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1.0 INTRODUCTION

It is said that, there was a shepherd named Magnes, who lived in ancient Greece. He used to take his herd of sheep and goats to the nearby mountains for grazing. He would take a stick with him to control his herd. The stick had a small piece of iron attached at one end. One day he was surprised to find that he had to pull hard to free his stick from a rock on the mountainside. It seemed as if the stick was being attracted by the rock. The rock was a natural magnet and it attracted the iron tip of the shepherd's stick. It is said that this is how natural magnets were discovered. Such rocks were given the name magnetite, perhaps after the name of that shepherd. Magnetite contains iron. It is also known as lodestone.

Some people believe that magnetite was first discovered at a place called Magnesia. The island of Magnesia is situated in west of present day Turkey. Chinese also used magnetic needles for navigation on ships as early in 400 B.C.

2.0 WHAT IS A MAGNET?

You may have played with magnets and watched them snap together or push apart. Magnets can also make some objects move or even fly through the air. A magnet can affect an object without even touching it.

The substances having the property of attracting magnetic materials like iron are now known as magnets.

When you bring two magnets close together, they will either repel or attract each other. The force that pushes magnets apart or pulls them together is called magnetic force. In other words 'a magnet is any object with magnetic force'.

2.1 Natural Magnets

Natural occurring minerals or ores having magnetic properties are called 'natural magnets'. Due to their irregular shapes and weak attracting power, natural magnets are *rarely* used now a days.

2.2 Artificial Magnets

Now a days pieces of iron and many other materials of suitable shapes and sizes are made as magnets. Such magnets are called artificial magnets. *e.g.* Bar magnet, U-shaped magnet (horse-shoe magnet), cylindrical magnet or a ball ended magnet, magnetic compass needle, etc.

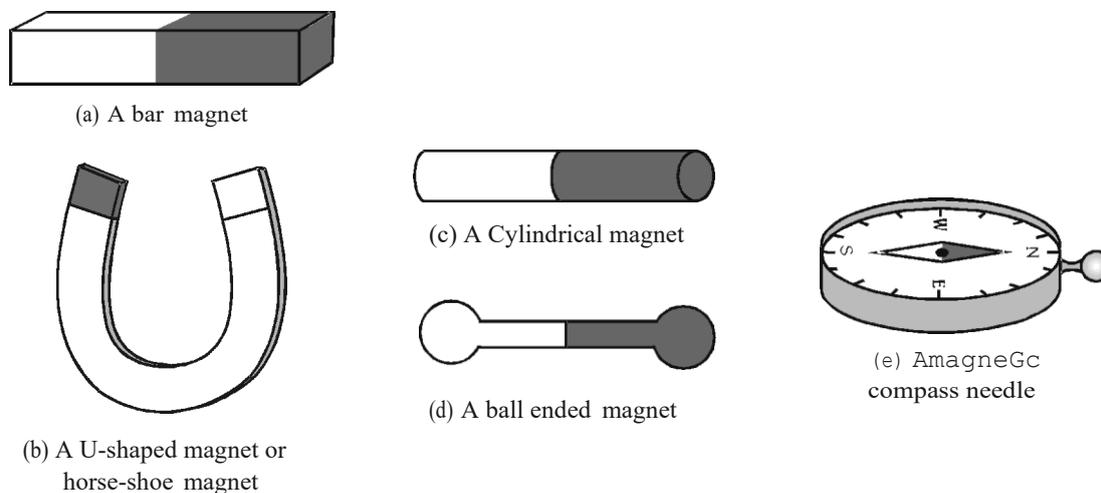


Fig. 1

ACTIVE PHYSICS

1. Take a plastic or a paper cup. Fix it on a stand with the help of a clamp as shown in fig.2. Place a magnet inside the cup and cover it with a paper so that the magnet is not visible.
2. Attach a thread to a clip made of iron. Fix the other end of the thread at the base of the stand just below the paper cup. Keep the length of the thread sufficiently short.
3. Gradually lower the paper cup. When the cup is quite near to the clip, the clip get raised in air without support, like a *k'ie*. This is because the iron clip is attracted towards the magnet present inside the cup.

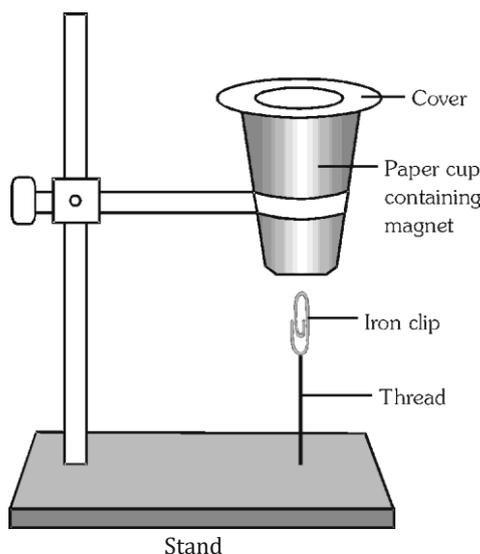


Fig.2 Active physics

3.0 MAGNETIC AND NON-MAGNETIC MATERIALS

The magnet attracts certain materials whereas some do not get attracted towards magnet. The materials which get attracted towards a magnet are called magnetic materials. Iron, nickel and cobalt are magnetic in nature.

