CBSE CLASS X

Science (086)

QUESTION PAPER

From previous CBSE Board Exam questions

Code: TXMNO3	Questions: 74	Maximum Marks: 186	Generated: 2026-06-15 13:05

SELECTIONS USED

Source	Previous-year board
Subject	Science
Lessons	Magnetic Effects of Electric Current
Year	2022-2026
Questions selected	74

Composition — Types: 25 Short · 14 MCQ · 13 Assertion–reason · 12 Long · 6 Very short · 5 Case-based

Q1. § Introduction | § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR **[1]**

Assertion (A) : The deflection of a compass needle placed near a current carrying wire decreases when the magnitude of an electric current in the wire is increased.
Reason (R) : Strength of the magnetic field at a point due to a current carrying conductor increases on increasing the current in the conductor.

(A) Both (A) and (R) are true and (R) is the correct explanation of (A).
(B) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(C) (A) is true, but (R) is false.
(D) (A) is false, but (R) is true.

Previously asked in: 2024 31/2/1 Q20

◆ **Magnetic Effects of Electric Current** | Magnetic field due to current-carrying conductor and compass needle deflection

Q2. § Introduction | § 12.1 MAGNETIC FIELD AND FIELD LINES | § 12.2.4 Magnetic Field due to a Current in a Solenoid **[4]**

What is electromagnetic induction ? What is observed in the galvanometer when a strong bar magnet is held stationary near one end of a coil of large number of turns ? Justify your answer.

Previously asked in: 2022 31/4/1 Q14 (OR)

◆ **Magnetic Effects of Electric Current** | Effect of stationary magnet on a coil – no deflection in galvanometer | Electromagnetic Induction

Q3. § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR | § 12.2.2 Right-Hand Thumb Rule **[2]**

Answer the following based on the given figures 'a' and 'b':

(a) Name the poles P, Q, R and S of the magnets in the following figures 'a' and 'b'. (½+½+1=2)

(b) State the inference drawn about the direction of the magnetic field lines on the basis of these diagrams.

Previously asked in: 2022 31/2/1 Q6 (OR-1)

◆ **Magnetic Effects of Electric Current** | Magnetic poles and field lines between magnets (attraction and repulsion)

Q4. § 12.1 MAGNETIC FIELD AND FIELD LINES § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[1]**

Which one of the following statements is not true about a bar magnet ?

(A) It sets itself in north-south direction when suspended freely.
(B) It has attractive power for iron filings.
(C) It produces magnetic field lines.
(D) The direction of magnetic field lines inside a bar magnet is from its north pole to its south pole.

Previously asked in: 2025 31/3/1 Q14

◆ **Magnetic Effects of Electric Current** Properties of a Bar Magnet

Q5. § 12.1 MAGNETIC FIELD AND FIELD LINES **[1]**

Assertion (A) : The needle of a compass, kept in an external magnetic field, always aligns itself in the North-South direction of the Earth.

Reason (R) : The behaviour of the needle of the compass is similar to the behaviour of a freely suspended bar magnet.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2026 31/3/1 Q32

◆ **Magnetic Effects of Electric Current** Compass needle and Earth's magnetic field – alignment in North-South direction Compass needle as a freely suspended bar magnet

Q6. § 12.1 MAGNETIC FIELD AND FIELD LINES **[1]**

Assertion (A) : The needle of a magnetic compass kept in strong external magnetic field, always aligns itself in north-south direction on the earth.

Reason (R) : Behaviour of the needle of a compass is same as that of a freely suspended bar magnet.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2026 31/5/1 Q32

◆ **Magnetic Effects of Electric Current** Magnetic compass and bar magnet behaviour in external magnetic field

Q7. § 12.2.2 Right-Hand Thumb Rule **[2]**

"Magnetic field is a physical quantity that has both direction and magnitude." How can this statement be proved with the help of magnetic field lines of a bar magnet ?

Previously asked in: 2022 31/4/1 Q2 (OR)

◆ **Magnetic Effects of Electric Current** Magnetic field as a vector quantity – direction and magnitude from field lines of a bar magnet

Q8. § 12.2.2 Right-Hand Thumb Rule **[2]**

State the rule to determine the direction of a (a) magnetic field produced around a straight conductor carrying current and (b) force experienced by a current carrying straight conductor placed in a magnetic field which is perpendicular to it.

Previously asked in: 2023 31/6/1 Q26

◆ **Magnetic Effects of Electric Current** Fleming's Left-Hand Rule – direction of force on a current-carrying conductor in a magnetic field Right-Hand Thumb Rule (Maxwell's Corkscrew Rule) – direction of magnetic field around a current-carrying straight conductor

Q9. § 12.2.2 Right-Hand Thumb Rule **[1]**

The resultant magnetic field at point 'P' situated midway between two parallel wires (placed horizontally) each carrying a steady current I is

(a) in the same direction as the current in the wires.
(b) in the vertically upward direction.
(c) zero
(d) in the vertically downward direction.

Previously asked in: 2023 31/1/1 Q16

◆ **Magnetic Effects of Electric Current** Magnetic field due to parallel current-carrying wires and superposition at midpoint

Q10. § 12.2.2 Right-Hand Thumb Rule **[3]**

Name and state the rule to determine the direction of a :

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

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

Previously asked in: 2024 31/1/1 Q32

◆ **Magnetic Effects of Electric Current** Fleming's Left-Hand Rule – direction of force on a current-carrying conductor in a magnetic field
Right-Hand Thumb Rule (Maxwell's Corkscrew Rule) – direction of magnetic field around a current-carrying straight conductor

Q11. § 12.2.2 Right-Hand Thumb Rule **[3]**

Draw the pattern of the magnetic field produced around a vertical current carrying straight conductor passing through a horizontal cardboard. Mark the direction of current and the magnetic field lines. Name and state the rule which is used to determine the direction of magnetic field associated with a current carrying conductor.

