

Transformers

Question Paper

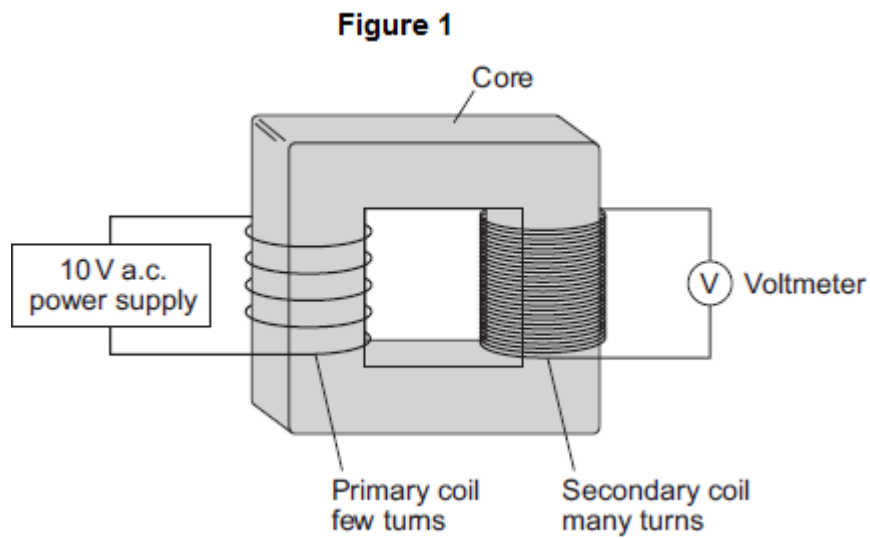
Level	GCSE
Subject	Physics
Exam Board	AQA
Unit	P3
Topic	Transformers
Difficulty Level	Bronze Level
Booklet	Question Paper

Time Allowed: 37 minutes

Score: /37

Percentage: /100

Q1. Figure 1 shows a traditional transformer.



- (a) (i) Which metal should the core of the transformer be made from?

Tick (✓) **one** box.

aluminium	<input type="checkbox"/>
copper	<input type="checkbox"/>
iron	<input type="checkbox"/>

(1)

- (ii) What would the reading be on the voltmeter shown in **Figure 1**?

Draw a ring around the correct answer.

2 V

10 V

50 V

Give the reason for your answer.

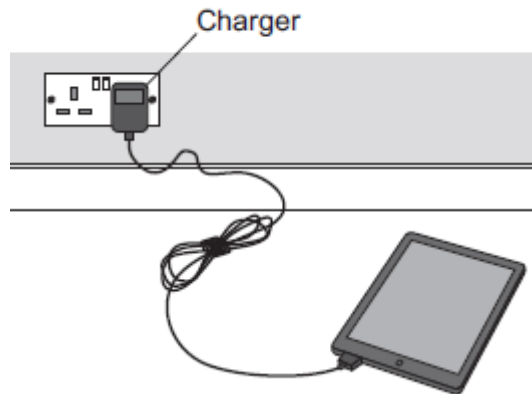
.....

.....

(2)

(b) **Figure 2** shows a tablet computer and its charger.

Figure 2



The charger contains a switch mode transformer.

(i) Use the correct answer from the box to complete the sentence.

200	1000	20 000
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Switch mode transformers operate at frequencies
from 50 kHz to kHz.

(1)

(ii) Give **one** advantage of a switch mode transformer over a traditional transformer.

.....
.....

