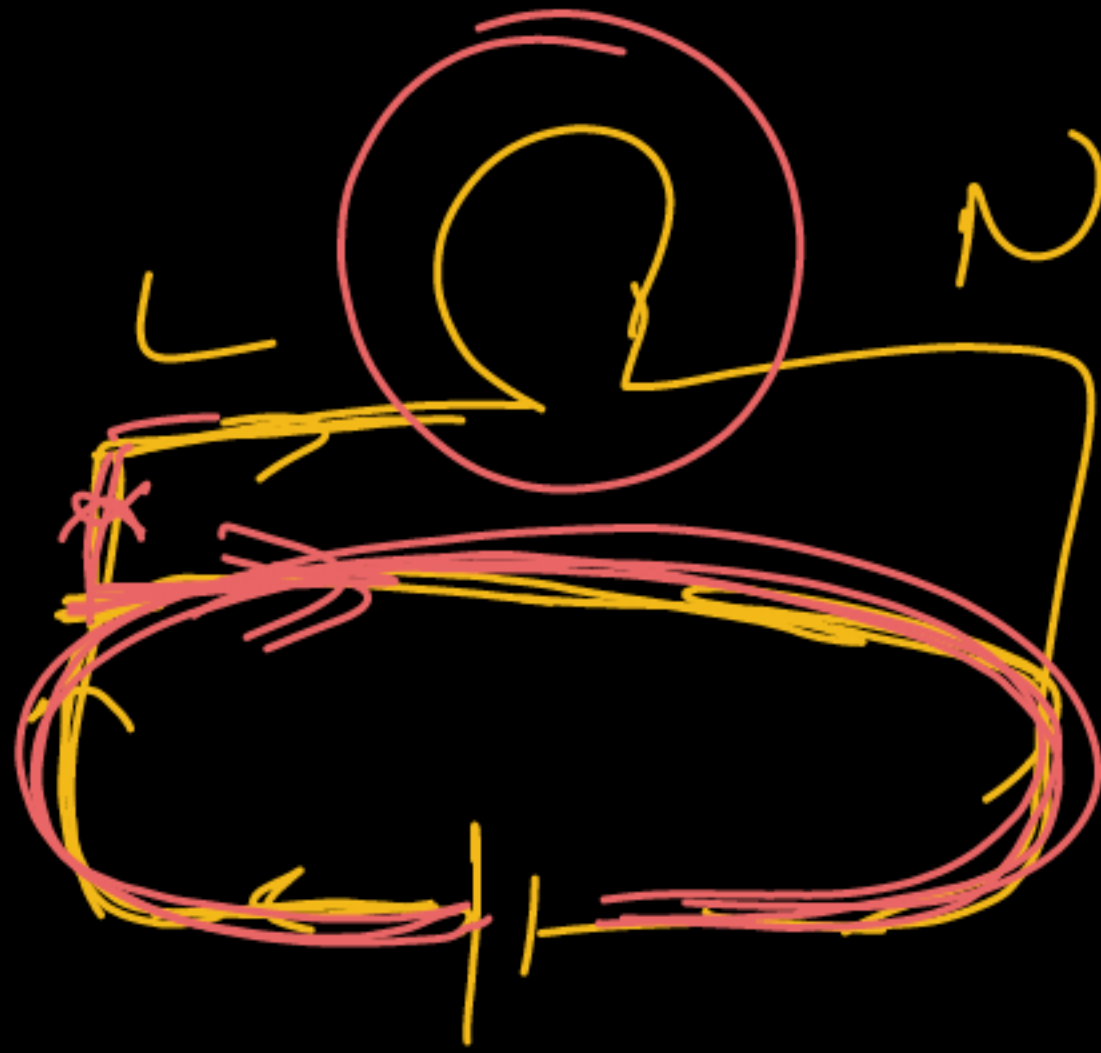
Short-circuiting occurs when the live wire and neutral wire come into direct contact, allowing a large current to flow. This can cause overheating, damage to appliances, or even fires. It often happens due to damaged insulation or faulty wiring.

