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D.4 Induction (HL)

Checklist (HL)

Higher level (HL)

What you should know

After studying this subtopic, you should be able to:

- Understand the terminology used when describing fields interacting with conducting wires.

- Identify the variables that can change the amount of magnetic flux penetrating a loop.

- Use the equation for magnetic flux:

$$\Phi = BA \cos \theta$$

- Describe and explain the effect of a changing magnetic field on the emf in a conductor in that field.

- Calculate the induced emf in a conductor using:

$$\varepsilon = -N \frac{\Delta \Phi}{\Delta t} \text{ and } \varepsilon = BvL$$

- Understand the minus sign in the equation for induced emf:

$$\varepsilon = -N \frac{\Delta \Phi}{\Delta t}$$

- Explain the direction of induced current with reference to conservation of energy.

- Explain the sinusoidal shape of magnetic flux and emf against time graphs for a coil rotating in a constant magnetic field.

- Identify and explain the changes in induced emf when the frequency of rotation changes in a constant magnetic field.

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