International Journal of Advanced Research in Engineering Technology & Science
ISSN: 2349-2819
Email: editor@ijarets.org Volume-6 Issue-8 August-2019 www.ijarets.org

STUDY ON MAGNETIC EFFECT OF AN ELECTRIC CURRENT

Kalpana
Research Scholar
Sunrise, Alwar (Rajasthan)

Dr. Vipin Kumar
Professor
Sunrise, Alwar (Rajasthan)

Abstract

We portray in this proposition a few examinations on the effect of electric fields on itinerant fluid precious stones (NLC). Magnetic fields have been utilized uniquely to adjust the fluid gems in explicit headings in certain trials. Two sections of the postulation are on electro hydrodynamic dangers [EHD] in NLC in which flex electricity assumes a significant part. In the last two parts we have portrayed electro optic strategies of estimating mooring energies relating to shift and azimuthally directions, making utilization of the electric field actuated chief misshapening because of the flex electric effect. In the fourth section we report estimations of flex electric coefficients of various nematogenic compounds. In Chapter I, an overall prologue to fluid gems is given with an accentuation on NLC. The applicable actual properties of nematics are portrayed. Since a significant piece of this work is connected with EHD dangers and flexes electric effect, an overall hypothetical and test foundation to these peculiarities is additionally given.

Keywords: *Magnetic Effect, Electric Current*

Introduction

In the previous illustration you have discovered that, electricity is a significant part in this day and age of industrialization. Our life is inadequate without it. Regardless of whether we work in an office or at home, everything relies on the accessibility of electricity. Apparatuses like the electric bulb, fan, TV, fridge, clothes washer, engine, radio, everything works because of electricity. At the point when electric current goes through a current-conveying conduit or loop then a magnetic field is delivered around it. The working of apparatuses like an electric ringer depends on this rule. Rather than this assuming a constant change in a magnetic field is created then electric current can be delivered. This is the manner by which electricity and magnetism have become equivalent today. Transmission of electric current happens from the far off electricity age stations through high strain wires, through transformers to homes. This part manages the importance of safe utilization of electricity. Alongside this similar ideas connected with magnetism are clarified through basic activities that one can perform all alone.

OBJECTIVES

1. Identify magnets and explain their properties;
2. Explain the concept of magnetic field and state the properties of lines of magnetic force;

MAGNET AND ITS PROPERTIES

Magnet has forever been a thing of wonderment use and attraction for humans. As per history, the utilization of magnets was found by the old Greeks during the time of Greek Civilization.

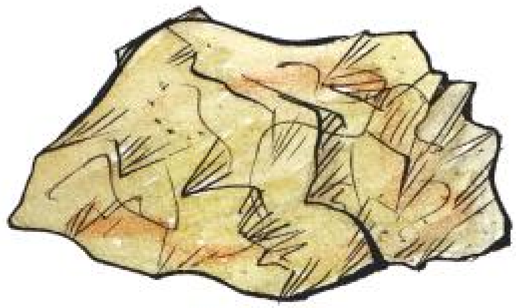

Fig. 1 Natural magnet

They observed stones which had the option to attract iron and nickel like different substances. This normally happening stones (see Fig. 1) which was found then, at that point, is called as 'lodestone'. This is an oxide of iron (Fe3O4). The property of attraction of little particles of iron towards lodestone is called as 'magnetism'. It has been generally expected seen that the magnetic power of attraction of these normal magnets is substantially less and hence, these magnets can't be use for practical purposes. Solid magnets made of iron, nickel and lead are made misleadingly and utilized for practical purposes. Those magnets are likewise called as permannent magnet. Thus, a magnet is a material or item that creates a magnetic field which is liable for a power that pulls or attacts on different materials.