The materials which do not get attracted towards a magnet are called non-magnetic materials. Most of the materials we use in our daily life are non-magnetic in nature. Copper, aluminium, silver, wood, plastics, rubber, paper, etc. all are non-magnetic in nature.

ACTIVE PHYSICS

1. Take a magnet and put it in the sand. Move the magnet in the sand for few seconds. Now, pull out the magnet from the sand.
2. Some particles of sand or soil may stick to the magnet. Now, gently shake the magnet to remove the particles of sand. But some particles may continue to sticking to the magnet. These particles are surely magnetic in nature and usually they are small pieces of iron (iron filings) present in the sand.
3. Through this activity, we can find out whether the soil or sand from a given place contains particles that have iron. Also, we can conclude that 'magnetic particles can be separated from non-magnetic particles using magnets'.

4.0 MAGNETIC POWER

The parts of a magnet where the magnetic force is strongest are called the magnetic poles. All known magnets have two poles, a north pole and a south pole.

ACTIVE PHYSICS

1. Put some iron filings on a sheet of paper. Roll a bar magnet in the filings and then lift it up. You will observe that most of the iron filings stick to the magnets at the ends [see fig.3(a)]. There are fewer iron filings in between and almost none at the middle of the bar magnet. This means the iron filings do not stick to the magnet uniformly along its length. They stick more to certain portions of the magnet.
2. Now, repeat this activity with a horseshoe magnet. Again, you will observe that most of the iron filings stick to the two ends of the horseshoe magnet [see fig.3(b)].
3. From this activity, we can conclude that in a bar magnet or a horseshoe magnet, the regions of strongest magnetism are near their ends. These ends are called magnetic poles.

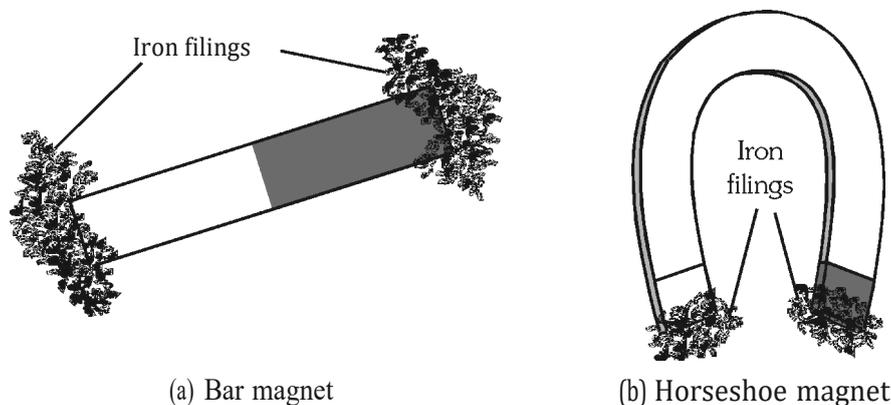


Fig.3 Active physics

6.0 PROPERTIES OF A MAGNET

5.1 Attractive Nature

When iron filings are put near a bar magnet, the magnet attracts iron filings towards it. The attracting power is maximum (near the ends poles) and minimum (at the middle (neutral region)).

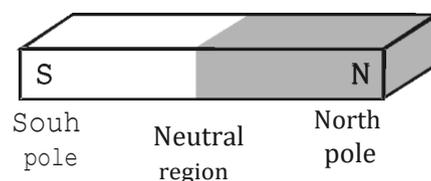


Fig. 4

5.2 Directive Property

When a magnet is suspended freely, it aligns itself to north-south direction. The pole of the bar magnet pointing towards north direction when suspended freely is called 'north pole (or north seeking pole)'. The pole of the bar magnet pointing towards south direction when suspended freely is called 'south pole (or south seeking pole)'.

ACTIVE PHYSICS

1. Take a bar magnet and suspend it using a thread [see fig.5(a)]. Another method is to place the magnet on a cork and float the cork in a vessel containing water [see fig.5(b)]. There should not be a magnet or magnetic material present near the suspended bar magnet so that it does not disturb the suspended bar magnet.

