



UNIQUE STUDY POINT

Fun with Magnets

Question 1: Fill in the blanks in the following

- (i) Artificial magnets are made in different shapes such as _____, _____ and _____.
- (ii) The Materials which are attracted towards a magnet are called _____.
- (iii) Paper is not a _____ material.
- (iv) In olden days, sailors used to find direction by suspending a piece of _____.
- (v) A magnet always has _____ poles.

Answer: (i) Artificial magnets are made in different shapes such as **bar magnet, horse shoe** and **cylindrical**.

- (ii) The Materials which are attracted towards a magnet are called **magnetic**.
- (iii) Paper is not a **magnetic** material.
- (iv) In olden days, sailors used to find direction by suspending a piece of **magnet**.
- (v) A magnet always has **two** poles

Question 2: State whether the following statements are true or false

- (i) A cylindrical magnet has only one pole.
- (ii) Artificial magnets were discovered in Greece.
- (iii) Similar poles of a magnet repel each other.
- (iv) Maximum iron filings stick in the middle of a bar magnet when it is brought near them.
- (v) Bar magnets always point towards North-South direction.
- (vi) A compass can be used to find East-West direction at any place.

(vii) Rubber is a magnetic material.

Answer: (i) False

Magnets always have two poles; the north pole and the south pole. A cylindrical magnet also has two poles.

(ii) False

Artificial magnets were not discovered in Greece. Only natural magnets were discovered in Greece.

(iii) True

Like poles of magnets repel each other, while unlike poles of magnets attract each other. The south pole of a magnet attracts the north pole of another magnet and repels the south pole of that magnet.

(iv) False

The amount of iron filings that stick to a bar magnet depends on the strength of the magnet. The magnetism of a bar magnet is maximum at its two poles and minimum in the middle. Hence, maximum iron filings will stick at the two ends of the magnet and minimum in the middle.

(v) True

A freely suspended magnet always points towards the North–South direction.

(vi) True

A magnetic compass always points towards the North–South direction.

If the North–South direction is known, then the East–West direction can also be determined. This direction is perpendicular to the North-South direction, i.e., perpendicular to the compass needle in the same plane.

(vii) False

Rubber is not attracted by a magnet. Hence, it is a non-magnetic material.

Question 3: It was observed that a pencil sharpener gets attracted by both the poles of a magnet although its body is made of plastic. Name a material that might have been used to make some part of it.

Answer: The blade of a pencil sharpener is made of iron. Iron is a magnetic material. Since magnets can attract objects made of magnetic materials, a pencil sharpener gets attracted towards both poles of a magnet.

Question 4: Column I shows different positions in which one pole of a magnet is placed near that of the other. Column II indicates the resulting action between them for each situation. Fill in the blanks.

Column I	Column II
N-N	_____
N-__	Attraction
S-N	_____
__-N	Repulsion

Answer:

Column I	Column II
N – N	Repulsion
N – S	Attraction
S – N	Attraction
S – S	Repulsion

Question 5: Write any two properties of a magnet.

Answer: Two properties of a magnet are:

- (i) A magnet always has two poles: north pole and south pole.
- (ii) Like magnetic poles repel each other and unlike magnetic poles attract each other.

Question 6: Where are poles of a bar magnet located?

Answer: The poles of bar magnet are located at its two end points.

Question 7: A bar magnet has no markings to indicate its poles. How would you find out near which end is its north pole located?

Answer: A bar magnet is hanged in the air and the end pointing to the north is the north pole of the magnet.

Or

A freely suspended bar magnet always comes to rest in the North–South direction. The north facing end of the magnet is its north pole, and the south facing end is its south pole (as shown in the given figure).

Hence, the unknown poles of a bar magnet can be marked by suspending it freely by a string.

Question 8: You are given an iron strip. How will you make it into a magnet?

Answer: An iron strip can be converted into a magnet by following method:

Place the iron strip on a table. Place one pole of a bar magnet near one end of the iron strip. Move the bar magnet along the length of the iron strip starting from one end to the other end as shown in the following figure. Then, lift the magnet and bring the pole to the starting point and move in the same direction as before.

On repeating this process for at least 30-40 times, the iron strip will become a bar magnet with two poles.

Question 9: How is a compass used to find directions?

Answer: A compass has a magnetic needle that can rotate freely. When a compass is kept at a place, the magnetic needle aligns in north-south direction. Red arrow of the compass needle is termed as north pole and the other end as south pole.

