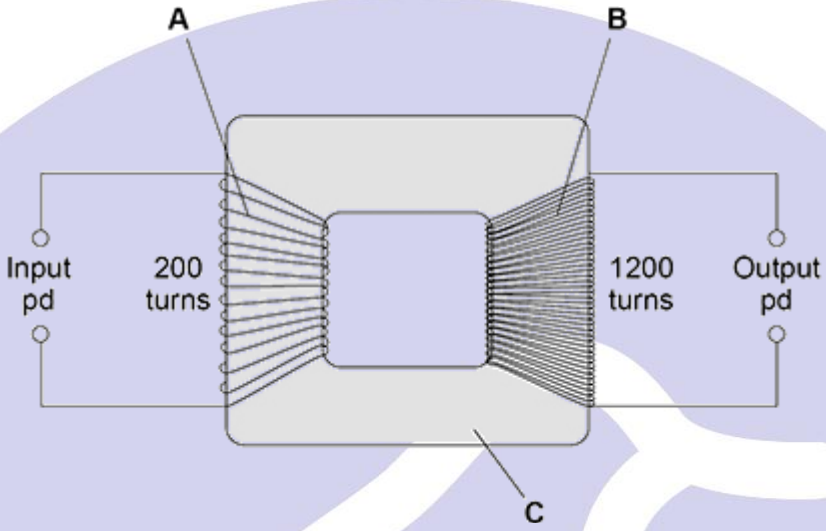
Q1.

The National Grid uses transformers to change potential difference (pd).

Figure 1 shows a transformer.

Figure 1



(a) Identify the parts of the transformer labelled in **Figure 1**.

A _____

B _____

C _____

(2)

(b) The input pd causes an alternating current.

Explain why there is an alternating current in the output when the transformer is connected to a circuit.

_____

_____

_____

_____

_____

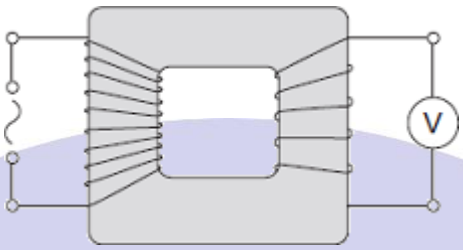
_____

(3)

(Total 5 marks)

Q2.

The diagram shows a transformer with a 50 Hz (a.c.) supply connected to 10 turns of insulated wire wrapped around one side of the iron core.
A voltmeter is connected to 5 turns wrapped around the other side of the iron core.



(a) What type of transformer is shown in the diagram?

Draw a ring around the correct answer.

step-down **step-up** **switch mode**

(1)

(b) Transformers will work with an alternating current (a.c.) supply but will **not** work with a direct current (d.c.) supply.

(i) Describe the difference between a.c. and d.c.

(2)

