Next Toppers

Class X

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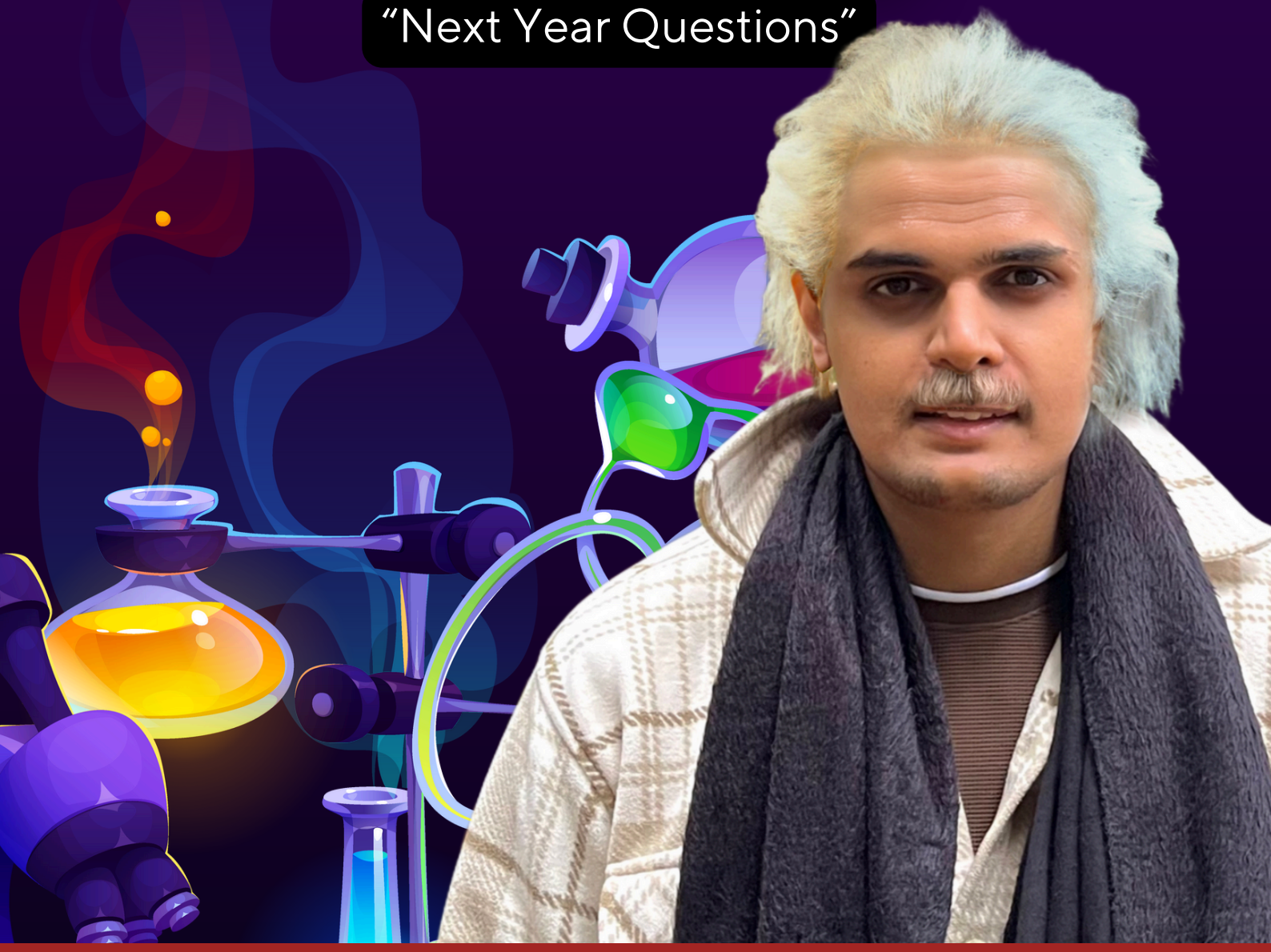
NYQs

"Next Year Questions"



Magnetic Effects of Electric Current

PRASHANT KIRAD

Magnetic Effects of Electric Current

Q1.The magnetic field inside a long straight solenoid-carrying current:
(a) increases as we move towards its end.
(b) decreases as we move towards its end.
(c) is zero.
(d) is the same at all points

Q2. A positively-charged particle (alpha-particle) projected towards the west is deflected towards the north by a magnetic field. The direction of the magnetic field is
(a) downward
(b) towards east
(c) towards south
(d) upward

