

OCR B Physics A Level

6.1.2 - Transformers

Flashcards

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What are the two types of transformers?



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1. Step-Up Transformers
2. Step-Down Transformers



What do step-up transformers do?



What do step-up transformers do?

Step-up transformers increase voltage.



Describe the composition of a basic transformer.



Describe the composition of a basic transformer.

A magnetic core with a primary coil attached to the input voltage and a secondary coil connected to the output voltage.



Compare the number of turns on the primary and secondary coils for a step-up transformer.



Compare the number of turns on the primary and secondary coils for a step-up transformer.

The secondary coil has a greater number of turns since step-up transformers increase the voltage.



Explain how a step down transformer works.



Explain how a step down transformer works.

- An alternating current passes through the primary coil, causing a changing magnetic field to be induced around it.
- This produces a changing magnetic field in the core, that in turn induces a current through the secondary coil.
- The secondary coil has fewer turns than the primary coil, meaning the voltage in the secondary coil is lower.



Why must the current in the primary coil be an alternating current?



Why must the current in the primary coil be an alternating current?

To induce a potential difference in the secondary coil, there must be a constantly changing magnetic flux. To achieve this the magnetic field in the core must be alternating, which is achieved by using an alternating current in the primary coil.



State the relationship between the number of turns on each coil and the voltage induced.



State the relationship between the number of turns on each coil and the voltage induced.

$$\frac{N_1}{N_2} = \frac{V_1}{V_2}$$

Where N_1/N_2 is the number of turns on the primary/secondary coil and, V_1/V_2 is the voltage across the primary/secondary coil.



State **three** causes of inefficiency in transformers.



State **three** causes of inefficiency in transformers.

1. Energy wasted in magnetising and demagnetising the core.
2. Eddy currents.
3. Resistance in the wires.



How can you reduce the energy wasted
in magnetising and demagnetising the
core?



How can you reduce the energy wasted in magnetising and demagnetising the core?

By choosing an easily magnetised material such as (magnetically) soft iron, to be used as the core of the transformer.



What are eddy currents?



What are eddy currents?

Eddy currents are small swirling currents that are induced in the core and causes energy loss through heating.



How can eddy currents be reduced?



How can eddy currents be reduced?

Laminating the core reduces eddy currents since the eddy currents cannot pass through the laminating material and so their amplitude is decreased.

