

WJEC Wales Physics GCSE

SP1.9: Output of a Transformer

Practical Flashcards

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Outline the basic steps of the practical.



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1. Wrap 100 turns of coil around the primary core and 20 turns around the secondary core of the iron C-cores.
2. Attach a voltmeter across the ends of each coil and attach an A.C power source to the primary coil.
3. Turn on the power and record the voltages.
4. Add 10 coils to the secondary coil and repeat.
5. Repeat with up to 200 coils on the secondary coil.



Why must an A.C power supply be used?



Why must an A.C power supply be used?

The direction of the current must be constantly changing in order to induce a continually changing magnetic field in the the core. This changing field is required to induce a potential difference in the secondary coil.



Why do the coils of wire need to be insulated?



Why do the coils of wire need to be insulated?

To prevent electrical current passing into the core of the transformer. No electrical contact should be made between the primary and secondary coils.



Why should the power supply be switched off immediately after and between readings?



Why should the power supply be switched off immediately after and between readings?

To reduce the likelihood of the coils of wire overheating.



What type of voltmeter must be used in this experiment?



What type of voltmeter must be used in this experiment?

1. An alternating-current voltmeter.
2. Alternatively a multimeter set on an A.C current setting could also be used.



What graph should be plotted with this data?



What graph should be plotted with this data?

Number of turns on the secondary core against the secondary core voltage.



What relationship should the graph show?



What relationship should the graph show?

A linear relationship, which will be shown on the graph as a straight line passing through the origin.



Suggest reasons why a linear relationship may not be observed.



Suggest reasons why a linear relationship may not be observed.

1. Heat loss in wires.
2. Resistance in the crocodile clips connecting the coils to the meters.
3. Number of coils incorrectly counted.



How could the efficiency of the transformer set up be calculated?



How could the efficiency of the transformer set up be calculated?

$$V_1/V_2 = N_1/N_2$$

Using the above equation to predict the voltage that will be induced in the secondary coil. Then calculating what percentage of the predicted value that the experimental value is.



What safety precautions should be taken
in this experiment?



What safety precautions should be taken in this experiment?

1. Avoid touching the wires during or immediately after use to prevent burning.
2. Do not exceed a power supply voltage of 4 V in order to keep the heating under control.

