O P JINDAL SCHOOL, SAVITRINAGAR

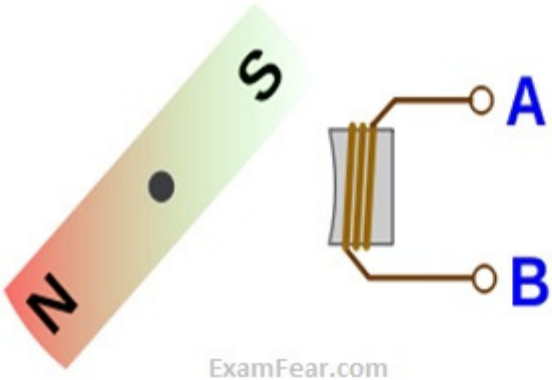
CLASS NOTES

CLASS X PHYSICS | TOPIC : MAGNETIC EFFECT OF CURRENT

Date : 11 /05/20 | SUBTOPIC: ELECTROMAGNETIC INDUCTION

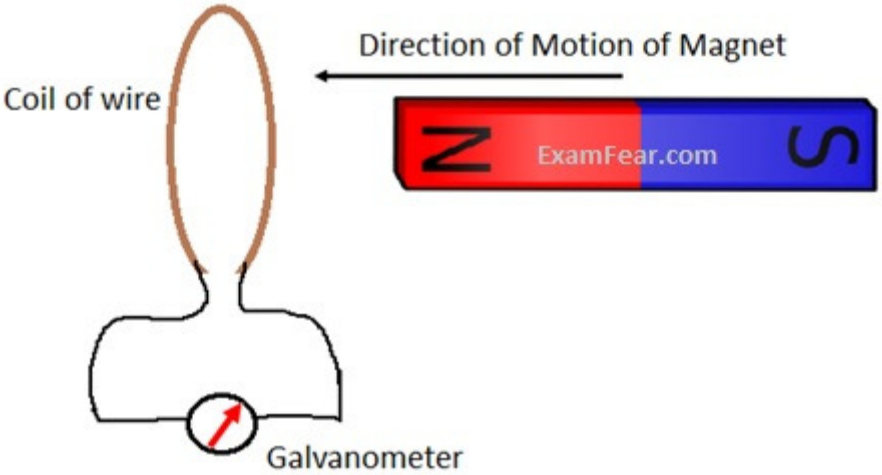
Electromagnetic Induction

This process by which a changing magnetic filed in conductor induces a current in another conductor is called **electromagnetic induction**. The scientist **Michael Faraday** did many experiments in this field.

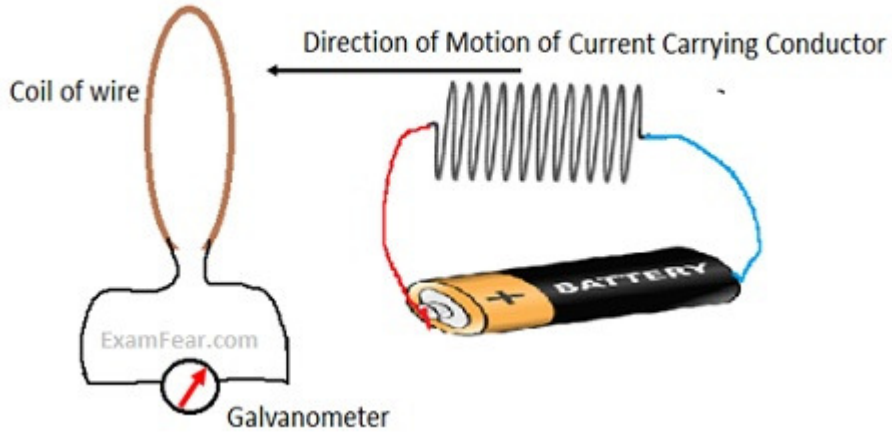


Faraday's Experiment-1

- Take a wire, a bar magnet and a galvanometer
- Move the magnet towards the coil of wire.
- The galvanometer moves to indicate a current in the wire.
- When the direction of the magnet is reversed, the current reverses (indicated by the galvanometer needle swaying in the opposite direction)
- When the speed of movement of the magnet changes, the galvanometer deflects faster.
- **Conclusion : Moving a magnet towards a coil induces a current in the coil whose direction and magnitude is given by the galvanometer.**

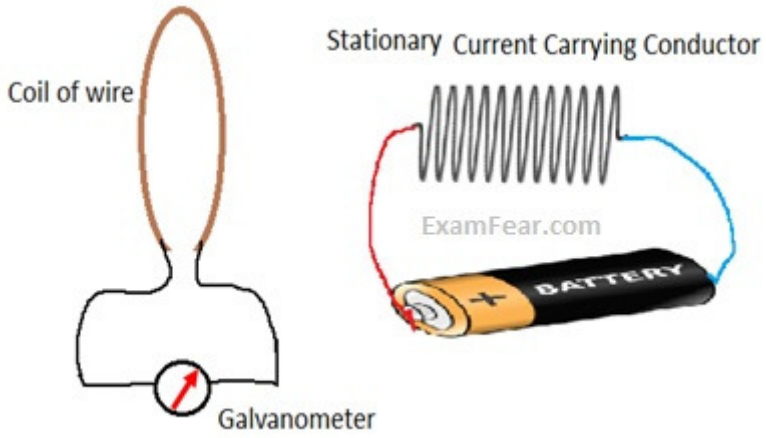


Faraday's Experiment-2



- Take a wire, a current carrying conductor/wire and a galvanometer
- Move the current carrying conductor towards the coil of wire. (Magnet is replaced by current carrying conductor)
- The galvanometer moves to indicate a current in the wire.
- **Conclusion: Current is induced in a coil when a current carrying conductor is brought in its vicinity.**

Faraday Experiment-3



- Take a wire, a current carrying conductor/wire and a galvanometer
- Donot move the current carrying conductor. Keep it stationary
- The galvanometer moves to indicate a current in the wire.
- In general, the current carrying conductor/magnet is called **primary coil**. The conductor in which the current is induced is called the **secondary coil**
- **Conclusion: Relative motion between the current carrying conductor and the wire is not mandatory for inducing current in the wire.**

Faraday's conclusions

- As the current in the primary coil changes, the magnetic field associated with changes.
- **Then the magnetic field associated with the secondary coil also changes. And this causes the current**
- **This process by which a changing magnetic filed in conductor induces a current in another conductor is called electromagnetic induction.**
- The direction of the current is given by **Flemings Right Hand Rule : Stretch the thumb, forefinger and middle finger of your right hand such that they are mutually perpendicular to each other (as shown in the figure). If the thumb points in the direction of motion of the**

conductor, the forefinger points in the direction of the magnetic field and then the middle finger points in the direction of the induced current