

Edexcel GCSE Physics

Topic 13.1P-13.4P - Electromagnetic Induction

Flashcards

This work by [PMT Education](https://www.pmt.education) is licensed under [CC BY-NC-ND 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/)



What happens when an electrical conductor moves relative to a magnetic field? (Higher)



What happens when an electrical conductor moves relative to a magnetic field? (**Higher**)

A voltage (potential difference) is induced across the conductor.



What happens to an electrical conductor when there is a change to the magnetic field that it is placed in? **(Higher)**



What happens to an electrical conductor when there is a change to the magnetic field that it is placed in?

(Higher)

The voltage (potential difference) is also changed.



How do you produce an electric current using a magnet and a conductor on a small-scale? (Higher)



How do you produce an electric current using a magnet and a conductor on a small-scale? (Higher)

- Moving a coil of wire between magnetic poles
 - Moving a magnet within a coil of wire

Once a voltage is induced, if there is a complete circuit, a current will also be induced.



How is electrical current produced on a large-scale? (Higher)



How is electrical current produced on a large-scale?
(Higher)

An electromagnet is rotated around a
coil.



What factors affect the size of an induced voltage? (Higher)



What factors affect the size of an induced voltage?
(Higher)

- The number of turns on the coil of wire
 - How strong the magnetic field is
 - The speed of the movement



What is the requirement for an induced potential difference to cause a current flow? (Higher)



What is the requirement for an induced potential difference to cause a current flow? (**Higher**)

The conductor must form a closed loop or be part of a complete circuit.



What can be said about the direction of the magnetic field produced by an induced current? (Higher)



What can be said about the direction of the magnetic field produced by an induced current? (Higher)

- The direction of the field is such that it opposes the change that induced the current
- This change is either the movement of the conductor or a change to the field



What are two ways that the generator effect is used to generate different types of current? (Higher)



What are two ways that the generator effect is used to generate different types of current? (Higher)

- In an alternator to produce alternating-current
- In a dynamo to produce direct-current



How does a dynamo generate current? (Higher)



How does a dynamo generate current? (Higher)

A coil of wire rotates inside a magnetic field. A commutator is used to ensure it continues rotating in the same direction, therefore keeping the current flowing in the same direction (d.c. current).



How is electromagnetic induction used in alternators to generate alternating current? (Higher)



How is electromagnetic induction used in alternators to generate alternating current? (**Higher**)

A coil of wire rotates in a magnetic field.

The end of this coil is connected to slip rings which will cause the current to change direction while rotating. This means a.c is produced.



What electromagnetic effect does a
microphone take advantage of and how?
(Higher)



What electromagnetic effect does a microphone take advantage of and how? (Higher)

- The generator effect
- It converts the pressure variations in sound waves into alternating current



How do loudspeakers make use of the motor effect? (Higher)



How do loudspeakers make use of the motor effect?
(Higher)

The motor effect is used to convert variations in the current of an electrical circuit into the pressure variations which produce audible sound.



Explain how a loudspeaker works.
(Higher)



Explain how a loudspeaker works. (Higher)

- A cone wrapped in wire is connected to an a.c power supply and is placed in a permanent magnetic field
- When current flows through the wire, it creates a magnetic field which interacts with the permanent field
- This produces a force which causes the cone to vibrate, producing sound



How is the pitch of the sound from a
loudspeaker changed? (Higher)



How is the pitch of the sound from a loudspeaker changed? (**Higher**)

- The frequency of the a.c current is altered
- This creates a different frequency of vibration in the cone



How do microphones convert sound into electrical signals? (Higher)



How do microphones convert sound into electrical signals? (Higher)

- Sound produces pressure variations which cause the diaphragm to vibrate
- A coil of wire is connected to the diaphragm, so as the diaphragm moves, the coil also moves
- Movement in a magnetic field = a p.d. is induced
- As there is a complete circuit a current is also created