Previously asked in: 2023 31/5/1 Q32 (b)

◆ **Magnetic Effects of Electric Current** Magnetic field pattern around a straight current-carrying conductor
Right-Hand Thumb Rule (Maxwell's Corkscrew Rule)

Q12. § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR § 12.2.2 Right-Hand Thumb Rule **[1]**

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 :

(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.

Previously asked in: 2023 31/5/1 Q14

◆ **Magnetic Effects of Electric Current**
Magnetic field due to a straight current-carrying conductor (direction using Right-Hand Thumb Rule)

Q13. § 12.2.2 Right-Hand Thumb Rule **[5]**

The given figure shows the current passing through the straight conductor XY.

(i) Copy the diagram and draw the magnetic field lines when current flows from conductor X to Y. [2]

(ii) Name and state the rule used in determining the direction of the magnetic field lines in the situation given above. [1]

(iii) State Fleming's left hand rule. Using this rule, determine the direction of force applied on an electron entering a uniform magnetic field as shown in the figure. [2]

Previously asked in: 2025 31/2/1 Q36 (a)

◆ **Magnetic Effects of Electric Current** | Fleming's Left-Hand Rule and force on a charged particle in a magnetic field | Magnetic field due to a straight current-carrying conductor | Right-Hand Thumb Rule (Maxwell's Corkscrew Rule)

Q14. § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[4]**

> A student was asked to perform an experiment to study the force on a current carrying conductor in a magnetic field. He took a small aluminum rod AB, a strong horse shoe magnet, some connecting wires, a battery and a switch and connected them as shown. He observed that on passing current, the rod gets displaced. On reversing the direction of current, the direction of displacement also gets reversed.

Answer the following:

(c) Draw the pattern of magnetic field lines produced around a current carrying straight conductor held vertically on a horizontal cardboard. Indicate the direction of the field lines as well as the direction of current flowing through the conductor.

Previously asked in: 2022 31/2/1 Q15 (OR-2)

◆ **Magnetic Effects of Electric Current** | Magnetic field lines around a current-carrying straight conductor | Right-hand thumb rule / direction of magnetic field

Q15. § 12.2.2 Right-Hand Thumb Rule **[3]**

Draw a diagram to show the pattern of magnetic field lines on a horizontal sheet of paper due to a straight conductor passing through its centre and carrying current vertically upwards. Mark on it (i) the direction of current in the conductor and (ii) the corresponding magnetic field lines. State right hand thumb rule and check whether the directions marked by you are in accordance with this rule or not.

Previously asked in: 2024 31/2/1 Q32

◆ **Magnetic Effects of Electric Current** | Magnetic field lines due to a straight current-carrying conductor | Right Hand Thumb Rule

Q16. § 12.2.3 Magnetic Field due to a Current through a Circular Loop **[1]**

The correct pattern of magnetic field lines of the field produced by a current carrying circular loop is :

(a) Magnetic field pattern option (a)
(b) Magnetic field pattern option (b)
(c) Magnetic field pattern option (c)
(d) Magnetic field pattern option (d)

Previously asked in: 2023 31/4/1 Q14

◆ **Magnetic Effects of Electric Current** | Magnetic field lines due to a current-carrying circular loop

Q17. § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR § 12.2.2 Right-Hand Thumb Rule § 12.2.3 Magnetic Field due to a Current through a Circular Loop **[1]**

Assertion (A) : Magnetic field lines do not intersect each other.
Reason (R) : Magnetic field lines are imaginary lines, the tangent to which at any point gives the direction of the field at that point.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2023 31/2/1 Q20

◆ **Magnetic Effects of Electric Current** Properties of Magnetic Field Lines

Q18. § 12.1 MAGNETIC FIELD AND FIELD LINES § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR **[1]**

Assertion (A) : Magnetic field lines never intersect each other.
Reason (R) : If they intersect, then at the point of intersection, the compass needle would point towards two directions, which is not possible.

A Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
B Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
C Assertion (A) is true, but Reason (R) is false.
D Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2024 31/4/1 Q19

◆ **Magnetic Effects of Electric Current** Properties of Magnetic Field Lines

Q19. § 12.2.2 Right-Hand Thumb Rule § 12.2.3 Magnetic Field due to a Current through a Circular Loop **[3]**

Consider a rectangular cardboard having two holes P and Q through which a current carrying circular loop has been inserted as shown in the diagram.

(a) Make this diagram on your answer sheet and draw three magnetic field lines, one each passing through the points 1 (near P), 2 (at the centre of the loop) and 3 (near Q). [1]

(b) List two factors on which the intensity of the magnetic field produced at the centre of the loop depends. [1]

(c) Name the rule you will apply to determine the direction of magnetic field produced due to a current carrying straight conductor. [1]

Previously asked in: 2025 31/3/1 Q32

◆ **Magnetic Effects of Electric Current** Factors affecting magnetic field intensity at the centre of a circular loop Magnetic field lines due to a current-carrying circular loop Right-Hand Thumb Rule for current-carrying straight conductor

Q20. § 12.1 MAGNETIC FIELD AND FIELD LINES § 12.2.2 Right-Hand Thumb Rule **[1]**

Assertion (A) : Magnetic field lines around a bar magnet never intersect each other.
Reason (R) : Magnetic field produced by a bar magnet is a quantity that has both magnitude and direction.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2025 31/3/1 Q19

◆ **Magnetic Effects of Electric Current** Magnetic field as a vector quantity (magnitude and direction) Magnetic field lines properties – non-intersection

Q21. § 12.1 MAGNETIC FIELD AND FIELD LINES § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR **[1]**

Assertion (A) : No two magnetic field lines are found to cross each other.
Reason (R) : The compass needle cannot point towards two directions at the point of intersection of two magnetic field lines.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2025 31/1/1 Q19

◆ **Magnetic Effects of Electric Current** Properties of Magnetic Field Lines – Non-intersection of Field Lines

Q22. § Introduction § 12.1 MAGNETIC FIELD AND FIELD LINES § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR **[4]**

> AB is a coil of copper wire having a large number of turns. The ends of the coil are connected with a galvanometer as shown. When the north pole of a strong bar magnet is moved towards the end B of the coil, a deflection is observed in the galvanometer.