Q3. What happens to the current in short circuit?
(a) reduces substantially
(b) does not change
(c) increases heavily
(d) vary continuously

Q4. A strong bar magnet is placed vertically above a horizontal wooden board. The magnetic lines of force will be:
(a) Only in the horizontal plane around the magnet
(b) Only in the vertical plane around the magnet
(c) In horizontal as well as vertical planes around the magnet
(d) In all the planes around the magnet

Q5. What is not true about poles of a magnet?
(a) Poles exist always in pairs.
(b) Poles of a magnet are always unlike.
(c) Poles of a magnet are of equal strength.
(d) Poles are situated a little outwards from the geometrical ends of magnet.

Q6.(a) State three factors on which the strength of magnetic field produced by a current carrying solenoid depends.
(b) Draw circuit diagram of a solenoid to prepare an electromagnet

Q7.Give reasons for the following:

(a) It is dangerous to touch the live wire of the main supply rather than neutral wire.
(b)Using fuse in a household electric circuit is important.

Q8.Draw the magnetic field lines through and around a single loop of wire carrying electric current.

Q9.Give reason for the following
(i) There is either a convergence or a divergence of magnetic field lines near the ends of a current carrying straight solenoid.
(ii) The current carrying solenoid when suspended freely rests along a particular direction.

Q10.Find the direction of the magnetic field due to a current carrying a circular coil held:
(i) vertically in the North-South plane, and an observer looking at it from the east sees the current flow in an anticlockwise direction,
(ii) vertically in the East-West plane, and an observer looking at it from the south see the current flow in an anticlockwise direction,
(iii) horizontally, and an observer looking at it from below sees the current flow in a clockwise direction.

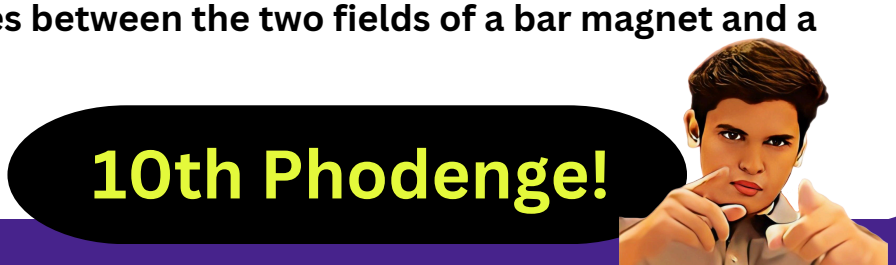
Q11. List the properties of magnetic lines of force.

Q12.Explain what is short-circuiting and overloading in an electric supply.

Q13.(a) State the Right Hand Thumb rule to find the direction of the magnetic field around a current carrying a straight conductor.
(b) How will the magnetic field be affected on:
(i) reversing the direction of flow of current in the conductor?
(ii) increasing the current through the conductor

Q14.(a) State the purpose of the soft iron core used in making an electromagnet
(b) List two ways of increasing the strength of an electromagnet if the material of the electromagnet is fixed.

Q15. Draw the pattern of magnetic field lines of a bar magnet and a current carrying solenoid.
List two distinguishing features between the two fields of a bar magnet and a solenoid.



SOLUTION

Ans1. d

Ans2. d

Ans3. c

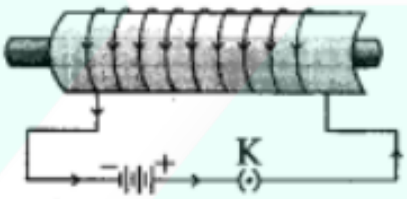
Ans4. d

Ans5. d

Ans 6. (a) Strength of magnetic field produced by a current carrying solenoid depends upon the following factors:

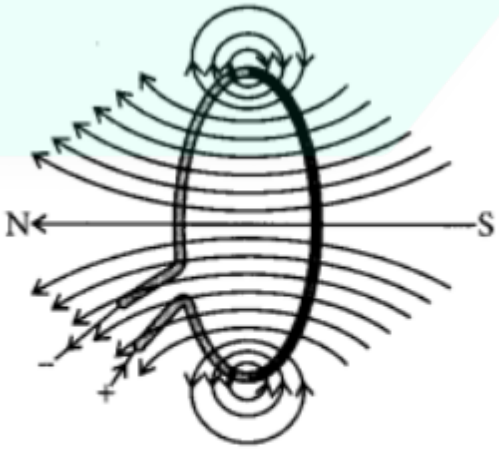
- **number of turns in the coil**
- **amount of current flowing through it**
- **length of the solenoid**
- **Material of core of the solenoid.**

(b) 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.



