Section A (Objective Questions)

1. Observe pictures A and B, given in fig 13.1, carefully.

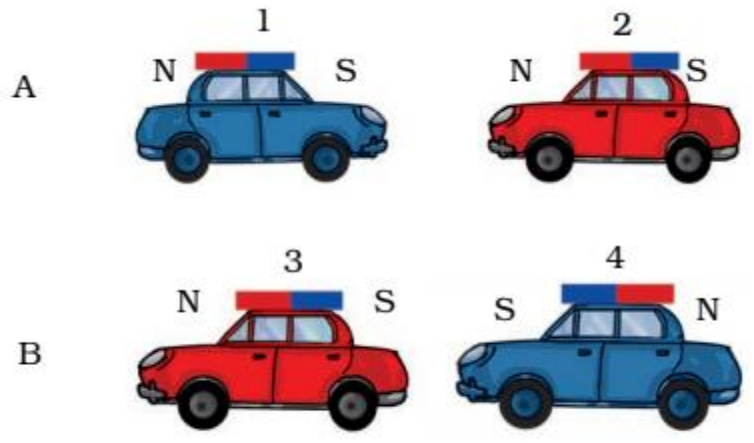


Fig. 13.1

Which of the following statement is correct for the above-given pictures?
(a) In A, cars 1 and 2 will come closer, and in B, cars 3 and 4 will come closer.
(b) In A, cars 1 and 2 will move away from each other, and in B, cars 3 and 4 will move away.
(c) In A, cars 1 and 2 will move away, and in B, 3 and 4 will come closer to each other.
(d) In A, cars 1 and 2 will come closer to each other and in B, 3 and 4 will move away from each other.

Solution:

(d): In A, cars 1 and 2 will come closer to each other and in B, 3 and 4 will move away from each other.

Unlike poles attract each other, while like poles repel each other.

In case A: cars 1 and 2 are facing each other with opposite poles hence they get attracted.

In case B: cars 3 and 4 are facing each other with the same poles hence they get repelled.

2. The arrangement to store two magnets is shown in figures (a), (b), (c) and (d) in fig 13.2. Which one of them is the correct arrangement?

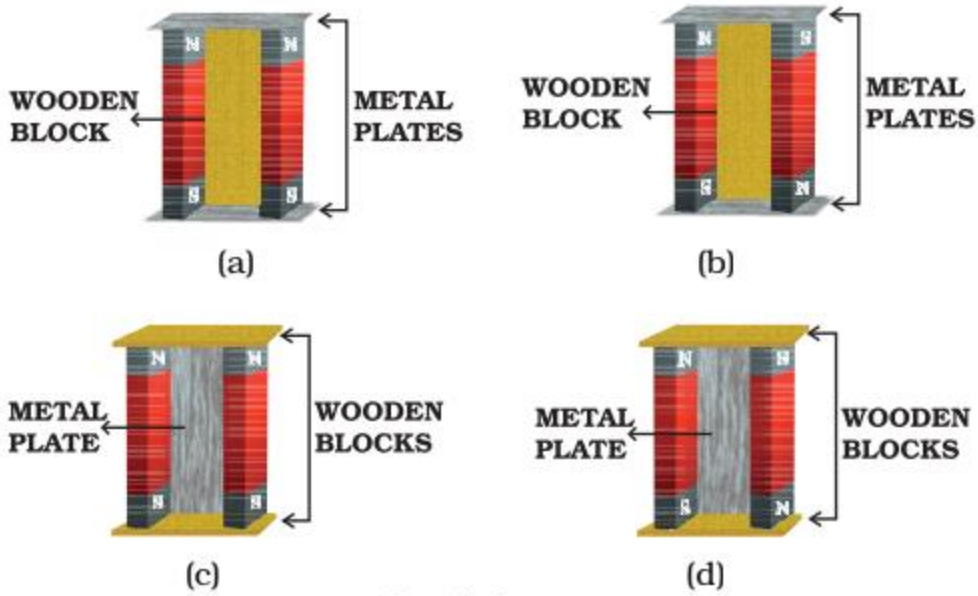


Fig. 13.2

Solution:

(b): option 'b' is the correct arrangement.

3. Three magnets A, B and C, were dipped one by one in a heap of iron filing. Figure 13.3 shows the amount of iron filing sticking to them.

