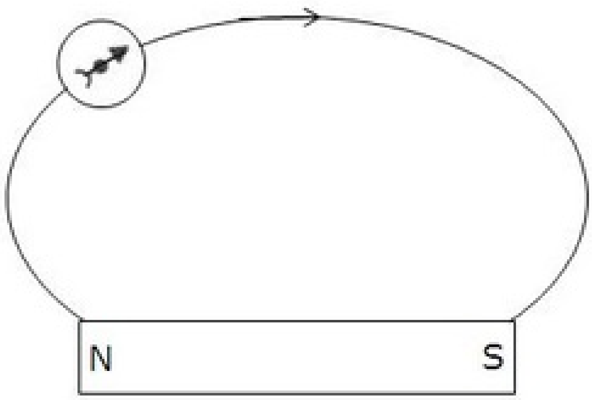
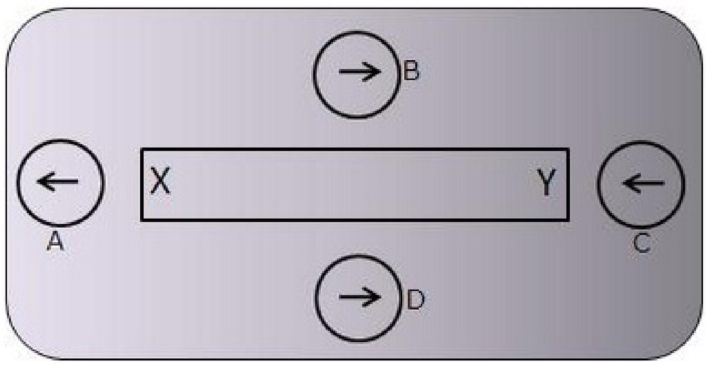
PAGE 74:
Q24.
As the north pole of the magnetic needle is pointing in the opposite direction,so the nearer end of the magnet will be north pole.



Q25.

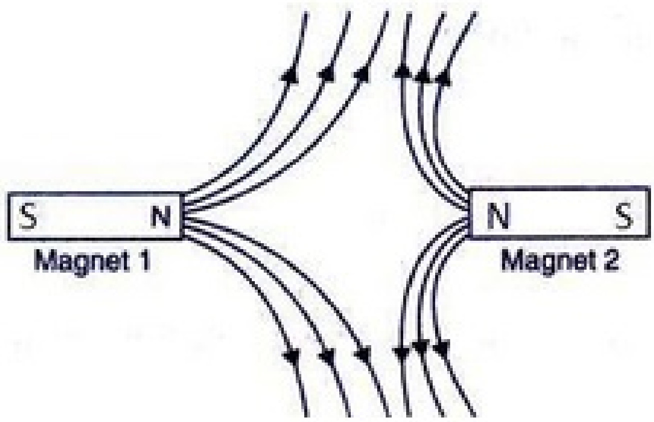
(a)



(b) X, as it repels the north pole (tip) of magnetic needle.

Q26.
A=N; B=N; C=S; D=S; E=N; F=S
Q27.
(a)

(i)



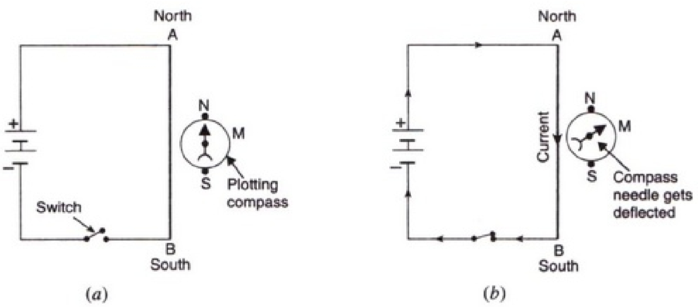
(ii) Magnet 2 is weaker.

PAGE 81:

Q1.
Magnetic effect.
Q2.
We conclude that a current carrying wire produces a magnetic field around it.