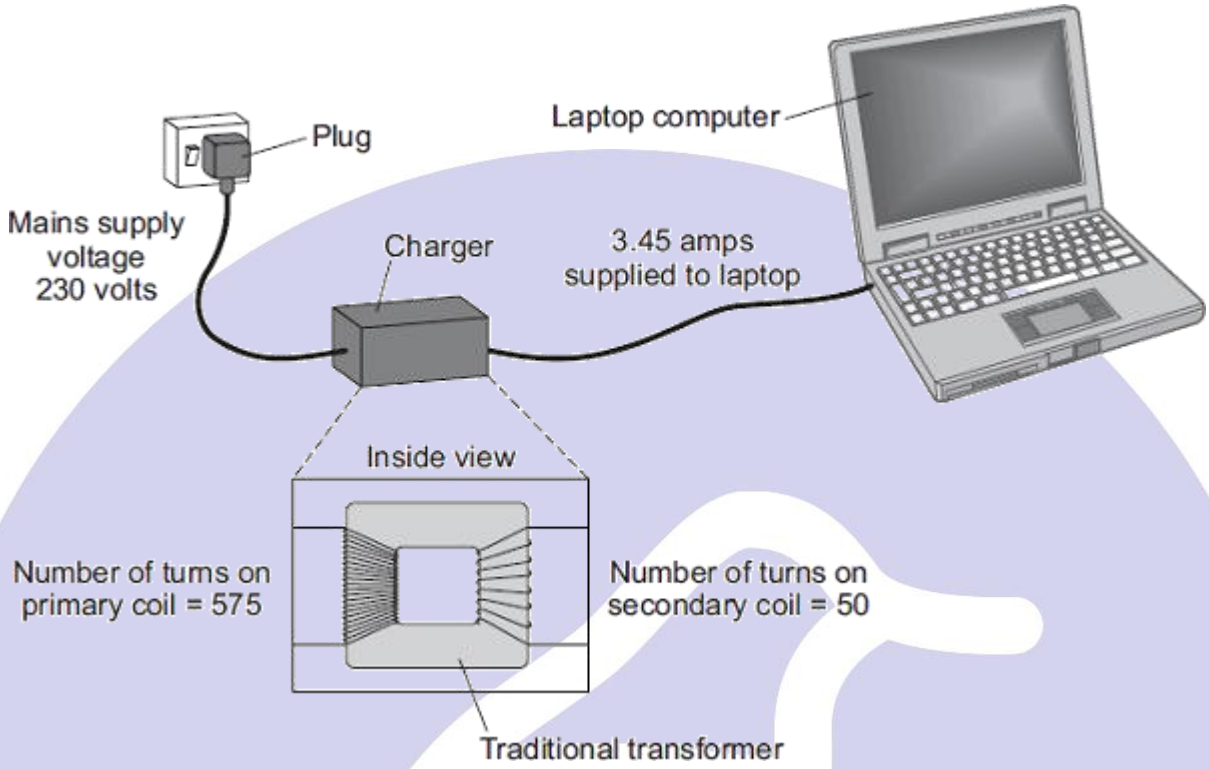
(ii) Explain how a transformer works.

(4)

(Total 7 marks)

Q3.

Batteries inside laptop computers are charged using laptop chargers. The laptop charger contains a traditional transformer.



(a) The alternating current flowing through the primary coil of the transformer creates an alternating current in the secondary coil.

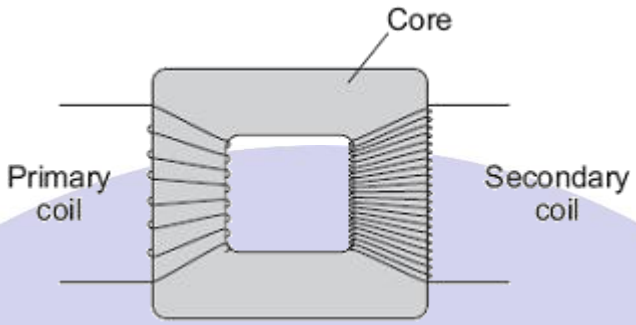
Explain how.

(3)

(Total 3 marks)

Q4.

(a) The diagram shows the structure of a transformer.



(i) The primary and secondary coils of a transformer are made of insulated wire.

Why is this insulation necessary?

_____

_____

(1)

(ii) Why is the core made of iron?

_____

_____

(1)

(iii) Explain how the transformer works.

_____

_____

_____

_____

_____

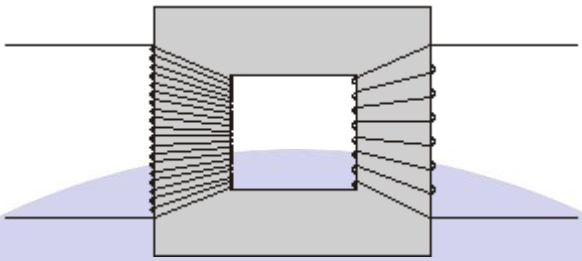
_____

(3)

(Total 5 marks)

Q5.

(a) The basic structure of a transformer is a primary coil of insulated wire, an iron core and a secondary coil of insulated wire.