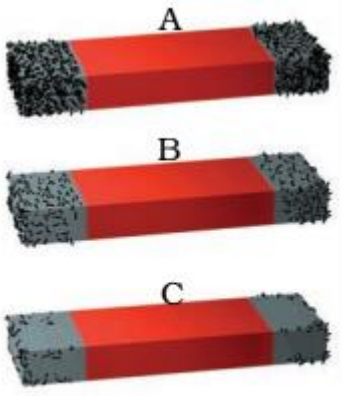


Fig. 13.3

The strength of these magnets will be

(a) A > B > C

(b) A < B < C

(c) A = B = C

(d) A < B > C

Solution:

(a): A > B > C

The amount of iron filing sticking to magnets is directly proportional to their strengths.

4. North pole of a magnet can be identified by
(a) Another magnet having its poles marked as North pole and South pole.
(b) Another magnet, no matter whether the poles are marked or not.
(c) Using an iron bar.
(d) Using iron filings.
Solution:

(a): Another magnet having its poles marked as the north pole and south pole.

5. A bar magnet is immersed in a heap of iron filings and pulled out. The amount of iron filing clinging to the
(a) North Pole is almost equal to the South Pole.
(b) North pole is much more than the South Pole.
(c) North pole is much less than the South Pole.
(d) Magnet will be the same all along its length.
Solution:

(a): North Pole is almost equal to the South Pole.

The magnetic strengths of the North Pole and the South Pole of a magnet are the same.

6. If we suspend a magnet freely, it will settle in .

a) east-west direction
b) north-south direction
c) north-east direction
d) east-south direction

Answer: **north-south direction**

7. Making a magnetic substance a magnet by bringing it closer to another magnet without touching it, is

a) magnetic induction method
b) single touch method
c) double touch method
d) electrical method

Answer: **magnetic induction method**

8. An example of natural magnet is

a) iron
b) steel
c) lodestone
d) none of above

Answer: **lodestone**

9. The artificial magnet used to detect direction in the laboratory is

a) U-shaped magnet
b) horse shoe magnet
c) electromagnet
d) magnetic compass

Answer: magnetic compass

10. A bar magnet is cut into four pieces. Each piece is:

(a) a complete magnet

(b) two pieces have only north pole

(c) two pieces have only south pole

(d) demagnetized

Answer: option **(a) a complete magnet** is correct.

11. A steel bar can be magnetized permanently by rubbing a bar magnet:

(a) along its length

(b) at its ends

(c) at its center

(d) none of these

Answer: option **(a) along its length** is correct.

12. An artificial magnet used for finding geographic is known as :

(a) electromagnet

(b) horse-shoe magnet

(c) magnetic needle

(d) bar magnet

Answer: option **(c) magnetic needle** is correct.

13. The surest test of magnetism is:

(a) attraction

(b) repulsion

(c) (a) and (b) both

(d) none of these

Answer: option **(b) repulsion** is correct.

14. Magnetic south pole of the earth is situated near:

(a) geographic south pole

(b) geographic north pole

(c) geographic east

(d) geographic west

Answer: option **(a) geographic south pole** is correct.

15. Magnetic lines of force around a bar magnet :

(a) are closed continuous curves

(b) travel from north to south outside the magnet

(c) bend around the length of magnet

(d) all the above

Answer: option **(d) all the above** is correct.

16. The magnetic compass is placed in a circular:

(a) iron case

(b) stainless steel case

(c) aluminium case

(d) nickel case

Answer: option **(b) stainless steel case** is correct.

17. For plotting a magnetic field around a bar magnet, the device used is

(a) magnetic needle

(b) magnetic compass

(c) tracing needle

(d) none of these

Answer: option **(b) magnetic compass** is correct.

18. Magnetic lines of force can pass through:

(a) only magnetic substances

(b) only non-magnetic substance

(c) both (a) and (b)

(d) none of the above

Answer: option **(c) both (a) and (b)** is correct.

B. Fill in the blanks

1. The space around a magnet where its influence can be detected is called _____.

2. The close continuous _____in a magnetic field is called a magnetic lines of force.

3. The magnetic north pole of the earth is towards the geographic _____.

4. The power of attraction of a _____.

5. A device used by the sailors to find the direction in which their ship is moving is called _____.

Answers:

1. The space around a magnet where its influence can be detected is called __**magnetic field**__ .
2. The close continuous __**curve**__ in a magnetic field is called a magnetic lines of force.
3. The magnetic north pole of the earth is towards the geographic __**south pole**__.
4. The power of attraction of a __**horse shoe**__.
5. A device used by the sailors to find the direction in which their ship is moving is called __**magnetic needle**__.