Ans7.(a) Live wire is at 220V and neutral wire is at zero volt since the electric current flows from higher potential to lower potential, we can get an electric shock by touching live wire but that is not the case with neutral wire.
(b)Fuse is an important safety device. It is used in series with any electrical appliance and protects it from short-circuiting and overloading.

Ans8.



Ans9.(i) There is either a convergence or a divergence of magnetic field lines near the ends of a current carrying straight solenoid because it behaves similar to that of a bar magnet and has a magnetic field line pattern similar to that of a bar magnet. Thus the ends of the straight solenoid behaves like poles of the magnet, where the converging end is the south pole and the diverging end is the north pole.
(ii) The current carrying solenoid behaves similar to that of a bar magnet and when freely suspended aligns itself in the north-south direction.

Ans10.As per the right-hand rule, the direction of the magnetic field is
(i) west to east
(ii) north to south
(iii) into the paper.

Ans11.

- These magnetic field lines extend from the magnet's N pole to its S pole.
- These lines never come together.
- The magnetic field direction at any point on the magnetic line is indicated by the tangent at that location.
- A magnet's magnetic field lines are continuous closed loops.

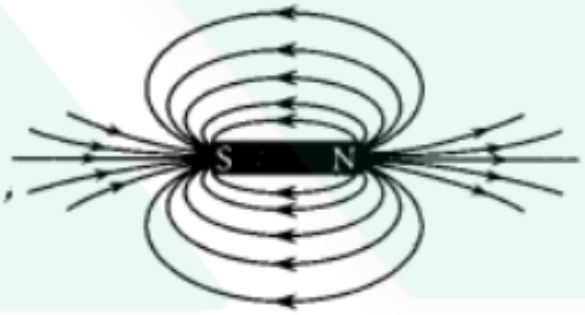
Ans12. Short circuiting
If the plastic insulation of the live wire and neutral wire gets torn, then the two wires touch each other. This touching of the live wire and neutral wire directly is known as short-circuiting. The current passing through the circuit formed by these wires is very large and consequently a high heating effect is created which may lead to fire.
Overloading
The current flowing in domestic wiring at a particular time depends on the power ratings of the appliances being used. If too many electrical appliances of high power rating are switched on at the same time, they draw an extremely large current from the circuit. This is known as overloading. Due to this large current flowing through them, the copper wires of household wiring get heated to a very high temperature and may lead to fire.

Ans13.
(a) It says that you are holding a straight conductor carrying current in your right hand and your thumb pointing in the direction of the current. Your finger will then circle the conductor while pointing in the direction of the magnetic field's field lines.
(b) (i) The magnetic field's direction changes if the direction of the current changes.

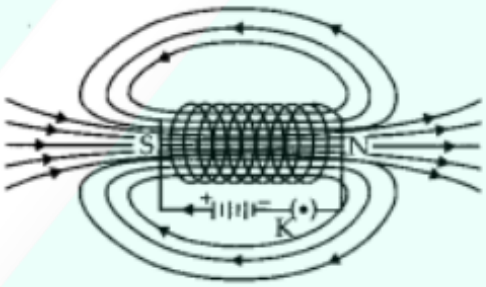
(ii) The magnetic field's strength increases along with an increase in current.

Ans14.(a)Electric bells and buzzers, loudspeakers, headphones, and other electrical devices all use electromagnets.
The soft iron core that is inserted into an electromagnet makes the magnetic field produced stronger. Thus increasing the electromagnet's strength in the process.
(b) The strength of the electromagnet in use can be increased by
(i) Increasing the current flowing through the coil.
(ii) the number of turns in the coil may also be increased.

Ans15.Magnetic field lines around a bar magnet.



Solenoid : A coil of many circular turns of insulated copper wire wrapped in the shape of cylinder is called solenoid.



Field lines of the magnetic field through and around a current-carrying solenoid

Following are the distinguishing features between the two fields.

- Nature of Magnetism: A bar magnet is permanent, while a solenoid is temporary (electromagnet).
- Control: A bar magnet's field is fixed, while a solenoid's field can be adjusted by changing current or coil turns.