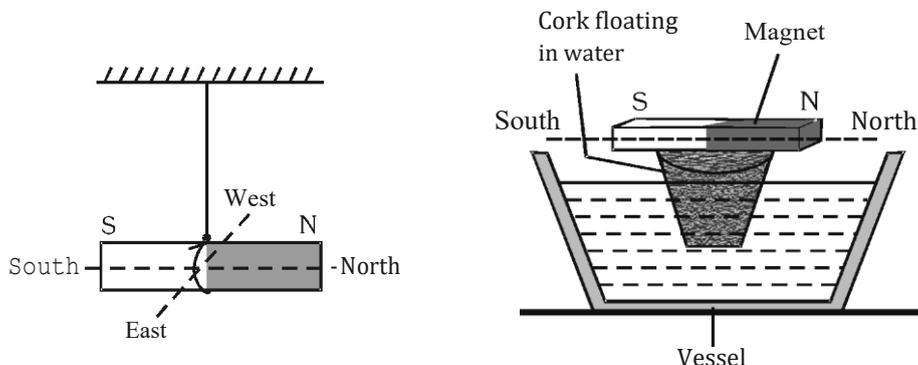


Fig.5

2. You will observe that the freely suspended bar magnet always comes to rest in the north-south direction. One end of the magnet points towards the north. This *part* is called the north pole of the magnet. The other end which points towards the south is called the south pole of the magnet.

s.s Poles Exist in Pairs

In a bar magnet there are always two poles which *are* equal in strength and opposite in nature. In other words, 'a magnet is always a dipole'.

5.4 Inductive Stature

When certain substances like iron, steel, cobalt, nickel are placed near a bar magnet, they acquire magnetisation called 'induced magnetisation'. The phenomenon is called 'magnetic induction'. It involves inducing opposite pole in a magnetic material like iron on the side facing the magnetic pole (see fig.6).

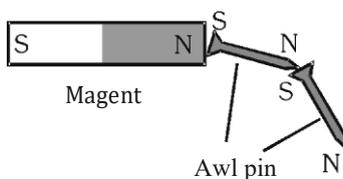


Fig. 6

s.s Forces Between The Poles of Two Magnets

When two magnets are brought together, a north pole and a south pole attract each other i.e., unlike poles attract each other [see fig.7(a)]. Like poles (north-north or south-south) repel each other see fig.7(b)].

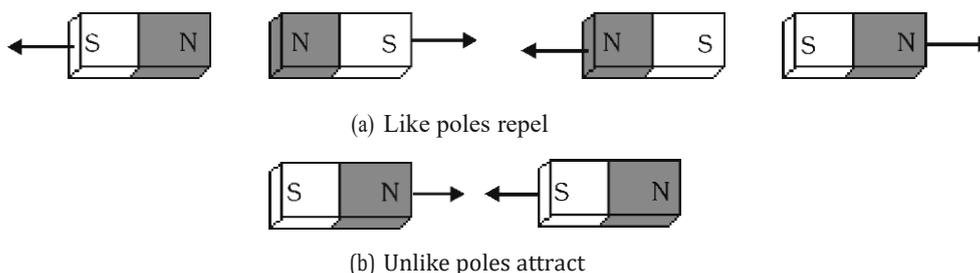


Fig.7 Forces between the poles of two magnets

Illustrations

Illustration 1. A magnet is kept quite close to a gold ring, but the ring did not get attracted towards the magnet. Try to find out the reason behind it.

Solution First thing that should come in your mind is that 'a magnet always attract a magnetic material, it does not attract a non-magnetic material. This means gold is a non-magnetic material.

Illustration 2. A freely suspended magnet aligns in a north-south direction. Why ?

Solution Earth has its own magnetism, similar to the magnetism of a bar magnet. The poles of the giant imaginary magnet inside *the* Earth are located near, but not exactly at, Earth's geographic poles. This is why, a freely suspended magnet align itself to Earth's magnetic north and south poles. Actually, a freely suspended magnet aligns approximately not exactly in the geographic north-south direction.

CHECK POST-1

1. A tailor was stitching buttons on his shirt. The needle has slipped from his hand on to the floor. Can you help the tailor to find the needle ?
2. If you put a magnet in a heap of iron filings, which part of magnet attracts them the least ?
3. You are given two identical bars which look as if they might be made of iron. One of them is a magnet, *white* the other is a simple iron bar. How will you find out, which one is a magnet ?

6.0 MAGNETIC FIELD

A region of influence surrounding a magnet, in which other magnets or materials like iron are affected by magnetic forces is called 'magnetic field'.

ACTIVE PHYSICS

1. Fix a sheet of white paper on a drawing board using some adhesive material. Place a bar magnet in the centre of it. Sprinkle some iron filings uniformly around *the* bar magnet. You can use salt-sprinkler for this purpose.
2. Now tap the board gently. You will observe that iron filings align themselves in a specific curved manner around the magnet. This pattern of curve lines is the magnetic field of the bar magnet.

