UNIQUE STUDY POINT

By Sumeet Sahu

www.uniquestudyonline.com

Unique Study Point, Amitesh Nagar, Indore, MP | Contact: 8103405051

Class: VI	**Subject:** Science	**Session:** 2025-26
Chapter: 04 - Exploring Magnets	**Time:** 1½ Hours	**Max. Marks:** 40

General Instructions:

1. All questions are compulsory.
2. This question paper contains 20 questions divided into five sections A, B, C, D and E.
3. Section A contains 10 MCQs of 1 mark each.
4. Section B contains 4 questions of 2 marks each.
5. Section C contains 3 questions of 3 marks each.
6. Section D contains 1 question of 5 marks.
7. Section E contains 2 Case Study Based questions of 4 marks each.

SECTION A - Multiple Choice Questions (1 mark each)

Q1. Which of the following is a magnetic material?

(a) Wood

(b) Plastic

(c) Iron

(d) Glass

Q2. A freely suspended bar magnet always aligns itself in which direction?

(a) East-West

(b) North-South

(c) Northeast-Southwest

(d) Any random direction

Q3. The ends of a magnet where the magnetic force is maximum are called:

(a) Centers

(b) Poles

(c) Edges

(d) Corners

Q4. When the North pole of one magnet is brought near the North pole of another magnet, they will:

(a) Attract each other

(b) Repel each other

(c) Not affect each other

(d) Stick together

Q5. Which of the following metals is NOT magnetic?

(a) Iron
(b) Nickel
(c) Cobalt
(d) Copper

Q6. The naturally occurring magnets are called:
(a) Artificial magnets
(b) Lodestones
(c) Bar magnets
(d) Ring magnets

Q7. A magnetic compass is used to find:
(a) Time
(b) Temperature
(c) Directions
(d) Distance

Q8. If a bar magnet is broken into two pieces, each piece will have:
(a) Only North pole
(b) Only South pole
(c) Both North and South poles
(d) No poles

Q9. Maximum iron filings stick to a bar magnet at its:
(a) Middle portion
(b) Ends (poles)
(c) Uniformly all over
(d) Upper surface only

Q10. The needle of a magnetic compass is itself a:
(a) Piece of iron
(b) Small magnet
(c) Non-magnetic material
(d) Plastic strip

SECTION B - Short Answer Questions (2 marks each)

Q11. Differentiate between magnetic and non-magnetic materials with two examples of each.

Q12. Why does a freely suspended magnet always rest in the North-South direction?

Q13. State the law of magnetic poles.

Q14. How can you test whether a given bar is a magnet or just a piece of iron?

SECTION C - Short Answer Questions (3 marks each)

Q15. Describe an activity to show that magnetic force can act through non-magnetic materials.

Q16. Explain how you can make your own magnetic compass using simple materials.

Q17. Three identical bars (two magnets and one iron bar) are given to you without any labels. How will you identify which two are magnets without using any other material?

SECTION D - Long Answer Question (5 marks)

Q18. (a) What are poles of a magnet? Where is the magnetic force maximum in a bar magnet?
(b) Describe an activity to demonstrate that a magnet has two poles and most iron filings stick near the poles.
(c) Can we obtain a magnet with a single pole? Explain.

SECTION E - Case Study Based Questions (4 marks each)

Q19. Case Study 1:
Reshma was writing a story about sailors in ancient times who got caught in a storm with an overcast sky. The stars were not visible and they could not find directions. After researching, she learned that sailors used magnetic compasses for navigation. A magnetic compass has a needle that is itself a small magnet which can rotate freely. The needle always points in the North-South direction.