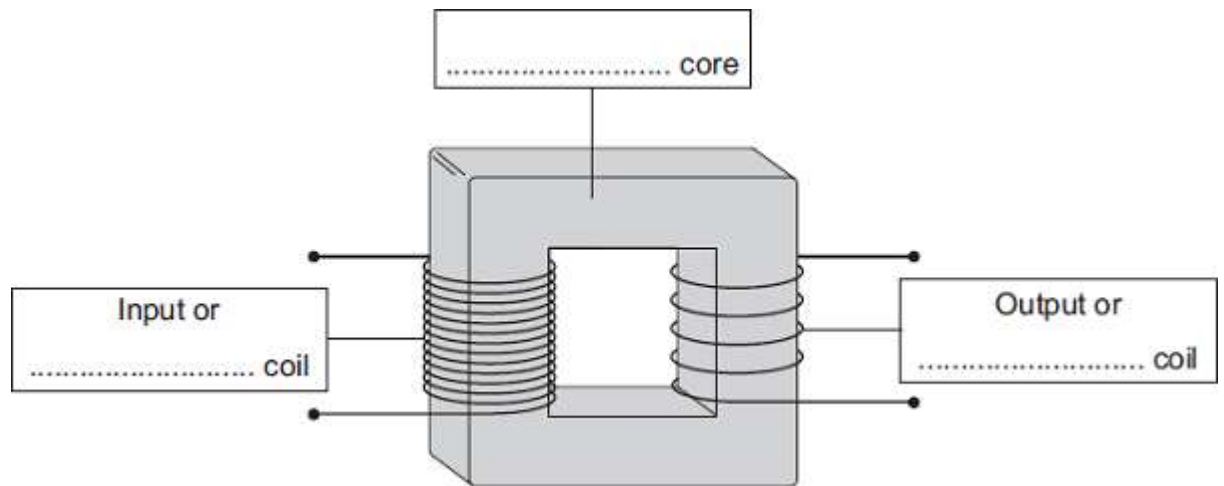
(1)

(Total 5 marks)

Q2.(a) The diagram shows the structure of a traditional transformer.

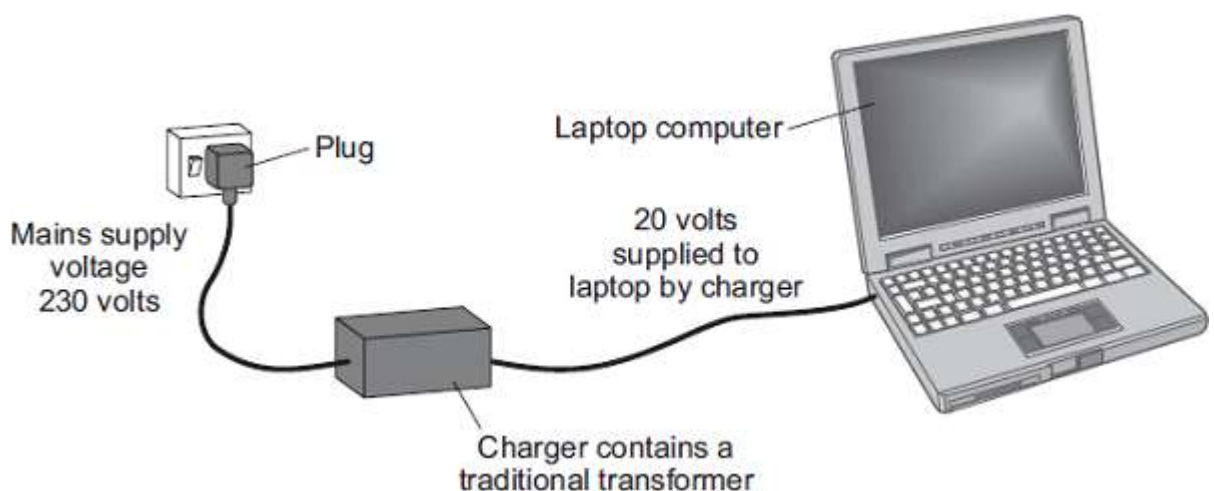
Use words from the box to label the diagram.

aluminium	brass	iron	large	primary	secondary
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(3)

- (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.

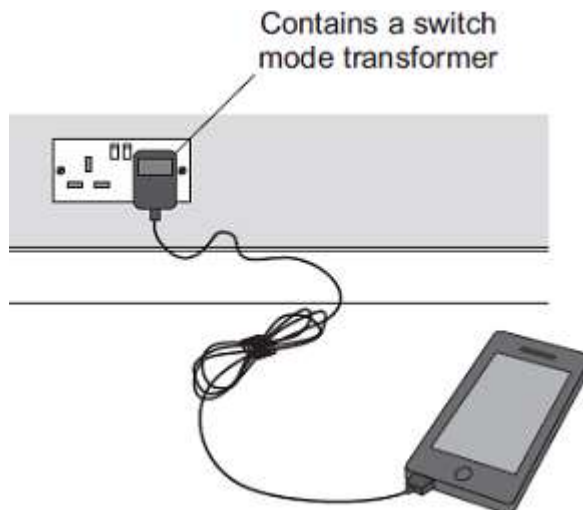
What does a step-down transformer do?

