





Section A

- Write the answer of the following questions. [Each carries 1 Mark] [20]
1. A coloured insulated coating is used for earthing wires cover.
 2. The lines of magnetic field forms
 3. The magnetic field outside the solenoid is
 4. The magnetic field is in the area where the magnetic field lines are very close to one another.
 5. The presence of current can be detected with the help of
 6. When a conducting rod kept in north-south and if it free fall, then the induced current is produced.
 7. The resistance of fuse wire is low and melting point is high.
 8. If a magnet is taken away from the cross section of conducting coil along the axis, the end of coil toward the magnet act as like (similar) pole.
 9. In commercial motor, permanent magnet is used.
 10. Full name of MRI is Magnetic Resonance Imaging.
 11. The core of an electromagnet must be of
(A) soft iron (B) hard iron (C) rusted iron (D) none of these
 12. A coil of conductive wire is wound around which piece of metal to make an electromagnet ?
(A) Aluminium (B) Nichrome (C) Soft Iron (D) Copper
 13. How many times does AC current with 50 Hz frequency change direction in one second ?
(A) 100 (B) 200 (C) 50 (D) 25
 14. Same current is flowing in following four circles. Which circle have maximum magnetic field at its centre ?
(A)  (B)  (C)  (D) 
 15. According to right-hand thumb rule, what direction the thumb indicates ?
(A) Electric current (B) Magnetic field
(C) Magnetic force (D) Motion of conductor
 16. What is magnetic field ?
 17. Name the scientist who discovered magnetic effect of current.
 18. On what factor does strength of magnetic field of a solenoid depend ?
 19. What is the potential difference between the live and neutral wires and frequency of AC in India ?
 20. In a solenoid how much is the magnetic field produced by a circular coil having n turns as compared to the one produced by a single turn ?

Section B

- Write the answer of the following questions. [Each carries 2 Marks] [18]
21. State whether the following statements are true or false.
(A) The field at the centre of a long circular coil carrying current will be parallel straight lines.

(B) A wire with a green insulation is usually the live wire of an electric supply.

22. List two methods of producing magnetic fields.
23. Why don't two magnetic field lines intersect each other ?
24. List the properties of magnetic field lines.
25. Draw magnetic field lines around a bar magnet.
26. In what ways can the electromagnetic induction occurs ?
27. What is short circuit ? Write the damage or possible probability of accident due to this.
28. Write four characteristics of domestic electric circuits.
29. Why does a compass needle remain rest in the north-south direction ?

Section C



● Write the answer of the following questions. [Each carries 3 Marks]

[18]

30. Two room heater are marked 220 V, 500 W and 200 V, 800 W respectively. If the heaters are connected in parallel to 220 V mains supply, calculate (i) The current drawn by each heater (ii) The resistance of each heater (iii) Total electric energy consumed in commercial units if they operate simultaneously for 2 hours ?
31. Give the characteristics of magnetic field lines.
32. On which factor the magnitude of magnetic field produced due to current carrying straight wire depends ?
33. State the rule to determine the direction of a
 - (1) Magnetic field produced around a straight conductor-carrying current.
 - (2) Force experienced by a current-carrying straight conductor placed in a magnetic field which is perpendicular to it, and
 - (3) Current induced in a coil due to its rotation in a magnetic field.
34. The magnetic field in a given region is uniform. Draw the diagram to represent it.
35. Consider a circular loop of wire lying in the plane of the table. Let the current pass through the loop clockwise. Apply the right-hand rule to find out the direction of the magnetic field inside and outside the loop.

Section D

● Write the answer of the following questions. [Each carries 4 Marks]

[4]

36. Draw a schematic diagram of domestic wiring system and explain it.

OPEN STUDENT FOUNDATION

CHAPTER:12

STD 10 : SCIENCE
IMPORTANT QUESTION DAY 12

Date : 28/02/24

Section A

● Write the answer of the following questions. [Each carries 1 Mark] [20]

1. A coloured insulated coating is used for earthing wires cover.
➡ green
2. The lines of magnetic field forms
➡ closed loops
3. The magnetic field outside the solenoid is
➡ zero
4. The magnetic field is in the area where the magnetic field lines are very close to one another.
➡ strong
5. The presence of current can be detected with the help of
➡ galvanometer
6. When a conducting rod kept in north-south and if it free fall, then the induced current is produced.
➡ False
7. The resistance of fuse wire is low and melting point is high.
➡ False
8. If a magnet is taken away from the cross section of conducting coil along the axis, the end of coil toward the magnet act as like (similar) pole.
➡ False
9. In commercial motor, permanent magnet is used.
➡ False
10. Full name of MRI is Magnetic Resonance Imaging.
➡ True
11. The core of an electromagnet must be of
(A) soft iron (B) hard iron (C) rusted iron (D) none of these

