Electric Circuits & Electrical Safety

Question Paper

Course	CIE IGCSE Physics
Section	4. Electricity & Magnetism
Topic	Electric Circuits & Electrical Safety
Difficulty	Medium

Time Allowed 60

Score /43

Percentage /100

Question 1a

Fig. 10.1 shows an arrangement for making an electromagnet.

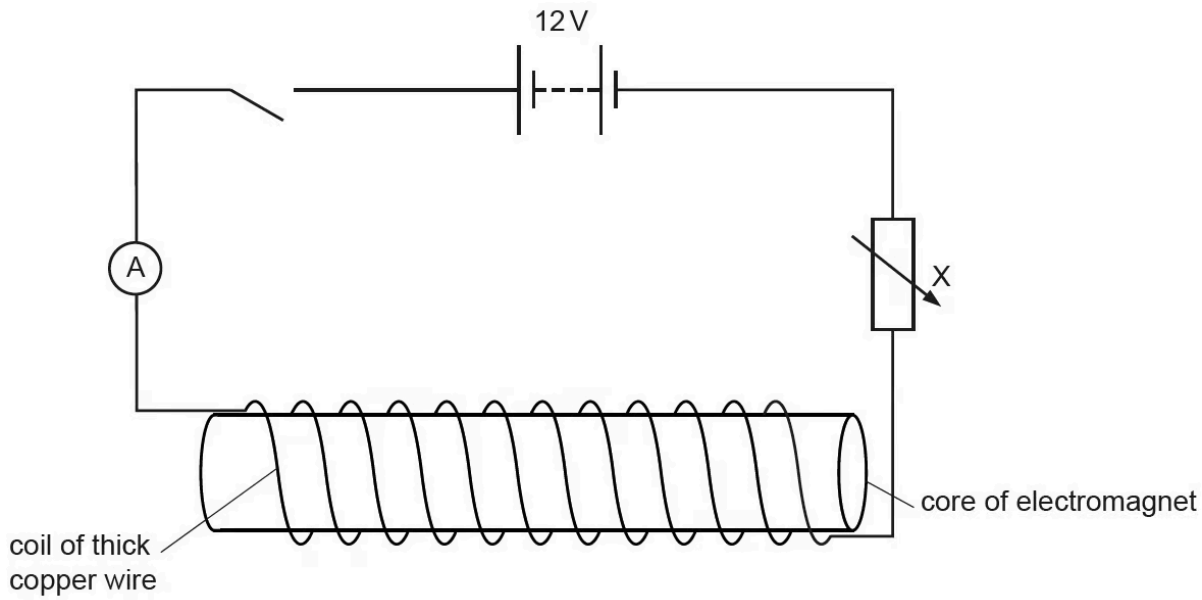

Fig. 10.1

(i) State a material which is suitable for the core of the electromagnet.

[1]

(ii) State the name for component X in Fig. 10.1.

[1]

(iii) Describe and explain how component X varies the strength of the electromagnet.

[2]

[4 marks]

Question 1b

The switch is closed. The reading on the ammeter is 1.5 A.

Calculate the resistance of the circuit.

resistance = ... Ω

[3 marks]

Question 2a

A student does an experiment to determine the resistance of a fixed resistor, R.

The student draws an incomplete diagram of the circuit, as shown in Fig. 10.1.

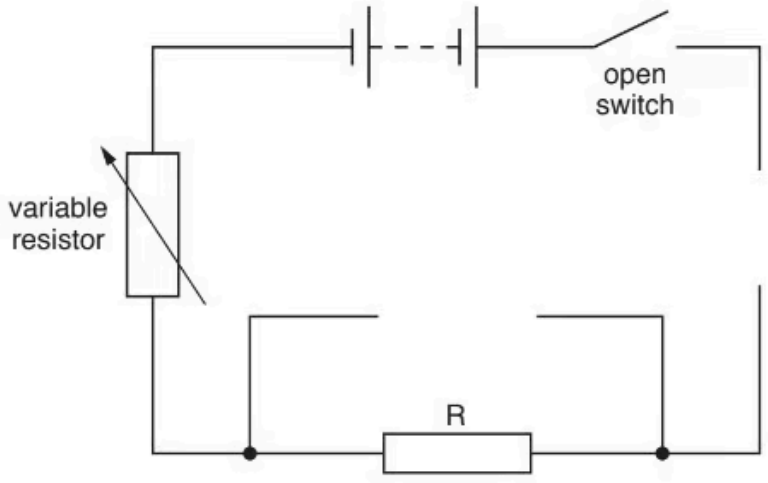

Fig. 10.1

(i) On Fig. 10.1, draw the missing circuit symbols.

[3]

(ii) Describe how the student could use the circuit to determine a reliable value for the resistance of R.

[5]

[8 marks]

Question 2b

Fig. 10.2 shows a 20 Ω resistor connected to a power supply.

