Electricity – 2019 Nov IGCSE

1. 0625/31/O/N/19/No.10

A teacher is investigating the resistance of a lamp.

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

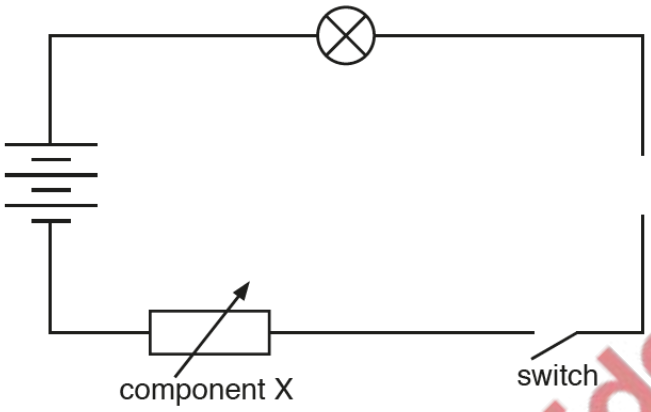

Fig. 10.1

(a) (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 4.5V. Calculate the resistance of the lamp.

resistance = ... Ω [3]

(b) (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]

[Total: 9]

2. 0625/32/O/N/19/No.10

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

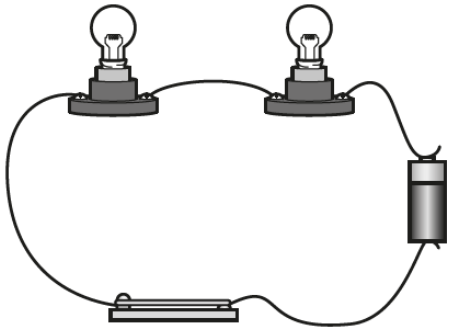

Fig. 10.1

(a) (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]

(b) Fig. 10.2 represents a different type of circuit.

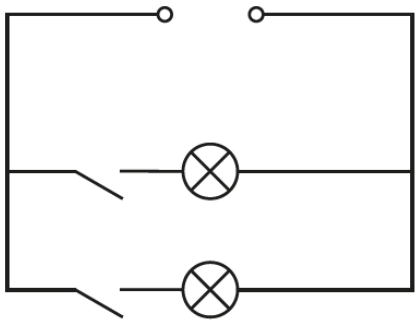

Fig. 10.2

(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.

1. .....

2. .....

[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.

current = ... A [3]

[Total: 8]

3. 0625/33/O/N/19/No.10

Fig. 10.1 shows the symbol for an electrical component.

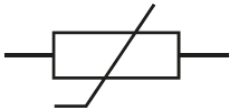

Fig. 10.1

(a) State the name of the component shown in Fig. 10.1.

..... [1]

(b) The resistance of the component shown in Fig. 10.1 varies with temperature. Fig. 10.2 shows a graph of resistance against temperature for the component.

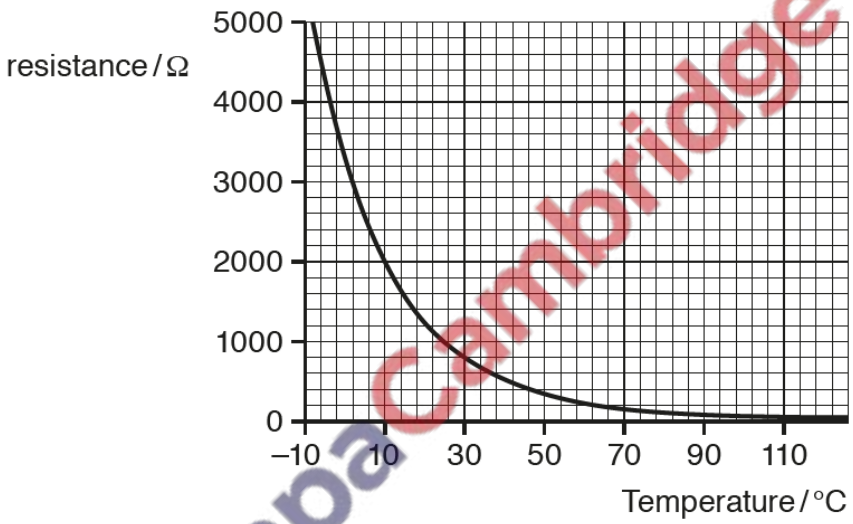

Fig. 10.2

(i) Use Fig. 10.2 to determine the resistance of the component at a temperature of 10 °C.

