

PHYSICS

CLASS NOTES FOR CBSE

Chapter 07. Magnetic Effect of Electric Current

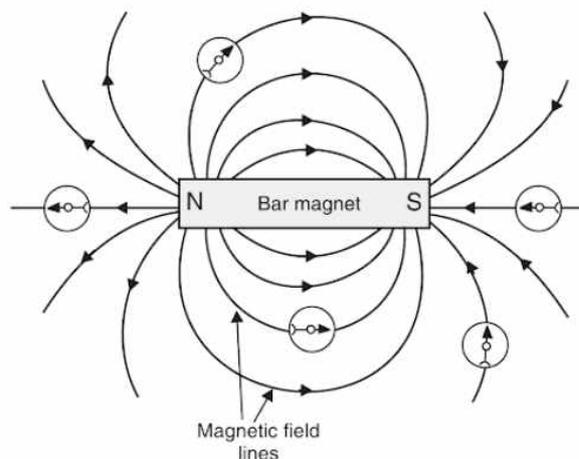
The term 'magnetic effect of electric current' means that 'an electric current flowing in a wire produces a magnetic field around it'. Electric current can produce magnetism. A magnet is an object which attracts pieces of iron, steel, nickel and cobalt. A bar magnet is a long, rectangular bar of uniform cross-section which attracts pieces of iron, steel, nickel and cobalt. Like magnetic poles repel each other whereas unlike magnetic poles attract each other.

01. Magnetic Field

The space surrounding a magnet in which magnetic force is exerted, is called a magnetic field. The direction of magnetic field at a point is the direction of the resultant force acting on a hypothetical north pole placed at that point.

02. Magnetic Field Lines

The magnetic field lines are the lines drawn in a magnetic field along which a north magnetic pole would move. The magnetic field lines always begin from the N-pole of a magnet and end on the S-pole of the magnet. The magnetic field lines leave the north pole of a magnet and enter its south pole. The strength of magnetic field is indicated by the degree of closeness of the field lines. Where the field lines are closest together, the magnetic field is the strongest.



MISOSTUDY.COM

The Best Online Coaching for IIT-JEE | NEET Medical | CBSE INQUIRY +91 8929 803 804

03. Properties of the Magnetic Field Lines

- (i) The magnetic field lines originate from the north pole of a magnet and end at its south pole.
- (ii) The magnetic field lines come closer to one another near the poles of a magnet but they are widely separated at other places.
- (iii) The magnetic field lines do not intersect (or cross) one another.

04. Magnetic Field of Earth

The earth itself behaves as a magnet. The shape of the earth's magnetic field resembles that of an imaginary bar magnet. The axis of earth's magnetic field is inclined at an angle of about 15° with the geographical axis. The earth's magnetism is due to the magnetic effect of current (which is flowing in the liquid core at the centre of the earth). Thus, earth is a huge electromagnet.

05. Magnetic Effect of Current (Or Electromagnetism)

A current flowing in a wire always gives rise to a magnetic field around it. The deflection of compass needle by the current-carrying wire in the above experiment shows that an electric current produces a magnetic field around it. A concealed current-carrying conductor can be located due to the magnetic effect of current by using a plotting compass.

06. Magnetic Field Patterns Produced by Current-Carrying Conductors Having Different Shapes

- (i) A straight conductor (or straight wire) carrying current,
- (ii) A circular loop (or circular wire) carrying current, and
- (iii) A solenoid (long coil of wire) carrying current.

07. Direction of Magnetic Field Produced by Straight Current-Carrying Conductor (Straight Current-Carrying Wire)

Imagine that you are grasping (or holding) the current-carrying wire in your right hand so that your thumb points in the direction of current, then the direction in which your fingers encircle the wire will give the direction of magnetic field lines around the wire.



MISOSTUDY.COM
The Best Online Coaching for IIT-JEE | NEET Medical | CBSE INQUIRY +91 8929 803 804