

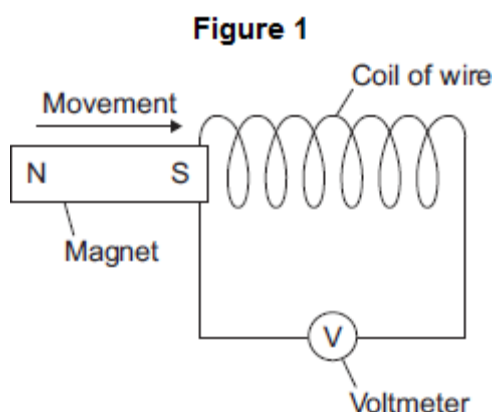
Name of the Student: _____

Max. Marks : 25 Marks

Time : 25 Minutes

Q1.

Figure 1 shows a magnet moving into a coil of wire. This movement causes a reading on the voltmeter.



- (a) Use the correct word from the box to complete the sentence.

generated	induced	produced
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Moving the magnet into the coil of wire causes a reading on the voltmeter because a potential difference is _____ across the ends of the wire.

(1)

- (b) A student investigated how the number of turns on the coil of wire affects the maximum voltmeter reading. The student changed the number of turns on the coil of wire, then moved the magnet into the coil. The student recorded the maximum voltmeter reading.

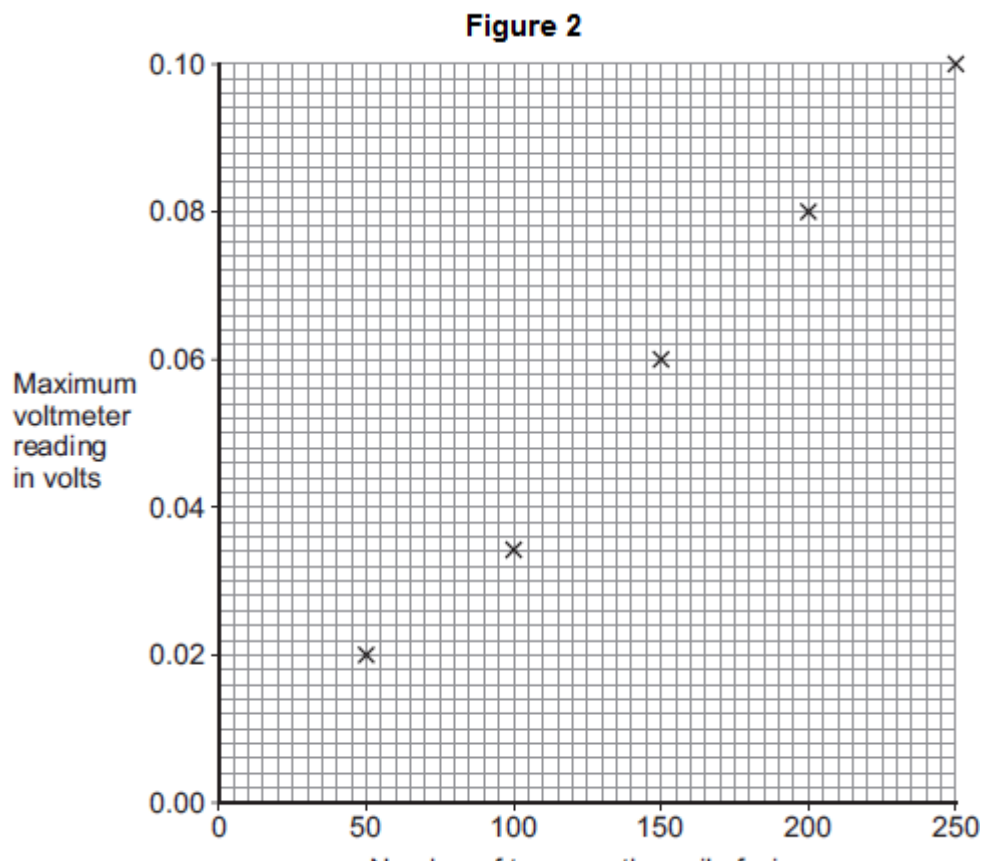
To obtain valid data, suggest **two** variables that the student should control in this investigation.

1. _____

2. _____

(2)

- (c) The student's results are shown in **Figure 2**.