Ans. (A) soft iron

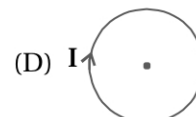
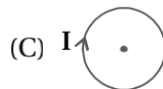
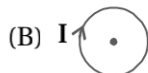
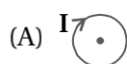
12. A coil of conductive wire is wound around which piece of metal to make an electromagnet ?
(A) Aluminium (B) Nichrome (C) Soft Iron (D) Copper


Ans. (C) Soft Iron

13. How many times does AC current with 50 Hz frequency change direction in one second ?
(A) 100 (B) 200 (C) 50 (D) 25

Ans. (A) 100

14. Same current is flowing in following four circles. Which circle have maximum magnetic field at its centre ?



Ans. (A) 

➡ At minimum distance from the conducting wire, the magnetic field is maximum.

15. According to right-hand thumb rule, what direction the thumb indicates ?

- (A) Electric current (B) Magnetic field
(C) Magnetic force (D) Motion of conductor

Ans. (A) Electric current

16. What is magnetic field ?

➡ The region around a magnet in which the force of attraction or repulsion produced by the magnet can be detected in magnetic field.

17. Name the scientist who discovered magnetic effect of current.

➡ Hans Christian Oersted

18. On what factor does strength of magnetic field of a solenoid depend ?

➡ Strength of magnetic field of a solenoid is proportional to number of turns of coil and magnitude of current.

19. What is the potential difference between the live and neutral wires and frequency of AC in India ?

➡ In our country the potential difference between the two wire is 220 V and frequency of AC is 50 Hz.

20. In a solenoid how much is the magnetic field produced by a circular coil having n turns as compared to the one produced by a single turn ?

➡ n times

Section B

● Write the answer of the following questions. [Each carries 2 Marks]

[18]

21. State whether the following statements are true or false.

- (A) The field at the centre of a long circular coil carrying current will be parallel straight lines.
(B) A wire with a green insulation is usually the live wire of an electric supply.

➡ (A) This statement is true.

(B) This statement is false. It is earthing wire.

22. List two methods of producing magnetic fields.

➡ (i) Any magnet-bar magnet, horse-shoe magnet or round magnet can be used.

(ii) A wire carrying current produces a field around it.

(iii) A loop or solenoid carrying current produce magnetic field.

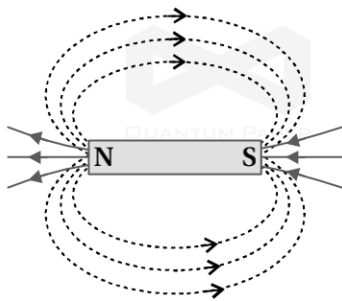
23. Why don't two magnetic field lines intersect each other ?

➡ For answer see Section-1 short answer type Question No. 5.

24. List the properties of magnetic field lines.

➡ For answer see Section-1 Question No. 5.

25. Draw magnetic field lines around a bar magnet.



26. In what ways can the electromagnetic induction occurs ?
- ➡ When the conductor moves in magnetic field or the magnetic field varying around the conductor then the induced current is produced in conductor.
 - ➡ Generally when the conductor moves in magnetic field, the induced current is obtained easily.
27. What is short circuit ? Write the damage or possible probability of accident due to this.
- ➡ When accidentally positive and negative wire of circuit is contacted, the total resistance of the circuit suddenly decreases as result of this the current in the circuit abruptly increases. This is called short circuit.
 - ➡ Spark is produced at a point where short circuit exist. Hence possibility of fire may occur, moreover, possibility of faults in appliance increases.
28. Write four characteristics of domestic electric circuits.
- ➡ (i) In this connection, appliances are connected parallel to each other.
 - ➡ (ii) Each appliance has a separate switch to ON/OFF.
 - ➡ (iii) Two separate circuit are used, one of 15 A current rating and the other circuit is 5 A current rating.
 - ➡ (iv) To each circuit, a separate fuse is connected.
29. Why does a compass needle remain rest in the north-south direction ?
- ➡ Earth act as a magnet and north pole of earth magnet is in south direction and south pole of earth magnet is in north direction.
 - ➡ Like poles repel, while unlike poles attract each other hence needle always remain at rest in north-south direction.