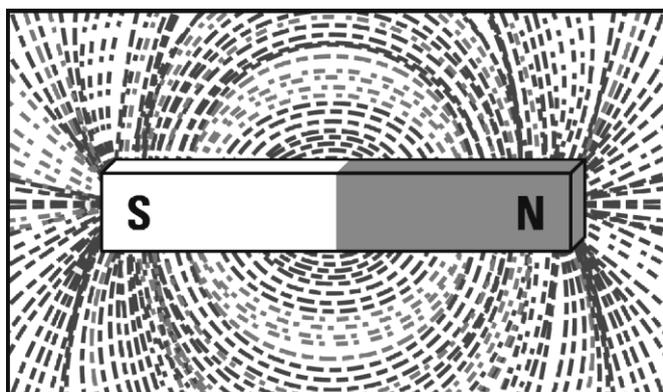


Fig. 8 Active physics

7.0 FINDING DIRECTION USING MAGNETS

Magnets were known to people from ancient times. Many properties of magnets *were* also known to them. It is said that an emperor in China named Hoang Ti had a chariot with a statue of a lady that could rotate in any direction. It had an extended arm as if it was showing the way (see fig.9). The statue had an interesting property. It would rest in such a position that its extended arm always pointed towards South. By looking at the extended arm of the statue, the Emperor was able to locate directions when he went to new places on his chariot. The property of magnet that was used in statue of the lady is that, 'a freely suspended magnet always keeps itself in north-south direction'.

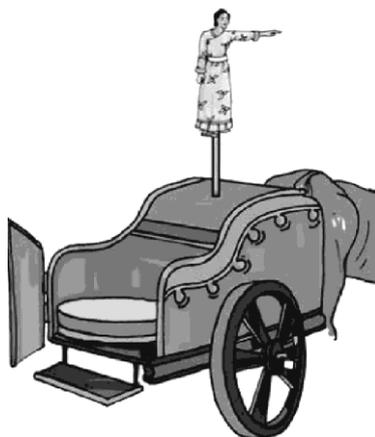


Fig. 9

7.4 Magnetic Compass needle (or Compass)

Pretend you are on a boat at night. No land is in sight. The sky is cloudy. Ancient sailors could become lost on such nights until the compass was invented.

- A magnetic compass needle or simply 'compass' is an instrument that uses Earth's magnetic field to help people find directions. A compass needle is actually a thin magnet. The needle points in north direction because it aligns in the direction Earth's magnetic field. Since a compass needle points north, the compass can be used to tell north, east, south, and west, and other directions in between.



Fig. 10

ACTIVE PHYSICS

1. Take a rectangular piece of iron. Place it on the table. Now take a bar magnet and place one of its poles near one edge of the bar of iron. Without lifting the bar magnet, move it along the length of the iron bar till you reach the other end.

2. Now, lift the magnet and bring the *pole* (the same *pole* you started with) to the same point of the iron bar from which you began (see fig.11). Move the magnet again along the iron bar in the same direction as you did before. Repeat this process about 50-60 times.
3. Now bring a small pin near the iron bar. If iron bar attracts the pin, it means it has become a magnet. If not, continue the process for some more time. Remember that the pole of the magnet and the direction of its movement should remain the same. Try this activity on iron nail, a needle or a blade and convert them into a magnet.

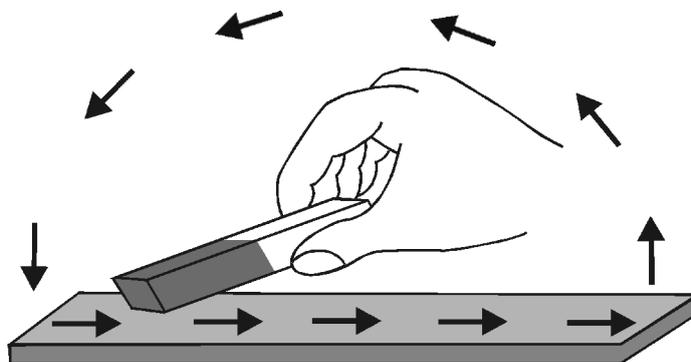


Fig. 11 Active physics

8.0 ELECTROMAGNETS

In the 1820s and 1830s, scientists such as Michael Faraday and Joseph Henry made some amazing discoveries about electric currents and magnets. They found that electric currents make magnetic fields and that magnets could generate, or make, an electric current.

When an electric current flows through a wire, it creates a magnetic field around the wire. Increasing the current makes the magnetic field stronger. You can also make the magnetic field stronger by winding the wire into a long coil. Each loop of wire is like a little magnet that has its own magnetic force. All loops together produce a strong magnetic field.

An electromagnet is a coil of wire wrapped around an iron core. When an electric current flows through the coil, it creates a magnetic field. This produces temporary magnetism in the iron core. Thus, magnetism of current carrying coil and iron core together produces a strong magnetic field. When the current stops, the iron core is no longer magnetic and there is no magnetic field due to the coil.