Question 10: A magnet was brought from different directions towards a toy boat that has been floating in water in a tub. Affect observed in each case is stated in Column I. Possible reasons for the observed affects 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 north pole towards its head
Boat is not affected by the magnet	Boat is fitted with a magnet with its

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

Answer:

Column I	Column II
Boat gets attracted towards the magnet	Boat is made of a magnetic material
Boat is not affected by the magnet	Boat is made of a non-magnetic material
Boat moves towards the magnet when the north pole of the magnet is 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 the north pole towards its head
Boat floats without changing its direction	Boat has a small magnet fixed along its length

Short Answer Type Questions

Question 1. Who discovered magnet?

Answer: An old shepherd who lived on Create Island named Magnes discovered it.

Question 2. Name the country in which it (magnet) was discovered.

Answer: Greece.

Question 3. When was magnetite discovered?

Answer: Magnetite was discovered around 800 B.C.

Question 4. What is magnetite called now?

Answer: Magnetite like materials are called magnets now.

Question 5. What are magnetic materials (substances)?

Answer: Materials which get attracted by the magnet are called magnetic materials (substances).

Question 6. What are non-magnetic substances?

Answer: Substances which are not attracted by magnet are called non-magnetic substances.

Question 7: Write the names of some non-magnetic substances.

Answer: Rubber, Cotton, Plastic, Wood, Button, Cloth, etc.

Question 8. Name the first magnet.

Answer: Lodestone.

Question 9. What is lodestone?

Answer: Lodestone is a type of iron. It bears the properties of magnet.

Question 10. Make a list of given substances into two groups – magnetic and non-magnetic.

Answer: Key, Wood, Glass, Alpin, Chalk, Pencil, Nail, Cup of tea, Book, Rubber, Needle, Fork, table

Magnetic substances	Non-magnetic substances
Key, alpin, nail, needle, fork (because all these stick to the magnet)	Wood, glass, chalk, pencil, cup of tea, book, rubber. (none of these sticks to the magnet)

Question 11. How many poles are there in a magnet?

Answer: There are two poles in a magnet, north-pole and south-pole.

Question 12. To which part of the magnet do the most of the iron filings (or pins) stick?

Answer: Most of the iron filings (or pins) stick to the poles, i.e., north and south poles. At these poles of magnet magnetic effect is maximum.

Question 13. To which part of the magnet do none or only a few iron filings (or pins) stick?

Answer: Minimum number of iron filings stick to the middle part of the magnet. Magnet has its magnetic effect least in this part (middle part).

Question 14. Which is the north-pole of a bar magnet?

Answer: It is the tip of a bar magnet which points towards the north direction.

Question 15. Which is the south-pole of a bar magnet?

Answer: It is the tip of a bar magnet that points towards the south direction.

Question 16. Where are south and north poles of earth's magnet?

Answer: Earth's magnetic south-pole is near the geographic north-pole and north-pole of earth's magnet is near geographic south-pole.

Question 17. What happens when a pole of a bar magnet say its north-pole is marked with a chalk and suspended freely? What do you observe on rotating the bar magnet?

Answer: The marked pole comes to rest in north direction. On rotating, after some time, it again comes to rest in north direction.

Question 18. Mark the north-poles of two bar magnets and bring the poles of the magnets near each other, and note down your observations in table.

Answer:

Poles, facing one another	They are called	We observe
North-South	Opposite poles	Attraction
North-North	Similar poles	Repulsion
South-South	Similar poles	Repulsion
South-North	Opposite poles	Attraction

Question 19. What will happen to the magnet when we cut it into two pieces?

Answer: When we cut a bar magnet into two pieces, both these pieces act as magnets and we get two magnets.

Question 20. When a bar magnet was brought close to a compass, the orientation of the needle became as shown in figure. Identify the poles on the ends of the bar magnet marked 'A' and 'B'. Explain how you arrived at your answer.

Answer: Orientation of the needle clearly shows that red marked 'end (north-pole) attracts the end of bar magnet marked "A". It means both these are unlike poles and the end of bar magnet marked "A" is south-pole. End marked 'B' is north-pole because like (same) poles repel each other.

Question 21. In which direction does freely suspended magnet rest?

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

Question 22. How did we come to know that magnet is helpful to find (detect) directions?

Answer: About 800 years ago, Chinese saw that a hanging lodestone always comes to rest in a particular direction i.e., north-south. Therefore, they came to know about finding the direction with the help of lodestone.

Question 23. Why is compass needle kept in a closed glass vessel?

Answer: Compass needle is a small and thin magnet used to find the direction. If it is kept in open, it may deflect in any direction due to pressure exerted by air. So to know right direction, it is kept covered by glass covering.

Question 24. Does the compass needle point in different directions?

