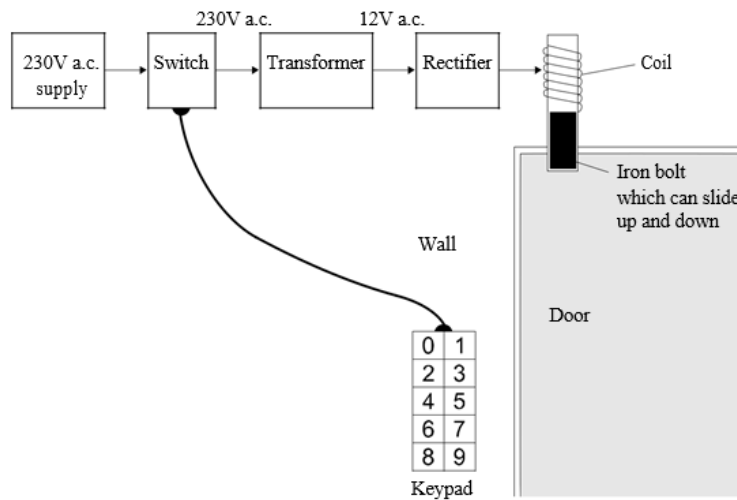


TRANSFORMER 2

Q1. The diagram shows the design for a remotely controlled door bolt.

When the correct numbers are entered into the keypad the transformer switches on. Then the door can be opened.



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

(1 mark)

(b) What does the abbreviation a.c. stand for?

(1 mark)

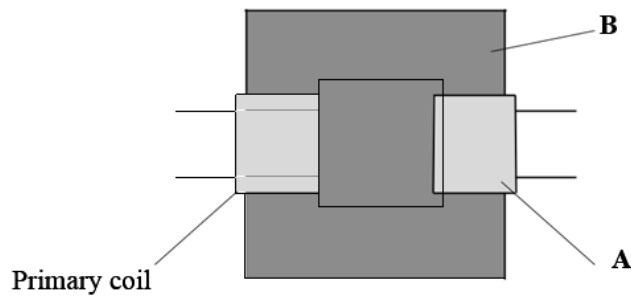
(c) Complete the sentences using the correct words from the box.

attracts	downwards	magnet	reflects
sideways	switch	transformer	upwards

- (i) When a current flows in the coil, the coil _____
becomes a _____
- (ii) The coil _____ the iron bolt which _____
moves _____

(3 marks)

Q2 (a) The diagram shows a transformer.



(a)(i) What is part A?

(1 mark)

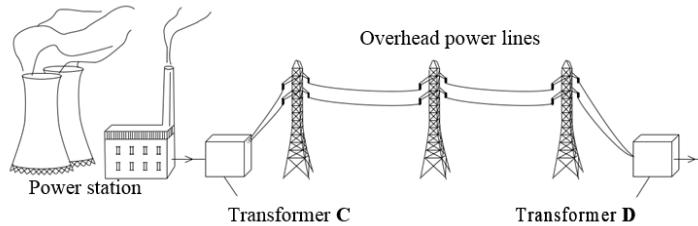
(a)(ii) What is part B and what is it made of?

(2 marks)

(a)(iii) When there is an alternating current in the primary coil, what is produced in part B?

(2 marks)

(b) Transformers are used in the National Grid. The diagram shows part of the National Grid.



Complete the two spaces in the sentence.

Transformer C is a _____ transformer and transformer D _____
is a _____
transformer.

(1 mark)

(c) This is an item from a newspaper.

Health at risk from power lines?

Are high voltage power lines a health risk to people who live near them?

Some scientists think that scientific evidence shows that they are.

Other scientists do not think that the scientific evidence supports this conclusion.

Which two suggestions would reduce the possible risk to people's health?

Put a tick (✓) in the box next to the answers

Do not build new houses near to existing power lines.

Move the power lines so that they take the shortest routes.

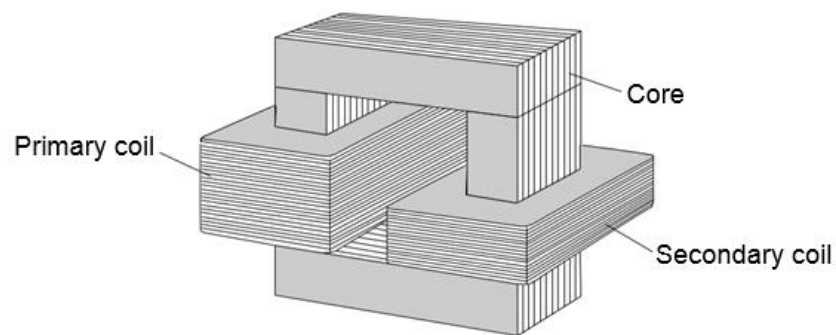
Move each power station to the centre of the nearest city.

Build new power lines away from where people live

Use more transformers in the National Grid.

(2 marks)

Q3. A teacher demonstrates a small transformer.



(a) (i) What is the core made of?

