



TRINITY COLLEGE FOR WOMEN NAMAKKAL

Department of Physics

INTRODUCTION TO ELECTROMAGNETISM

19PPH07-ODD Semester

Presented by

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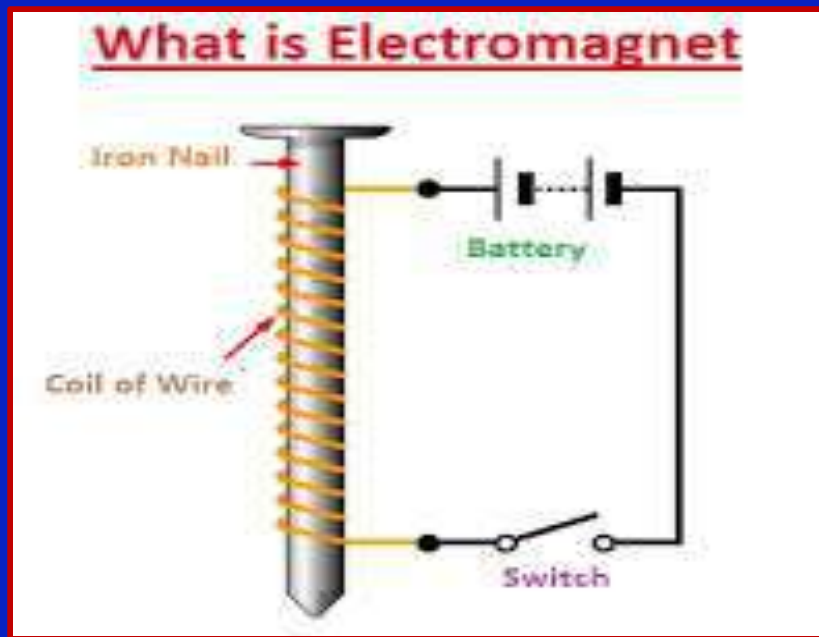
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WHAT IS ELECTROMAGNET?

An electromagnet is a temporary magnet which behaves like a magnet when an electric current is passed through the insulated copper wire and loses its magnetism when current is stopped.



WHY IS IT CALLED ELECTROMAGNETIC?

Electromagnetic waves are produced by the motion of electrically charged particles. These waves are also called "electromagnetic radiation" because they radiate from the electrically charged particles. They travel through empty space as well as through air and other substances.

WHAT IS ELECTROMAGNETISM?

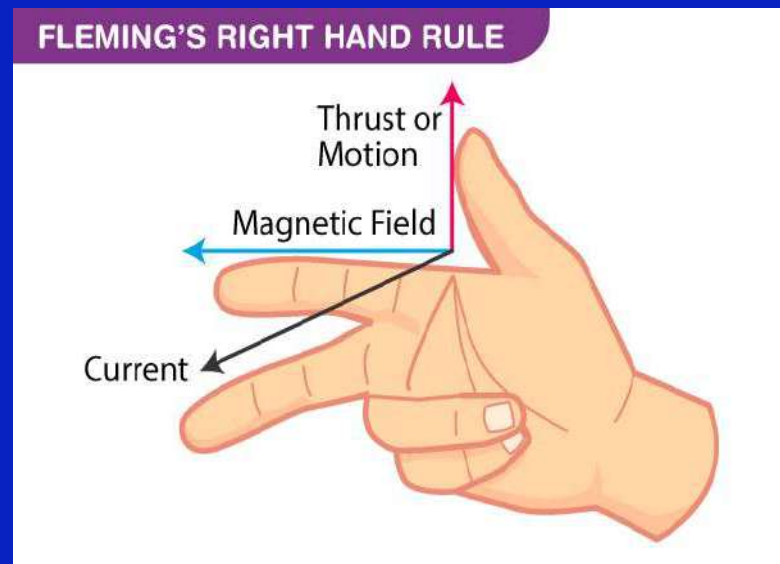
Electromagnetism is a process where a magnetic field is created by introducing the current in the conductor.

When a conductor is electrically charged it generates magnetic lines of force of conductor.

For example, if current i.e., positive charges moving in a wire, it produces the magnetic field along the wire, and the direction of magnetic lines and force can be determined using **Right-hand Rule.**

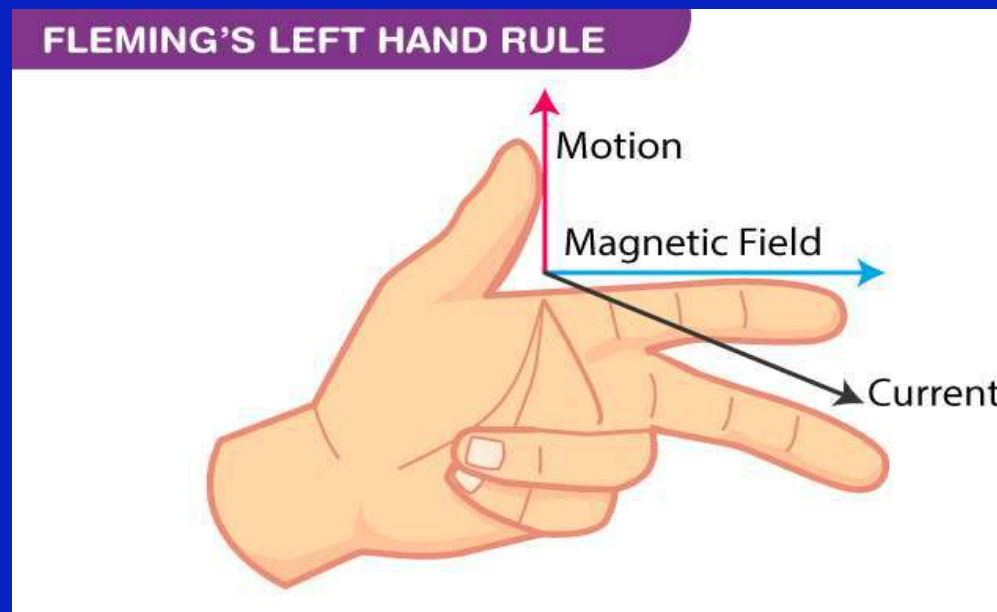
Fleming's right hand rule

Fleming's right hand rule states to hold the forefinger, middle finger and thumb of right hand mutually perpendicular to each other so that the forefinger points in the direction of external magnetic field and thumb points in the direction of motion of conductor.



Fleming's left hand rule

Fleming's left hand rule states that if we stretch thumb, forefinger or the index finger and the middle finger in such a way that they are mutually perpendicular to each other then the thumb gives the direction of the motion of the conductor, index finger gives the direction of the magnetic field and the middle finger



Define electromagnetic induction

- Electromagnetic induction is the production of an electromotive force across an electrical conductor in a changing magnetic field.
- We have seen what happens when a conductor is electrically charged. Now, let's see what happens if we place a conductor in between the magnetic field.
- When a conductor is placed or moved through the magnetic field it generates voltage i.e., electricity. This principle is called Electromagnetic Induction.
- The voltages generated will be based on the speed of the conductor moving through the electric field. Faster the speed of the conductor, the greater the induced electricity or voltage.

What is Electromagnetic Force?

The electromagnetic force is a type of physical interaction that occurs between electrically charged particles.

It acts between charged particles and is the combination of all magnetic and electrical forces.

The electromagnetic force can be attractive or repulsive.

What is Electromagnetic Waves?

Definition: Electromagnetic waves or EM waves are waves that are created as a result of vibrations between an electric field and a magnetic field.

List a few properties of the electromagnetic wave?

❖ A few properties of electromagnetic waves are:

Electromagnetic waves are propagated by oscillating waves electric and magnetic waves oscillating at right angles to each other

❖ They exhibit the properties of interference and diffraction

❖ They travel at a speed of 3×10^8 m/s in a vacuum.

❖ They are transverse waves.

❖ The relationship between the wavelength (λ) and frequency (c) of an electromagnetic wave is given as follows:

$$c = v \lambda$$

List a few applications of electromagnetism?

A few applications of electromagnetism are:

- ✓ Electromagnetism serves as a fundamental working principle for many of the home appliances in household applications.
- ✓ The Maglev trains or high-speed trains work on the principle of electromagnetism.
- ✓ Electromagnetic radiations are used in the communication system to transfer data from the source to the receiver
- ✓ In industries, starting from small instruments to large power equipment, electromagnetism is used at least at one stage of their work.

What does electromagnetic do to your body?

Some members of the public have attributed a diffuse collection of symptoms to low levels of exposure to electromagnetic fields at home. Reported symptoms include headaches, anxiety, suicide and depression, nausea, fatigue and loss of libido.

THANK YOU

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