Answer the sub-questions based on the case below. Part (a) and (b) are compulsory; an internal choice has been provided in Part (c).

(a) State the reason for using galvanometer in the activity and why does its needle deflects momentarily when magnet is moved towards the coil.

(b) What would be observed in the galvanometer in a situation when the coil and the bar magnet both move with the same speed in the same direction ? Justify your answer.

(c) State the conclusion that can be drawn from this activity. Will there be any change in the momentary deflection in the galvanometer if number of turns in the coil is increased and a more stronger magnet is moved towards the coil ?

Previously asked in: 2022 31/4/1 Q14 (main)

◆ **Magnetic Effects of Electric Current** Electromagnetic Induction – Galvanometer deflection and induced current Factors affecting induced EMF – number of turns and strength of magnet Relative motion between coil and magnet

Q23. § 12.2.4 Magnetic Field due to a Current in a Solenoid **[3]**

What is a solenoid ? When does a solenoid behave as a magnet ? Draw the pattern of the magnetic field produced inside it showing the directions of the magnetic field lines.

Previously asked in: 2023 31/6/1 Q32

◆ **Magnetic Effects of Electric Current** Magnetic field lines pattern inside a solenoid Solenoid behaving as a magnet (current-carrying solenoid) Solenoid – definition and structure

Q24. § 12.2.4 Magnetic Field due to a Current in a Solenoid **[1]**

The magnetic field inside a long straight current carrying solenoid :

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

Previously asked in: 2023 31/6/1 Q15

◆ **Magnetic Effects of Electric Current** Magnetic field inside a solenoid

Q25. § 12.2.2 Right-Hand Thumb Rule § 12.2.4 Magnetic Field due to a Current in a Solenoid **[3]**

Answer the following:

(i) Draw the pattern of magnetic field lines of (1) a current carrying solenoid (2) a bar magnet

(ii) List two distinguishing features between the two fields.

Previously asked in: 2023 31/1/1 Q32(b)

◆ **Magnetic Effects of Electric Current** Comparison between magnetic field of solenoid and bar magnet Magnetic field lines of a bar magnet Magnetic field lines of a current-carrying solenoid

Q26. § 12.1 MAGNETIC FIELD AND FIELD LINES § 12.2.4 Magnetic Field due to a Current in a Solenoid § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[2]**

Name the device used to magnetise a piece of magnetic material. Draw a labelled diagram to show the arrangement used for the magnetisation of a cylinder made of soft iron.

Previously asked in: 2024 31/3/1 Q25(b)

◆ **Magnetic Effects of Electric Current** Magnetisation of magnetic materials using a solenoid

Q27. § 12.2.4 Magnetic Field due to a Current in a Solenoid **[1]**

Strength of magnetic field produced by a current carrying solenoid DOES NOT depend upon :

(A) number of turns in the solenoid
(B) direction of the current flowing through it
(C) radius of solenoid
(D) material of core of the solenoid

Previously asked in: 2024 31/2/1 Q16

◆ **Magnetic Effects of Electric Current** Factors affecting magnetic field strength of a current-carrying solenoid

Q28. § 12.2.4 Magnetic Field due to a Current in a Solenoid **[1]**

The pattern of the magnetic field produced inside a current carrying solenoid is :

(a) [diagram a]
(b) [diagram b]
(c) [diagram c]
(d) [diagram d]

Previously asked in: 2024 31/1/1 Q14

◆ **Magnetic Effects of Electric Current** Magnetic field pattern inside a current-carrying solenoid

Q29. § 12.2.4 Magnetic Field due to a Current in a Solenoid **[1]**

Assertion (A) : The pattern of the magnetic field of a solenoid carrying a current is similar to that of a bar magnet.
Reason (R) : The pattern of the magnetic field around a current carrying conductor is independent of the shape of the conductor.

A Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
B Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
C Assertion (A) is true, but Reason (R) is false.
D Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2025 31/5/1 Q19

◆ **Magnetic Effects of Electric Current** Dependence of magnetic field pattern on shape of conductor Magnetic field of a solenoid and its similarity to a bar magnet

Q30. § Introduction § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR **[3]**

In the diagram given below, Coil 1 is connected in series with a battery and a plug key while Coil 2 is connected with a galvanometer.

(i) Why does the galvanometer show deflection only when the key (K) is plugged in and not when a steady current starts flowing in the circuit? [1]

(ii) What is observed in the galvanometer, when the key is plugged out? [1]

(iii) State the conclusion based on the observation of this activity. [1]

Previously asked in: 2022 31/3/1 Q12(a)

◆ **Magnetic Effects of Electric Current** Electromagnetic Induction – Mutual Induction between Two Coils Induced Current and Changing Magnetic Flux

Q31. § 12.2.4 Magnetic Field due to a Current in a Solenoid **[3]**

What is a Solenoid? Draw the pattern of the magnetic field lines around a current carrying solenoid. Mark on the pattern the region where the magnetic field is uniform.

Previously asked in: 2022 31/3/1 Q11

◆ **Magnetic Effects of Electric Current** Solenoid – definition and magnetic field pattern

Q32. § 12.2.4 Magnetic Field due to a Current in a Solenoid **[2]**

Answer the following:

(i) What is a solenoid ?