.....

.....

(1)

- (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)

- (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.

(iii)

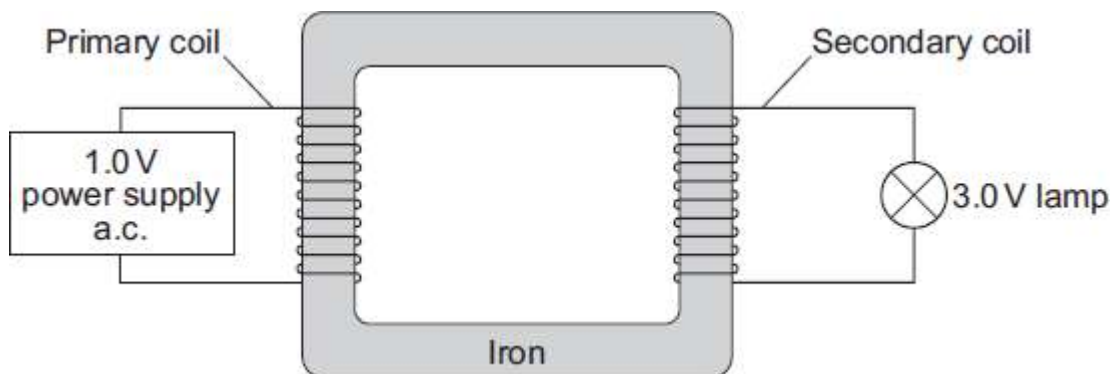
The batteries are recycled mainly due to

an environmental		consideration.
a political		
a social		

(1)

(Total 6 marks)

Q3.(a) The diagram shows a simple transformer made by a student. The student has designed the transformer to light a 3.0 V lamp using a 1.0 V power supply.



(i) What name is given to the part of the transformer that is made of iron?

Draw a ring around your answer.

- centre connector core

(1)

(ii) When the power supply is switched on, the lamp is not very bright.

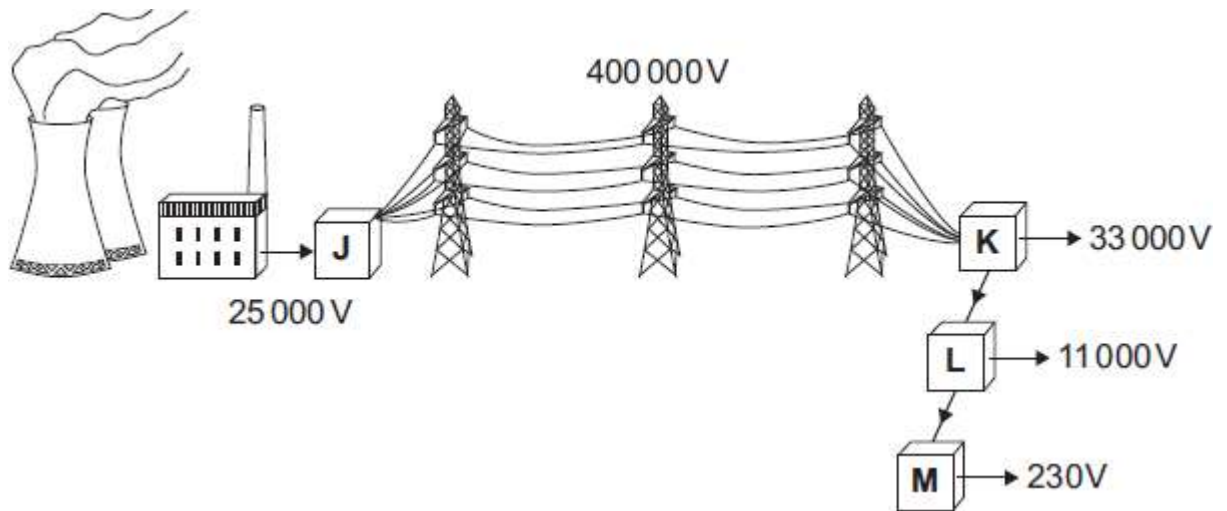
Suggest **one** change that the student can make to increase the brightness of the lamp.