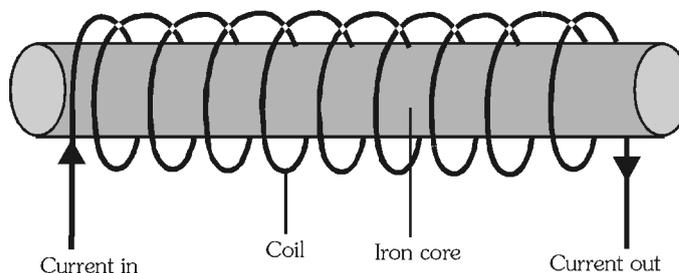


Fig. 12 An electromagnet

8.1 Advantage of Electromagnet Over Permanent Magnet

- (i) An electromagnet can produce a strong magnetic field as compared to a permanent magnet.
- (ii) The strength of magnetic field of an electromagnet can be changed easily by changing the current or the number of turns in the coil.
- (iii) The polarity (north pole or south pole) of the electromagnet can be changed by reversing the direction of the current.
- (iv) An electromagnet can be easily magnetised or demagnetised as per the requirement.

9.0 ELECTRIC BELL

In an electric bell, a small hammer is attached to the iron strip called armature. The armature is vibrated back and forth several times a second, striking a metal bell (or gong). Fig.13 shows the circuit that causes the armature to move. When a button is pushed, the switch is closed. An electric current flows through the contacts and the spring attached to the coils, and the iron cores become magnetised. The cores attract the iron armature, which moves toward the electromagnet, causing the hammer to strike the bell. As the hammer strikes the bell, the movement of the armature opens the contacts. The electric current stops flowing to the coils and the soft iron cores become demagnetised, releasing the armature. A spring pulls the armature back to re-establish contact, thereby completing the circuit, and the entire cycle begins again.

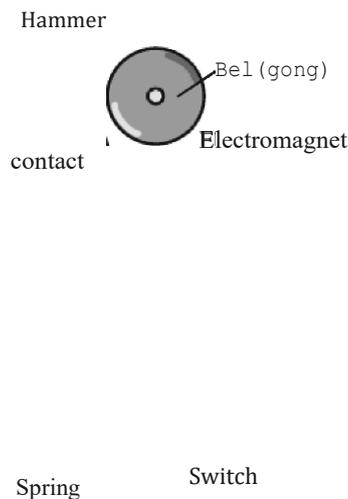


Fig. 13

9.1 Uses of Magnets And Electromagnets

- (1) They are used in radio and stereo speakers.
- (2) They are used in almirah and refrigerator doors to keep them in closed position.
- (3) They are used on video and audio cassette tapes.
- (4) They are used on the hard discs and floppies for computers.
- (5) They are used in different children's toys.
- (6) In medicine, they are used in magnetic resonance imaging (MRI) scanners to examine the inner body parts of human beings.
- (7) Electromagnets are frequently used now a days for various purposes. e.g. lifting heavy iron pieces, electric doorbells, telephones, miniature circuit breakers (MCB), electric guitars, vacuum cleaners, etc.
- (8) Magnetic compass needle is used to find the approximate north-south direction.

10.0 SAFETY MEASURES FOR MAGNETS

- (i) Magnets should not be heated at high temperatures, repeatedly hammered or dropped from some height. This is because by doing so, they lose their magnetism.
- (ii) Magnets become weak if they are not stored properly. Magnets tend to become weaker after some time if their poles are left free. This is called self demagnetisation. To avoid this, bar magnets are kept in pairs separated by a piece of wood, with unlike poles on the same side. Pieces of iron, called magnetic keepers or simply keepers, are placed across both ends. A horseshoe magnet needs only one keeper across its poles.

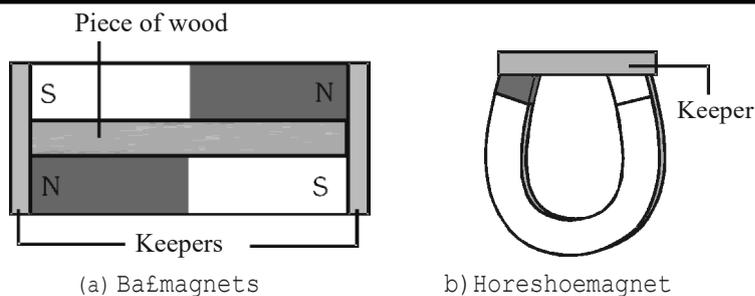


Fig.14 Keeping magnets safely

Illustrations

Illustration 3. Can we separate the north pole of a magnet from its south pole by breaking it from the middle ?

Solution If we break a magnet into two parts from the middle, we cannot isolate the north and the south poles. Instead we will get with two separate magnets, each with its own north and south poles. If we further cut these two magnets, we would get four separate magnets, each with its own north and south poles (see fig.15). This means, poles always exist in pairs, and we can never have an isolated north pole or south pole.

