19. Properties of a Magnetic field

Q.1. Write the appropriate term in the blanks.

(a) The alloys called..... and.....are used for making industrial magnets.

Ans : Nipermag and Alnico

(b) A magnetic field can pass through .....and.....

Ans : Cardboard and Water

(c) The intensity of magnetic field is indicated by the lines of..... .

Ans : Force

(d) The real test of a magnet is..... .

Ans : Repulsion

Q.2. With whom should I pair up ?

Group 'A'	Group 'B'
(1) Compass	(a)The highest magnetic force.
(2) Door of a cupboard	(b) Like poles
(3) Repulsion	(c) A magnet
(4) Magnetic pole	(d) A magnetic needle

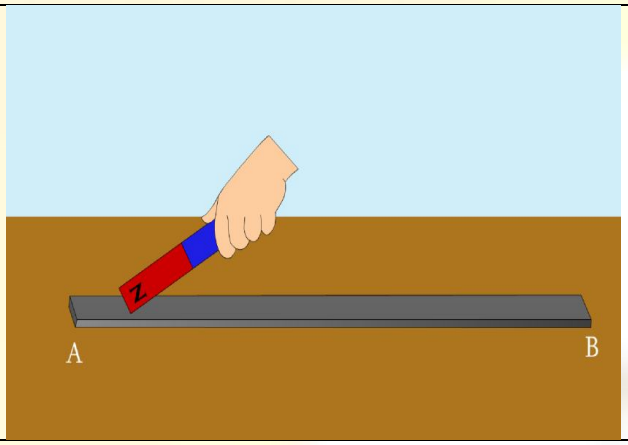
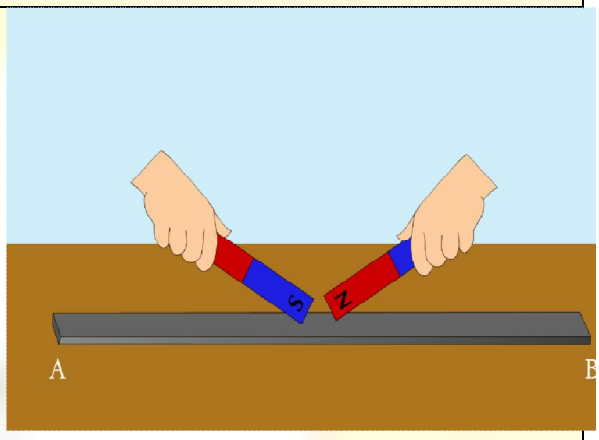
Answer :

Group 'A'	Group 'B'
(1) Compass	A magnetic needle
(2) Door of a cupboard	A magnet
(3) Repulsion	Like poles
(4) Magnetic pole	The highest magnetic force.

Q.3. Write answers to the following questions :

(a) Distinguish between the two methods of making artificial magnets.

Ans :

Single-touch method	Double-touch method
	
1. ' N' pole of one bar magnet is rubbed over a steel bar from the end A to the end B. On repeating this procedure 15-20 again and again magnetism is developed in the steel bar. This method is called the single-touch method.	1. Taking two bar magnets and placing their two opposite poles at the centre of the steel bar, both the magnets are rubbed over the steel bar from one end to the other such as south pole of one of magnet is at the 'A' end and the north pole of the another bar magnet is at the 'B' end. On repeating this procedure 15 to 20 times again and

	again, magnetism is developed in the steel bar. This method is called the double- touch method.
2. The magnetism produced by this method is of low strength and lasts for a short while.	2. The magnetism produced by this method lasts longer as compared to that of single touch method.

(b) Which substances are used for making electromagnets ?

Ans : Electromagnet is made using- an iron nail, copper wire of about 1 meter, a battery and pins and can be tasted.

(c) Write a note on ' Magnetic field '.

Ans : Michael Faraday proposed the idea of magnetic lines of force to explain the magnetic field. The magnetism of a magnet acts upon a certain distance from the magnet. The space around the magnet in which the magnetic force acts on an object, is called a magnetic field. The magnetic field around the magnet can be shown with magnetic lines of force.

