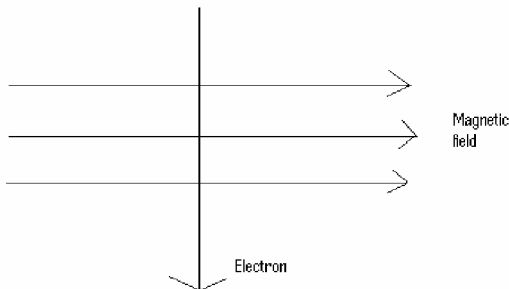


CHAPTER -13

MAGNETIC EFFECTS OF ELECTRIC CURRENT

HOTS Questions and Answers

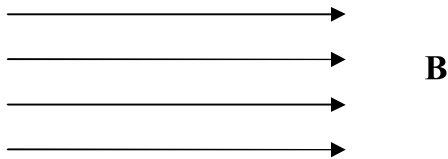
- Q.1 A straight wire carrying electric current is moving out of plane of paper and is perpendicular to it. What is the direction and type of induced magnetic field?
- Q.2 How can it be shown that magnetic field exist around a wire carrying current?
- Q.3 How can a solenoid be used to magnetise a steel bar.
- Q.4 Why can't two magnetic field lines ever intersect?
- Q.5 Can a 5 A fuse be used in wire carrying 15 A current? Why?
- Q.6 Give the factors that affect strength of magnetic field at a point due to a straight conductor carrying current.
- Q.7 Where do we connect a fuse: with live wire or with neutral wire?
- Q.8 Give two uses of electromagnets.
- Q.9 Name any two devices which use permanent magnets.
- Q.10 Draw the magnetic field lines representing uniform magnetic field.
- Q.11 A current-carrying straight conductor is placed in the east-west direction. What will be the direction of the force experienced by this conductor due to earth's magnetic field? How will this force get affected on? (a) reversing the direction of flow of current (b) doubling the magnitude of current.
- Q.12 An electron enters a magnetic field at right angles to it as shown in fig. The direction of the force acting on the electron will be:
(a) to the right (b) to the left (c) out of the page (d) into the page



- Q.13 Why is the earth pin thicker and longer than the live and the neutral pins?
- Q.14 A coil of insulated copper wire is connected to a galvanometer. What would happen if a bar magnet is
- Pushed into the coil?
 - Withdrawn from inside the coil?
 - Held stationary inside the coil?

ANSWERS OF THE ABOVE QUESTIONS

- A.1 Induced magnetic field will be in the form of concentric circles in the plane of paper.
- A.2 By using magnetic compass which, shows deflection.
- A.3 By inserting the steel bar inside the solenoid and switching on electric current.
- A.4 If so then at the point of intersection there will be two different directions of magnetic field which is not possible.
- A.5 No, because both of them would then be ineffective in controlling the amount of current flowing.
- A.6 Magnitude of electric current, perpendicular distance between that point and conductor.
- A.7 It is always connected with live wire.
- A.8 (i) It is used in cranes for lifting heavy loads.
(ii) used in electric bells.
- A.9 Loudspeakers, Galvanometer, voltmeter.
- A.10



- A.11 The direction of earth's magnetic field is from G-south to G-north. Let current is from west to east. Therefore force is vertically upwards.
- (a) By reversing the direction of current, the direction of will be reversed i.e. vertically downwards.
- (b) The magnitude of the force is doubled.
- A.12 When a conductor carrying current is placed perpendicular to the direction of magnetic field, the acting on it is given by Fleming's left hand rule. Since the direction of current is the same as that of the motion of a positive charge, the direction of force acting on it when moving perpendicular to the direction of magnetic field is the same as that acting on a current-carrying conductor placed perpendicular to the direction of magnetic field. Obviously, the force acting on an electron is opposite to that. Therefore in this case it is into the page.
- A.13 It is thicker so that it does not enter into the live or neutral sockets. It is made longer so that it gets connected to the earth terminal earlier than the live and neutral pins. This ensures the safety of the user.
- A.14 (i) Due to change in magnetic flux linked with coil, the galvanometer shows deflection (say towards right).
- (ii) Due to change in magnetic flux linked with coil, the galvanometer shows deflection (say towards left opposite to that in case one).
- (iii) As it is stationary no change in magnetic flux linked with coil, so galvanometer shows no deflection.

More Questions for Practice

- Q.1 The magnetic field inside a long straight solenoid carrying current:
- is zero
 - decreases as we move towards its end
 - is same at all points.
 - Increases as we move towards its end
- Q.2 Which of the following properties of proton can change while it moves freely in a magnetic field?
- mass
 - speed
 - velocity
 - momentum.
- Q.3 How do we think the displacement of rod AB will be affected if
- current in a rod AB is increased
 - a stronger horse-shoe magnet is used
 - length of rod AB is increased ?(Figure 13.12 Page number 230).
- Q.4 A positively-charged particle (alpha particle) projected towards west is deflected towards north by magnetic field. The direction of magnetic field is :
- towards south
 - towards east
 - downward
 - upward
- Q.5 What is the role of the split-ring in an electric motor?
- Q.6 What will be the frequency of an A.C if its direction changes after every .01 s?
- Q.7 An A.C has a frequency of 50 Hz. How many times does it change its direction in one second?
- Q.8 A student performs an experiment to study the magnetic effect of current around a current carrying straight conductor. He reports that
- The direction of deflection of the north pole of a compass needle kept at a given point near the conductor remains unaffected even when the terminals of the battery sending current in the wire are inter changed.
 - for a given battery, the degree of deflection of a N-pole decreases when the compass is kept at a point farther away from the conductor.
- Which of the above observations of the student is incorrect and why?
- Q.9 Draw the pattern of magnetic field lines of a current carrying solenoid. What does the pattern of field lines inside the solenoid indicate? Write one application of magnetic field of current carrying solenoid.
- Q.10 Sketch magnetic field lines around a current carrying straight conductor.
- Q.11 Why does a current carrying conductor kept in a magnetic field experience force?
- On what factors does the direction of this force depend? Name and state the rule used for determination of direction of this force.
- Q.5 Two circular coils A and B are placed close to each other. If the current in the coil A is changed, will some current be induced in the coil B? Give reason.
- Q.6 Explain what is short-circuiting and overloading in an electric supply?
- Q.7 What is the function of an earth wire? Why is it necessary to earth the metallic appliances?
- Q.8 (a) What is an electromagnet? What does it consist of?

- (b) Name one material in each case which is used to make a (i) permanent magnet
(ii) Temporary magnet.
- Q.9 Draw a sketch of the pattern of field lines due to a (i) current flowing in a circular coil (ii) current carrying solenoid.
- Q.10 A circuit has a fuse of 5A. What is the maximum number of 100W, 220V bulbs that can be safely used in the circuit.