(ii) Draw the pattern of magnetic field lines of the magnetic field produced by a solenoid through which a steady current flows.

Previously asked in: 2022 31/1/1 Q6 (b)

◆ **Magnetic Effects of Electric Current** Solenoid – definition and magnetic field line pattern

Q33. § 12.2.4 Magnetic Field due to a Current in a Solenoid **[1]**

For a current in a long straight solenoid, N and S poles are created at the two ends. Among the following statements, the incorrect statement is :

(a) The magnetic field lines inside the solenoid are in the form of straight lines, which indicates that the magnetic field is uniform at all points inside the solenoid.
(b) The strong magnetic field produced inside the solenoid can magnetize the soft iron placed inside it.
(c) The pattern of the magnetic field associated with a current carrying solenoid is different from the pattern of the magnetic field around a bar magnet.
(d) The N and S poles exchange positions when the direction of current through the solenoid is reversed.

Previously asked in: 2023 31/5/1 Q16

◆ **Magnetic Effects of Electric Current** Magnetic field due to a solenoid and polarity of its ends

Q34. § 12.2.2 Right-Hand Thumb Rule § 12.2.4 Magnetic Field due to a Current in a Solenoid **[3]**

(B) For the current carrying solenoid as shown, draw magnetic field lines and give reason to explain that out of the three points A, B and C, at which point the field strength is maximum and at which point it is minimum ?

Previously asked in: 2023 31/4/1 Q32 (B)

◆ **Magnetic Effects of Electric Current** Comparison of magnetic field strength at different points (inside and outside a solenoid) Magnetic field lines of a current-carrying solenoid

Q35. § 12.2.2 Right-Hand Thumb Rule | § 12.2.4 Magnetic Field due to a Current in a Solenoid | § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[1]**

The current carrying device which produces a magnetic field similar to that of a bar magnet is :

(A) A straight conductor
(B) A circular loop
(C) A solenoid
(D) A circular coil

Previously asked in: 2024 31/5/1 Q14

◆ **Magnetic Effects of Electric Current** | Solenoid and its magnetic field (similar to bar magnet)

Q36. § 12.2.4 Magnetic Field due to a Current in a Solenoid **[1]**

The strength of magnetic field produced inside a long straight current carrying solenoid does not depend upon :

(A) number of turns in the solenoid
(B) direction of current flowing through the solenoid
(C) material of the core filled inside the solenoid
(D) radius of the coil of the solenoid

Previously asked in: 2025 31/3/1 Q15

◆ **Magnetic Effects of Electric Current** | Magnetic field inside a solenoid and factors affecting it

Q37. § 12.2.4 Magnetic Field due to a Current in a Solenoid **[5]**

Answer the following:

(i) Define the term solenoid. Draw the pattern of the magnetic field lines in and around a current carrying straight solenoid. Mark on the pattern the (i) direction of current, (ii) direction of field lines near the ends of the solenoid, and (iii) region where the magnetic field is uniform. [4]

(ii) How would you make an electromagnet using a current carrying solenoid ? [1]

Previously asked in: 2025 31/2/1 Q36 (b)

◆ **Magnetic Effects of Electric Current** | Electromagnet – making an electromagnet using a current-carrying solenoid | Solenoid – definition, magnetic field pattern, and field lines

Q38. § 12.2.4 Magnetic Field due to a Current in a Solenoid **[5]**

Attempt either (a) or (b) :

(i) What is a solenoid ? Draw a diagram showing the magnetic field pattern due to a current-carrying solenoid (inside and outside).

(ii) Name any two factors on which the magnitude of the magnetic field due to a current-carrying solenoid depends.

(iii) A current-carrying solenoid is stretched and converted into a straight wire carrying current. Draw a diagram showing the magnetic field pattern around it and mark the direction of the magnetic field.

Previously asked in: 2026 31/3/1 Q39 (a)

◆ **Magnetic Effects of Electric Current** | Magnetic field around a straight current-carrying wire | Solenoid – definition, magnetic field pattern, and influencing factors

Q39. § Introduction | § 12.2.4 Magnetic Field due to a Current in a Solenoid | § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[2]**

How is an electromagnet made ? Write any two ways by which the strength of electromagnet can be increased.

Previously asked in: 2026 31/4/1 Q33 (B)

◆ **Magnetic Effects of Electric Current** | Electromagnet and Solenoid

Q40. § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[4]**

> A student was asked to perform an experiment to study the force on a current carrying conductor in a magnetic field. He took a small aluminum rod AB, a strong horse shoe magnet, some connecting wires, a battery and a switch and connected them as shown. He observed that on passing current, the rod gets displaced. On reversing the direction of current, the direction of displacement also gets reversed.

On the basis of your understanding of this phenomenon, answer the following questions:

(a) Why does the rod get displaced on passing current through it ?

(b) State the rule that determines the direction of the force on the conductor AB.

(c) (i) If the U shaped magnet is held vertically and the aluminum rod is suspended horizontally with its end B towards due north, then on passing current through the rod from B to A as shown, in which direction will the rod be displaced ? (ii) Name any two devices that use current carrying conductors and magnetic field.

Previously asked in: 2022 31/2/1 Q15 (OR-1)

◆ **Magnetic Effects of Electric Current** | Applications of force on current-carrying conductor (electric motor, loudspeaker) | Direction of displacement of conductor using Fleming's Left-Hand Rule | Fleming's Left-Hand Rule | Force on a current-carrying conductor in a magnetic field

Q41. § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR | § 12.2.2 Right-Hand Thumb Rule | § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[2]**

When is the force experienced by a current – carrying straight conductor placed in a uniform magnetic field. (1 + 1 = 2)

(i) Maximum ;

(ii) Minimum ?