(i) Why is the core made of iron?

_____

_____

(1)

(ii) Explain how a transformer works.

_____

_____

_____

_____

_____

_____

_____

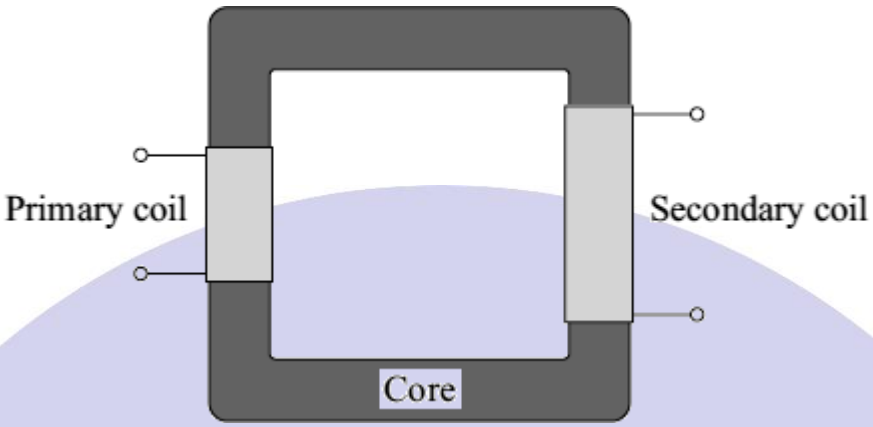
_____

(4)

(Total 5 marks)

Q6.

(a) The diagram shows the basic structure of a step-up transformer.



(i) What is the core made of?

_____

(1)

(ii) Explain how an alternating input produces an alternating output.

_____

_____

_____

_____

_____

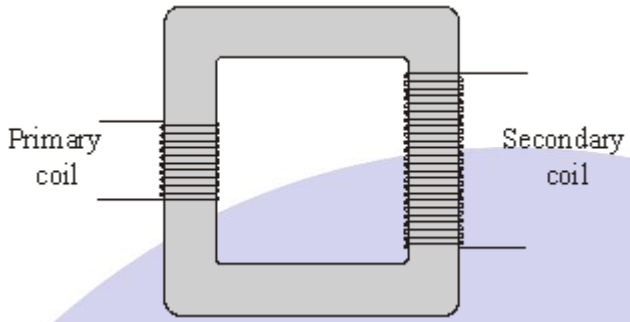
_____

(3)

(Total 3 marks)

Q7.

(a) The diagram shows the structure of a transformer.



Explain how the transformer works.

_____

_____

_____

_____

_____

_____

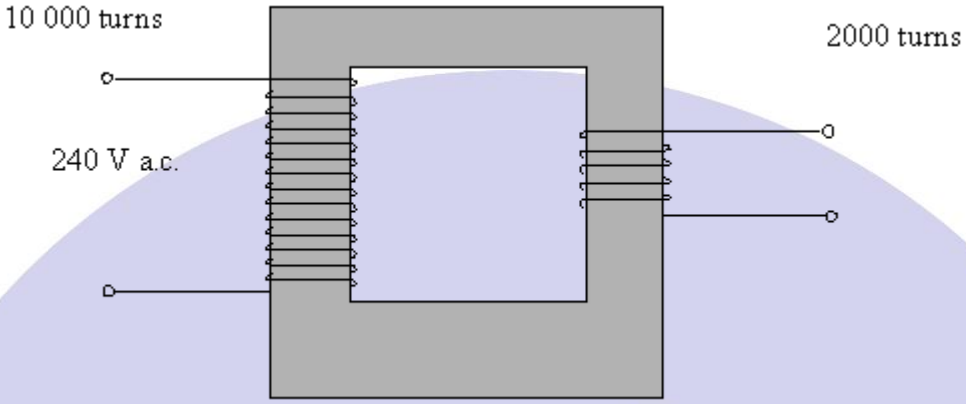
(3)

(Total 3 marks)

Q8.