$$V = I(R)$$

$$\frac{V}{0} = I$$

$$\left(\frac{1}{0} = \infty\right)$$

$$I = \infty$$



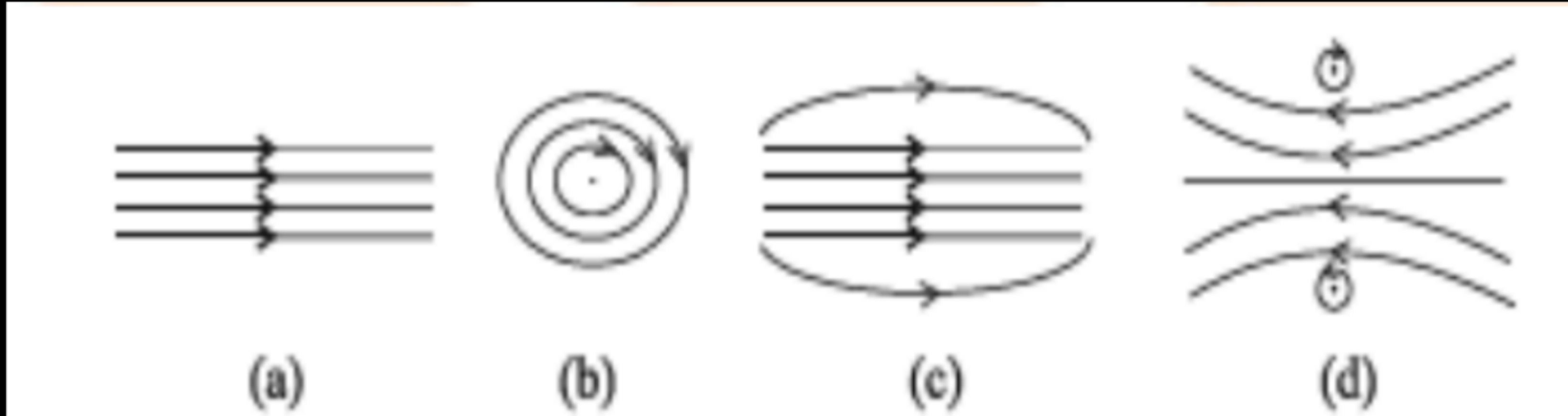
$$R \approx 0$$

$$I = \infty$$

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Q.The pattern of the magnetic field produced inside a current carrying solenoid is:(2024)



AC 

Current changes
direction

50 Hz

Long supply
distance

domestic Circuit

DC



No change
in direction

No Frequency (Zero)

