

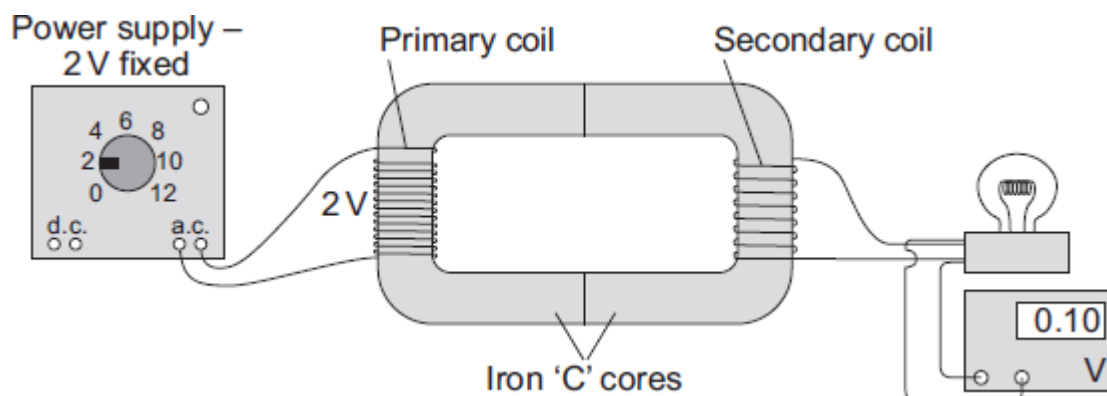
Name of the Student: _____

Max. Marks : 17 Marks

Time : 17 Minutes

Q1.

The diagram shows the apparatus used by a student to investigate a transformer.

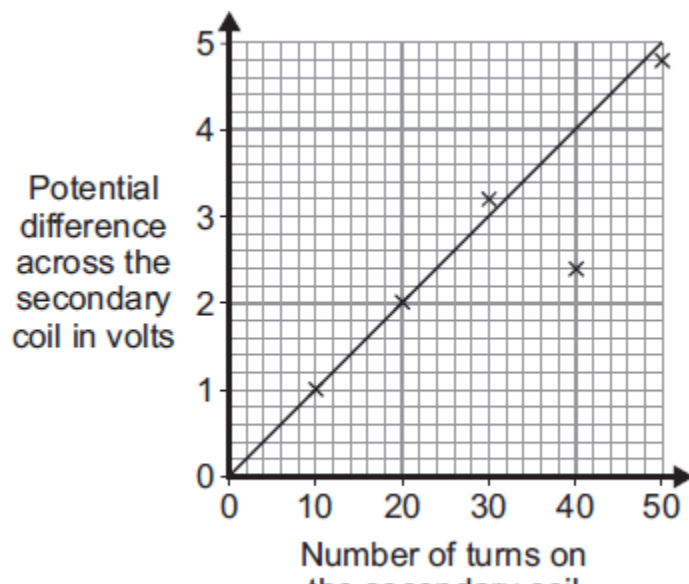


- (a) The transformer made by the student would not have worked if the core had been made from aluminium and not iron.

Why?

(1)

- (b) The student made changes to the number of turns used to make the secondary coil. He then measured the potential difference across the secondary coil after each change. The graph shows the student's results.



- (i) What range of values was used for the number of turns on the secondary coil?

From _____ to _____

(1)

- (ii) When he drew the line of best fit, the student ignored one of the data points.

Why?

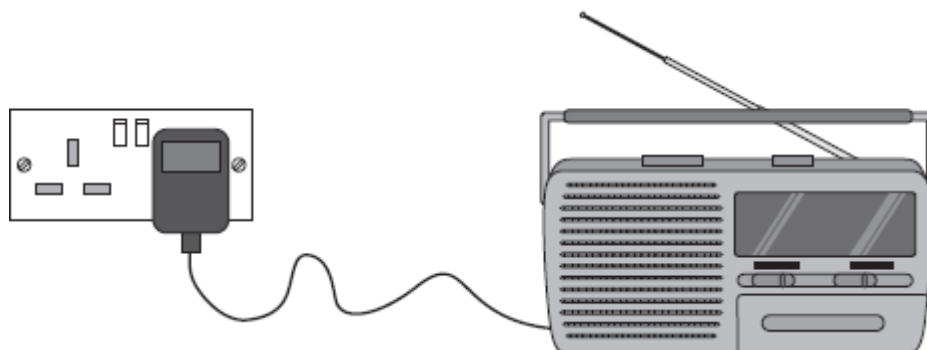
(1)

- (iii) What is the minimum number of turns needed on the secondary coil for the transformer to act as a step-up transformer?