Section C

- Write the answer of the following questions. [Each carries 3 Marks] [18]

30. Two room heater are marked 220 V, 500 W and 200 V, 800 W respectively. If the heaters are connected in parallel to 220 V mains supply, calculate (i) The current drawn by each heater (ii) The resistance of each heater (iii) Total electric energy consumed in commercial units if they operate simultaneously for 2 hours ?

- ➡ (i) Current drawn by 500 W heater

$$I_1 = \frac{P_1}{V} = \frac{500}{220} = 2.27 \text{ A}$$

- (ii) Resistance of 500 W heater

$$R_1 = \frac{V}{I_1} = \frac{220}{2.27} = 96.7 \ \Omega$$

$$\therefore R_1 \approx 97 \ \Omega$$

- Current drawn by 800 W heater

$$I_2 = \frac{P_2}{V} = \frac{800}{220} = 3.64 \text{ A}$$

Resistance of 800 W heater

$$R_2 = \frac{V}{I_2} = \frac{220}{3.64} = 60 \Omega$$

(iii) Energy consumed in 2 hours

$$\begin{aligned} E_0 &= E_1 + E_2 \\ &= P_1 t + P_2 t &= 2600 \text{ Wh} \\ &= 500 \times 2 + 800 \times 2 &= 2.6 \text{ kWh} = 26 \text{ unit} \end{aligned}$$

31. Give the characteristics of magnetic field lines.

- (1) Magnetic field is a vector hence it has magnitude as well as direction.
- (2) Outside they seem to travel from north to south and inside south to north. Hence they always form closed loops.
- (3) The magnetic field lines are crowded near the pole where the field is strong and far from the magnet where the field is weak.
- (4) The direction of the magnetic field is tangent to the field line at any point in space.
- (5) Magnetic field lines do not intersect each other.

32. On which factor the magnitude of magnetic field produced due to current carrying straight wire depends ?

- If the current in the wire increases, the magnetic field also increases and hence the deflection of compass needle increases and if the current decreases, the produced magnetic field decreases.
- Moreover, if the current in wire flow with constant, then magnetic field decreases as the distance from wire increases. So the deflection of compass needle decreases and as coming nearby the deflection of compass needle increases.
- Also, as we go away from the current carrying straight wire, the size of the concentric circles around the wire increases.
- Magnetic field lines around wire are arranged circularly in a plane perpendicular to the direction of the current passing through wire.

33. State the rule to determine the direction of a

- (1) Magnetic field produced around a straight conductor-carrying current.
 - (2) Force experienced by a current-carrying straight conductor placed in a magnetic field which is perpendicular to it, and
 - (3) Current induced in a coil due to its rotation in a magnetic field.
- (1) To know the direction of magnetic field produced around a straight conductor-carrying current. Rule used is - Right hand thumb rule.
 - For figure see Section-1 Question No. 9.
 - (2) Fleming's left hand rule is used to find the direction of force experienced by a current carrying straight conductor, when placed in a magnetic field, which is perpendicular to it.
 - For figure see Section-1 Question No. 17.
 - **Rule :** Stretch the first three fingers of the left hand mutually perpendicular to each other such that the fore-fingers points the direction of magnetic field, the middle finger points the direction of current, then the thumb will indicate the direction of force experienced by the conductor. It shows the direc-

tion of motion and the force acting on the conductor.

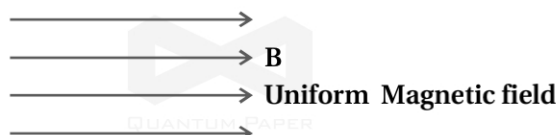
(3) Fleming's right hand rule is used to determine the direction of induced current in a coil due to its rotation in a magnetic field. This rule is as below :

➡ **Rule :** Stretch the first three fingers of the right hand mutually perpendicular to each other such that the fore-finger gives the direction of magnetic field and the thumb points the direction of the motion of a conductor then the middle finger will give the direction of induced current.