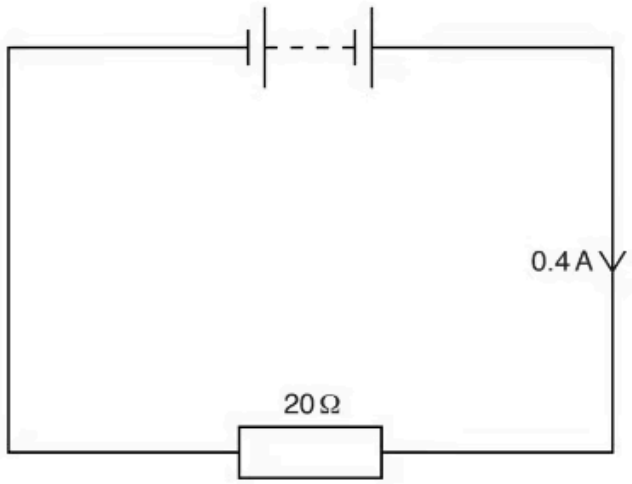

Fig. 10.2

A second 20 Ω resistor is connected in series with the first.

State and explain how this affects the current in the circuit.

[4 marks]

Question 3a

A teacher is investigating the resistance of a lamp.

Fig. 10.1 shows part of the circuit she uses. The circuit is incomplete.

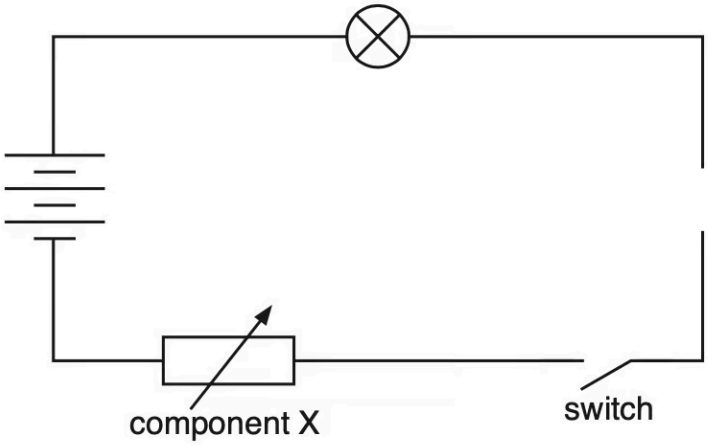

Fig. 10.1

(i) To determine the resistance of the lamp, the teacher adds two meters to her circuit.

On Fig. 10.1, draw circuit symbols to show each meter correctly connected in the circuit.

[3]

(ii) When the current in the lamp is 0.25A, the potential difference (p.d.) across the lamp is 4.5 V. Calculate the resistance of the lamp.

resistance = ... Ω [3]

[6 marks]

Question 3b

Extended tier only

(i) State the name of component X.

[1]

(ii) Describe and explain how the teacher uses component X to investigate the resistance of the lamp.

[2]

[3 marks]

Question 4a

A teacher uses a power supply in a metal case. The circuit for the power supply includes a fuse.

(i) Draw the electrical symbol for a fuse.

[1]

(ii) The metal case of the power supply is earthed. A fault occurs and a live wire touches the metal case.

Explain how earthing the metal case protects the teacher.

[3]

[4 marks]

Question 4b

The power supply circuit includes a transformer. Its input voltage is 240 V. There are 960 turns on the input coil and 64 turns on the output coil.

Calculate the output voltage of the transformer.

output voltage = ... V

[3 marks]

Question 5a

A circuit is made from two lamps, a cell and a switch, as shown in Fig. 10.1.

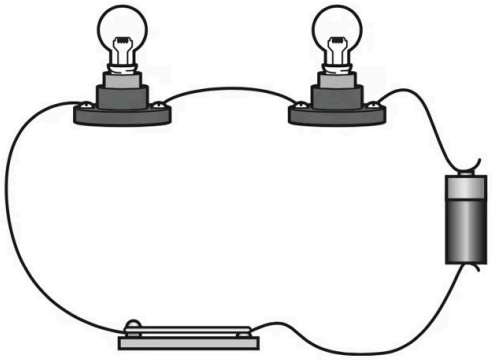

Fig. 10.1

(i) Draw the circuit symbol for a cell.

[1]

(ii) State the term used for the arrangement of lamps in the circuit in Fig. 10.1.

[1]

(iii) The switch is closed and the lamps light.

State the name of the charged particles that are flowing through the wires.

[1]

[3 marks]

Question 5b

Extended tier only

Fig. 10.2 represents a different type of circuit.

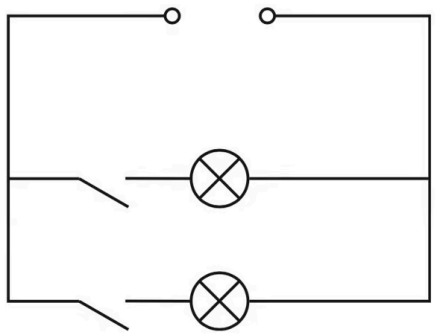

Fig. 10.2

(i) Compare Fig. 10.1 and Fig. 10.2.
State **two** advantages of the type of circuit shown in Fig. 10.2 with the type of circuit shown in Fig. 10.1.

[2]

(ii) The potential difference across the power source in Fig. 10.2 is 3.0 V. The combined resistance of the two lamps is 12 Ω.

Calculate the size of the current in the circuit when the switches are closed.

current = ... A [3]

[5 marks]