Previously asked in: 2022 31/2/1 Q6 (OR-2)

◆ **Magnetic Effects of Electric Current** | Force on a current-carrying conductor in a magnetic field – conditions for maximum and minimum force

Q42. § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR | § 12.2.2 Right-Hand Thumb Rule | § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[3]**

Answer the following:

(i) State the rule used to find the force acting on a current carrying conductor placed in a magnetic field.

(ii) Given below are three diagrams showing entry of an electron in a magnetic field. Identify the case in which the force will be (1) maximum and (2) minimum respectively. Give reason for your answer.

Previously asked in: 2023 31/1/1 Q32(a)

◆ **Magnetic Effects of Electric Current** | Fleming's Left-Hand Rule for force on a current-carrying conductor in a magnetic field | Force on a moving charge (electron) in a magnetic field – dependence on angle of entry

Q43. § 12.2.2 Right-Hand Thumb Rule **[2]**

Draw a labelled diagram to show the pattern of magnetic field lines produced due to a current carrying straight conductor. Mark on it the direction of current in the conductor and the direction of magnetic field lines.

Previously asked in: 2024 31/3/1 Q25(a)

◆ **Magnetic Effects of Electric Current** | Magnetic field due to a current-carrying straight conductor

Q44. § 12.2.2 Right-Hand Thumb Rule | § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[5]**

Answer the following:

(i) By using the given experimental set-up. How can it be shown that : (a) a force is exerted on the current-carrying conductor AB when it is placed in a magnetic field. (b) the direction of force can be reversed in two ways.

(ii) When will the magnitude of the force be highest?

(iii) State Fleming's left hand rule.

Previously asked in: 2025 31/4/1 Q36(B)

◆ **Magnetic Effects of Electric Current** | Conditions for maximum force on a current-carrying conductor | Fleming's Left Hand Rule | Force on a current-carrying conductor in a magnetic field | Reversing the direction of force on a current-carrying conductor

Q45. § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR | § 12.2.2 Right-Hand Thumb Rule | § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[3]**

In the figure given below, a simple electric motor is shown. As shown in the figure, the current in the coil ABCD flows from A to B in the arm AB and C to D in the arm CD.

(i) State the directions in which the arms AB and CD will experience a force.

(ii) Identify the part of the electric motor that reverses the flow of current in the coil ABCD and write its name.

(iii) After the reversal of flow of current in the coil ABCD, state the directions in which the arms AB and CD will experience a force.

(iv) Name the rule which is applied to determine the direction of force on a current carrying conductor placed in a magnetic field.

Previously asked in: 2022 31/3/1 Q12(b)

◆ **Magnetic Effects of Electric Current** | Electric Motor – principle and working | Fleming's Left-Hand Rule | Split-ring commutator (current reversal in electric motor)

Q46. § 12.2.2 Right-Hand Thumb Rule | § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[3]**

Answer the following :

(i) A straight cylindrical conductor is suspended with its axis perpendicular to the magnetic field of a horse-shoe magnet. The conductor gets displaced towards left when a current is passed through it. What will happen to the displacement of the conductor if the (1) current through it is increased ? (2) horse-shoe magnet is replaced by another stronger horse-shoe magnet ? (3) direction of current through it is reversed ?

(ii) Name and state the rule for determining the direction of force on a current carrying conductor in a magnetic field.

Previously asked in: 2023 31/5/1 Q32 (a)

◆ **Magnetic Effects of Electric Current** | Factors affecting the force on a current-carrying conductor (current magnitude, field strength, current direction) | Fleming's Left-Hand Rule | Force on a current-carrying conductor in a magnetic field

Q47. § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR | § 12.2.2 Right-Hand Thumb Rule | § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[1]**

Assertion (A) : A current carrying straight conductor experiences a force when placed perpendicular to the direction of magnetic field.
Reason (R) : The net charge on a current carrying conductor is always zero.

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(c) (A) is true but (R) is false.
(d) (A) is false but (R) is true.

Previously asked in: 2023 31/4/1 Q20

◆ **Magnetic Effects of Electric Current** | Force on a current-carrying conductor in a magnetic field | Net charge on a current-carrying conductor

Q48. § 12.2.2 Right-Hand Thumb Rule | § 12.2.3 Magnetic Field due to a Current through a Circular Loop | § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[1]**

A rectangular loop ABCD carrying a current I is situated near a straight conductor XY, such that the conductor is parallel to the side AB of the loop and is in the plane of the loop. If a steady current I is established in the conductor as shown, the conductor XY will :

A remain stationary.
B move towards the side AB of the loop.
C move away from the side AB of the loop.
D rotate about its axis.

Previously asked in: 2024 31/4/1 Q15

◆ **Magnetic Effects of Electric Current** | Force between parallel current-carrying conductors

Q49. § 12.2.2 Right-Hand Thumb Rule **[1]**

Assertion (A) : Direction of force exerted on a current-carrying conductor placed in a magnetic field remains same if the directions of both magnetic field and current flowing through the conductor are reversed.
Reason (R) : The direction of force exerted on a current-carrying conductor placed in an external magnetic field can be determined by using magnetic compass.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2026 31/2/1 Q32

◆ **Magnetic Effects of Electric Current** | Fleming's Left-Hand Rule | Force on a current-carrying conductor in a magnetic field

Q50. § Introduction § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[3]**

Answer the following :

(a) Describe an activity to show that a current carrying conductor, placed in an external magnetic field experiences a force.

(b) Imagine that you are sitting in a chamber with your back to one wall. An electron beam, moving horizontally towards the front wall from the back wall, is deflected by a strong magnetic field to your right side. Find the direction of the magnetic field.