These solid magnets can be made in different shapes and creats its own industrious magnetic field. The magnets that are normally accessible in various shapes are:

(a) Bar magnet

(b) Horseshoe magnet

(c) Cylindrical magnet

(d) Circular magnet

(e) Rectangular magnet

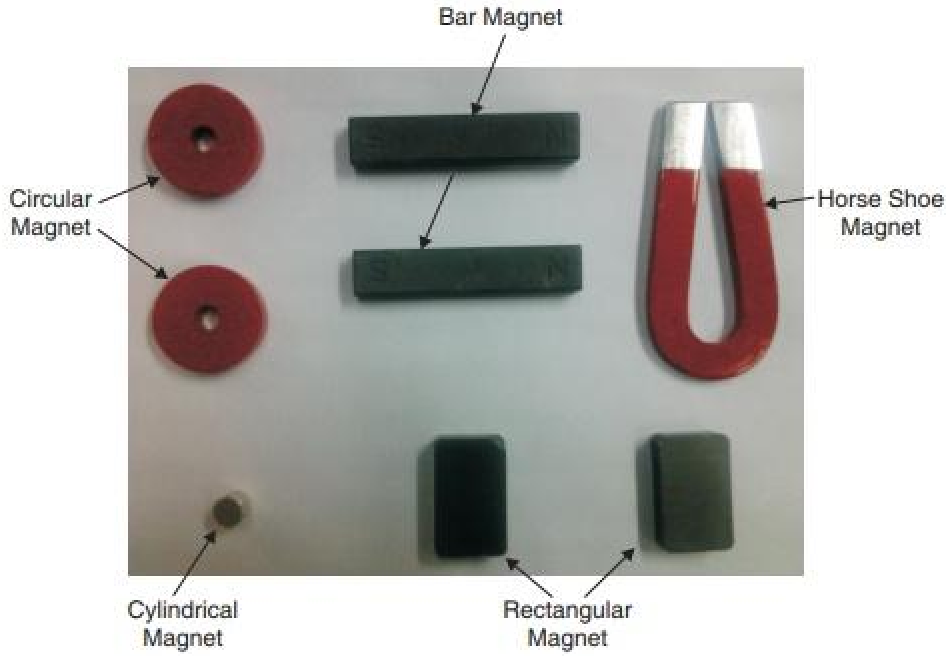

Fig. 2: Magnets of different shapes

Have you at any point notice magnets of any of above shapes arround you? These magnets of various shapes are utilized in different machines utilized at home like recording device, radio, engine, entryway ringer, earphones and so on These magnets are utilized in different apparatuses to one or the other hold or isolated, control, raise (lift) substances, changing electrical energy to mechanical energy (engines, amplifiers) or mechanical to electrical energy (generators and mouthpieces). Assuming that a characteristic magnet is suspended openly with the assistance of a string, it generally rests in the 'north-south' bearing. On the off chance that the magnet is somewhat abandoned this course, it actually gets back to something very similar. The end that rests towards the 'north' is named as 'North Pole' while the one which closes at 'south' is named as South Pole. They are addressed as 'N' and 'S'.

Take one magnetic needle, two bar magnets, some iron filling, an alpin and do the trial investigation of properties of magnet.

Following step may follow:

1. Tie a string at the middle of a bar magnet and hang it with the help of a hook. This bar always rests at the same direction. With the help of the magnetic needle, find out the direction. By this you will be able to prove that a bar magnet always rests in the north-south direction.

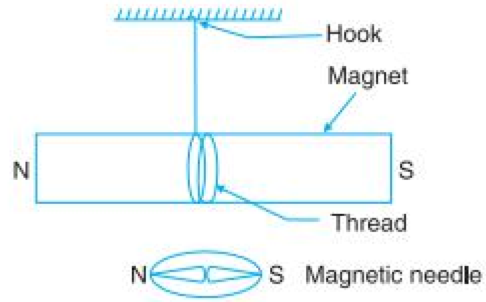

Fig. 3 (i)

Take iron fillings close to the bar magnet. They adhere to the magnet. Accordingly, magnet attracts iron. You would see that how much iron fillings close to the shafts is most extreme while at the center is irrelevant.

