

(ii) Strength of magnetic field produced by electromagnet can be changed by changing the magnitude of electric current through the solenoid while strength of magnetic field of a permanent magnet cannot be changed.

(iii) The polarities of the electromagnet can be interchanged by reversing the direction of current through the solenoid while the polarities of permanent magnet cannot be interchanged.

(iv) An electromagnet can easily be made more powerful than the permanent magnet. (any one)

- 3(a) An alpha particle while passing through a magnetic field gets projected towards north. In which direction will an electron project when it passes through the same magnetic field? 2
- (b) Name the rule to determine the direction of magnetic field and direction of motion of electron.

Ans : (a) South (b) In both cases it is Fleming's Left Hand rule.

- 4 When is the force experienced by a current-carrying straight conductor placed in uniform magnetic field 2
- (a) Maximum;
- (b) Minimum

Ans :

(a) Maximum: When the direction of current in a current carrying conductor is perpendicular to the direction of magnetic field.

(b) Minimum: (Zero) When the direction of current in a current carrying conductor is parallel/antiparallel/ along the direction of magnetic field.

- 5 What are the factors which govern the force experienced by a current carrying conductor placed in a uniform magnetic field depends? 2

Ans :

The factors which govern the force experienced by conductor which is placed in a uniform magnetic field are:

- (a) strength of the magnetic field in which conductor is placed.**
- (b) strength of current flowing through the conductor.**
- (c) length of conductor.**

- 6 Explain, why fuse wire is made of a tin-lead alloy and not copper? 2

Ans :

Tin-lead alloy has a low melting point so wire made of this alloy melt easily whereas copper has a high melting point due to which fuse made of copper wire will not melt easily when a short circuit takes place.

- 7 Explain any two situations that can cause electrical hazards in domestic circuits.

2

Ans :

(i) Connecting too many electrical devices to a single socket or in the extension cord for any length of time draws high current from the mains that will exceed the current rating of connecting wires. The wires cannot withstand such a high current and melt and may cause fire.

(ii) Most electrical hazards in domestic circuits are caused by the faulty electrical outlets, old and out-dated appliances. The chances of short circuit, i.e. contact of live wire and neutral wires with each other due to damage in their insulation or some fault in the appliances are very high. It may result spark at the contact point which may even cause fire.

- 8 (a) Electrical switches should not be operated with wet hand.
(b) In domestic electric circuit, with which wire we connect a fuse?

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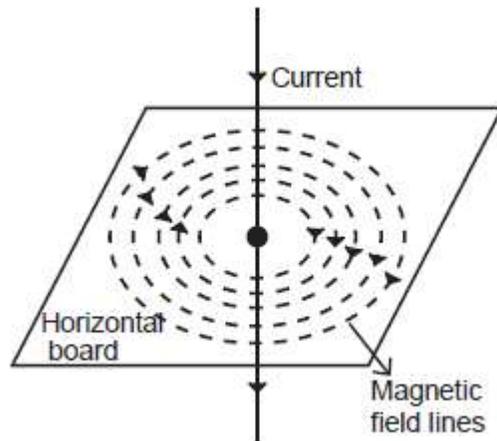
Ans :

(a) Switches should not be operated with wet hand: Water is a good conductor of electricity as it contains salt and impurities. When we touch the switch with wet hand, it is possible that electric current will pass through our body and we get a severe shock.

(b) Fuse is always connected in series with live wire.

- 9 Earth wire has zero voltage just like the neutral wire, then what is the difference between these two wires?

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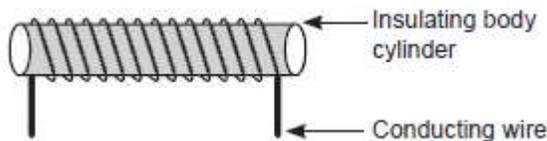


Direction of magnetic field lines can be checked experimentally by placing a magnetic compass needle any where on the card board. Direction of its North pole indicating the direction of magnetic field.

12 What is meant by solenoid? How does a current carrying solenoid behave? Give its main use. 3

Ans :

Solenoid: A coil of many circular turns of insulated copper wire wound on a cylindrical insulating body (i.e. cardboard etc.) such that its length is greater than its diameter is called solenoid.



When current is flowing through the solenoid, the magnetic field line pattern resemble exactly with those of a bar magnet with the fixed polarity North and South pole at its ends and it acquires the directive and attractive properties similar to bar magnet. Hence the current carrying solenoid behaves a bar magnet.

Use of current carrying solenoid: It is used to form a temporary magnet called electromagnet as well as permanent magnet.

13 What is overloading? State the causes of overloading. 3

Ans :

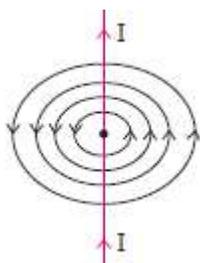
(a) The factors on which magnitude of magnetic field (B) produced by a current (I) carrying conductor depends

(i) current flowing in the conductor as $B \propto I$.

(ii) distance (r) from the wire as $B \propto \frac{1}{r}$

(b) Right hand thumb rule: It state that it we hold the current carrying conductor in the right hand in such a way that the thumb is stretched along the direction of current, then the curly finger around the conductor represent the direction of magnetic field around the conductor produced by it.

(c) Pattern of magnetic field around current carrying straight conductor is similar is concentric circles whose centre lie on the conductor as shown below:



16 Can a freely suspended current carrying solenoid stay in any direction? Justify your answer. What will happen when the direction of current in the solenoid is reversed? **3**

Ans :

• **No, the freely suspended current carrying solenoid always stay only in geographical North and South direction, because it behaves like a bar magnet. The one end of a solenoid behave as a magnetic North pole while the other behave as a South pole.**

• **If the direction of current in a freely suspended solenoid is reversed, then the polarity of its end will be interchanged and the solenoid will rotate through an angle of 180°.**

17 State the various advantages and applications of electromagnet. **3**

Ans : Advantages of an electromagnet

1. It produces very strong magnetic field.

2. Its magnetism lasts as long as current flows through it So, it is a temporary magnet.

3. The strength of electromagnet can be controlled by varying either the number of turns or the current flowing through it.