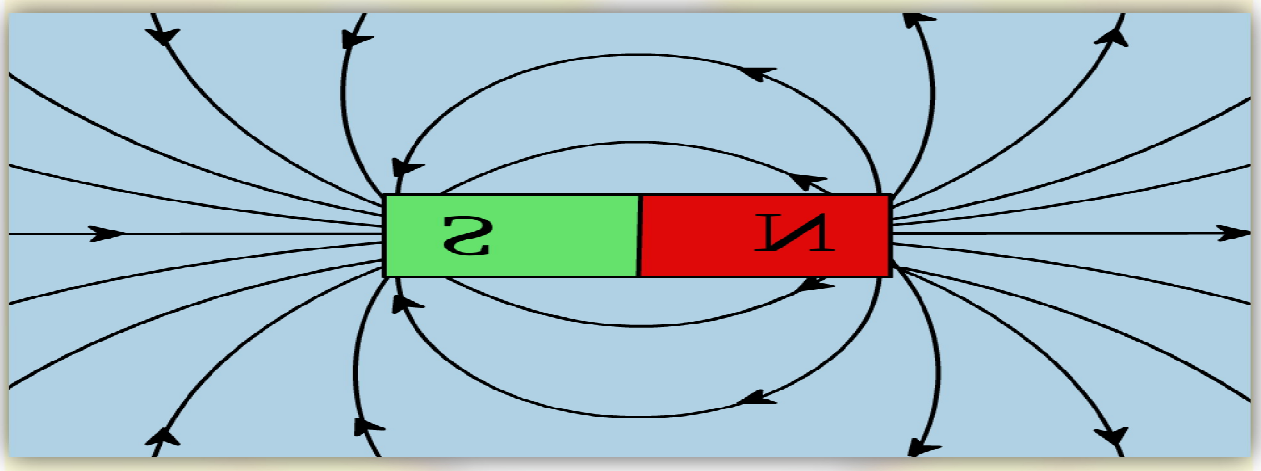
(d) Why is a magnetic needle used in a compass ?

Ans : The magnetic needle used in a compass freely rotates and always settles in the north- south direction as it is a

property of a magnet. Thus, a magnet. Thus, a magnetic needle can be used to ascertain to direction. Hence, magnetic needle is used in a compass.

(e) Explain with the help of a diagram how the intensity and direction of the magnetic field of a bar magnet can be determined.

Ans :



(1) The intensity of magnetic field is indicated by the magnetic lines of force in that particular area. (2) Intensity of magnetic field in a particular area can be understood by the number of field lines passing perpendicular through that unit area. The intensity of magnetic field is more where the lines of force are more concentrated.(3) The direction of magnetic field is

determined by the directions of magnetic lines of force. The magnetic lines of force always start from the north pole and end on the south pole. In the similar manner, the direction of magnetic field is from north pole to south pole.

Q.4. Give detailed information about how the merchants of olden times used a magnet while travelling.

Ans : The merchants of olden times used to carry compass for ascertaining directions while travelling. In a compass, a magnetic needle is fitted. This magnetic needle supported on a sharp point can freely rotate in horizontal plane. If a traveler goes anywhere while travelling, due to the property of a magnet, Magnetic needle always get settled in the north-south direction. Once, the north direction is known , other directions can be easily known, At the oceans where only water is seen everywhere or at the desert areas where only sand is seen everywhere, it becomes difficult to know the direction at night. At that time, the compass used to be helpful for merchants to know the direction.

Q.5 Use your brain power!

(1) Which direction will a magnetic needle show on the geographic north pole ?

Ans : The magnetic lines of force of the earth's magnet are tangential to the ground at both the poles of the earth. Therefore (near to geographic north pole of the earth) the

magnetic needle that can freely rotate, would settle nearly vertical that means it would settle nearly perpendicular to the ground. It's north pole would be towards the ground and south pole would be in the upward direction.

(2) Is magnetic force a vector or a scalar quntity ?

Ans : Magnetic force has both magnitude and direction and thus magnetic force is a vector quantity.

(3) What is meant by magnetic force ?

Ans : The force of attraction or repulsion between the poles of the magnet or the force by which magnetic substances are attracted towards the magnet is called magnetic force.

(4) How does a magnetic force act without direct contact ?

Ans : Magnetic force is produced due to the magnetic lines of force. Magnetic lines of force start from the north pole and end on the south pole. Therefore, these lines of force are spread in the region around the magnet. Because of this, the magnetic force can act up to a certain distance from the magnet. Thus, a magnetic force act without direct contract.

(5) What is the difference between gravitational force and magnetic force ?

Ans : The gravitational force acts on any object which has mass. There is only attraction, no repulsion in case of the gravitational force.

The magnetic force does not act on an object. It acts between magnets as well as magnets and magnetic substances. Both attraction and repulsion take place in case of the magnetic force.

(6) Why is repulsion the real test for identifying a magnet ?

Ans : If there is an attraction between two objects, we cannot say that, both the objects are magnet. Because, one of them can be magnet and other object can be substance like an iron.

However, if there is attraction between the ends of these objects and after keeping an end of one object unchanged, the end of the other object is changed, and if repulsion take place between these two ends of the objects, we can surely say that both the objects are magnets. Because, there is repulsion between like poles of the magnet and attraction between unlike poles of the magnet. Thus, repulsion is the real test for identifying a magnet.

(7) How will you find a magnet from among the various articles given to you ?

Ans : First we shall take a bar magnet. Bring its any pole near both the ends of each object given. If there is attraction between both these poles then we understand that the object is not a magnet but it is a magnetic substance such as iron ,

nickel or cobalt. If there is no attraction between both the ends then we identify it is a non-magnetic substance. if there is attraction at one of the end and repulsion at the other end then the other object is a magnet, because repulsion is the real test for identifying a magnet.

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