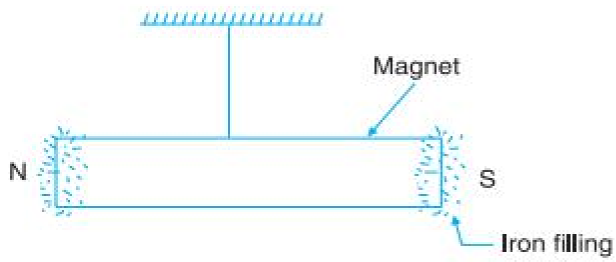

Fig. 3 (ii)

3. If you bring any pole of a bar magnet near the pole of a freely suspended bar magnet, then either it will attract or repel the same. Opposite poles of a magnet attract each other while like poles (north-north or south-south) repel each other.

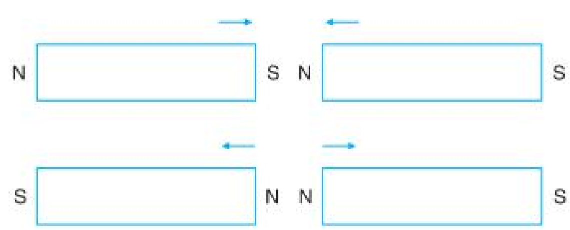

Fig. 3 (iii)

MAGNETIC FIELD

Keep a little magnetic needle almost a bar magnet. The magnetic needle turns and stops in a specific course as it were. This shows that a power acts on the magnetic needle that causes it to pivot and rest in a specific heading as it were. This power is called force. The district around the magnet where the power on the magnetic needle happens and the needle stops at a particular heading, is known as a magnetic field. The course of magnetic field is addressed by magnetic line of powers. As displayed in Fig. 17.4(i), the course of magnetic needle changes constantly and it follows the bended way while moving from north to south. This bended way is known as magnetic line of powers. Digression line draw anytime on magnetic line of power, address the course of magnetic field by then. These magnetic line of powers have following properties:

1. Magnetic line of powers generally starts from north pole and end at south pole of the magnet.
2. These line of powers never meet one another.
3. Near the posts magnetic lines are extremely close to one another which shows that magnetic field at the shafts is more grounded as contrast with different parts.

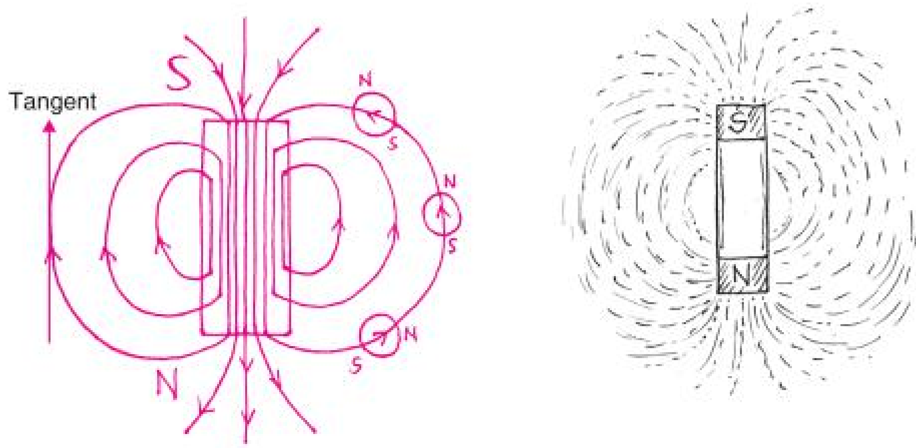

Fig. 4 (i)

Our Earth itslef acts as a monster magnet with south magnetic pole some place in the Arctic and north magnetic pole in Antaractic. The Earth likewise acts like a bar magnet. It's hot fluid place center contains iron and as it moves, it makes an electric current that cause a magnetic field around the Earth. The Earth has a north and south magnetic pole. These poles are not same with the geographic north and south poles on a guide and shifted at a point of 11.3 degree with repect to it. Because of this, assuming that a magnetic needle is suspended openly, it rests in the north-south bearing and is valuable for route.

