QB365 Question Paper Software
10th Standard - Science
Magnetic Effects of Electric Current Assertion and reason

Exam Time: 00:20 Hrs

Date: 2025-10-11

Total Marks: 10

Questions:

Assertion and reason

1. **Assertion:** Solenoid is like a bar magnet.
   Reason: One end of the solenoid behaves as a magnetic north pole, while the other behaves as the south pole.
   Codes
   (a) If both assertion and reason are true and the reason is correct explanation of assertion.
   (b) If both assertion and reason are true but reason is not a correct explanation of assertion.
   (c) If assertion is true and reason is false.
   (d) If both assertion and reason are false.

2. **Assertion:** The magnitude of the force is the highest when the direction of current is at right angle to the direction of the magnetic field.
   Reason: Fleming's left-hand rule illustrates the same by stretching first three fingers of left hand.
   Codes
   (a) If both assertion and reason are true and the reason is correct explanation of assertion.
   (b) If both assertion and reason are true but reason is not a correct explanation of assertion.
   (c) If assertion is true and reason is false.
   (d) If both assertion and reason are false.

3. **Assertion:** Magnetic field lines have both direction and magnitude.
   Reason: The field lines, emerge from the north pole and merge at south pole
   Codes
   (a) If both assertion and reason are true and the reason is correct explanation of assertion.
   (b) If both assertion and reason are true but reason is not a correct explanation of assertion.
   (c) If assertion is true and reason is false.
   (d) If both assertion and reason are false.

4. **Assertion**: In electric circuits, wires carrying currents in opposite directions are often twisted together.
   Reason: If the wire are not twisted together, the combination of the wires forms a current loop. The magnetic field generated by the loop might affect adjacent circuits or components
   Codes
   (a) Both A and R are true, and R is correct explanation of the assertion.
   (b) Both A and R are true, but R is not the correct explanation of the assertion.

(c) A is true, but R is false.
(d) A is false, but R is true.

5. **Assertion:** Magnetic field interacts with a moving charge and not with a stationary charge.
Reason: A moving charge produces a magnetic field
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true.

6. **Assertion:** In a conductor, free electrons keep on moving but no magnetic force acts on a conductor in a magnetic field.
Reason: Force on free electron due to magnetic field always acts perpendicular to its direction of motion.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true

7. **Assertion:** The magnetic field produced by a current carrying solenoid is independent of its length and cross sectional area.
Reason: The magnetic field inside the solenoid is uniform.
Codes
(a) Both A and R are true, and R is correct explanation of the assertion.
(b) Both A and R are true, but R is not the correct explanation of the assertion.
(c) A is true, but R is false.
(d) A is false, but R is true

8. 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) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
(c) If Assertion is true, but Reason is false.
(d) If Assertion is false, but Reason is true.

9. Assertion (A) : The 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) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
(c) If Assertion is true, but Reason is false.
(d) If Assertion is false, but Reason is true.

10. Assertion (A) : On freely suspending a current carrying solenoid, it comes to rest in geographical N-S direction.
Reason (R) : One end of current carrying straight solenoid behaves as a North pole and the other end as a South pole, just like a bar magnet.
(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) If both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
(c) If Assertion is true, but Reason is false.
(d) If Assertion is false, but Reason is true.

Answers Key:

Assertion and reason

1. (a) If both assertion and reason are true and the reason is correct explanation of assertion.
2. (b) If both assertion and reason are true but reason is not a correct explanation of assertion.
3. (b) If both assertion and reason are true but reason is not a correct explanation of assertion.
4. (a): If the wires are twisted together, they can be modelled as a single wire carrying current in the opposite directions. In this model, no magnetic field is induced in the wires which does not affect adjacent circuits.
5. (a): An electric current is equivalent to the charges (or electrons) in motion. Such charges produce magnetic interaction. The magnetic field produced by current interacts with magnetic needle and deflects it.
6. (c): In a conductor, the average velocity of electrons is zero. Hence no current flows through the conductor. Hence, no force acts on this conductor
7. (b) Both A and R are true, but R is not the correct explanation of the assertion
8. (a) The reason for magnetic field lines not intersecting each other is that the direction of the magnetic field at any point can only be a single direction. Therefore, magnetic field lines do not intersect each other. Hence, option (a) is correct.
9. (b) The magnetic field would not able to be in two direction at a point, where two magnetic lines intersect because that is not possible. If the current is increased, then the magnetic field also increase. Therefore, both Assertion and Reason are correct but Reason is not correct explanation of Assertion.
10. (a) When a current is flowing through a solenoid, then according to "clock face rule" one end of the solenoid behaves as North pole and other end behaves as South pole. Hence, a current carrying solenoid behaves as a bar magnet. On freely suspending, it comes to rest in geographical N-S direction. Therefore, both A and R are true and R is the correct explanation of A.