The 1.0 V power supply cannot be changed.

.....

(1)

(b) The diagram shows part of the National Grid system. The transformers, J, K, L and M, are an essential part of the system.



- (i) Which transformer, **J**, **K**, **L** or **M**, is a step-up transformer?

Write your answer in the box.

(1)

- (ii) Some scientists claim to have found evidence to suggest that children living near to overhead power lines are more likely to develop leukaemia. However, the scientists are not sure that the power lines are the cause of the problem.

The evidence from this and other investigations may worry some people.

What do you think scientists should do?

Put a tick (✓) in the box next to your answer.

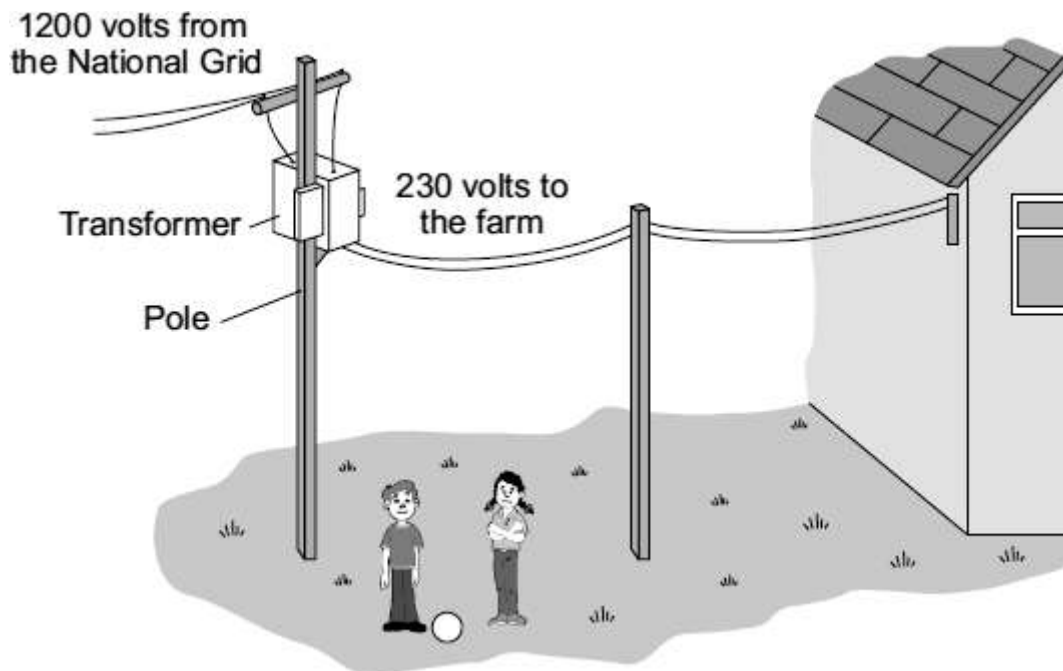
Scientists should always publish the evidence from investigations immediately.

Scientists should ignore any evidence from investigations that may worry people.

Scientists should publish the evidence from an investigation only when they have found out as many facts as possible.

(1)
(Total 4 marks)

Q4. The diagram shows part of the system used to supply a farm with electricity.



(a) The core of the transformer is made of metal.

Complete the following sentence by drawing a ring around the correct word in the box.

The metal used for the core of the transformer is

copper.

iron.

steel.

(1)

(b) (i) What sort of transformer is shown in the diagram?

.....

(1)

(ii) Complete the following sentence by drawing a ring around the correct line in the box.

