

# Edexcel GCSE Physics

## Topic 13.5-13.11P - Transformers

### Flashcards

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Describe the makeup of a basic transformer. (Higher)



Describe the makeup of a basic transformer.  
(Higher)

A primary coil and a secondary coil of wire wrapped around an iron core.



Why is iron used as the core for a transformer? (Higher)



Why is iron used as the core for a transformer?  
(Higher)

It is easily magnetised.



Explain how a transformer works.  
(Higher)



Explain how a transformer works. (Higher)

- An alternating current flows through the primary coil
- This induces a changing magnetic field in the core
- This changing magnetic field induces an emf, which produces a current in the secondary coil



Why must the current flowing through the primary coil of a transformer be alternating? (Higher)





Why must the current flowing through the primary coil of a transformer be alternating? (Higher)

- For current to be induced in the secondary coil, the magnetic field in the core must be continuously changing
- For the magnetic field to be changing, the current in the primary coil must be alternating



What can be said about the electrical power input and output of a 100% efficient transformer? **(Higher)**



What can be said about the electrical power input and output of a 100% efficient transformer? (**Higher**)

The electrical power input is equal to the electrical power output.



Give an equation linking number of turns with  
p.d. in transformers



Give an equation linking number of turns with p.d. in transformers

$$\frac{\text{primary p.d.}}{\text{secondary p.d.}} = \frac{\text{primary turns}}{\text{secondary turns}}$$



State the power equation for transformers with a 100% efficiency (using voltage and current).



State the power equation for transformers with a 100% efficiency (using voltage and current).

$$V_p \times I_p = V_s \times I_s$$



On a step-down transformer, does the secondary coil have more or fewer turns? **(Higher)**





On a step-down transformer, does the secondary coil have more or fewer turns? **(Higher)**

The secondary coil has fewer turns.



What is an advantage of a step down transformer in the national grid?



What is an advantage of a step down transformer in the national grid?

It means that the voltage can be reduced to a value safe enough to be used in houses.



Why is it important to have step up transformers in the national grid?



# Why is it important to have step up transformers in the national grid?

It can increase efficiency.

- For the same power, a higher voltage will lead to a lower current ( $P=V \times I$ ).
- The lower the current, the less energy that is lost.
- Used for transmission across power lines



# How does a step up transformer work? (Higher)



## How does a step up transformer work? (Higher)

- The primary coil has fewer turns
- An a.c. current produced a magnetic field in the primary coil
- The iron core passes the magnetic field to the secondary coil
- The magnetic field induces a higher voltage in the secondary coil
- Power is conserved, so this produces a lower current



Where are step-up and step-down transformers used in the national grid?





Where are step-up and step-down transformers used in the national grid?

Step-up transformers are used at power stations, whilst step-down transformers are used domestically.