Give a reason for your answer.

(2)

- (c) A radio can be used with a 9 V battery or it can be plugged into the 230 V mains electricity supply using an adapter. The mains adapter contains a transformer.



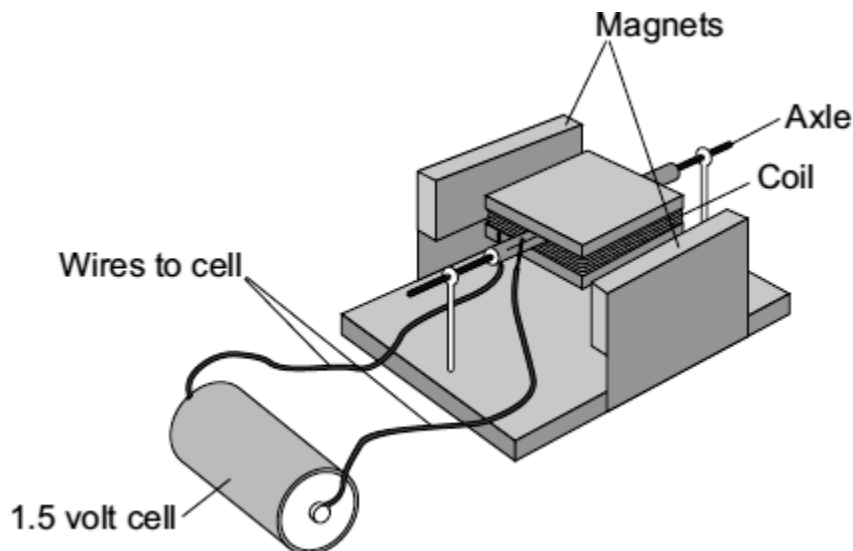
Why must the mains adapter contain a transformer?

(1)

(Total 6 marks)

Q2.

- (a) Complete the description of the device shown below by drawing a ring around the correct line in each box.



- (i) The device is being used as

an electric motor.
a generator.
a transformer.

(1)

- (ii) The coil needs a flick to get started. Then one side of the coil is pushed by the

cell
coil
force

and the other side is pulled, so that the coil spins.

(1)

- (b) Suggest **two** changes to the device, each one of which would make the coil spin faster.

1. _____

2. _____

(2)

- (c) Suggest **two** changes to the device, each one of which would make the coil spin in the opposite direction.

1. _____

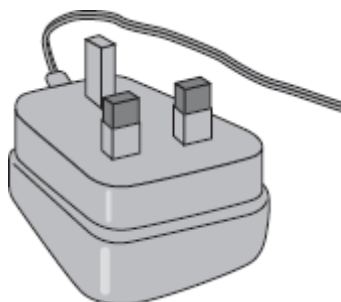
2. _____

(2)

(Total 6 marks)

Q3.

- (a) The drawing shows the plug for operating a radio from the mains.



This plug contains a transformer. There are 4600 turns on its primary coil and 200 turns on its secondary coil. The plug is used on the mains supply and has a potential difference (p.d.) of 230 V across its primary coil.

Use the equation in the box to calculate the p.d. across the secondary coil of the transformer.

$\frac{\text{p.d. across primary}}{\text{p.d. across secondary}} = \frac{\text{number of turns on primary}}{\text{number of turns on secondary}}$

Show clearly how you work out your answer.

p.d. across secondary = _____ V

(2)

- (b) The coils of the transformer are made of insulated wire.

Why is the wire insulated?

(1)

(c) (i) What material is the core of a transformer made from?

(1)

(ii) Why is the core made from this material?

(1)

(Total 5 marks)