In this transformer, the number of turns on the secondary coil is

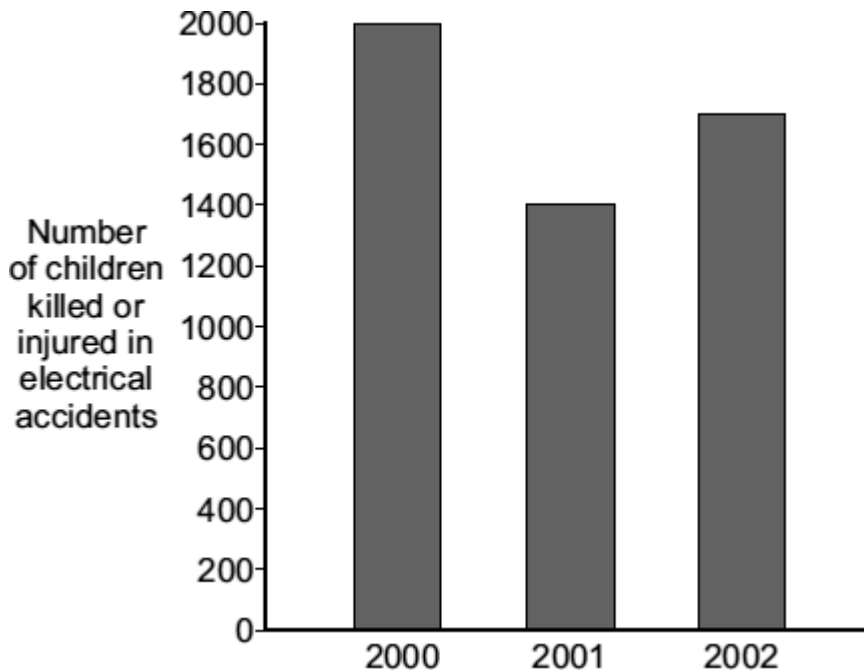
less than
the same as
greater than

the number of turns on the primary coil.

(1)

(c) Transformers and other electrical equipment can be dangerous.

The following bar chart shows the numbers of children, aged 14 or under, killed or injured in electrical accidents in the UK in 2000, 2001 and 2002.



(i) In which of these years were most children killed or injured in electrical accidents?

.....

(1)

(ii) A newspaper claims that the number of children killed or injured by electrical accidents will increase in 2011.

Which of the following gives a reason why the information given in the graph does not support this claim.

Put a tick (✓) in the box next to your answer.

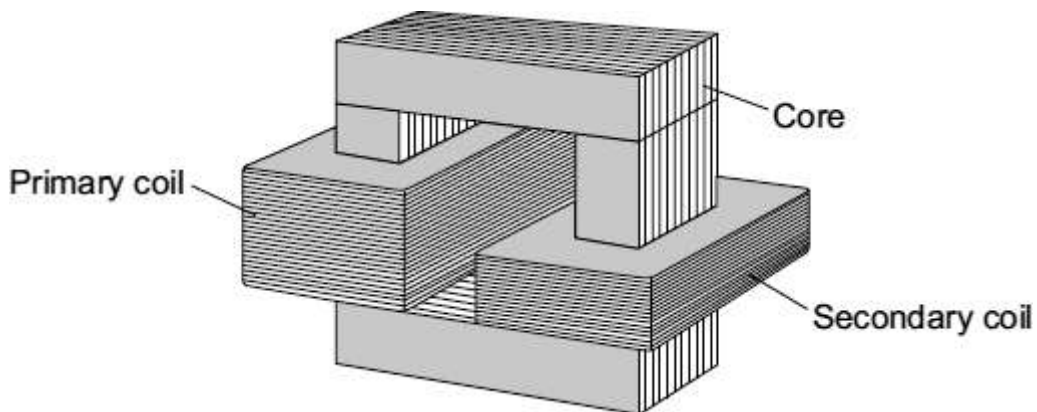
The pattern shows an upward trend.

The pattern shows a downward trend.

There is no pattern.

(1)
(Total 5 marks)

Q5. 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)

- (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)

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

.....

(1)

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

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

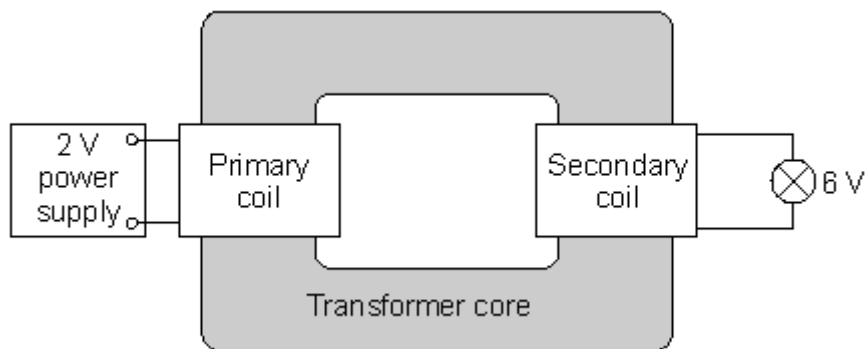
coil	core	current	ends	field	wire
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A transformer works because an alternating in the primary produces a changing magnetic in the and then in the secondary coil.