Previously asked in: 2026 31/1/1 Q36

◆ **Magnetic Effects of Electric Current** | Fleming's left-hand rule / direction of force and field | Force on a current-carrying conductor in a magnetic field

Q51. § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[3]**

On the basis of the given circuit arrangement, answer the following questions :

(a) What happens to the rod AB when the key K is closed and why ?

(b) Name and state the rule that determines this behaviour of the rod AB in the above situation.

Previously asked in: 2026 31/4/1 Q37

◆ **Magnetic Effects of Electric Current** | Fleming's Left-Hand Rule for force on a current-carrying conductor in a magnetic field | Fleming's Left-Hand Rule – direction of force on current-carrying conductor in magnetic field | Force on a current-carrying conductor in a magnetic field

Q52. § 12.4 DOMESTIC ELECTRIC CIRCUITS **[3]**

Answer the following about domestic electric circuits.

(a) "The third wire of earth connection is very important in domestic electric appliances." Justify this statement.

(b) List two precautions to be taken to avoid the overloading of domestic electric circuits.

Previously asked in: 2025 31/5/1 Q33

◆ **Magnetic Effects of Electric Current** | Earth connection (third wire) in domestic electric appliances | Overloading of domestic electric circuits – precautions

Q53. § Introduction § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR § 12.2.2 Right-Hand Thumb Rule **[5]**

Answer the following:

(i) Draw the pattern of the magnetic field lines for the two parallel straight conductors carrying current of same magnitude 'I' in opposite directions as shown. Show the direction of magnetic field at a point O which is equidistant from the two conductors. (Consider that the conductors are inserted normal to the plane of a rectangular cardboard.)

(ii) In our houses we receive A.C. electric power of 220 V. In electric iron or electric heater cables having three wires with insulation of three different colours – red, black and green are used to draw current from the mains. (a) What are these three different wires called? Name them colourwise. (b) What is the potential difference between the red wire and the black wire? (c) What is the role of the wire with green insulation in case of accidental leakage of electric current to the metallic body of an electrical appliance?

Previously asked in: 2025 31/4/1 Q36(A)

◆ **Magnetic Effects of Electric Current** | Domestic electric circuits – live, neutral and earth wires (colour coding) | Magnetic field lines around two parallel conductors carrying current in opposite directions

Q54. § 12.2.3 Magnetic Field due to a Current through a Circular Loop **[5]**

Attempt either (a) or (b) :
(b)
(i) Draw the pattern of magnetic field lines through and around a current-carrying circular loop.
(ii) State the rule to find out the direction of the magnetic field inside and around the circular loop.
(iii) Give reasons :
(I) Why should a burnt-out fuse be replaced by another fuse of identical rating only, in an electric circuit ?
(II) Why is soft iron-core used in making an electromagnet ?

Previously asked in: 2026 31/2/1 Q39 (b)

◆ **Magnetic Effects of Electric Current** | Electric fuse – rating and safety in electric circuits | Magnetic field lines pattern through and around a current-carrying circular loop | Right-hand thumb rule / clock rule for direction of magnetic field in a circular loop | Soft iron core in electromagnets

Q55. § 12.2.2 Right-Hand Thumb Rule **[5]**

Attempt either (a) or (b) :
(a)
(i) State the rule which gives the direction of force acting on a current-carrying conductor placed in a magnetic field.
(ii) What is a fuse ? Why is it called a safety device ?
(iii) Why are electrical appliances with metallic bodies connected to the mains through a three-pin plug, whereas an electric bulb is connected with a two-pin plug ?
(iv) What will be the direction of force experienced by the conductor AB due to the magnetic field, when current flows in the direction shown ? Name the law you applied to find the direction.

Previously asked in: 2026 31/2/1 Q39 (a)

◆ **Magnetic Effects of Electric Current** | Earthing and Three-Pin Plug – safety in electrical appliances | Electric Fuse – working principle and role as a safety device | Fleming's Left-Hand Rule – direction of force on current-carrying conductor in magnetic field

Q56. § 12.1 MAGNETIC FIELD AND FIELD LINES | § 12.2.2 Right-Hand Thumb Rule | § 12.2.3 Magnetic Field due to a Current through a Circular Loop **[2]**

Answer the following about magnetic field lines :

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

(ii) How is a uniform magnetic field in a given region represented ? Draw a diagram in support of your answer.

Previously asked in: 2024 31/1/1 Q26

◆ **Magnetic Effects of Electric Current** | Properties of Magnetic Field Lines | Representation of Uniform Magnetic Field

Q57. § 12.2.2 Right-Hand Thumb Rule | § 12.2.3 Magnetic Field due to a Current through a Circular Loop | § 12.2.4 Magnetic Field due to a Current in a Solenoid **[5]**

Why can't two magnetic field lines cross each other ? Draw magnetic field lines showing the direction of the magnetic field due to a current carrying long straight solenoid. State the conclusion which can be drawn from the pattern of magnetic field lines inside the solenoid. Name any two factors on which the magnitude of the magnetic field due to this solenoid depends.

Previously asked in: 2025 31/6/1 Q36(b)

◆ **Magnetic Effects of Electric Current** | Factors affecting the magnitude of magnetic field of a solenoid | Magnetic field due to a current-carrying solenoid | Magnetic field lines – properties and why they cannot cross

Q58. § 12.1 MAGNETIC FIELD AND FIELD LINES **[4]**

> In order to obtain magnetic field lines around a bar magnet, a student performed an experiment using a magnetic compass and a bar magnet. The magnet was placed on a sheet of white paper fixed on a drawing board. Using magnetic needle he obtained on the paper a pattern of magnetic field lines (as shown below) around the bar magnet.

Answer the following sub-parts based on the experiment and the magnetic field pattern shown.

(a) By convention, the field lines emerge from north pole and merge at south pole. Why? Give reason.

