Chapter-6 Magnetism

Q-1.Short Answer Questions:

1. Magnets that are found in nature are called natural magnets. Magnetite or lodestone is a natural magnet.
   Magnets that are made by humans are called artificial magnets. A bar magnet is an artificial magnet.
   Artificial magnets are preferred over natural magnets because these magnets are much stronger than the natural magnets.
2. A magnet has the following properties:
   (i) A magnet attracts magnetic substances towards itself (attractive property).
   (ii) When a magnet is suspended freely, it always rests along the north- south direction (directive property).
   (iii) Like poles of a magnet repel and unlike poles attract each other (attraction and repulsion property).
   (iv) The poles of a magnet always exist in pairs. A single pole does not exist.
3.

Sr. No	Parameter	Temporary magnet	Permanent magnet
1	Material	It is made of soft iron.	It is made of steel, cobalt and nickel.
2	Strength	It is weak. It cannot be used to convert an ordinary piece of iron into a magnet.	It is strong. It can convert an ordinary piece of iron into a temporary magnet.
3	Loss of magnetic property	It loses its magnetic properties after the magnetic force is removed.	It does not lose its magnetic properties.

4. A magnet can be demagnetized in the following ways:
   (i) By rough handling
   (ii) By hammering it violently several times
   (iii) By dropping it on the floor many times
   (iv) By heating it to a very high temperature
   (v) By self-demagnetization

Q-2. Long Answer Questions:

1. The property is called its attractive property. The property of attraction is not same everywhere along the length of the magnet. It is maximum at the poles and minimum at the centre of the magnet.

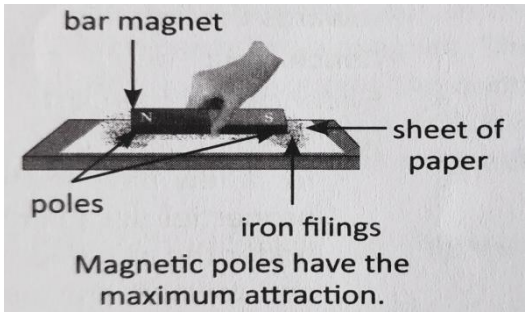
   Aim: To show that magnetic poles have the maximum attraction

   Things needed: Iron filings, a bar magnet and a sheet of paper

   Method:

   1. Spread some iron filings over a sheet of paper.
   2. Roll the bar magnet on the iron filings.

   Make sure that all the parts of the magnet touch the iron filings. Pick up the magnet and observe.



Magnetic poles have the maximum attraction.

   Observation: Most of the iron filings cling near the ends of the magnet with a few in the middle.

   Conclusion: Magnetic poles have the maximum attraction.

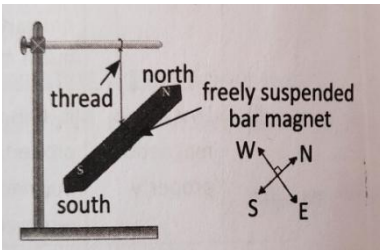
2. The property of a magnet to direct itself along the north-south direction is called its directive property. The end of the magnet that points towards the geographic north is called the north-seeking or north pole of the magnet. The end of the magnet that points towards the geographic south is called the south-seeking or south pole of the magnet.

   Aim: To show the directive property of a magnet

   Things needed: A bar magnet, a wooden stand and a piece of thread

   Method: Take a bar magnet. Suspend it freely with a thread tied at its centre as shown in the

   Observation: The freely suspended bar magnet points in the north-south direction when it comes to rest.



A freely suspended bar magnet always points in the north-south direction.

   Conclusion: A freely suspended magnet always points in the north-south direction.

3. We can recognize a magnetic field with the help of the following activity.

   Aim: To study the magnetic field around a bar magnet

   Things needed: A sheet of white paper, a drawing board, some drawing pins, a bar magnet and some iron filings

   Method:

   (i) Fix a sheet of white paper on a drawing board with the help of drawing pins.