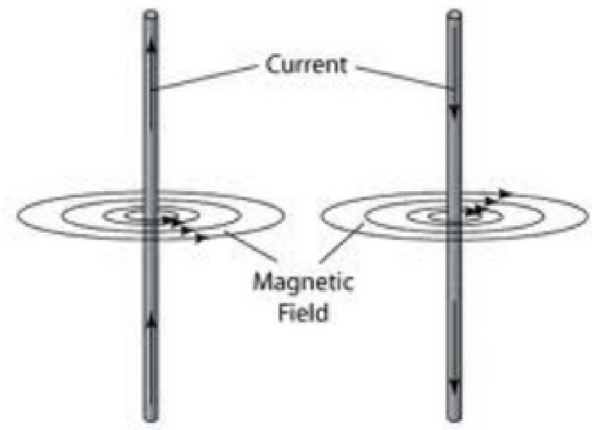
PAGE 82:

Q3.
Magnetic effect of current was discovered by Oersted.
Q4.
Magnetic field becomes very strong.
Q5.
Maxwell's right hand thumb rule.
Q6.
The magnetic field lines around a straight current-carrying conductor are concentric circles whose centres lie on the conductor.
Q7.
Maxwell's corkscrew rule.
Q8.
True.
Q9.
Solenoid.
Q10.
The strength of an electromagnet can be increased by
(i) increasing the number of turns in the coil
(ii) increasing the current flowing in the coil
(iii) reducing the length of air gap between the poles
Q11.
(a) magnetic field; concentric circles
(b) bar magnet
(c) turns; current; iron
(d) north
(e) south.
Q12.
A current-carrying wire concealed in a wall can be located due to the magnetic effect of current by using a plotting compass. If a plotting compass is moved on a wall, its needle will show deflection at the place where current-carrying wire is concealed.
Q13.



We take a thick insulated copper wire and fix it in such a way that the portion AB of the wire is in the north-south direction as shown in fig. A plotting compass M is placed under the wire AB. The two ends of the wire are connected to a battery through a switch. When no current is flowing in the wire AB, the compass needle is parallel to the wire AB and points in the usual north-south direction. When current is passed through wire AB by closing the switch, we find that the compass needle is deflected from its north-south position. On opening the switch, the compass needle returns to its original position.
Thus, the deflection of compass needle by the current carrying wire shows that magnetic field is associated with an electric current.
Q14.

(a)



(b) Maxwells right-hand thumb rule: According to this rule, imagine that you are grasping 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.
Q15.
(b) According to Maxwell's right hand thumb rule: Imagine that you are grasping 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.

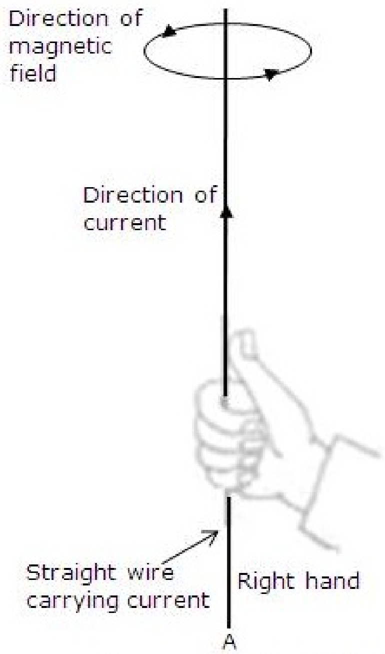


Figure : Right-hand thumb
Rule to find the direction of
Magnetic field

Let AB be the straight wire carrying current in the vertically upward direction from A to B. To find out the direction of the magnetic field lines produced by this current, we imagine that we are grasping the current carrying wire in our right hand as shown in fig. so that our thumb points in the direction of current towards B. Now, the direction in which our fingers are folded gives the direction of magnetic field lines. In this case, the direction of magnetic field lines is in the anticlockwise direction.

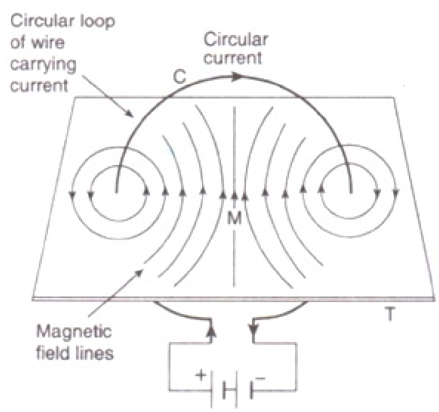
Q16.

According to Maxwell's corkscrew rule: Imagine driving a corkscrew in the direction of current, then the direction in which we turn its handle is the direction of magnetic field.

This rule is used to determine the direction of magnetic field around a straight current carrying conductor.

Q17.

(a)



Magnetic lines of force due to a
circular wire carrying current

(b) The strength of magnetic field produced by a current-carrying circular coil can be increased by:

- increasing the number of turns of wire in the coil.
- increasing the current flowing through the coil.

Q18.