C. Statements given below are incorrect. Write the correct statements:

1. The magnetic field around a bar magnet is directed from the south pole toward north pole.

Answer: The magnetic field around a bar magnet is directed from the north pole toward the south pole.

2. Earth's magnetic strength is weakest near the geographical poles.

Answer: Earth's magnetic strength is strongest near the geographical poles.

3. The magnetic south pole of the earth is near the geographic south pole.

Answer: Earth's magnetic south pole is actually near the geographic north Pole.

4. The strength of a magnet is strongest in the middle and weakest at its ends.

Answer: The strength of a magnet is weaker in the middle and stronger at its ends.

5. The magnetic lines of force around a bar magnet mutually attract each other.

Answer: The magnetic lines of force around a bar magnet do not mutually attract each other.

D. Match the following:

A magnet was brought from different directions towards a toy boat that has been floating in water in a tub. The effect observed in each case is stated in Column I. Possible reasons for the observed effects are mentioned in Column II. Match the statements given in Column I with those in Column II.

Column I	Column II
Boat gets attracted towards the magnet	Boat is fitted with a magnet with a north pole towards its head
Boat is not affected by the magnet	Boat is fitted with a magnet with a south pole towards its head

Boat moved towards the magnet when the north pole was brought near its head	Boat has a small magnet fixed along its length
Boat moves away from the magnet when the north pole is brought near its head	Boat is made up of magnetic material
Boat floats without changing its direction	Boat is made up of non-magnetic material

Solution:

Column I	Column II
Boat gets attracted towards the magnet	Boat is made up of magnetic material
Boat is not affected by the magnet	Boat is made up of non-magnetic material
Boat moved towards the magnet when the north pole was brought near its head	Boat is fitted with a magnet with the south pole towards its head
Boat moves away from the magnet when the north pole is brought near its head	Boat is fitted with a magnet with a north pole towards its head
Boat floats without changing its direction	Boat has a small magnet fixed along its length

Section B

II. Short Answer Questions:

Q1. Four identical iron bars were dipped in a heap of iron filings one by one. The figure shows the amount of iron filings sticking to each of them.

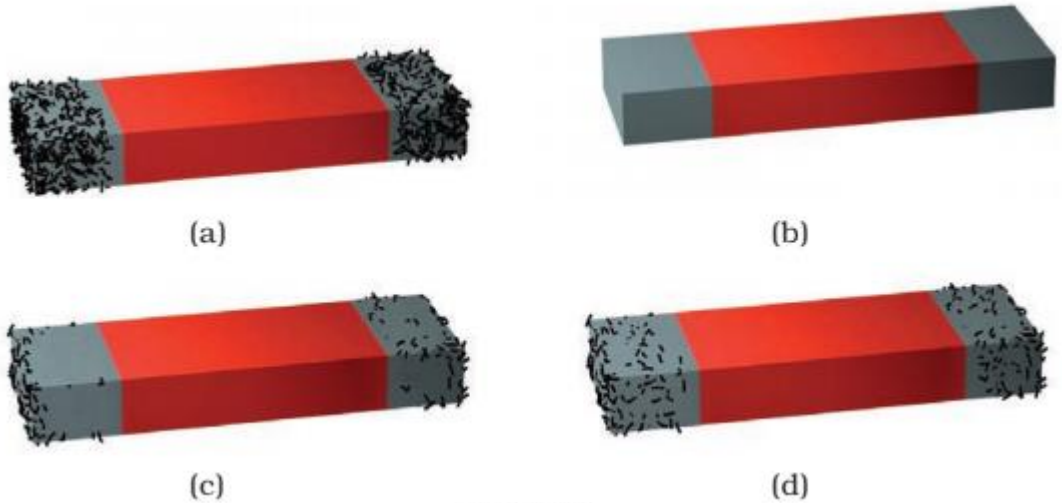


Fig. 13.5

(a) Which of the iron bar is likely to be the strongest magnet?

(b) Which of the iron bars is not a magnet? Justify your answer.

Solution:

(a) Iron bar (a) is likely to be the strongest magnet since more amount of iron filings have stuck to the magnet than any other bars.

(b) Iron bar (b) is not a magnet since none of the iron filings sticks to the magnet.

Q2. A toy car has a bar magnet laid hidden inside its body along its length. Using another magnet, how will you find out which pole of the magnet is facing the front of the car?

Solution: We know that unlike poles attract each other while like poles repel each other. In the case of a toy car, if the front of the toy car gets attracted to the north pole of the given magnet, then it is the south pole of the bar magnet hidden inside the car and vice-versa.

Q3. You are provided with two identical metal bars. One out of the two is a magnet. Suggest two ways to identify the magnet.

Solution: There can be the following ways to identify the magnet out of the two identical metal bars:

(i) By attracting iron filings to the magnet, we get to know which is a magnet.

(ii) By using another magnet. If it is a magnet like poles will repel each other while unlike poles will attract each other.

Q4. What are magnetic and non-magnetic substances ? Give two examples of each.

Answer:

Magnetic substances: The substances that get attracted by a magnet are called magnetic substances. Iron, steel, cobalt, and nickel are magnetic substances.

Non-magnetic substances: The substances that do not get attracted by a magnet are called non-magnetic substances, e.g., wood, plastic, copper, paper, aluminum, rubber, and stone.

Q5. What are natural and artificial -magnets?

Answer:

Natural magnets: Natural magnets are those which are found in nature e.g. load stone.

Artificial magnets: Man-made magnets are called artificial magnets, e.g. electromagnets.

Q6. How is an artificial magnet prepared from a natural magnet?

Answer: Pieces of iron or other materials are made of magnets by rubbing them with natural magnets (or by passing direct current through a wire wound around them). This is how artificial magnets are made.

Section C

Q7. How can the magnetic properties of a magnet be destroyed?

Answer:

1. By hammering the magnet repeatedly.

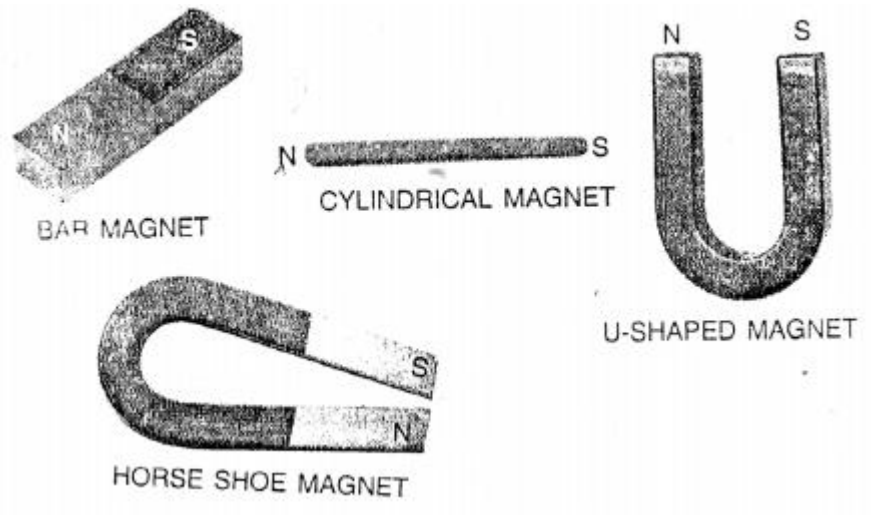
2. By rough handling
3. By heating.

Q8. Why does a freely suspended magnet always rest in a north-south direction?

Answer: A freely suspended magnet always rest in north-south direction because the north pole of the magnet lies in the geographic north direction and the south pole of the magnet lies in the geographic south direction. So it aligns itself in N-S direction. As unlike poles attract and like poles repel.

Q9. Draw diagrams of the artificial magnets of four different shapes.

Answer:



Q10. Why are the artificial magnets preferred over the natural magnets?

Answer: Artificial magnets are preferred over natural magnets because natural magnets are weak and often irregular in shape, they can readily be magnetized and demagnetized by turning the current on or off in the coil.

Q11. Explain the attractive properties of a magnet with the help of an experiment.

Answer: Take iron filling on a piece of paper. Bring a bar magnet near it. An iron filling will cling to it. It shows the attractive properties of a magnet.

Q12. How are the magnets kept safely? What is the role of keepers in storing the magnets?

Answer: When magnets are not in use they should be kept and stored in magnetic keepers. The magnetic keepers are pieces of soft iron. A magnetic keeper has a cardboard with one or two iron soft pieces. Two

magnets are placed in such a way that their opposite poles are close to each other and then a soft iron keeper is attached with it.