(b) State the relationship between strength of the magnetic field and the degree of closeness of the field lines.

(c) (A) (i) No two field lines can ever intersect each other. Give reason. (ii) The magnetic field in a given region is uniform. Draw a diagram to represent it.

Previously asked in: 2025 31/5/1 Q39

◆ **Magnetic Effects of Electric Current** | Magnetic field lines around a bar magnet – properties and conventions | Non-intersection of magnetic field lines – reason | Relationship between strength of magnetic field and closeness of field lines | Uniform magnetic field – diagrammatic representation

Q59. § 12.1 MAGNETIC FIELD AND FIELD LINES | § 12.2.2 Right-Hand Thumb Rule | § 12.2.3 Magnetic Field due to a Current through a Circular Loop **[2]**

What are magnetic field lines. List two important properties of magnetic field lines.

Previously asked in: 2025 31/4/1 Q26

◆ **Magnetic Effects of Electric Current** | Magnetic Field Lines | Properties of Magnetic Field Lines

Q60. § 12.1 MAGNETIC FIELD AND FIELD LINES **[4]**

> A student fixes a sheet of white paper on a drawing board using some adhesive materials. She places a bar magnet in the centre of it and sprinkles some iron filings uniformly around the bar magnet using a salt-sprinkler. On tapping the board gently, she observes that the iron filings have arranged themselves in a particular pattern.

Read the passage and answer the following questions:

(a) Draw a diagram to show this pattern of iron filings. [1]

(b) Draw the magnetic field lines of a bar magnet showing the poles of the bar magnet as well as the direction of the magnetic field lines. [1]

(c) Choose one of the following alternatives: [2]

Previously asked in: 2022 31/1/1 Q15

◆ **Magnetic Effects of Electric Current** | Magnetic field lines of a bar magnet | Properties and characteristics of magnetic field lines

Q61. § 12.2.2 Right-Hand Thumb Rule **[2]**

Answer the following:

(i) Name and state the rule to determine the direction of force experienced by a current carrying straight conductor placed in a uniform magnetic field which is perpendicular to it.

(ii) 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 ?

Previously asked in: 2022 31/1/1 Q6 (a)

◆ **Magnetic Effects of Electric Current** | Fleming's Left-Hand Rule – direction of force on current-carrying conductor in magnetic field | Force on moving charged particles (alpha particle and electron) in a magnetic field

Q62. § 12.2.2 Right-Hand Thumb Rule § 12.2.3 Magnetic Field due to a Current through a Circular Loop **[1]**

Assertion (A) : Two magnetic field lines around a current carrying straight wire do not intersect each other.
Reason (R) : The magnitude of the magnetic field produced at a given point increases as the current through the wire increases.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2023 31/5/1 Q20

◆ **Magnetic Effects of Electric Current** Dependence of magnetic field magnitude on current
Magnetic field lines around a current-carrying straight wire

Q63. § 12.1 MAGNETIC FIELD AND FIELD LINES § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR § 12.2.2 Right-Hand Thumb Rule **[1]**

An alpha particle enters a uniform magnetic field as shown. The direction of force experienced by the alpha particle is :

(a) towards right
(b) towards left
(c) into the page
(d) out of the page

Previously asked in: 2023 31/4/1 Q16

◆ **Magnetic Effects of Electric Current** Force on a moving charged particle in a magnetic field

Q64. § 12.1 MAGNETIC FIELD AND FIELD LINES § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR § 12.2.2 Right-Hand Thumb Rule **[1]**

A positron enters a uniform magnetic field at right angles to it as shown. The direction of force experienced by the positron will be :

(a) to the right
(b) to the left
(c) into the page
(d) out of the page

Previously asked in: 2023 31/2/1 Q16

◆ **Magnetic Effects of Electric Current** Force on a moving charged particle in a magnetic field

Q65. § 12.2.4 Magnetic Field due to a Current in a Solenoid **[3]**

Answer the following parts:

(a) What happens when a bundle of wires of soft iron is placed inside the coil of a solenoid carrying a steady current ? Name the device obtained. Why is it called so ? [2]

(b) Draw the magnetic field lines inside a current carrying solenoid. What does this pattern of magnetic field lines indicate ? [1]

Previously asked in: 2024 31/5/1 Q32

◆ **Magnetic Effects of Electric Current** Electromagnet – construction and working
Magnetic field lines inside a current-carrying solenoid

Q66. § Introduction § 12.2.1 Magnetic Field due to a Current through a Straight Conductor § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[1]**

A uniform magnetic field exists in the plane of paper as shown in the diagram. In this field, an electron (e^-) and a positron (p^+) enter as shown. The electron and positron experience forces :

(A) both pointing into the plane of the paper.
(B) both pointing out of the plane of the paper.
(C) pointing into the plane of the paper and out of the plane of the paper respectively.
(D) pointing out of the plane of the paper and into the plane of the paper respectively.

Previously asked in: 2024 31/5/1 Q15

◆ **Magnetic Effects of Electric Current** Force on a charged particle moving in a magnetic field

Q67. § 12.1 MAGNETIC FIELD AND FIELD LINES § 12.2.1 Magnetic Field due to a Current through a Straight Conductor **[3]**

A student fixes a sheet of white paper on a drawing board. He places a bar magnet in the centre of it. He sprinkles some iron filings uniformly around the bar magnet. Then he taps the drawing board gently and observes that the iron filings arrange themselves in a particular pattern.
(a) Why do iron filings arrange in a particular pattern ?
(b) What does the crowding of iron filings at the ends of the magnet indicate ?
(c) What do the lines, along which the iron filings align, represent ?
(d) If the student places a cardboard horizontally in a current carrying solenoid and repeats the above activity, in what pattern would the iron filings arrange ? State the conclusion drawn about the magnetic field based on the observed pattern of the lines.