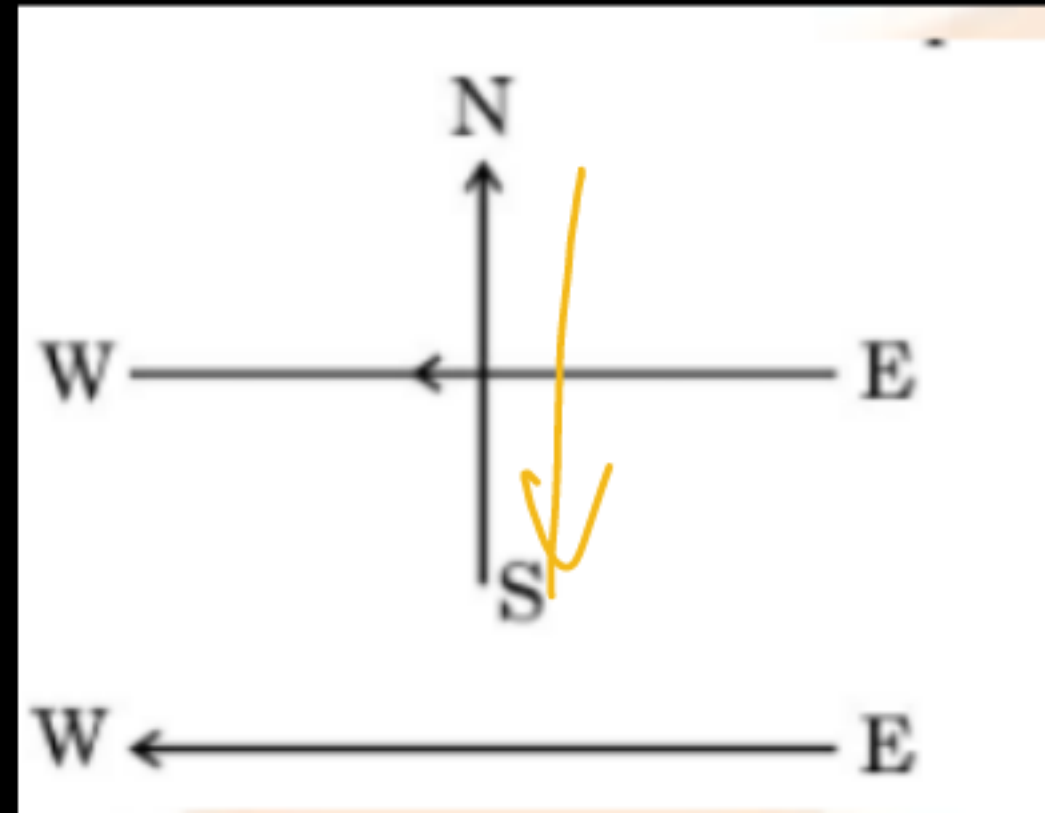
Short distance

Battery

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Q. A constant current flows in a horizontal wire in the plane of the paper from east to west as shown in the figure. The direction of the magnetic field will be north to south at a point: (2024)



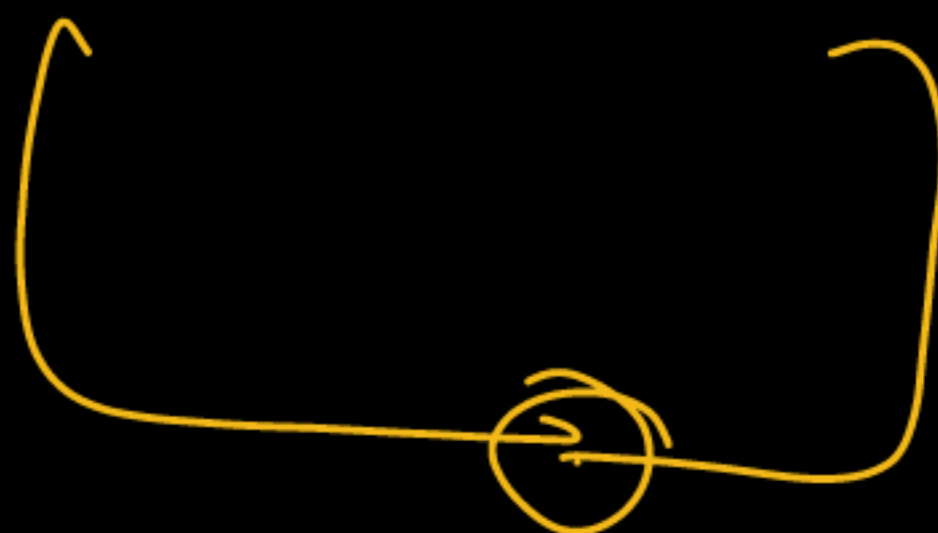
- (a) directly above the wire.**
- (b) directly below the wire.**
- (c) located in the plane of the paper on the north side of the wire.**
- (d) located in the plane of the paper on the south side of the wire.**

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Q. The most important safety method used for protecting home appliances from short-circuiting or overloading is