Draw a ring around the correct word in the box.

aluminium	copper	iron
-----------	--------	------

(1 mark)

(a) (ii) The potential difference (p.d.) across the secondary coil is less than the p.d. across the primary coil.

What sort of transformer is it?

(1 mark)

(b)Where is a step-up transformer used as part of the National Grid?

(1 mark)

(c)The teacher writes a note about the transformer but leaves five spaces.

Use the correct words from the box to complete the spaces.

coil	core	current	ends	field	wire
------	------	---------	------	-------	------

A transformer works because an alternating _____ in the primary _____ produces a changing magnetic _____ in the _____ and then in the secondary coil.

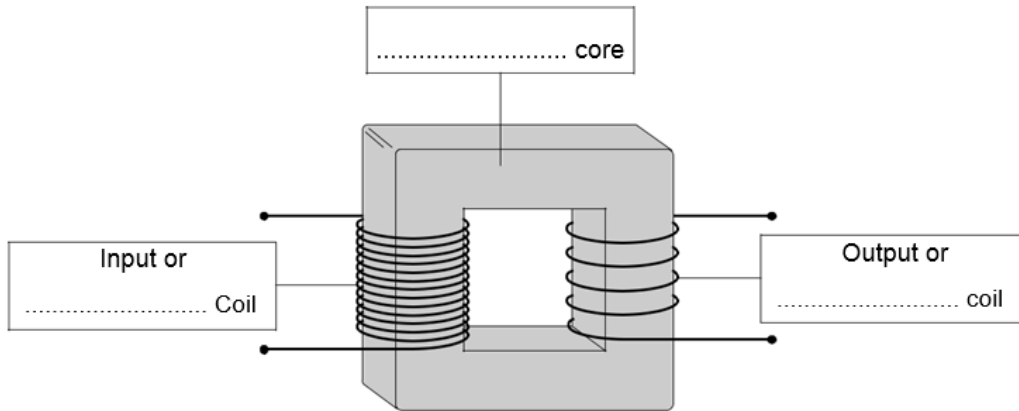
This induces an alternating potential difference across the _____ of the secondary coil.

(5 marks)

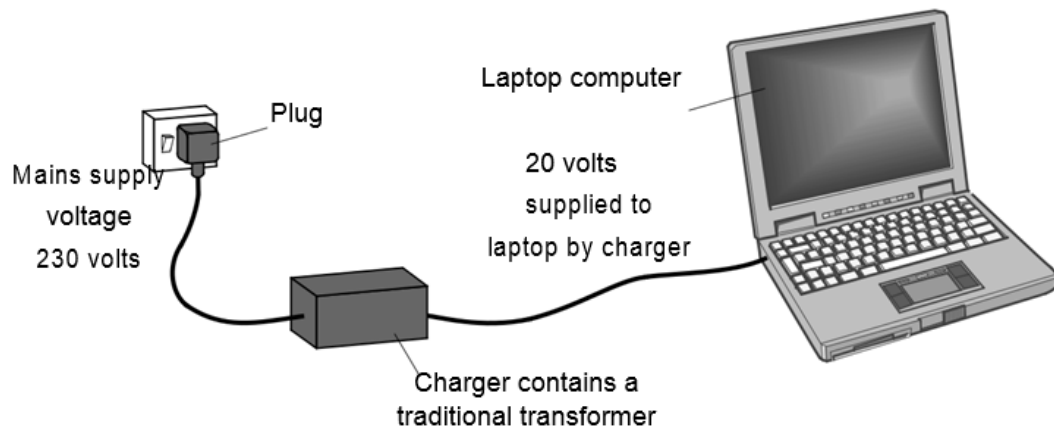
Q4. (a) The diagram shows the structure of a traditional transformer.

Use words from the box to label the diagram.

aluminium brass iron large primary secondary



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



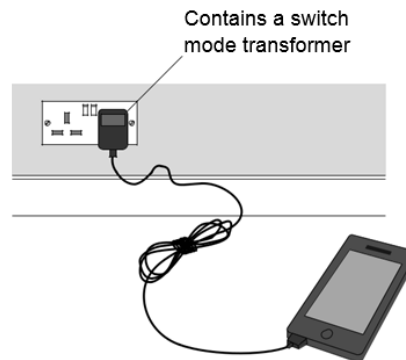
The laptop charger contains a step-down transformer.

What does a step-down transformer do?

(1 mark)

(c) The transformer used in a modern mobile phone charger is a switch mode transformer.

This is different to the traditional transformer used in the laptop charger.



Give one advantage of using a switch mode transformer, rather than a traditional transformer.

(1 mark)

(d) Laptop batteries and mobile phone batteries can only be recharged a limited number of times. When a battery cannot be recharged, it is better to recycle the battery than to throw it away.