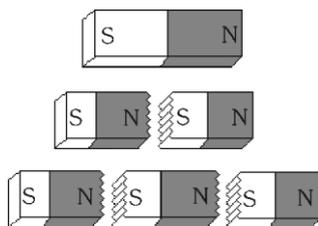


Fig. 15

1. The most suitable material to be used as the core of an electromagnet is
 (A) Aluminium (B) Iron (C) Copper (D) Zinc
2. Strength of magnetic field depends on
 (A) Strength of current (B) Direction of current
 (C) Both A & B (D) None of above
3. The strength of an electromagnet can be increased by .
 A) Increasing the current in coil {B} Increasing the number of turns in coil
 (C) Both (A) & (B) are correct (D) None of above

GOLDEN KEY POINTS

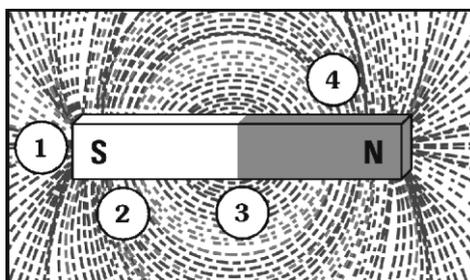
- Magnetism is the ability of an object to push or pull another object that has the magnetic property.
 - The bar magnets, horseshoe magnets, magnetic compass needle, etc, all have magnetism that exists for many years. Thus, they are called permanent magnets.
 - Magnetic separation is used to separate magnetic ores like magnetite from non-magnetic impurities.
 - Magnets that are far apart do not pull or push enough to move each other. The magnetic force between two magnets is weak when magnets are far apart. The magnetic force gets stronger as the magnets are brought closer together.
 - In 1600, an English physician, William Gilbert, suggested that the Earth acts like a giant magnet.
 - If a magnet attracts an object, it does not mean that the object is surely a magnet. It may be an unmagnetised piece of iron or it may be a magnet.
 - Magnets are surrounded by a magnetic field, an invisible area where the forces of magnetic attraction or repulsion can be detected.
 - Our Earth is actually a giant magnet. Much of the inside of the Earth is made up of molten iron. This iron creates a magnetic field that surrounds our planet.
 - A magnetic compass needle approximately point toward Earth's north pole. The geographic north pole and the magnetic north pole are in slightly different places.
 - Strength of an electromagnet increases with the increase in current. The more tightly the turns are wound stronger will be the electromagnet.
 - An electromagnet can be switched on and off by turning the electric current on and off. Also, by changing the current, the magnetic field can be made stronger or weaker.
-

EXERCISE - 1

OBJECTIVE QUESTIONS

Multiple choice questions

- Magnetic force becomes stronger when magnets are
(A) both metal. (B) farther apart. (C) different sizes. (D) closer together
- Earth can be thought of as a giant magnet because it
(A) orbits around the Sun. (B) has a magnetic field.
(C) rotates on its axis. (D) has a moon.
- What happens when a magnet is brought near an iron nail ?
(A) The magnet repels the nail. (B) The nail repels the magnet.
(C) The nail becomes magnetic. (D) Nothing will happen.
- Iron filings were sprinkled around a magnet and acquired the pattern shown below.



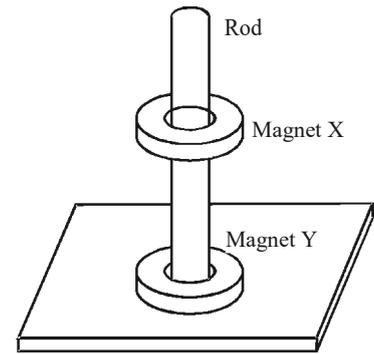
Where is the magnetic force strongest ?

- (A) 1 (B) 2 (C) 3 (D) 4
- A loudspeaker uses electromagnets to
(A) turn electrical energy into sound. (B) turn electrical energy into light.
(C) turn motion into electrical energy. (D) turn sound into electrical energy.
- Which of the following is not true about permanent magnets
(A) they have two poles. (B) they are surrounded by magnetic fields.
(C) they have magnetic force. (D) they can be turned on and off.
- Where is the magnetic force exerted by a magnet strongest ?
(A) Both poles (B) North pole (C) South pole (D) Centre
- Look at the simple electromagnet below.
How can you make the electromagnet's magnetic field stronger ?
(A) Remove the iron nail.
(B) Use a wooden nail instead of an iron nail.
(C) Wrap more coils of wire around the nail.
(D) Wrap fewer coils of wire around the nail.