- (i) One of the results is anomalous.
Suggest a reason for the anomalous result.

(1)

- (ii) Draw a line of best fit on **Figure 2**.

(1)

- (d) A data-logger can automatically record and store data.

It may have been better for the student to have used a data-logger in his investigation rather than a voltmeter.

Suggest **one** reason why.

(1)

(Total 6 marks)

Q2.

If a fault develops in an electrical circuit, the current may become too great. The circuit needs to be protected by being disconnected.

A fuse or a circuit breaker may be used to protect the circuit.

One type of circuit breaker is a Residual Current Circuit Breaker (RCCB).

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

earth	live	neutral
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A fuse is connected in the _____ wire.

(1)

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

are bigger	are cheaper	react faster
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RCCBs are sometimes preferred to fuses because they _____ .

(1)

- (iii) RCCBs operate by detecting a difference in the current between two wires.

Use the correct answer from the box to complete the sentence.

earth and live	earth and neutral	live and neutral
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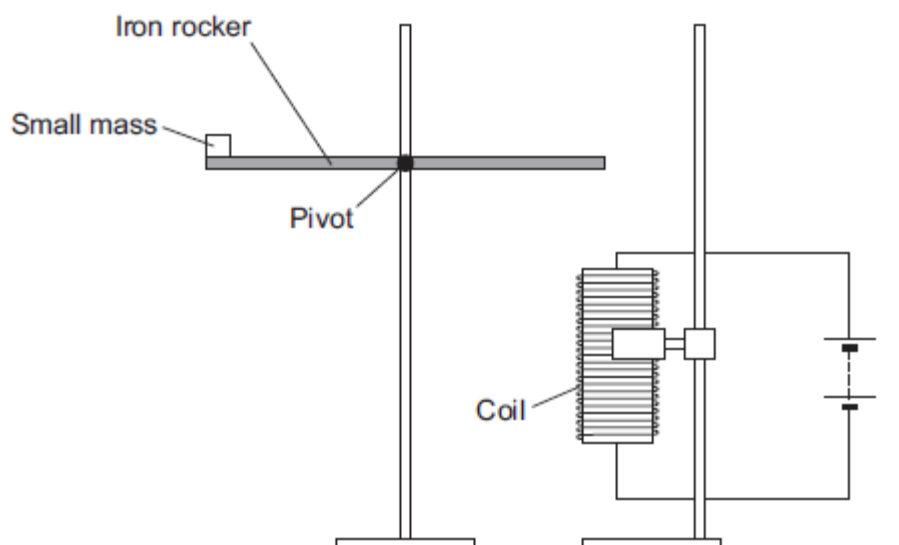
The two wires are the _____ wires.

(1)

- (b) An RCCB contains an iron rocker and a coil.

A student investigated how the force of attraction, between a coil and an iron rocker, varies with the current in the coil.

She supported a coil vertically and connected it in an electrical circuit, part of which is shown in the figure below .



She put a small mass on the end of the rocker and increased the current in the coil until the rocker balanced. She repeated the procedure for different masses.

Some of her results are shown in the table below.

Mass in grams	Current needed for the rocker to balance in amps
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5	0.5
10	1.0
15	1.5
20	2.0

- (i) State **two** extra components that must have been included in the circuit in the figure above to allow the data in the above table to be collected.

Give reasons for your answers.

(4)

- (ii) A teacher said that the values of current were too high to be safe.

Suggest **two** changes that would allow lower values of current to be used in this investigation.

Change 1 _____

Change 2 _____

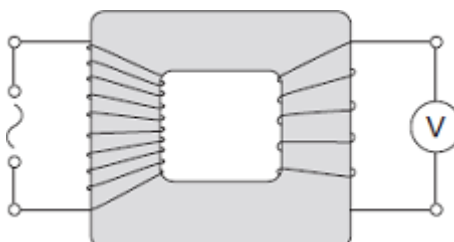
(2)

(Total 9 marks)

Q3.

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) The table shows values for the potential difference (p.d.) of the supply and the voltmeter reading.

p.d. of the supply in volts	Voltmeter reading in volts
6.4	3.2
3.2	
	6.4

- (i) Complete the table.

(2)

- (ii) Transformers are used as part of the National Grid.

How are the values of p.d. in the table different to the values produced by the National Grid?

(1)

- (c) 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 10 marks)