

CLASS 12

PHYSICS

REVISION NOTES

Class 12 Physics Chapter 6 Electromagnetic Induction – Revision Notes

A changing magnetic flux is the heart of electromagnetic induction, and this Class 12 Physics Chapter 6 summary traces that idea through Faraday's and Lenz's laws, motional emf, AC generators, and self- and mutual inductance.

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Magnetic Flux and Faraday's Law

Magnetic flux through a surface: $\Phi = \mathbf{B} \cdot \mathbf{A} = BA \cos\theta$.

Faraday's law: induced emf $E = -N(d\Phi/dt)$.

Lenz's Law

The induced emf/current always opposes the change in flux that produces it — a direct consequence of energy conservation.

Motional EMF

For a rod of length l moving with velocity v perpendicular to field B : $E = Blv$.

For a rod rotating about one end with angular frequency ω : $E = \frac{1}{2}B\omega l^2$.

AC Generator

A coil of N turns, area A , rotating at angular speed ω in field B produces emf $E = E_0 \sin(\omega t)$, where $E_0 = NBA\omega$ is the peak emf.

The average emf (and average current) over a full cycle is zero, since the emf is purely sinusoidal.

Self- and Mutual Inductance

Self-inductance: $E = -L(dI/dt)$; SI unit is the henry (H).

Mutual inductance: $E = -M(dI/dt)$; relates the emf in one coil to the changing current in a neighbouring coil.

Eddy Currents

Currents induced within the bulk of a conductor (not just along a wire) due to a changing flux; used constructively in induction furnaces and electromagnetic braking, and minimised (via lamination) in transformer cores to reduce energy loss.

One-Line Summary

A changing magnetic flux induces an emf (Faraday's law) in a direction that always opposes the change

producing it (Lenz's law), underlying motional emf, AC generators, and self- and mutual inductance.

Class 12 Physics Chapter 6 – Solutions and Important Questions

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