Answer: The compass needle has a magnetic needle closed in a glass covering. The needle can rotate on its pin pointed base. Its red marked end always indicates towards the north direction. It always rests in north-south directions. We use it to find out the direction.

Question 25. Hang a bar magnet with a thread on a stand and rotate the base of stand. What will happen?

Answer: The direction of bar magnet is not changed as we rotate the stand. It is because a freely suspended magnet comes to rest in particular direction, i.e., north-south directions. In this activity, only stand changes its direction.

Question 26. How do the shipmen find the direction even when north pointing pole star is not visible?

Answer: Shipmen during navigation can find the direction with the help of magnetic needle. This is believed to be first used by Chinese.

Question 27. Can an ordinary vessel be magnetised?

Answer: Yes, to magnetise ordinary vessel, it would have to be buried in the earth for many years.

Question 28. What happens when similar poles come close to each other?

Answer: They repel each other.

Question 29. When do two magnets attract each other?

Answer: Two magnets attract each other when their unlike (opposite) poles come close to each other.

Question 30. What do you mean by magnetic field?

Answer: The region around the magnet where its magnetic influence can be felt is called the magnetic field of the magnet.

Question 31. What is MRI?

Answer: Magnetic Resonance Imaging (MRI) is a medical diagnostic technique which uses the magnetic field inside the body for obtaining images of different parts of the body.

Long Answer Type Questions

Question 1. What are the properties of a magnet?

Answer:

- It attracts iron pieces towards itself.
- It always aligns itself in the same direction, if left to rotate freely.
- It is composed of oxides of iron (Fe_3O_4).

Question 2. What are soft and hard magnetic materials?

Answer: Soft iron is called soft magnetic material because it loses its magnetism easily. Soft iron is used in making electromagnets.

Steel is called a 'hard' magnetic material because it does not lose its magnetism so easily. It is used to make permanent magnets.

Question 3. Are both poles of a magnet similar?

Answer: No, the two poles of a magnet are not similar (alike). Both have different tendency. The pole that points towards the north is called north-pole while the pole pointing always towards the south is called south-pole.

Question 4. Why does bar magnet always point in north-south directions?

Answer: Bar magnet always points in north-south directions when left freely suspended because earth itself behaves like a magnet and north-pole of bar magnet is attracted towards south-pole of earth's magnet and vice versa.

Question 5. Can we isolate north-pole or south-pole?

Answer: No, we cannot isolate north-pole of a magnet from its south-pole or vice versa. If you break a bar magnet into two halves, you will not get a single north or south pole but two magnets each with its north and south-poles.

Question 6. Do magnetic poles exist separately like charges? Explain.

Answer: Magnetic poles do not exist separately like positive and negative charges. This means that it is not possible to isolate a north pole of a magnet from its south pole by cutting the magnet from the middle. Whenever a bar magnet is cut into two halves, we get two new magnets, each with its north and south poles. This will continue indefinitely even if extremely small pieces of bar magnets are obtained. Thus magnetic pole always exist in pairs.

Question 7. Can a magnet be demagnetised? How?

Answer: Yes, a magnet can be demagnetised:

- By packing like poles of two magnets in same direction.
- By hammering the magnet hard.
- By heating the magnet strongly.

Question 8. How should two-bar magnets be kept?

Answer: After using it, two-bar magnets should be placed inside a wooden box so that:

- the poles of two magnets lie opposite to each other.
- a wooden piece should be kept between the two magnets.
- metallic caps should be put on the poles, otherwise they will attract other magnetic objects.

Question 9. Match the following items given in Column A with that in Column B:

Column A	Column B
(a) Magnetite	(i) Non-magnetic substances
(b) Iron, nickel, cobalt	(ii) Used to find out N-S directions
(c) Leather, plastic, wax	(iii) Attract each other
(d) Lodestone	(iv) Natural magnet
(e) Compass	(v) Repel each other
(f) Like poles of two magnets	(vi) Discovered magnet accidentally
(g) Opposite poles of two magnets	(vii) Magnetic, substances
(h) Magnus	(viii) Name of first magnet

Answer:

Column A	Column B
(a) Magnetite	(iv) Natural magnet
(b) Iron, nickel, cobalt	(vii) Magnetic substances
(c) Leather, plastic, wax	(i) Non-magnetic substances
(d) Lodestone	(viii) Name of first magnet
(e) Compass	(ii) Used to find out N-S directions
(f) Like poles of two magnets	(v) Repel each other
(g) Opposite poles of two magnets	(iii) Attract each other
(h) Magnus	(vi) Discovered magnet accidentally

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