Based on the above case study, answer the following questions:

(a) Why does the needle of a magnetic compass always point North-South? (1 mark)

(b) What was the ancient Indian device similar to magnetic compass called? (1 mark)

(c) If you bring a bar magnet close to a compass needle, what will happen? (2 marks)

Q20. Case Study 2:
A science teacher performed an experiment in the class. She took three identical metal bars X, Y, and Z. She told students that two of them were magnets and one was just an iron bar. She asked students to identify which two were magnets without using any other external magnet or material. Students observed that when bar X was brought near bar Y, they attracted each other. When bar Y was brought near bar Z, they also attracted. However, when bar X was brought near bar Z, they repelled each other.

Based on the above case study, answer the following questions:

(a) Which two bars are magnets - X and Y, Y and Z, or X and Z? (1 mark)

(b) Which property of magnets helped students identify the magnets? (1 mark)

(c) Explain the observations when X was near Y, Y was near Z, and X was near Z. (2 marks)

DETAILED ANSWER KEY - PAPER 01

SECTION A - Answers to MCQs

Ans 1. (c) Iron

Iron is a magnetic material that is attracted towards magnets. Wood, plastic, and glass are non-magnetic materials.

Ans 2. (b) North-South

A freely suspended bar magnet always aligns itself in the North-South direction because Earth itself behaves like a giant magnet.

Ans 3. (b) Poles

The two ends of a magnet where the magnetic force is maximum are called poles - the North pole and the South pole.

Ans 4. (b) Repel each other

Like poles (North-North or South-South) of two magnets repel each other, while unlike poles attract each other.

Ans 5. (d) Copper

Copper is a non-magnetic material. Iron, nickel, and cobalt are the three magnetic metals.

Ans 6. (b) Lodestones

Naturally occurring magnets are called lodestones. They were discovered in ancient times and were used by sailors for navigation.

Ans 7. (c) Directions

A magnetic compass is used to find directions because its needle always points in the North-South direction.

Ans 8. (c) Both North and South poles

Even if a magnet is broken into smaller pieces, each piece will have both North and South poles. A single pole cannot exist.

Ans 9. (b) Ends (poles)

Maximum iron filings stick at the two ends (poles) of a bar magnet because the magnetic force is strongest at the poles.

Ans 10. (b) Small magnet

The needle of a magnetic compass is itself a small magnet that can rotate freely and aligns itself in the North-South direction.

SECTION B - Answers to Short Answer Questions

Ans 11.

Magnetic materials: Materials that are attracted towards a magnet are called magnetic materials.
Examples: Iron, Nickel

Non-magnetic materials: Materials that are not attracted towards a magnet are called non-magnetic materials.
Examples: Wood, Plastic

Ans 12.

A freely suspended magnet always rests in the North-South direction because Earth itself behaves like a giant magnet. The Earth's magnetic field interacts with the magnet's poles, causing it to align in the North-South direction. This property is used in magnetic compasses for finding directions.

Ans 13.

Law of Magnetic Poles:
1. **Like poles repel each other** - When two North poles or two South poles are brought close together, they push away from each other.
2. **Unlike poles attract each other** - When a North pole and a South pole are brought close together, they pull towards each other.

Ans 14.

To test whether a given bar is a magnet or just iron, we can use the property of repulsion:
1. Suspend the given bar freely using a thread
2. If it aligns in North-South direction, it is a magnet
3. Alternatively, bring it near a known magnet - if it shows repulsion at any position, it is a magnet. Iron will always show only attraction.

SECTION C - Answers to Short Answer Questions

Ans 15.

Activity to show magnetic force acts through non-magnetic materials:

Materials required: Bar magnet, magnetic compass, piece of wood/cardboard/plastic sheet/thin glass

Procedure:
1. Place the magnetic compass on a horizontal surface and let the needle come to rest
2. Bring one pole of the bar magnet close to the compass needle - observe the deflection
3. Now place a piece of wood (or cardboard/plastic/glass) between the magnet and compass needle without disturbing them
4. Observe that the needle still shows deflection

Conclusion: The compass needle deflects even when non-magnetic materials are placed between the magnet and the needle. This proves that magnetic force can act through non-magnetic materials.

Ans 16.

