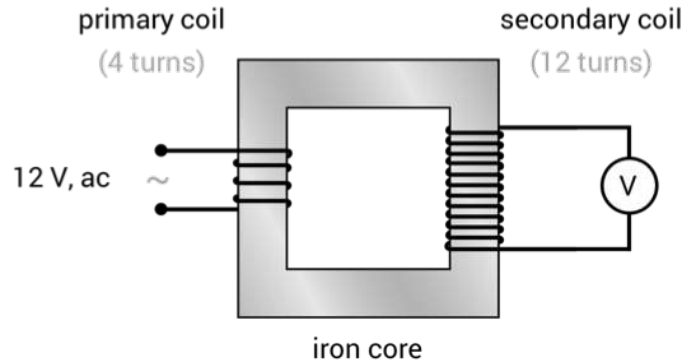


0	1
---	---

A student connects the below device in a physics lab.



0	1	.	1
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State the name which is given to this type of device.

[2 marks]

0	1	.	2
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When a current flows through its primary coil, a potential difference is measured across its secondary coil. Explain this observation.

[2 marks]

0	1	.	3
---	---	---	---

Use the information which is provided in the above diagram to calculate the value of the potential difference measured across the secondary coil.

Potential difference = _____ V

[2 marks]

0	1	.	4
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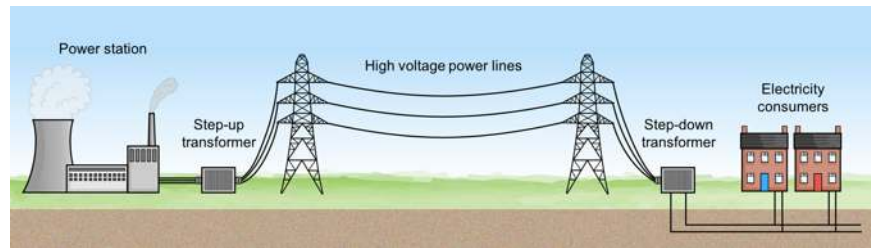
The student switches off the supply, then connects the device so that the ac supply is connected to the 12-turn coil, and the voltmeter, to the 4-turn coil. She then turns on the supply again.

Describe and explain the effect which these changes to the circuit will have on the voltmeter reading.

[2 marks]

0 2

The generator of a power station is supplying electrical energy to a nearby town, as described in the below diagram.



Information on the **step-up** transformer which is being used in this system is provided in the below table.

Potential difference across primary coil, V_p	30 kV
Number of turns on primary coil, n_p	5,000
Number of turns on secondary coil, n_s	50,000

0 2 . 1

The power output of the generator is **6 MW**. Show that the current in the **primary coil** of the step-up transformer is 200 A.

[2 marks]

0 2 . 2

Calculate the potential difference across its **secondary coil**.

Potential difference = _____ kV

[2 marks]

0 2 . 3

Hence (or otherwise) calculate the current in the high voltage power lines. You may assume that the transformer is 100% efficient.

Current = _____ A

[2 marks]

0 2 . 4

These power lines have a combined resistance of 150Ω . Assuming that the step-down transformer is also 100% efficient, and that the only dissipation of energy from this system comes from the electrical resistance of the power lines, calculate the efficiency with which electrical power is delivered between the power station and the town.

Efficiency = _____ %

[4 marks]