- (a) earthing
- ☒ (b) use of fuse
- (c) use of stabilizers
- (d) use of electric meter

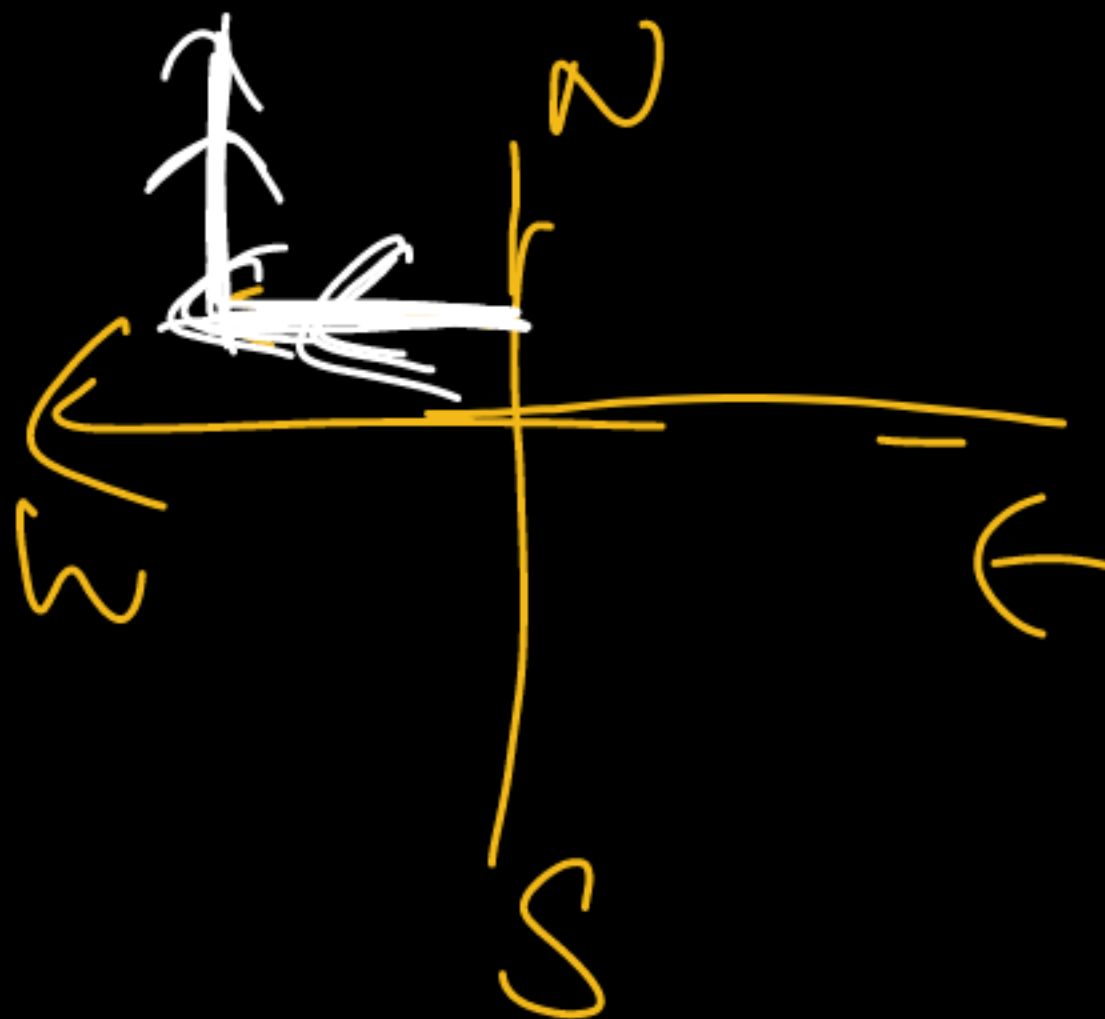


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Q. An alpha particle is diverted towards west is deflected towards north by a field. The field is magnetic. What will be the direction of field? (2023)

- a. Towards south
- b. towards east
- c. downward
- d. upward



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Q. In all the electrical appliances, the switches are put in the

- ~~a. live wire~~
- b. earth wire**
- c. neutral wire
- d. all of above

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Q. Flemings left-hand rule gives

(a) magnitude of the induced current.