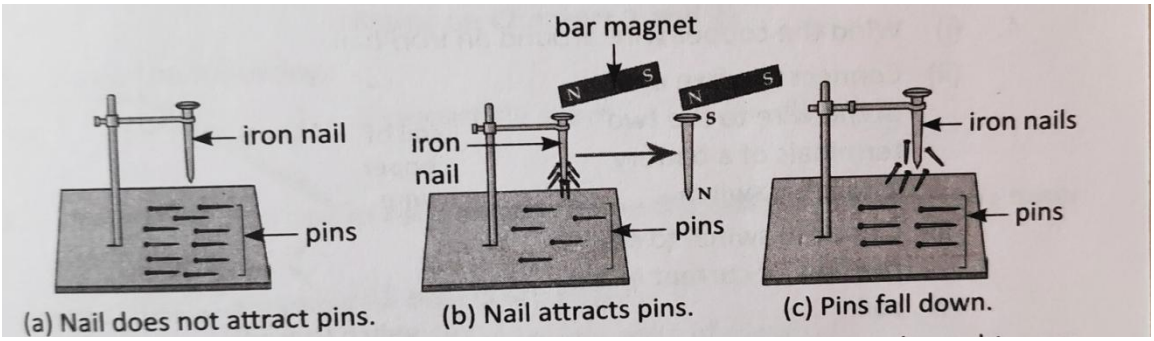
   (ii) Evenly spread some iron filings over the sheet.

   (iii) Place a bar magnet in the middle of the white paper. Tap the board gently.

   Observation: The iron filings rearrange themselves in the form of curves. It is because iron filings experience magnetic force and get attracted towards the magnet.

   Conclusion: There is a magnetic field around a bar magnet.

4. Evidences for the existence of the earth's magnetic field are:
   (i) When a piece of soft iron is buried under the surface of the earth for a few days in the north-south direction, it acquires magnetic properties. It can only be possible when the soft iron piece is placed under the influence of a magnetic field of some other magnet. The end towards the geographic south becomes the South Pole. The end towards the geographic north becomes the North Pole.
   (ii) When a bar magnet is suspended freely, it comes to rest along the north-south direction. The south of the magnet lies in the geographical south direction. The north pole of the magnet lies in the geographical north direction. We know that like poles repel and unlike poles attract each other. Therefore, there must be a magnetic south pole of the earth in the geographical north direction that attracts the north pole of the magnet towards itself. Similarly, there must be a magnetic north pole of the earth in the geographical south direction that attracts the south pole of the magnet towards itself.
5. **Magnetic induction method**
   When a piece of iron is placed near a magnet, it becomes a magnet. It shows all the properties of a magnet. This method is called magnetic induction. But when the magnet is removed, the iron piece does not show the properties of a magnet. It no longer remains a magnet.
   Aim: To make a magnet by magnetic induction method
   Things needed: A long iron nail, iron pins, a bar magnet and a stand
   Method:
   (i) Fix a long iron nail on a stand. Spread some iron pins on the base of the stand. The iron nail does not attract the pins [Fig. (a)].
   (ii)Take a bar magnet. Bring one pole (say north pole) near the head of the nail. Remove it after a few seconds.



   Observation and Discussion: When the bar magnet is brought near the head of the nail, some of the pins cling to the nail [Fig. (b)). In the presence of a magnet, the long iron nail behaves like a magnet. The head of the nail becomes the south pole and its tip becomes the north pole. When the magnet is removed, all the pins fall down [Fig. (c)]. It is because on removing the magnet, the long iron nail loses its magnetic property.

   Conclusion: The iron nail forms a temporary magnet by magnetic induction method.

6. Magnets can be kept safely by using bars of soft iron called magnetic keepers. Bar magnets are always stored in pairs with their unlike poles on the same side. They must be separated by a piece of wood. Two magnetic keepers are kept across their ends.
   In case of a horseshoe or U-shaped magnet, a single piece of soft iron is kept touching both the poles of the magnet. We should not hammer, drop, heat, and knock down a magnet. Also, we should keep magnets away from floppy disks, CDs, computers, credit cards and television sets. They demagnetize magnets.