Class VI : Physics

9. Which of the following would not change the strength of an electromagnet ?
(A) Increasing the amount of current. (B) Changing the current's direction.
(C) Inserting an iron core inside the coil. (D) Increasing the number of loops.
10. A compass points north because
(A) Earth's gravity is strongest at the north pole.
(B) Earth's magnetic field has poles that are exactly at geographic poles.
(C) Earth's magnetic field has poles that are near the geographic poles.
(D) Earth's magnetic field has poles that are in east-west direction.
11. Iron attracts
(A) only the north pole of a magnet. (B) only the south pole of a magnet.
(C) both north and south poles of a magnet. (D) the north pole but repels the south pole.
12. How is an electromagnet different from a permanent magnet ?
(A) It has north and south poles. (B) It attracts magnetic substances.
(C) Its magnetic field can be turned off. (D) Its poles cannot be reversed.
13. What is the shape of Earth's magnetic field similar to ?
(A) That of a horseshoe magnet (B) That of a bar magnet
(C) That of a ball ended magnet (D) None of these
14. When any magnet is cut into four equal parts and then they are again joined by quick fix then new magnet will behave as
(A) four bar magnets. (B) four ordinary rods.
(C) one ordinary bar magnet. (D) one ordinary iron rod.
15. An iron bar is considered as a magnet if the south pole of any other magnet
(A) repels its both the ends. (B) attracts its both the ends.
(C) neither attracts nor repels any of its ends. (D) attracts its one end and repels its other end.
16. Freely suspended magnet stays in direction of
(A) east-west (B) northeast- southwest
(C) north-south (D) northwest-southeast
17. In which part of a bar magnet the magnetisation is minimum ?
(A) At the centre (B) At both poles (C) At south pole (D) At north pole
18. Magnetism in materials is due to
(A) electrons at rest
(B) motion of electrons around the nucleus
(C) protons at rest
(D) neutrons at rest

19. Two ring magnets, X and Y are connected through a rod as shown below. Magnet X floats above magnet Y because

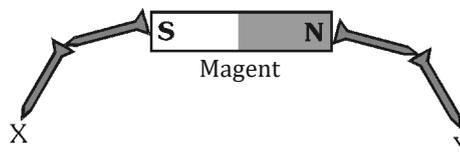


- (A) Magnet X is lighter than magnet Y.
 (B) Magnet X is more powerful than magnet Y.
 (C) The like poles of both magnets are facing each other.
 (D) The unlike poles of both magnets are facing each other.

20. A bar is confirmed to be a magnet when it

- (A) attracts all metal. (B) attracts another magnet.
 (C) attracts an unmagnetised piece of iron. (D) repels a magnet.

21. Observe the figure given below. The polarity of ends X and Y are respectively



- (A) North pole and north pole (B) North pole and south pole
 (C) South pole and north pole (D) South pole and south pole

22. When two pieces of solid materials each of same shape and size repel each other then

- (A) one of them must be a magnet.
 (B) both of them must be magnets.
 (C) one of them must be a non-magnetic substance.
 (D) both of them must be non-magnetic substances.

23. You are given two similar unmarked bars. One of them is a magnet while the other is a magnetic material. Without any other aid, how would you deduce which one of them is a magnet.

- (A) By placing the two bars parallel to each other.
 (B) By placing the tip of one of the bars near the middle point of the other bar.
 (C) By placing the tip of one of the bars near that other bar such they are parallel to each other.
 (D) By placing the tip of one of the bars near that of other such that they are perpendicular to each other.

24. An electric bell consists of

- (A) an electro magnet (B) a permanent magnet
 (C) Both (A) and (B) (D) None of these

25. Self demagnetisation is —

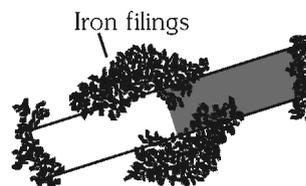
- (A) Magnet tends to become weaker after some time if their poles are left free.
 (B) Magnet tends to become stronger after some time if their poles are left free.
 (C) It behaves as *ieiciro* magnet.
 (D) None of these

Very short answer type questions

1. What is a magnet ?
2. Which magnetic pole is attracted to a south magnetic pole ?
3. Name two materials which *are* magnetic and two that are non-magnetic.
4. Describe, what is meant by the term magnetic field.
5. Why does the north end of a compass always point to the northern part of the Earth ?
6. What happens if a magnet is heated ?
7. What are magnetic keepers ?
8. Will the following magnets repel or attract each other ?

SIN _____ NHS _____

9. A bar magnet is rolled in the iron filings and then lifted up. What is wrong in the figure of that magnet shown below ?



10. What happens when like magnetic poles are brought close together ?

Short answer type questions

1. Why does a compass change direction when it is kept near a magnet ?
2. What are the differences between a permanent magnet and an electromagnet ?
3. Why does a magnet attract unmagnetised piece of iron ? Write the name of phenomenon involved in it.
4. Suppose astronauts land on Planet Z. Planet Z does not have a magnetic field. Will the astronauts be able to use a compass to find direction ? *five* reason.
5. A scientist says, "Magnetic poles of magnets and electric charges on bodies apply forces in similar ways." Explain what is meant by this statement?

6. Large electromagnetic cranes are used in junk yards for moving scrap metal from one location to another. Why would an electromagnet be more useful in this application than a permanent magnet ?
7. What do you call the type of material that is attracted to a magnet or can be magnetised? Give any two examples of this type of material.
8. What happens to the poles of a magnet if it is cut into pieces ?
9. Use the figure below to answer questions.



Compass

Bar magnet

- i) Explain why the compass needles are pointed in different directions ?
 - (ii) What will happen to the compass needles when the bar magnet is removed ?
10. How is a compass used to find directions ?