(b) magnitude of the magnetic field.

☒ (c) direction of the induced current.

(d) both, direction and magnitude of the induced current. (2020)

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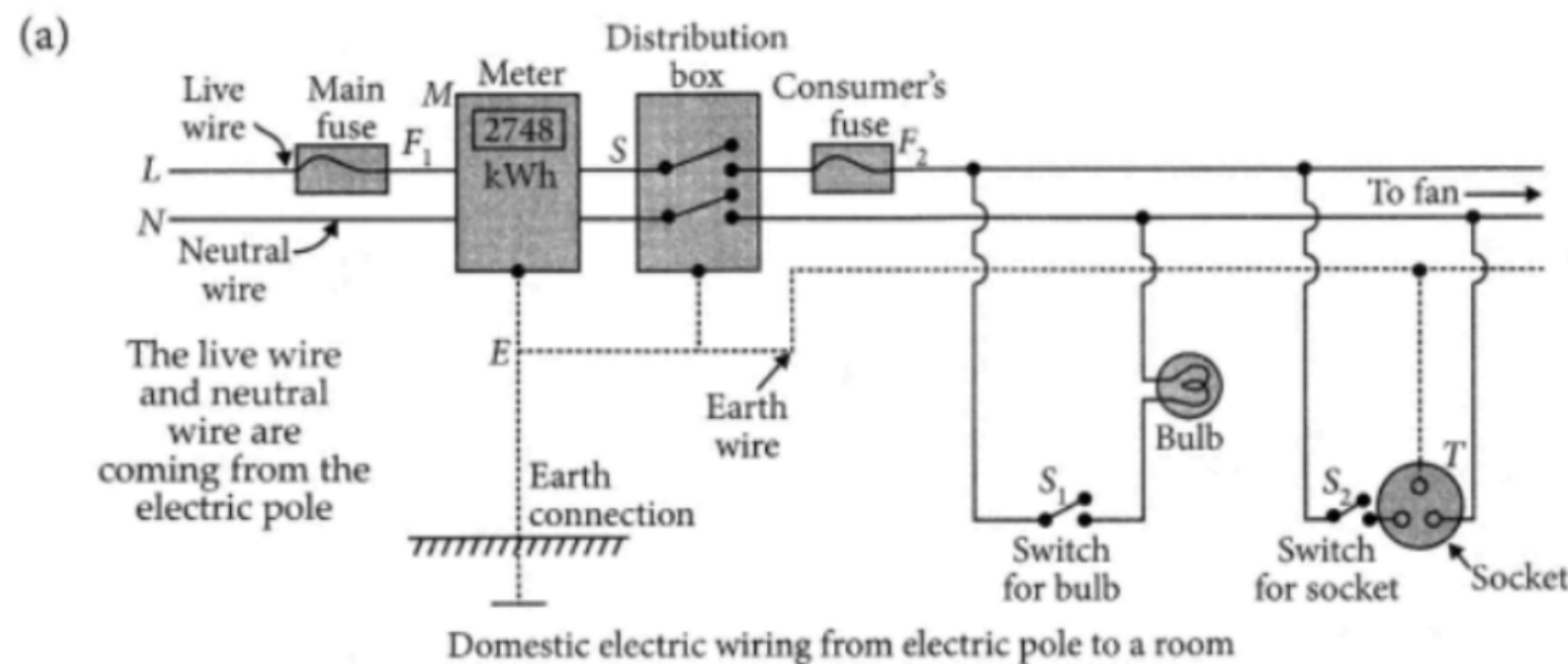
Q. The magnetic field inside a long straight solenoid - carrying current:

- (a) is zero
- (b) decreases as we move towards its end
- ☒ (c) is the same at all points
- (d) increases as we move towards its end

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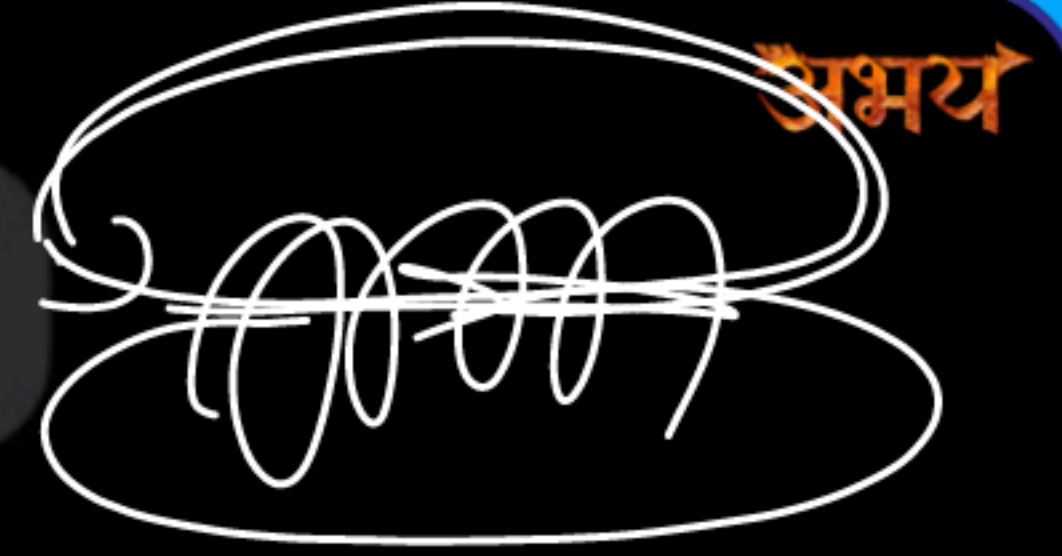
- (a) Draw a schematic diagram of a common domestic circuit showing provision of
 (i) Earth wire, (ii) Main fuse
 (iii) Electricity meter and
 (iv) Distribution box.
 (b) Distinguish between short circuiting and overloading. (2020)



(b) Overloading : The condition in which a high current flows through the circuit and at the same time too many appliances are switched on then the total current drawn through the circuit may exceed its rated value.

Short circuiting: The condition when the live wire comes in direct contact with the neutral wire, due to which a high current flows in the circuit.

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Q.How does a solenoid behave like a magnet? Can you determine the north and south poles of a current-carrying solenoid with the help of a bar magnet? Explain.

Answer

A solenoid is a copper wire coil made up of several insulated circular loops. Similar to how a bar magnet produces a magnetic field when current flows through it, a solenoid also creates a magnetic field when current flows through it. The arrangement of magnetic fields created around the solenoid when electricity is passed through it is depicted in the figure below.