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

(5)
(Total 8 marks)

- Q6.** The diagram shows a transformer made by a student. The student has designed the transformer to make a 6 V light bulb work using a 2 V power supply.



(a) Draw a ring around the correct answer to complete the following sentences.

(i) For the transformer to work, the student

- must use an a.c.
- can use either an a.c or a d.c.
- must use a d.c.

power supply.

(1)

(ii) On the primary coil there are 30 turns of wire. For the lamp to work brightly

there must be less than 30
exactly 30
more than 30 turns of wire on the secondary coil.

(1)

(b) What is the transformer core made from?

Give a reason for your answer.

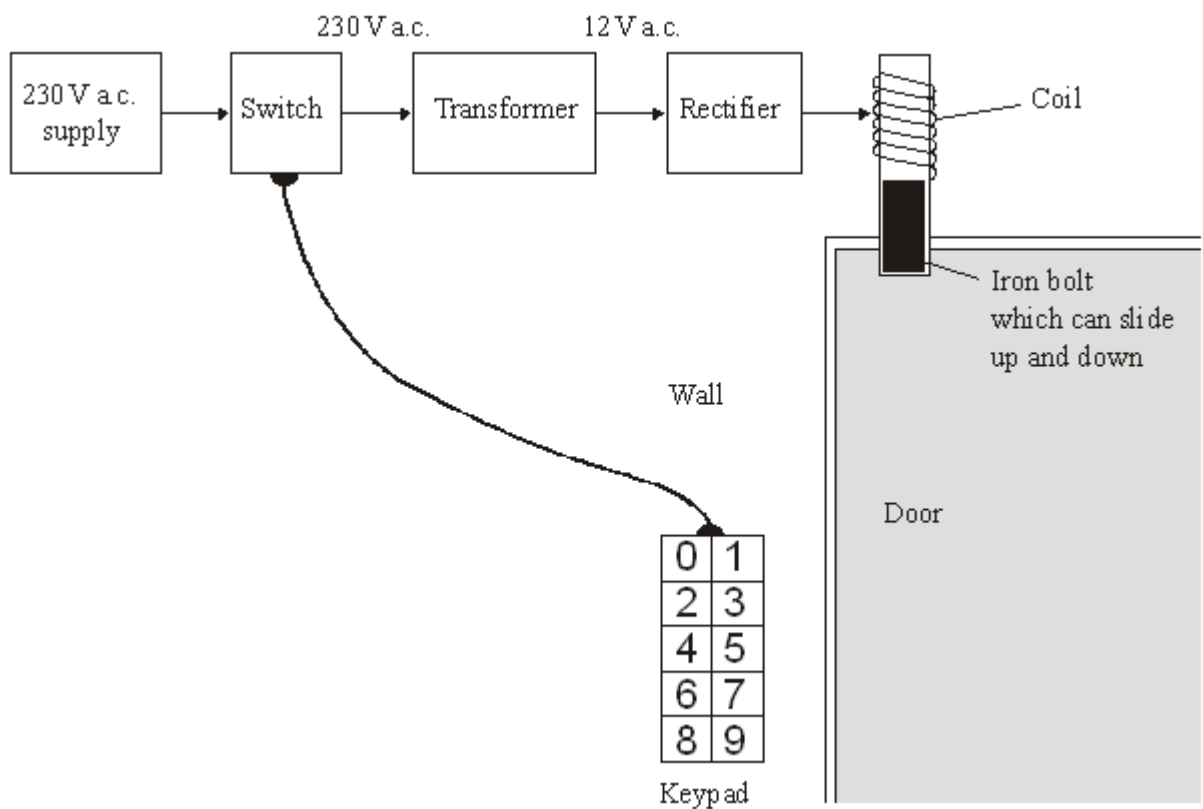
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.....

.....
.....

(2)
(Total 4 marks)

Q7. 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)

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

.....

(1)

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

attracts	downwards	magnet	reflects	repels
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)

(Total 5 marks)