Long **answer type questions**

1. Write any four properties of a magnet. Make figures.
2. (i) Where are poles of a bar magnet located ?
(ii) A bar magnet has no markings to indicate its poles. How would you find out near which end is its north pole located ? Make figure.
3. You are given an iron strip. How will you make it into a magnet ? Make figure.
4. (i) What is an electromagnet ? How does it work ? Make figure of an electromagnet.
(ii) How is an electromagnet better than a permanent magnet ?

True or false

1. Similar poles of a magnet repel each other.
2. Maximum iron filings stick in the middle of a bar magnet when it is brought near them.
3. Bar magnets always point towards North-South direction.
4. A compass can be used to find East-West direction at any place.
5. Rubber is a magnetic material.
6. Magnetic properties of a magnet reduces by repeatedly hammering it.
7. An electric bell uses a bar magnet.
8. Attraction of material with a magnet is a clear proof that 'it is a magnet'.

Match the column

1.

Column-I	Column-II
(A) A magnet is dropped from a height on a hard rock	(p) Magnetism is induced in the iron bar
(B) An electric current is passed through a coil of copper wire wound around an iron bar	(q) Magnetism is lost
(C) An iron bar is placed in line with a magnet	(r) Iron bar is a magnet
(D) A magnet repels an iron bar placed near	(s) Electromagnet

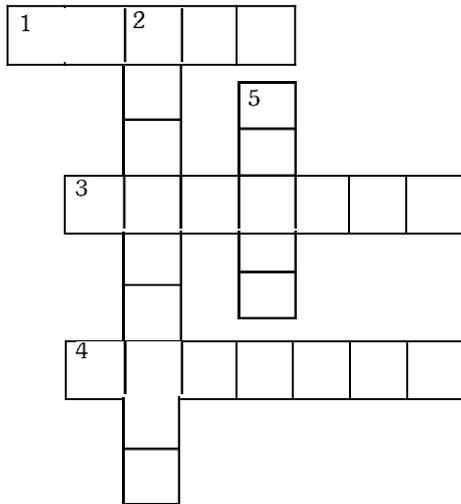
2.

Column-I	Column-II
(A) Natural magnet	(p) Electromagnet
(B) Temporary magnetism	(q) Lodestone
(C) North <i>Note</i> of a magnet	(r) Magnetic keeper
(D) Protection of magnet	(s) Points towards north when suspended freely

Fill in the blanks

1. Any object that has magnetic force is called a
2. Every magnet has a north and a south
3. The region of magnetic force around a magnet is called its
4. Earth's magnetic field causes ato show the north direction.
5. Only when electrical current flows, a magnetic field is produced in an
6. Materials similar to iron that have strong magnetic properties are called
7. The influence created by a magnet that exerts forces on other magnetic objects is known as a
8. A material that maintains its magnetic properties even when it is not close to another magnet is called a
9. Two magnetic north poles..... each other.
10. A north *pole* and a south pole each other.

Solve the following puzzle.



Across

- 1. Ends of magnet where magnetic force is maximum
- 3. To keep magnet safe these are used.
- 4. A simple device used for Navigation.

Down

- 2. A natural magnet
- 5. Like poles of magnet will _____ each other

ANSWERS

CHECK POST-1

- By using a magnet, we can help the tailor in finding the iron needle. When we move magnet on the floor, the iron needle will get attracted towards it as iron is a magnetic material. In this way we can find the lost needle.
- The middle part of the magnet has minimum attractive power towards magnetic material (iron fillings).
- First, we will take one of the bar in our hand and touch its end with the centre of the other bar. If there is a significant attraction between them, then the bar in hand is magnetised. If there is a negligible attraction between the two bars, then the bar in hand is unmagnetised, this means the other one is magnetised.

This is because the central part of a magnet is its neutral region (the region where the attractive power is minimum). If the magnetised bar is in our hand, this means we are touching its pole to the unmagnetised bar, there will be a significant attraction between the two bars. If the unmagnetised bar is in our hand, this means we are touching its end with the neutral region of the magnetised bar, thus, the attraction between them will be negligible.

CHECK POST-2

1. B 2. A 3. C

EXERCISE-1

Multiple choice questions

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	D	B	C	A	A	D	A	C	B	C	C	C	B	C	D
Que.	16	17	18	19	20	21	22	23	24	25					
Ans.	C	A	B	C	D	C	B	B	A	A					

EXERCISE-3

True or false

1. True 2. False 3. false 4. True 5. False 6. True 7. False 8. False

Match the column

1. (A) —r q ; (B) —r s ; (C) —r p ; (D) —r r 2. (A) —r q ; (B) —r p ; (C) —r s ; (D) —r r

Fill in the blanks

1. Magnet 2. Pole 3. Magnetic field 4. Magnetic compass needle
 5. Electromagnet 6. Magnetic materials 7. Magnetic field 8. Permanent magnet
 9. Repel 10. Attract

Solve the following puzzle.

1. Poles 2. Lodestone 3. Keepers 4. Compass 5. Repel