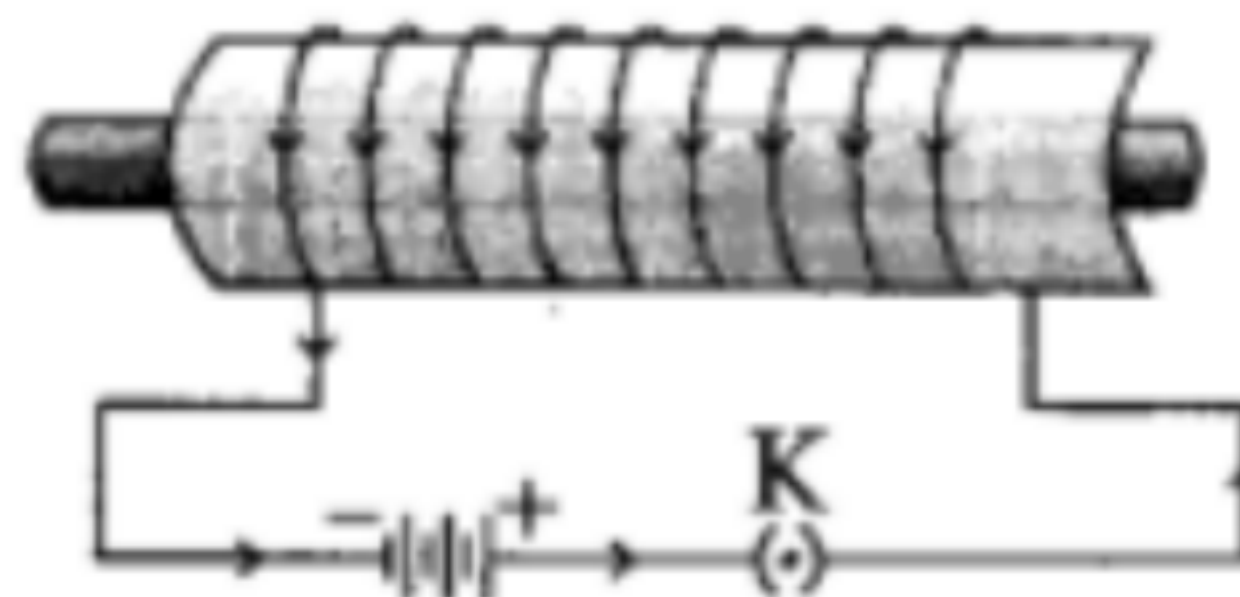
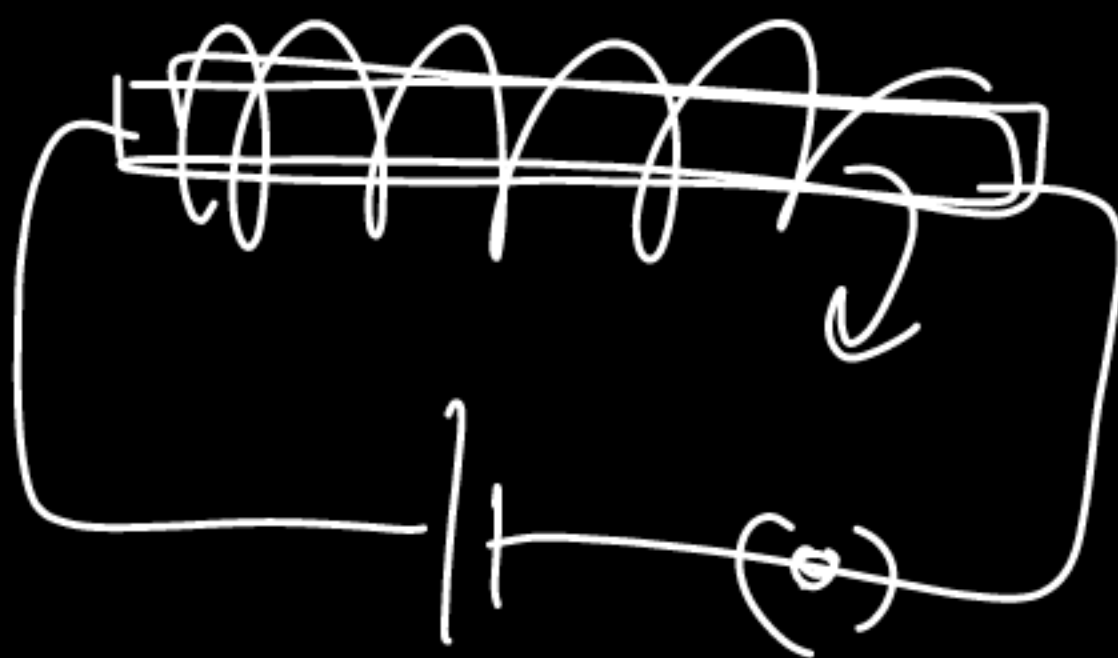
The solenoid repels the battery when the north pole of the bar magnet is brought close to the end that is attached to the negative terminal of the battery. We can conclude that the end linked to the negative terminal behaves as a north pole and the end connected to the positive terminal behaves as a south pole since, like poles, they repel one another.