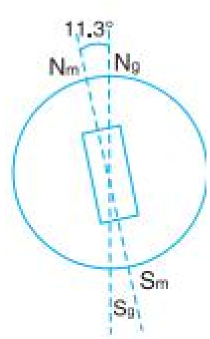

Fig. 4 (ii)

Magnetic Field due to a Current through a Circular Loop

We have up until this point noticed the example of the magnetic field lines delivered around a current-conveying straight wire. Assume this straight wire is bowed as a round circle and a current is gone through it. How might the magnetic field lines resemble? We realize that the magnetic field delivered by a current-conveying straight wire relies contrarily upon the separation from it. Likewise at each purpose in a current conveying roundabout circle, the concentric circles addressing the magnetic field around it would increase and bigger as we create some distance from the wire (Fig. 13.8). When we reach at the focal point of the round circle, the bends of these enormous circles would show up as straight lines. Each point on the wire conveying current would lead to the magnetic field showing up as straight lines at the focal point of the circle. By applying the right hand rule, it is not difficult to make sure that each part of the wire adds to the magnetic field lines in a similar bearing inside the circle. We realize that the magnetic field created by a current-conveying wire at a given point relies straightforwardly upon the current going through it. Hence, assuming there is a round loop having n turns, the field created is n times as extensive as that delivered by a solitary turn. This is on the grounds that the current in every round turn has a similar bearing, and the field because of each turn then, at that point, simply adds up.

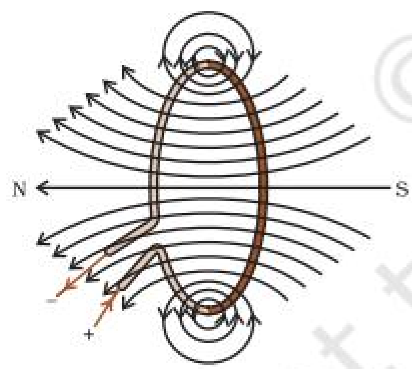

Figure. 5: Magnetic field lines of the field produced by a current-carrying circular loop

FORCE ON A CURRENT-CARRYING CONDUCTOR IN A MAGNETIC FIELD

We have discovered that an electric current coursing through a transmitter creates a magnetic field. The field so created applies a power on a magnet set nearby the guide. French researcher Andre Marie Ampere (1775–1836) proposed that the magnet should likewise apply an equivalent and inverse power on the current-conveying guide. The power because of a magnetic field acting on a current-helping guide can be shown through the accompanying activity.

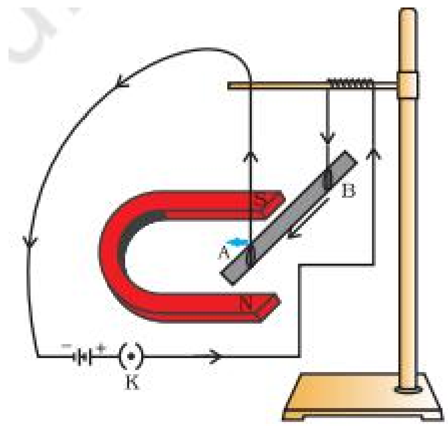

Figure 6: current-carrying rod, AB, experiences a force perpendicular to its length and the magnetic field.

The dislodging of the bar in the above activity recommends that a power is applied on the current-conveying aluminum bar when it is put in a magnetic field. It likewise proposes that the heading of power is additionally switched when the bearing of current through the guide is turned around. Presently shift the bearing of field to upward downwards by trading the two posts of the magnet. It is by and by saw that the heading of power acting on the current-conveying pole gets turned around. It shows that the bearing of the power on the guide relies on the heading of current and the course of the magnetic field. Tests have shown that the relocation of the bar is biggest (or the greatness of the power is the most elevated) when the heading of current is at right points to the course of the magnetic field. In such a condition we can utilize a basic rule to track down the course of the power on the guide

We considered the course of the current and that of the magnetic field opposite to one another and observed that the power is opposite to the two of them. The three bearings can be outlined through a straightforward rule, called Fleming's left-hand rule. As indicated by this standard, stretch the thumb, pointer and center finger of your left hand to such an extent that they are opposite together (Fig. 6). Assuming the main finger focuses toward magnetic field and the second finger toward current, then, at that point, the thumb will point toward movement or the power acting on the guide. Gadgets that utilization current-conveying conveyors and magnetic fields incorporate electric engine, electric generator, amplifiers, mouthpieces and estimating instruments. In the following not many segments we will learn about electric engines and generators.