Making a magnetic compass:

Materials needed: Iron sewing needle, bar magnet, cork piece, glass bowl, water

Steps:

1. Place the iron needle on a wooden table
2. Keep one pole of the magnet at one end of the needle and move it along the length to the other end
3. Lift the magnet and repeat this process 30-40 times with the same pole and in the same direction
4. The needle becomes magnetized - test by bringing iron filings near it
5. Pass the magnetized needle through a cork horizontally
6. Float the cork in a bowl of water keeping the needle above water level
7. The needle will align itself in North-South direction - your compass is ready!

Ans 17.

Method to identify magnets:

1. Take all three bars and label them as X, Y, and Z
2. Bring bar X near bar Y and observe - note if they attract or repel
3. Bring bar Y near bar Z and observe
4. Bring bar X near bar Z and observe

Analysis:
- An iron bar will always show attraction with both magnets
- Two magnets can show both attraction (unlike poles) and repulsion (like poles)
- The pair that shows repulsion in any position are the two magnets
- A magnet can be identified by its property of repulsion, while iron only attracts

SECTION D - Answer to Long Answer Question

Ans 18.

(a) Poles of a magnet:
The two ends of a magnet where the magnetic force is maximum are called poles. A magnet has two poles - the North pole and the South pole. The magnetic force is maximum at the poles of a bar magnet.

(b) Activity to demonstrate poles and attraction of iron filings:

Materials required: Bar magnet, iron filings, sheet of paper

Procedure:
1. Spread iron filings on a sheet of paper
2. Place a bar magnet over the iron filings
3. Tap the paper gently and observe

Observation:
- Maximum iron filings stick near the two ends of the bar magnet
- Very few iron filings stick at the middle portion
- The two ends where maximum filings stick are the poles of the magnet

Conclusion: This activity clearly shows that a magnet has two poles and the magnetic force is strongest at the poles.

(c) Can we obtain a magnet with a single pole?
No, it is not possible to obtain a magnet with a single pole. North and South poles always exist in pairs. Even if we break a magnet into smaller pieces, each piece will have both North and South

poles. This is a fundamental property of magnets. A single North pole or a single South pole cannot exist independently.

SECTION E - Answers to Case Study Based Questions

Ans 19.

(a) Why does the needle of a magnetic compass always point North-South?
The needle of a magnetic compass is itself a small magnet. It always points North-South because Earth behaves like a giant magnet with magnetic poles. The Earth's magnetic field interacts with the compass needle and aligns it in the North-South direction.

(b) Ancient Indian navigation device:
The ancient Indian device similar to a magnetic compass was called Matsya-yantra (or Machchh-yantra). It consisted of a magnetized fish-shaped iron piece kept in a vessel of oil and was used for navigation at sea.

(c) Effect of bringing a bar magnet near compass needle:
When a bar magnet is brought close to a compass needle, the needle will deflect from its North-South direction. If the North pole of the bar magnet is brought near the North pole of the compass needle, it will move away (repulsion). If the South pole is brought near the North pole of the needle, it will move closer (attraction). This happens because the compass needle itself is a magnet and follows the law of magnetic poles.

Ans 20.

(a) Which two bars are magnets?
Bars X and Z are the two magnets. This is because they showed repulsion when brought near each other, and only magnets can repel each other.

(b) Property that helped identify magnets:
The property of repulsion helped students identify the magnets. Only magnets can repel each other when like poles come close. An iron bar will always show attraction with a magnet but never repulsion.

(c) Explanation of observations:
1. **When X was near Y:** They attracted each other. This means Y could be either a magnet (unlike poles facing) or an iron bar (which always attracts magnet).

2. **When Y was near Z:** They also attracted each other. This confirms Y is the iron bar because it attracted both X and Z which are magnets.

3. **When X was near Z:** They repelled each other. This proves both X and Z are magnets with like poles (North-North or South-South) facing each other. Repulsion only occurs between like poles of two magnets.