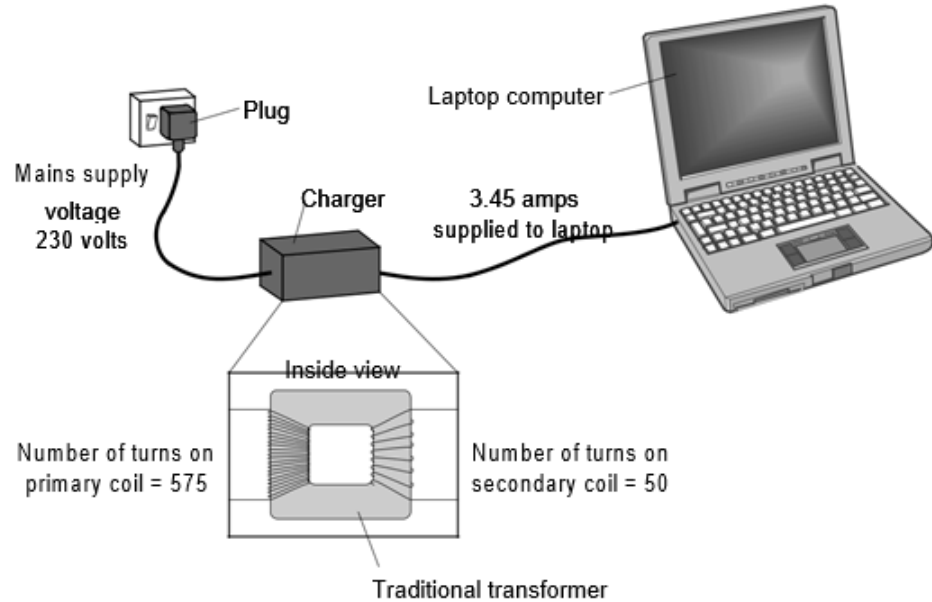
Draw a ring around the correct answer to complete the sentence.

The batteries are recycled mainly due to

an environmental
a political
a social

consideration.

Q5. 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 marks)

(b) (i) Use information from the diagram to calculate the potential difference the charger supplies to the laptop.

Use the correct equation from the Physics Equations Sheet.

Potential difference = _____ V

(2 marks)

(b) (ii) Calculate the current in the primary coil of the transformer when the laptop is being charged.

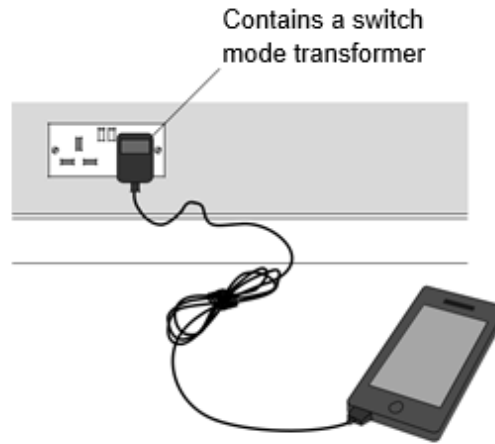
Assume the transformer is 100% efficient.

Use the correct equation from the Physics Equations Sheet.

Current = _____ A

(2 marks)

(c) Switch mode transformers can be used in mobile phone chargers.



Switch mode transformers can both use the UK mains supply.

transformers and traditional

The switch mode transformer is smaller and lighter than the traditional transformer used in the laptop charger.

Give one other advantage of the switch mode transformer.

(1 mark)

(d) Laptop batteries and mobile phone batteries can only be recharged a limited number of times. After this, the batteries cannot store enough charge to be useful. Scientists are developing new batteries that can be recharged many more times than existing batteries.

Suggest one other advantage of developing these new batteries.

(1 mark)

Q6. (a) In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

There are two types of traditional transformer; step-up and step-down.

Describe the similarities and differences between a step-up transformer and a step-down transformer.

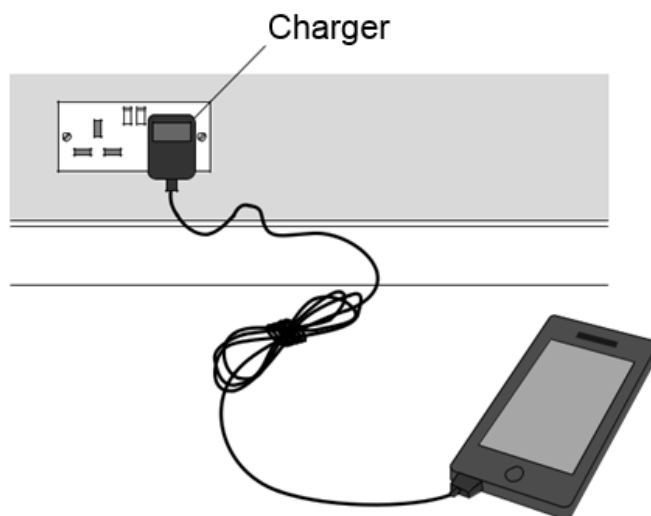
You should include details of:

- construction, including materials used
- the effect the transformer has on the input potential difference (p.d.).

You should not draw a diagram.

(b) Figure 15 shows a mobile phone and charger.

Figure 15



Mobile phone chargers use a different type of transformer, which is smaller and lighter than a traditional transformer.

What name is given to the type of transformer used in a mobile phone charger?

[1 mark]

Total 43 marks