PHYSICS

Magnetic Effects of Electric Current

Q1 In a current-carrying solenoid, the magnetic field inside is:
(A) Zero everywhere
(B) Weak and irregular
(C) Nearly uniform and strong
(D) Strong at the ends but zero in the middle

Q2 A solenoid behaves like:
(A) A bar magnet
(B) A resistor
(C) An electric cell
(D) A switch

Q3 The north pole of a solenoid can be identified using:
(A) Fleming's Left-Hand Rule
(B) Fleming's Right-Hand Rule
(C) Clock face rule
(D) Ampere's law only

Q4 The soft iron core inside a solenoid _____ the magnetic field produced.
(A) Weakens (B) Strengthens
(C) Reverses (D) Nullifies

Q5 1) A solenoid produces a uniform magnetic field outside.
2) Fleming's Left-Hand Rule predicts the direction of force on a conductor.
(A) 1 and 2 both correct
(B) 1 correct, 2 incorrect
(C) 1 incorrect, 2 correct
(D) Both incorrect

Q6 The force on a current-carrying conductor in a magnetic field is maximum when the conductor is:
(A) Parallel to the field
(B) Perpendicular to the field
(C) At 45° to the field
(D) In the same direction as field lines

Q7 **Assertion:** Increasing the number of turns in a solenoid increases the magnetic field strength.
Reason: More turns increase the net field contribution along the axis.
(A) Both Assertion and Reason true, Reason correct explanation of Assertion
(B) Both Assertion and Reason true, Reason not correct explanation of Assertion
(C) Assertion true, Reason false
(D) Assertion false, Reason true

Q8 In Fleming's Left-Hand Rule, the First finger represents:
(A) Magnetic field (B) Current
(C) Force (D) Torque

Q9 **Statement I:** Soft iron is preferred in electromagnets because it retains magnetism permanently.
Statement II: The ability to lose magnetism quickly is important for electromagnets.
(A) I true, II false
(B) I false, II true
(C) Both true
(D) Both false

Q10 If the current through a solenoid is reversed, its magnetic poles _____.
(A) Remain same (B) Reverse
(C) Vanish (D) Strengthen

Answer Key

Q1	C
Q2	A
Q3	C
Q4	B
Q5	C
Q6	B
Q7	A
Q8	A
Q9	B
Q10	B

Hints & Solutions

Q1 **Text Solution:**
The turns of a solenoid are closely packed, and each turn's field adds up, producing a **strong, nearly uniform** magnetic field inside.

Video Solution:

Q2 **Text Solution:**
A current-carrying solenoid produces a magnetic field similar to that of a **bar magnet**, with a north pole at one end and a south pole at the other.

Video Solution:

Q3 **Text Solution:**
The **clock face rule** says that if the current appears clockwise from one end, that end is the **south pole**, and vice versa.

Video Solution:

Q4 **Text Solution:**
The soft iron core becomes magnetized when placed inside a solenoid, which **increases the magnetic field strength** due to the combined effect of the solenoid's field and the induced magnetism.

Video Solution:

Q5 **Text Solution:**
Outside the solenoid, the magnetic field is **non-uniform and weak**, but Left-Hand Rule indeed predicts force direction.

Video Solution:

Q6 **Text Solution:**
Fleming's Left-Hand Rule shows that maximum force occurs when current is at **right angles** to the magnetic field.

Video Solution:

Q7 **Text Solution:**
Both Assertion and Reason true, Reason correct explanation of Assertion

Video Solution:

Q8 Text Solution:

In the Left-Hand Rule:

- **First finger** Magnetic field
- **Middle finger** Current
- **Thumb** Force/motion direction.

Video Solution:

Q9 Text Solution:

Soft iron is used in electromagnets because it **loses magnetism quickly** when current is switched off, making it ideal for applications where magnetism needs to be controlled.

Video Solution:

Q10 Text Solution:

Reversing the current in a solenoid reverses the direction of its magnetic field, causing its north and south poles to interchange.

Video Solution: