Chapter 2
Magnetism

I. Choose the best Answer:

Question 1.
A magnet attracts ……
(a) wooden materials
(b) any metal
(c) copper
(d) iron and steel
Answer:
(d) iron and steel

Question 2.
One of the following is an example for a permanent magnet.
(a) Electromagnet
(b) Mumetal
(c) Soft iron
(d) Neodymium
Answer:
(d) Neodymium

Question 3.
The south pole of a bar magnet and the north pole of a U-shaped magnet will ……..
(a) attract each other
(b) repel each other
(c) neither attract nor repel each other
(d) None of the above
Answer:
(a) attract each other

Question 4.
The shape of the Earth's magnetic field resembles that of an imaginary ……
(a) U-shaped magnet
(b) straight conductor carrying current
(c) solenoid coil
(d) bar magnet
Answer:
(d) bar magnet

Question 5.
MRI stands for……..

(a) Magnetic Running Image
(b) detection of magnetic field
(c) navigation
(d) Magnetic Radar Imaging
Answer:
(a) Magnetic Resonance Imaging

Question 6.
A compass is used for ……
(a) plotting magnetic lines
(b) detection of magnetic field
(c) navigation
(d) All of these
Answer:
(d) All of these

II. Fill in the blanks:

1. The magnetic strength is …… at the poles.
2. A magnet has …… magnetic poles.
3. Magnets are used in …… for generating electricity.
4. …… are used to lift heavy iron pieces.
5. A freely suspended bar magnet is always pointing along the …… north-south direction.

Answer:

1. maximum
2. two
3. dynamos
4. Electromagnets
5. geographic

III. Match the following:

1. Magnetite – Magnetic lines Natural
2. A tiny pivoted magnet – magnet
3. Cobalt – Compass box
4. Closed curves – Ferromagnetic material
5. Bismuth – Diamagnetic material

Answer:

1. Magnetite – Natural magnet
2. A tiny pivoted magnet – Compass box

3. Cobalt – Ferromagnetic material
4. Closed curves – Magnetic lines
5. Bismuth – Diamagnetic material

IV. Choose the correct option:

(a) If both assertion and reason are true and reason is the correct explanation of the assertion.
(b) If both assertion and reason are true but reason is not the correct explanation of assertion.
(c) If the assertion is true, but the reason is false.
(d) If the assertion is false, but the reason is true.

Question 1.
Assertion: Iron filings are concentrated more at the magnetic poles.
Reason: The magnets are so sharp.
Answer:
(b) Both assertion and reason are true but reason is not the correct explanation of assertion.

Question 2.
Assertion: The Earth's magnetic field is due to iron present in its core.
Reason: At a high temperature, a magnet loses its magnetic property or magnetism.
Answer:
(d) Assertion is false but the reason is true.

Correct statement:
The Earth's magnetic field is due to the molten charged metallic fluid inside the Earth's surface.

V. Answer briefly:

Question 1.
What is magnetic field?
Answer:
The space around a magnet in which its magnetic effect or influence is observed.

Question 2.
What is artificial magnet? Give examples.
Answer:
Magnets that are made by people in a laboratory or a factory are called artificial magnets.
Example:
Horse shoe magnet, bar magnet, U-shaped magnet, cylindrical magnets, disc magnets, ring magnets and electromagnets.

Question 3.
Distinguish between natural and artificial magnets.
Answer:
1. Natural Magnets:

- These are found in nature.
- Have irregular shapes and dimensions.
- The strength of a natural magnet is well determined and difficult to change.
- These are permanent magnets.
- They have a less usage.

2. Artificial Magnets:

- These are man-made magnets.
- They can be made in different shapes and dimensions.
- Artificial magnets can be made with required and specific strength.
- Their properties are time bound.
  They have a vast usage in day-to-day life.