(a) An appliance in a house has a transformer. The transformer is used to reduce the voltage to the level needed by the appliance.

The diagram shows the transformer.



(i) Name the material used for the core of the transformer.

_____

(1)

(b) Explain, in terms of magnetic fields, how a transformer works.

_____

_____

_____

_____

_____

_____

(4)

(c) A 12 V car battery is connected to the input leads of the transformer. It is hoped to reduce the voltage to 2.4 V in order to run a small motor. When the output voltage is measured it is found to be zero.

Explain why the output voltage is zero.

_____

_____

_____

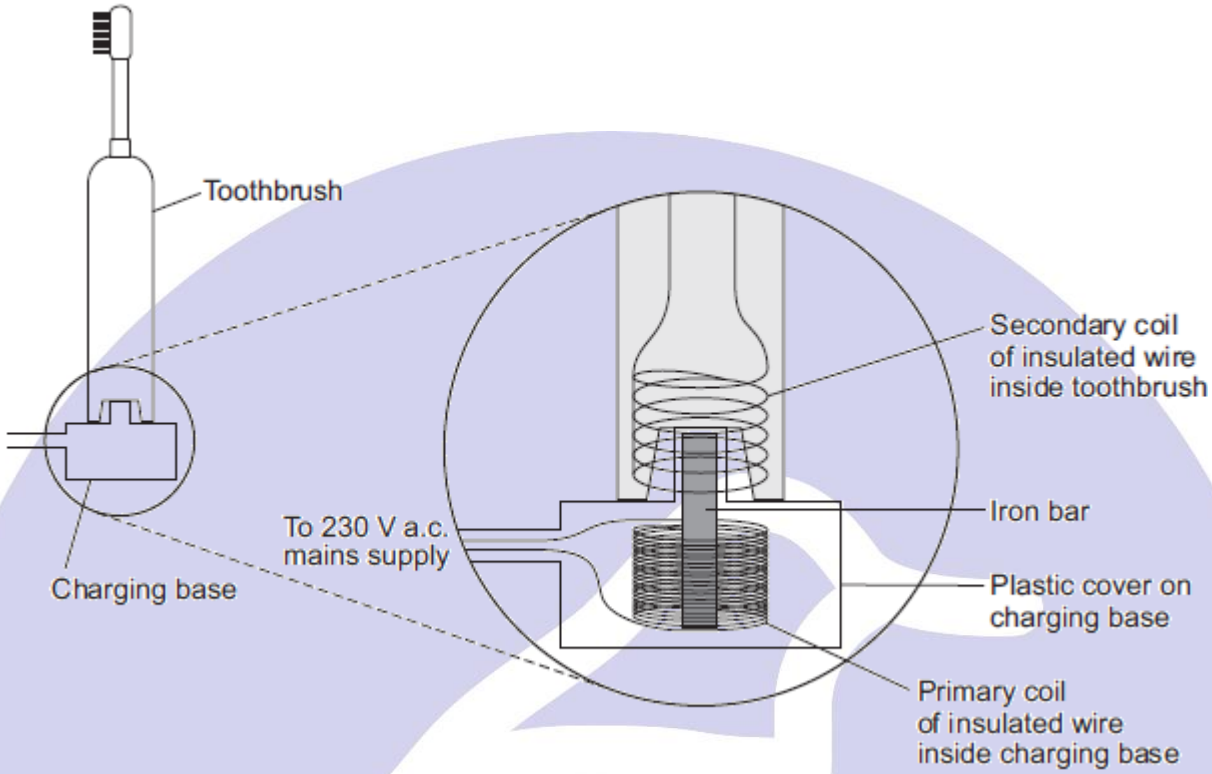
_____

(2)

(Total 7 marks)

Q9.

An electric toothbrush is charged by standing it on a separate charging base.
The diagram shows the inside of the electric toothbrush and the charging base.



(a) An alternating potential difference (p.d.) across the coil in the charging base creates an alternating current in the coil inside the toothbrush.

Explain how.

(3)

(Total 3 marks)