➡ **For figure see Section-1 Question No. 24.**

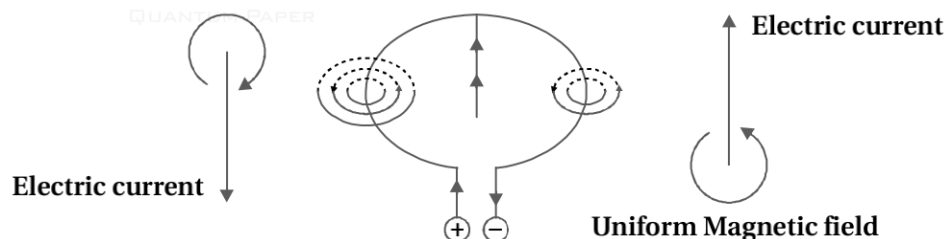
34. The magnetic field in a given region is uniform. Draw the diagram to represent it.

➡ The magnetic field in a given region is uniform can be represented by showing parallel lines at equidistance.



35. Consider a circular loop of wire lying in the plane of the table. Let the current pass through the loop clockwise. Apply the right-hand rule to find out the direction of the magnetic field inside and outside the loop.

➡ Since electric field is from positive to negative and also magnetic field is from north pole to south pole. Hence the positive is considered as north pole (N) and negative is considered south pole (S). (N) is taken as anticlockwise direction and (S) is taken as clockwise direction if we take these electric current is found inside and outside as shown in below figure.



Section D

● Write the answer of the following questions. [Each carries 4 Marks]

[4]

36. Draw a schematic diagram of domestic wiring system and explain it.

➡ In our homes, we receive supply of electric power through main supply (also called mains), either supported through overhead electric poles or by underground cables.

➡ One of the wires in this supply is with red insulation cover is called live wire (or positive).

➡ Another wire with black insulation is called neutral wire (or negative).

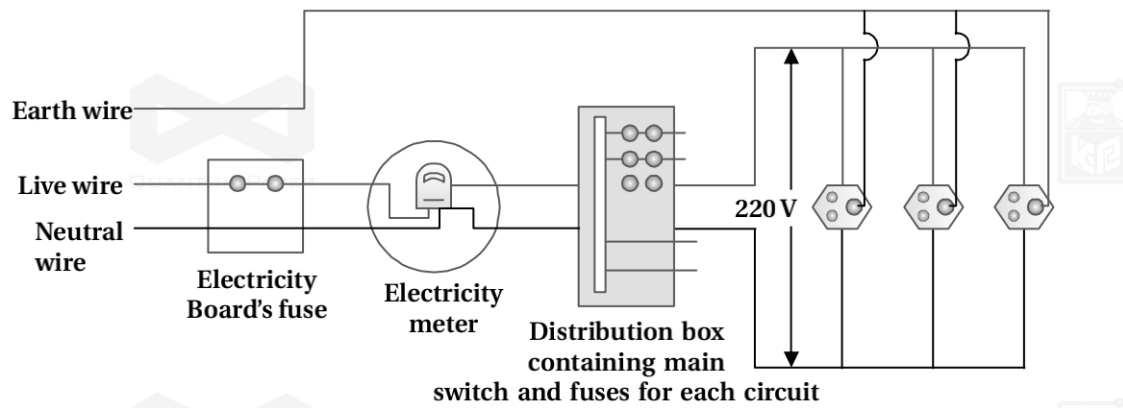
➡ In our country the potential difference between the two is 220 V and frequency of AC is 50 Hz. In USA it is 60 Hz.

➡ At the meter-board in the house, these wires pass into an electricity meter through a main fuse. Through the main switch they are connected to the line wires in the house.

➡ These wires supply electricity to separate circuits.

➡ In some houses, two separate circuits are used, one of 15 A current rating for appliances with higher power ratings such as geysers, air coolers etc.

➡ The other circuit is of 5 A current rating for bulbs, fans, etc.



A schematic diagram of one of the common domestic circuits

- ➡ Figure gives a schematic diagram of the common domestic circuit. In each separate circuit, different appliances can be connected across the live and neutral wire. Each appliance has a separate switch to ON/OFF the flow of current through it.
- ➡ In order that each appliance has equal potential difference, they are connected parallel to each other.
- ➡ A green coloured insulating coating on earthing wire and is connected with earth with metal plate deep in the earth near the house.
- ➡ Earthing wire is used for prevention of electric appliances like electric iron, toaster, table fan, refrigerator having a metallic body.
- ➡ Earthing wire is connected between the surface of appliances and deep pit of ground near to the house. Hence any leakage in current directly flow into the earth and do not feel electric shock.