Question 4.
Earth acts as a huge bar magnet. Why? Give reasons.
Answer:

1. A freely suspended magnetic needle at a point on the Earth comes to rest approximately along the geographical north – south direction.
2. This shows that the Earth behaves like a huge magnetic dipole with its magnetic poles located near its geographical poles.
3. The north pole of a magnetic needle approximately points towards the geographic north (NG).
4. The magnetic north pole of the needle is attracted by the magnetic south pole of the Earth (Sm), which is located at the geographic north NG.
5. Also, the magnetic south pole of the needle is attracted by the magnetic north pole of the Earth (Nm), which is located at the geographic south SG.

Question 5.
How can you identify non-magnetic materials? Give an example of a non- magnetic material.
Answer:

1. Materials which are not attracted by magnets are called non-magnetic materials.
2. Example: Wood, Glass, Rubber, Plastic, Aluminium.

VI. Answer in detail:

Question 1.
List out the uses of magnets in day-to-day life.
Answer:

1. In ancient times, the magnet in the form of 'direction stone' helped seamen to find the directions during a voyage.
2. Nowadays, magnets are used to generate electricity in dynamos.
3. Electromagnets are used in our day-to-day life.
4. They are used in electric bells and electric motors.
5. They are used in loudspeakers and microphones.
6. An extremely powerful electromagnet is used in the fast moving Maglev train to remain floating above the tracks.
7. In industries, magnetic conveyor belts are used to sort out magnetic substances from scraps mixed with non-magnetic substances.
8. Magnets are used in computer in its storing devices such as hard disks.
9. In banks, the magnets enable the computers to read the MICR numbers printed on a cheque.
10. The tip of the screw drivers are made slightly magnetic so that the screws remain attached to the tip.
11. At hospitals, extremely strong electro magnets are used in the MRI (Magnetic Resonance Imaging) to scan the specified internal organ.

Question 2.
How will you convert a 'nail' into a temporary magnet?
Answer:

1. Spread some steel pins on a wooden board and bring an iron nail near them.
2. Now, make one of the magnetic poles of the bar magnet touch one end of the iron nail.
3. Slide it along its length in one direction slowly till the other end is reached.
4. Repeat the process, as shown in the diagram, 20 to 30 times.
5. The magnet has to be moved in one direction only.
6. Avoid the swiping of the magnet back and forth.
7. Now, bring the iron nail near the steel pins.
8. The steel pins stick to the iron nail because nail has become a temporary magnet.

Question 3.
Write a note on Earth's magnetism.
Answer:

1. Earth has been assumed or imagined by the scientists as a huge magnetic dipole.
2. The south pole of the imaginary magnet inside the Earth is located near the geographic north pole and the north pole of the Earth's magnet is located near the geographic south pole.
3. The line joining these magnetic poles is called the magnetic axis.

4. The magnetic axis intersects the geographic north pole at a point called the north geomagnetic pole or northern magnetic pole.
5. It intersects the geographic south pole at a point called the south geomagnetic pole or southern magnetic pole.
6. The magnetic axis and the geographical axis (axis of rotation) do not coincide with each other.
7. The cause of the Earth's magnetism, are as follows.
    - Masses of magnetic substances in the Earth
    - Radiations from the Sun
    - Action of the Moon

VII. Higher Order Thinking Questions:

Question 1.
Though Earth is acting as a huge bar magnet it is not attracting other ferromagnetic materials. Why? Give reasons.
Answer:
Earth is not attracting other ferromagnetic materials because the magnetic character of ferromagnetic materials is affected by the external temperature. When they are heated, they become paramagnetic at curie temperature.

Question 2.
Why it is not advisable to slide a magnet on an iron bar back and forth during magnetising it?
Answer:
It is not advisable to slide a magnet on an iron bar back and forth because moving it in opposite directions will work to cancel each other out.

Question 3.
Thalami Dharaga and Sangamithirai were playing with a bar magnet. They put the magnet down and it broke into four pieces. How many poles will be there?
Answer:
Each broken piece behaves like a separate magnet. Therefore, four pieces will have eight poles.

Conclusion:
Thus, we can conclude that unlike poles of a magnet attract each other, i.e., the north pole and the south pole of a magnet attract each other.