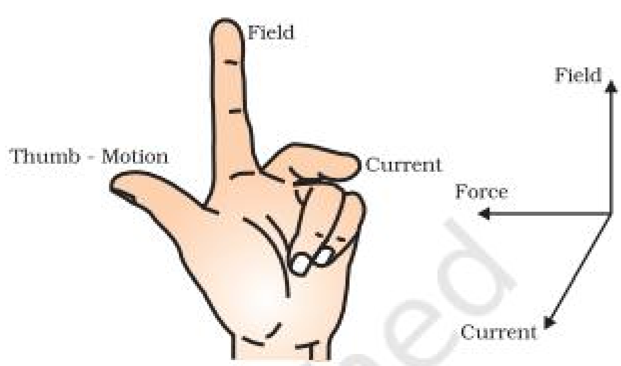

Figure 7: Fleming's left-hand rule

Conclusion

Magnetic field is an amount that has both bearing and extent. The heading of the magnetic field is taken to be the bearing wherein a north pole of the compass needle moves inside it. Hence it is taken by show that the field lines rise out of north pole and converge at the south pole Inside the magnet, the heading of field lines is from its south pole to its north pole. Along these lines the magnetic field lines are shut bends. The overall strength of the magnetic field is shown by the level of closeness of the field lines.

Reference

[1] R Herrmann, N Kubicki, T Schurig, H Dwelk, U Preppernau, A Krapf, H Kruger, H U Muller, L Rothkirch, W Kraak, W Braune, N Pruss, G Nachtwei, F Ludwig and E Kemnitz, Phys. Stat. Sol. B., 142K, 53, (1987).

[2] D U Gubser, R A Hein, S H Lawrence, M S Osofsky, D J Schrodt, L E Toth and S A Wolf, Phys. Rev. e, 35, 5350, (1987).

[3] T Hatano, A Matusushita, K Nakamura, K Honda, T Matsumoto and K Ogawa, Jpn. J Appl. Phys., 26, L374, (1987).

[4] S Hikama, T Hirai and S Kagoshima, Jpn. J .Appl. Phys., 26, 314, (1987).

[5] J Monecke, Phys. State Solidi., 143, K43, (1987).

[6] J J Nuemeier, Y Dalichaouch, J M Ferreira, R Lee, M B Maple, M S Torikachvilli, K N Yang Appl. Phys. Lett., 51, 371, (1987). R Hake, and H B W Zhou,

[7] C AIlgeier, J S Schilling and E Amberger, Phys. Rev. B, 35, 8791, (1987).

[8] M Hirabayashi, H Ihara, N Terada, K Senzaki, Waki, K Murata, M Tokumoto and Y Kimora, Phys., 26, L454, (1987). K Hayashi, S Jpn. J. Appl.

[9] K Gopalakrishnan, J V Yakhmi, M A Vaidya and R M Iyer, Appl. Phys. Lett., 51, 1367, (1987).

[10] S M Fine, M Greenblatt, S Simizu and S A Friedberg, Phys. Rev. B, 36, 5716, (1987).

[11] W G Gallagher, R L Sandstorm, T R Dinger, T M Shaw and D A Chance, Sol. St. Commun., 63, 147, (1987).

[12] J Rhyni, D A Neuman, J A Gotaas, F Beech, L E Toth, S Lawrence, S Wolf, M Osofsky and D U Gubser, Phys. Rev. B, 36, 2294, (1987).

[13] B Jayaram, S K Agarwal, A Gupta and A V Narlikar, Sol. st. Commun., 63, 713, (1987).