SmartKalike

CBSE Class 10 · Science

Magnetic Effects of Electric Current

10 most probable questions for Boards 2027

Q1. 1 mark · Multiple choice

Which statement best defines the magnetic field of a magnet?
(A) The region in which the magnet's force can be detected
(B) The material inside the magnet
(C) The region where electric current is always present
(D) The path followed only by iron filings

Answer

(A) The region in which the magnet's force can be detected — the region surrounding a magnet, in which the force of the magnet can be detected, is said to have a magnetic field.

Q2. 2 marks · Short answer

State the direction of magnetic field lines outside and inside a bar magnet. What does this show about the shape of the field lines?

Answer

The field lines emerge from north pole and merge at the south pole. Inside the magnet, the direction of field lines is from its south pole to its north pole. Thus the magnetic field lines are closed curves.

Q3. 3 marks · Medium answer

At a fixed point near a straight current-carrying conductor, what happens to the magnetic field strength when the current is increased? Describe the corresponding observation with a compass needle.

Answer

1. Increasing the current through a straight conductor increases the magnitude of the magnetic field at a fixed nearby point.
2. The compass needle at that point deflects more as the current increases. The amount of deflection changes when the current is varied.
3. This increase in deflection indicates that the magnetic field becomes stronger at the same point.

Q4. 4 marks · Long answer

Describe how the magnetic field around a straight current-carrying conductor changes as the distance from the conductor increases. Explain what happens to the compass needle's deflection and to the field-line pattern.

Answer

The magnetic field around a straight current-carrying conductor weakens as the distance from the conductor increases.

1. For a given current, the magnetic field produced by the conductor decreases as the distance from it increases.
2. A compass needle moved farther from the wire, while the current remains unchanged, shows a smaller deflection. The reduced deflection indicates a weaker magnetic field at the farther point.
3. The field-line pattern consists of concentric circles around the straight wire. These circles become larger and larger as the observation point moves away from the conductor.

Thus, at a greater distance, the conductor's magnetic field is weaker, and the compass needle's deflection is smaller.

Q5. 5 marks · Long answer

(a) State Fleming's left-hand rule and explain how it gives the direction of force on a current-carrying conductor when the current and magnetic field are perpendicular. (b) An electron moves through a magnetic field. What direction of current should be used when applying the rule, and why?

Answer

A current-carrying conductor in a magnetic field experiences a force whose direction depends on the current and magnetic-field directions.
1. Stretch the thumb, forefinger and middle finger of your left hand so that they are mutually perpendicular.
2. Point the forefinger in the direction of the magnetic field and the middle finger in the direction of the current; the thumb then indicates the direction of force or motion.
3. When current and magnetic field are perpendicular, the force is perpendicular to both. Fleming's left-hand rule identifies this force direction from the two given directions.
4. For an electron, use conventional current in the direction opposite to the electron's motion, because current is taken opposite to the direction of motion of electrons.
The rule therefore gives the force direction when the conventional current and magnetic-field directions are known.

Q6. 1 mark · Multiple choice

At a point in a magnetic field, how is the field direction defined?
(A) The direction in which the south pole of a compass needle moves
(B) The direction in which the north pole of a compass needle moves
(C) The direction in which iron filings fall
(D) The direction from the nearest pole to the centre of the magnet

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/science/magnetic-effects-of-electric-current

Q7. 2 marks · Short answer

What does the closeness of magnetic field lines indicate about the strength of the magnetic field and the force on a magnetic pole?

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/science/magnetic-effects-of-electric-current

Q8. 3 marks · Medium answer

State the potential difference between the live and neutral wires of the domestic mains supply. Give the usual insulation colours of the live and neutral wires, and state the frequency of the AC mains supply.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/science/magnetic-effects-of-electric-current

Q9. 5 marks · Long answer

A straight wire carries current vertically upwards. Explain how to use the right-hand thumb rule to find the magnetic field direction around it, and state the field direction when viewed from above.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/science/magnetic-effects-of-electric-current

Q10. 1 mark · Multiple choice

What happens to the direction of the magnetic field around a straight conductor when the current is reversed?
(A) It remains unchanged.
(B) It reverses.
(C) It becomes zero in every case.
(D) It changes only if the conductor is moved.

Full answer on SmartKalike: https://smartkalike.com/cbse/class-10/science/magnetic-effects-of-electric-current

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