Previously asked in: 2024 31/4/1 Q32

◆ **Magnetic Effects of Electric Current** Magnetic field due to a current-carrying solenoid Magnetic field lines and their properties

Q68. § 12.2 MAGNETIC FIELD DUE TO A CURRENT-CARRYING CONDUCTOR § 12.2.2 Right-Hand Thumb Rule § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[5]**

Attempt either (a) or (b) :

(i) With the help of a diagram, show that a current-carrying conductor placed in an external magnetic field, experiences a force. Indicate the direction of the field, current and force clearly.

(ii) The diagram given below shows an electron moving in a uniform magnetic field. (I) What will be the direction of the force acting on the electron ? (II) What will happen to the direction of the force acting on the electron, if the direction of the magnetic field as well as the direction of motion of the electron, both are reversed ?

Previously asked in: 2026 31/3/1 Q39 (b)

◆ **Magnetic Effects of Electric Current** Force on a current-carrying conductor in a magnetic field Force on a moving charged particle (electron) in a magnetic field

Q69. § 12.2.4 Magnetic Field due to a Current in a Solenoid **[5]**

Attempt option (B):

(i) Draw a diagram, showing the magnetic field lines in and around the current carrying solenoid. Write any two salient features of these lines.

(ii) What is an electromagnet and how is it made ?

Previously asked in: 2026 31/5/1 Q39 ((B))

◆ **Magnetic Effects of Electric Current** Electromagnet – definition and construction Magnetic field lines of a current-carrying solenoid

Q70. § 12.1 MAGNETIC FIELD AND FIELD LINES **[1]**

Assertion (A) : With the help of compass, magnetic field lines can be traced outside the bar magnet.
Reason (R) : The north pole of a compass needle always points towards the south pole of the magnet when brought close to it.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

Previously asked in: 2026 31/4/1 Q32

◆ **Magnetic Effects of Electric Current** | Magnetic Field Lines and Compass Needle

Q71. § 12.3 FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD **[2]**

As shown in the diagram an aluminium rod 'AB' is suspended horizontally between the two poles of a strong horse shoe magnet in such a way that the axis of rod is horizontal and the direction of the magnetic field is vertically upward. The rod is connected in series with a battery and a key. State giving reason : (a) What is observed when a current is passed through the aluminum rod from end B to end A ? (b) What change is observed in a situation in which the axis of the rod 'AB' is moved and aligned parallel to the magnetic field and current is passed in the rod in the same direction ?

Previously asked in: 2022 31/4/1 Q2 (main)

◆ **Magnetic Effects of Electric Current** | Condition for zero force: conductor parallel to magnetic field | Force on a current-carrying conductor in a magnetic field (Fleming's Left-Hand Rule)

Q72. § 12.2.3 Magnetic Field due to a Current through a Circular Loop § 12.2.4 Magnetic Field due to a Current in a Solenoid **[1]**

Assertion (A) : The strength of the magnetic field produced at the centre of a current carrying circular coil increases on increasing the number of turns in it.
Reason (R) : The current in each circular turn has the same direction and the magnetic field due to each turn then just adds up.

(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) (A) is true, but (R) is false.
(d) (A) is false, but (R) is true.

Previously asked in: 2023 31/1/1 Q20

◆ **Magnetic Effects of Electric Current** | Magnetic field due to a current-carrying circular coil – effect of number of turns | Superposition of magnetic fields from individual turns of a coil

Q73. § 12.2.2 Right-Hand Thumb Rule § 12.2.3 Magnetic Field due to a Current through a Circular Loop **[5]**

What are magnetic field lines ? How is the direction of magnetic field at a point determined ? Draw the pattern of magnetic field lines of the magnetic field produced by a current carrying circular loop. Mark on it the direction of (i) current and (ii) magnetic field lines. Name the two factors on which the magnitude of the magnetic field due to a current carrying coil depends.

Previously asked in: 2025 31/6/1 Q36(a)

◆ **Magnetic Effects of Electric Current** | Factors Affecting Magnitude of Magnetic Field due to a Current-Carrying Coil | Magnetic Field Lines – Definition and Direction | Magnetic Field due to a Current-Carrying Circular Loop

Q74. § 12.2.2 Right-Hand Thumb Rule § 12.2.3 Magnetic Field due to a Current through a Circular Loop **[5]**

Attempt option (A):

(i) Draw a diagram showing the magnetic field lines around a bar magnet. Write any two characteristics of magnetic field lines.

(ii) Write the statement of Right hand thumb rule.

(iii) The concentric circles representing the magnetic field around a current carrying straight wire become larger and larger as we move away from the wire. How does magnetic field change on these concentric circles ?

Previously asked in: 2026 31/5/1 Q39 ((A))

◆ **Magnetic Effects of Electric Current** | Magnetic field lines around a bar magnet and their characteristics | Magnetic field strength variation with distance from a current-carrying straight wire | Right Hand Thumb Rule

Q75. § 12.2.1 Magnetic Field due to a Current through a Straight Conductor § 12.2.3 Magnetic Field due to a Current through a Circular Loop **[3]**

Answer the following :

(a) The pattern of magnetic field due to a current carrying wire depends upon the shape made by that wire. Justify.

(b) A current carrying straight wire AB is shown in the given diagram. Out of X, Y and Z on which point will the strength of magnetic field be maximum and why ?

Previously asked in: 2026 31/1/1 Q37

◆ **Magnetic Effects of Electric Current** | Magnetic field pattern depends on shape of current-carrying conductor | Magnetic field strength varies with distance from a straight current-carrying wire

---

Available for free from:
https://cbsegrade10studyguide.com
https://github.com/orgs/cbse-free-resources/repositories