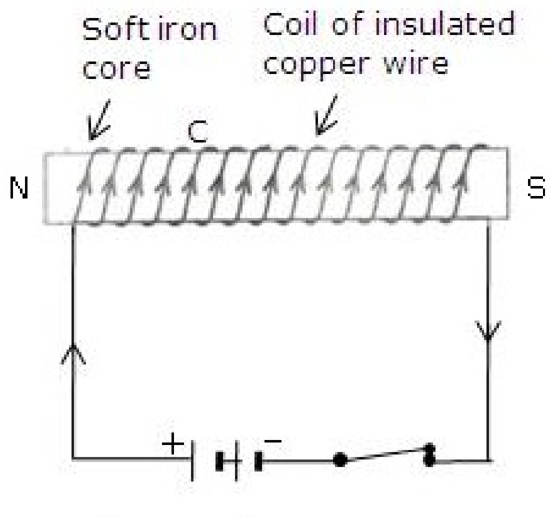
According to the Clock face rule, we look at one face of a circular wire (or coil) through which a current is passing:

(i) If the current around the face of the circular wire (or coil) flows in the clockwise direction, then that face of the circular wire will be South pole (S-pole).
(ii) If the current around the face of the circular wire (or coil) flows in the anti-clockwise direction, then that face of the circular wire will be North pole (N-pole).

(*a*) The direction of current in this face of circular wire is Clockwise, so this face of circular wire carrying current will act as a South magnetic pole (S-pole)

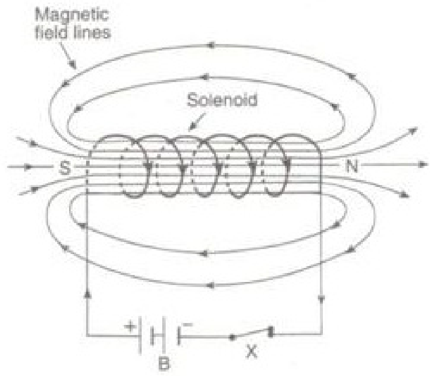
(*b*) The direction of current in this face of circular wire is Anticlockwise, so this face of circular wire carrying current will act as a North magnetic pole (or N-pole)

Q19.
The strength of magnetic field produced by a current-carrying solenoid depends on:
1. The strength of current in the solenoid: Larger the current passed through solenoid, stronger will be the magnetic field produced.
2. The number of turns in the solenoid: Larger the number of turns in the solenoid, greater will be the magnetic field produced.
Q20.
(a)

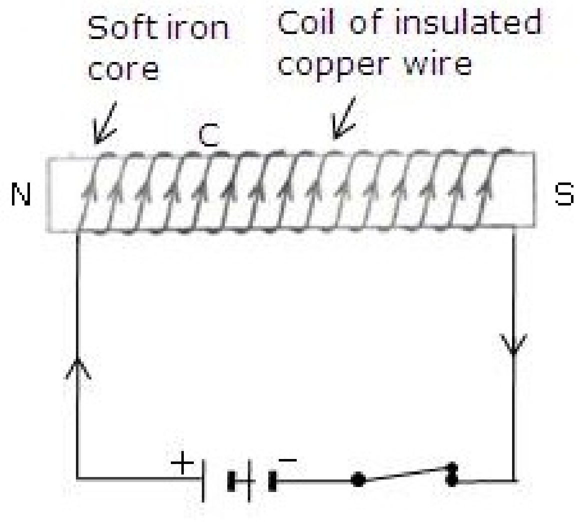


Electromagnet

A coil C of insulated copper wire is wound around a soft iron core NS and the two ends of the copper coil are connected to a battery. Thus, an electromagnet using a soft iron core.
(b) Electromagnetic cranes are used to separate copper from iron in a scrap yard. The current is switched on to energise the electromagnet and pick up the iron pieces from the scrap. Then these iron pieces are moved to another position, the electromagnet in switched off and the iron pieces are released.
Q21.
(a) An electromagnet produces a magnetic field so long as current flows in its coil i.e., it produces temporary magnetic field.; but a permanent magnet produces a permanent magnetic field.
(b) Electromagnets: Electric bell, electric motors.
Permanent magnets: Refrigerator doors, toys.
Q22.
(a) A solenoid is a long coil containing a large number of close turns of insulated copper wire.