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Q. Draw circuit diagram of a solenoid to prepare an electromagnet(2022).

A strong magnetic field produced inside a solenoid can be used to magnetise a piece of magnetic material, like soft iron, when placed inside the coil. The magnet so formed is called an electromagnet.



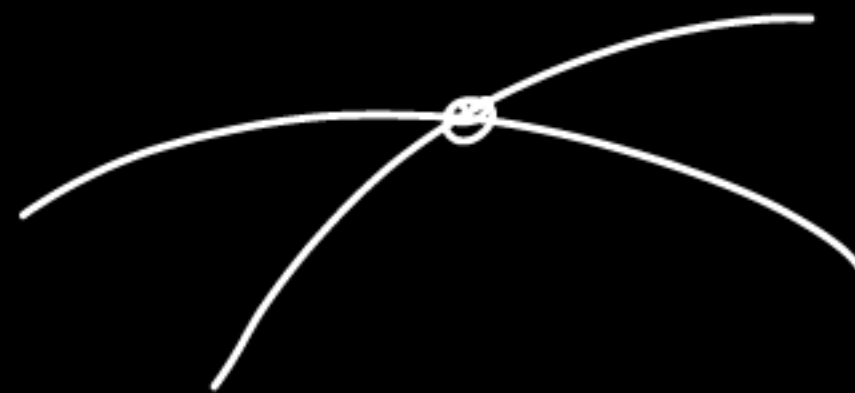
An electromagnet-A current-carrying solenoid coil which is used to magnetise steel rod inside it.

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Q.Two magnetic field lines do not intersect each other. Why? (2024)

Answer: Two magnetic field lines do not intersect each other because if they did, it would imply that at the point of intersection, there would be two different directions of the magnetic field, which is not possible.



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Q. Name and state the rule to determine the direction of a: (2024)

(i) Magnetic field produced around a current carrying straight conductor.

Answer: The rule to determine the direction of the magnetic field produced around a current carrying straight conductor is the Right-Hand Thumb Rule. According to this rule, if you hold the conductor in your right hand with the thumb pointing in the direction of the current, then the curled fingers point in the direction of the magnetic field lines.

(ii) Force experienced by a current carrying straight conductor placed in a magnetic field which is perpendicular to it.

Answer: The rule to determine the direction of the force experienced by a current carrying straight conductor placed in a perpendicular magnetic field is Fleming's Left-Hand Rule.

According to this rule, if the thumb, forefinger, and middle finger of the left hand are held mutually perpendicular to each other, with the forefinger pointing in the direction of the magnetic field, the middle finger pointing in the direction of the current, then the thumb points in the direction of the force.

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Q. (2015):

(a) What are magnetic field lines? ✓✓

(b) Why do two magnetic field lines never intersect each other?

Answer:

(a) Magnetic field lines are the imaginary lines used to represent the magnetic field. The direction of the field at any point is given by the tangent to the field line at that point.

(b) Two magnetic field lines never intersect each other because if they did, there would be two directions of the magnetic field at that point, which is not possible.

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Q. When is the force experienced by a current-carrying straight conductor placed in a uniform magnetic field:

(a) Maximum?

(b) Minimum?

(2020)



Answer:

(a) The force is maximum when the conductor is placed perpendicular to the magnetic field.

(b) The force is minimum (zero) when the conductor is placed parallel to the magnetic field.

“Boards Phodne h mere murkh balaks”

- Prasahant Kirad