Section D

IV. Long Answer Questions:

Q13. Three identical iron bars are kept on a table. Two out of three bars are magnets. In one of the magnets, the North-South poles are marked. How will you find out which of the other two bars is a magnet? Identify the poles of this magnet.

Solution: The magnet on which the North-South poles are marked can be used to find the magnet out of two bars.

Take the magnet with North-South poles marked, and keep it close to both the iron bars; hence both magnets get attracted to it since both are magnets.

To find out the poles of an unknown magnet, we can use the repulsion test. The north pole marked on the given magnet will repel the north pole of the unknown magnet and vice-versa.

Q14. Describe the steps involved in magnetising an iron strip with the help of a magnet.

Solution: An iron strip can be magnetised by rubbing it with a magnet in a particular direction again and again, as shown in the below figure.

Here are the steps involved:

- Consider a wooden table and place the desired iron strip, which has to be magnetised.
- Now take a bar magnet, where one end of the magnet is held in the hands, and the other end is on one edge of the strip.
- Rub the magnet again and again without lifting along the length of the strip.
- Repeat the above steps several times.
- Take the iron fillings and extend them on the strip. If it gets attracted, the strip gets magnetised, and if it does not, then repeat the steps a few more times.

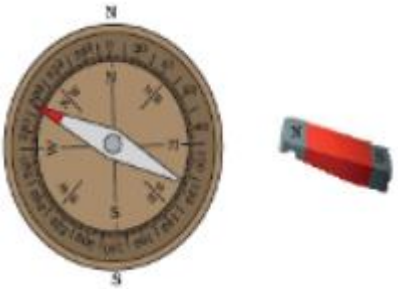
Q15. Figure 13.6 shows a magnetic compass. What will happen to the position of its needle if you bring a bar magnet near it? Draw a diagram to show the effect on the needle on bringing the bar

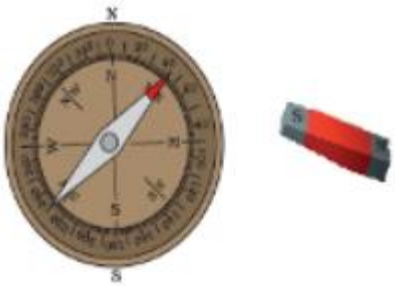
magnet near it. Also, draw the diagram to show the effect when the other end of the bar magnet is brought near it.

Fig. 13.6

Solution:

The magnetic needle of the compass will get deflected.





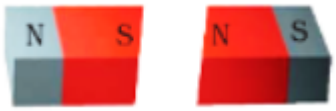
Q16. A bar magnet is cut into two pieces, A and B, from the middle, as shown in figure 13.8.

Fig. 13.8

Will the two pieces act as individual magnets? Mark the poles of these two pieces. Suggest an activity to verify your answer.

Solution: Yes, the two broken pieces, A and B, will act as individual magnets. A magnet will always have two poles – the North and South Pole. Hence, now each piece will have two poles.

By using the test of repulsion between the newly formed magnets, we can detect the poles of broken magnets.

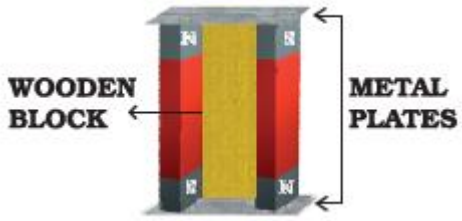


Q17. Suggest an arrangement to store a U-shaped magnet. How is this different from storing a pair of bar magnets?

Solution:

U-shaped magnet – One metal plate is placed across the two poles of the U-shaped magnet to store it.

Bar magnet – Two metal plates and one wooden block is used and arranged as shown in the figure.

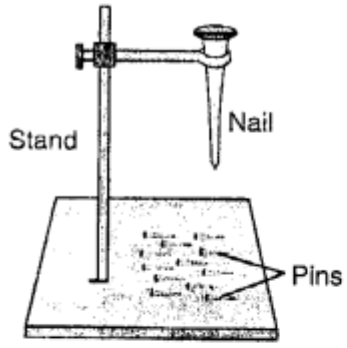


Q18. **State two ways of magnetising an iron piece.**

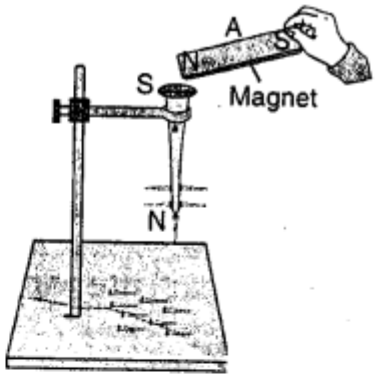
Answer: The two ways of magnetising an iron piece are:

1. Magnetic induction method.: Take a long iron nail and test it for magnetic properties by bringing near the magnetic substances. You will see nail does not attract the magnetic substances. Now bring near a pole of a bar magnet to the head of the nail. Now bring the iron paper clips near the pointed end of the nail, you will observe that the iron paper clips now get attracted towards the nail. This is because iron nail has become magnet. Now take

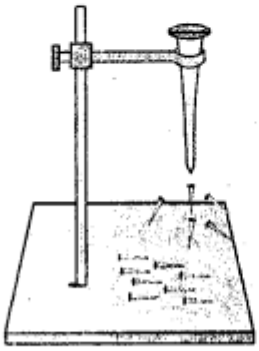
the bar magnet away form the iron nail, paper clips fall off. This magnetism is temporary.



No pin clings to the nail

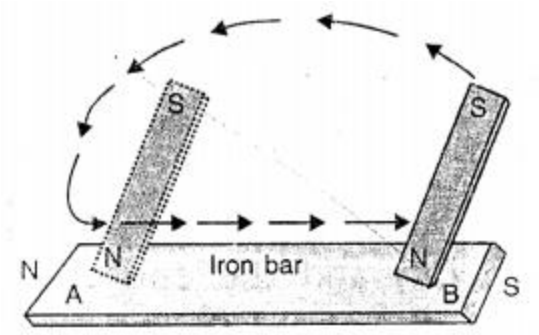


Some pins cling to the nail



On removal of the magnet, pins fall down

2. Single touch method: Take a demagnetised piece of iron. Place it on a table surface. Take a magnet and select its one pole. Now mb it with the selected pole on the iron in one direction for several times. After sometime, the iron piece turns into a magnet.



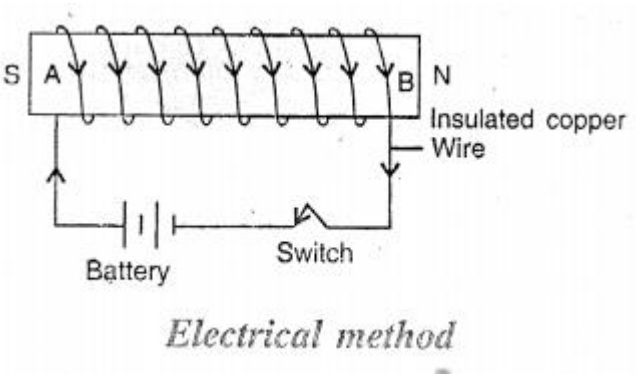
Q19 . State four important properties of a bar magnet.
Answer:

1. Attractive property: A magnet can attract small pieces of iron filing or other ferromagnetic materials.
2. Directive property: If a magnet is suspended horizontally by a thin thread (say silk thread), it rests always pointing north- south direction of earth.

3. Like poles always repel each other and unlike poles attract each other.
4. Poles always exist in pairs : Single pole can never exist.

Q20. How will you make an iron bar electromagnet ? Draw a diagram showing the polarities of the electromagnet.

Answer: Take the given iron bar AB. Wound several turns of insulated copper wire over the bar. Connect the ends of the wire to a battery through a switch. Press the switch to pass current. After some time, the bar AB becomes a magnet.



Electrical method

The end A of the bar at which the current enters the coil in clock¬wise direction becomes the south pole (S) and the end B of the bar at which the current leaves the coil in anti-clockwise direction becomes the north pole (N).

Q21. State four important uses of a magnet.

Answer: Use of magnet:

1. Magnets are used in magnetic compass, door bells, refrigerators.
2. Magnets are used in dynamos, motors, loudspeakers, microphones etc.
3. Ceramic magnets are used in computers.
4. Magnets are used in toys to give magic effect.

Q22. State three differences between the temporary and permanent magnets.

Answer:

Temporary magnet

1. It is made up of soft iron.
2. The magnet which loses its magnetism as soon as magnetising force is removed away from it.
3. Because of its weak power, it is not used to make iron piece into magnet.

Permanent magnets

1. It is made up of steel, cobalt and nickel.

2. The magnet, which does not lose its magnetic properties easily is called permanent magnet.
3. It can convert ordinary piece of iron into a temporary magnet.