(b) The magnetic field produced by a current-carrying solenoid is similar to the magnetic field produced by a bar magnet.
(c) Magnetic field lines inside a current-carrying solenoid are in the form of parallel straight lines. This indicates that the magnetic field inside the solenoid is uniform.
(d) The magnetic field strength of a current-carrying solenoid can be increased by
(i) increasing the number of turns in the solenoid.
(ii) increasing the current flowing through the solenoid.
(iii) using soft iron as core in the solenoid.
(e) Soft iron core.
Q23.
(a) An electromagnet is a temporary magnet that works on the magnetic effect of current. It consists of a long coil of insulated copper wire wrapped around a soft iron core that is magnetised ony when electric current is passed through the coil.
To make an electromagnet, we take a rod NS of soft iron and wind a coil C of insulated copper wire around it. When the two ends of the copper coil are connected to a battery, an electromagnet is formed.



Electromagnet

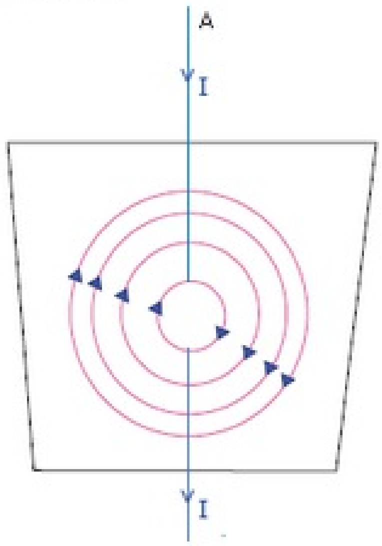
(b) An electromagnet is called a temporary magnet because it produces magnetic field so long as current flows in its coil.
(c) Core of an electromagnet should be of soft iron and not of steel because soft iron loses all its magnetism when current in the coil is switched off but steel does not lose its magnetism when the current is stopped.
(d) Strength of electromagnet depends on:
i. The number of turns in the coil - Increasing the number of turns in the coil increases the strength of the electromagnet.
ii. The current flowing in the coil - Increasing the current flowing in the coil increases the strength of the electromagnet.

iii. The length of air gap between its poles: Reducing the length of air gap between the poles of electromagnet increases the strength of the electromagnet.
(e) Electromagnets are used in several electrical devices such as electric bell, electric motor, loudspeaker etc. They are also used by doctors to remove particles of iron or steel from a patient's eye and to remove pieces of iron from wounds.

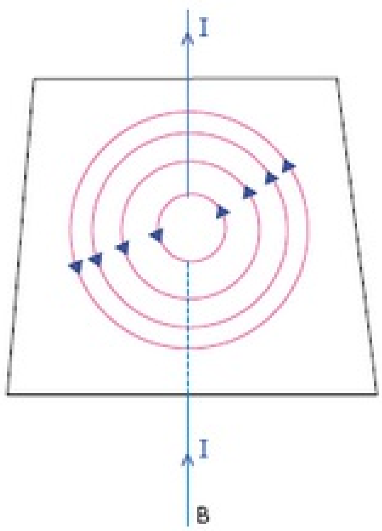
PAGE 84:

Q37.

(a) Clockwise



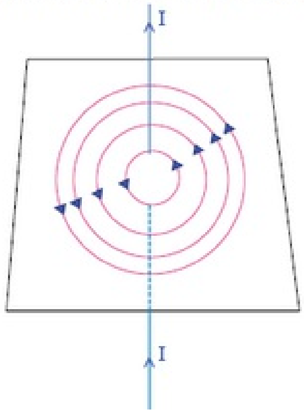
(b) Anticlockwise



We have used Maxwell's right hand thumb rule here.

Q38.
End A will be a S-pole because current flows in the clockwise direction at A.
Q39.
Direction of magnetic field is anticlockwise.

Direction of magnetic field is anticlockwise.



Maxwell's right hand thumb rule. is used to find out the direction of magnetic field.

Q40.

(a) End A becomes S-pole because current flows in clockwise direction at A.

(b) When A becomes S-pole, the other end becomes N-pole. So the tip of the compass (with also has North polarity) moves away from this end i.e., tip moves towards right.

Q41.

Magnetic field lines around it will be clockwise (according to Maxwell's right hand thumb rule).

Q42.

(a) End X is S-pole (because current flows in clockwise direction).

(b) End Y is N-pole (because current flows in anticlockwise direction).

(c) Clock face rule - Looking at the face of a loop, if the current around that face is in anticlockwise direction, the face has north polarity, while if the current at that face is in clockwise direction, the face has south polarity.

Q43.

The direction of current will be from east to west.

We have applied MAxwell's right hand thumb rule here.

According to Maxwell's right hand thumb rule: Imagine that you are grasping 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.

Q44.

(a) from top towards bottom.

Q45.

(a) Negative terminal

(b) Positive terminal

Because the current should be passed into wire upwards.

*********** END **********