..... Ω [1]

(ii) At another temperature, the resistance of the component is 800 Ω.
Calculate the current in the component when it is connected to a 12.0 V supply.

current = ...A [3]

[Total: 5]

4. 0625/41/O/N/19/No.7

The resistance of a 1.0 m length of resistance wire is 7.6 Ω. A length of this wire is taped to a metre rule. A crocodile clip is connected to one end of the resistance wire exactly at the 0 m mark of the rule. Fig. 7.1 shows the crocodile clip connected to terminal P.

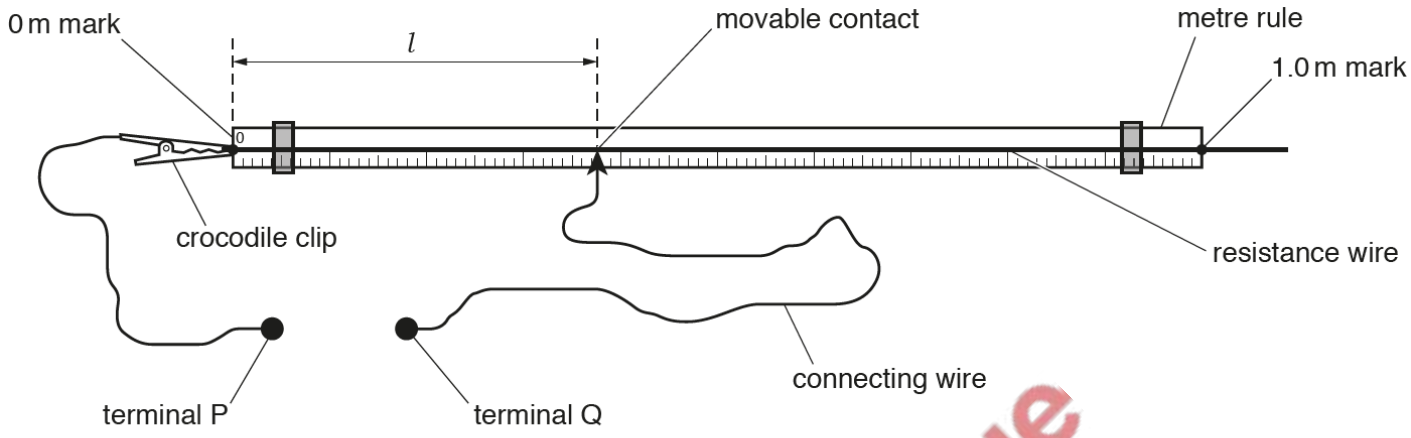

Fig. 7.1

A second terminal Q is connected to a movable contact using a long length of connecting wire. The movable contact is in contact with the resistance wire at a length l from the 0 m mark on the rule.

The movable contact is placed at different points on the resistance wire. The resistance R of the length l of the wire depends on l.

(a) On Fig. 7.2, sketch a graph to show how R varies with l for values of l between $l = 0$ and $l = 1.0$ m. Mark appropriate values on the axes of the graph.

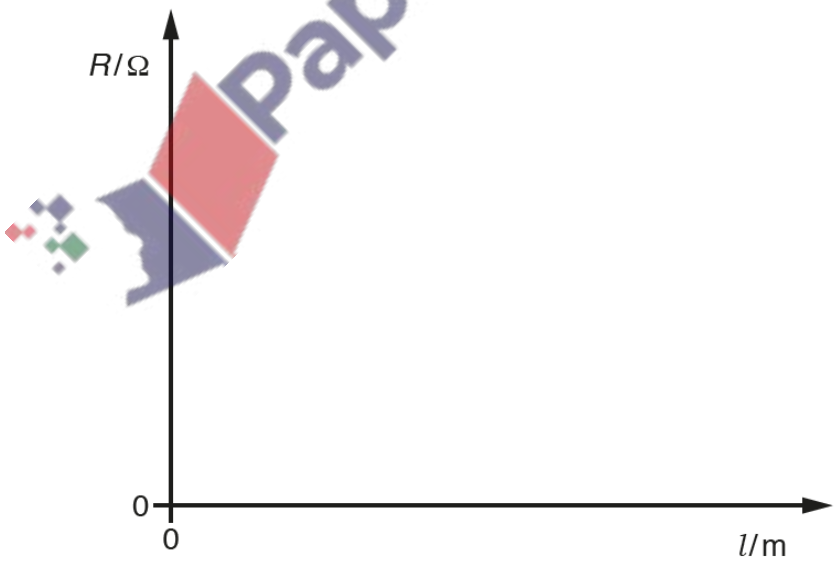

Fig. 7.2

[2]

(b) Fig. 7.3 shows a battery of electromotive force (e.m.f.) 12 V connected across the 1.0 m length of the resistance wire.

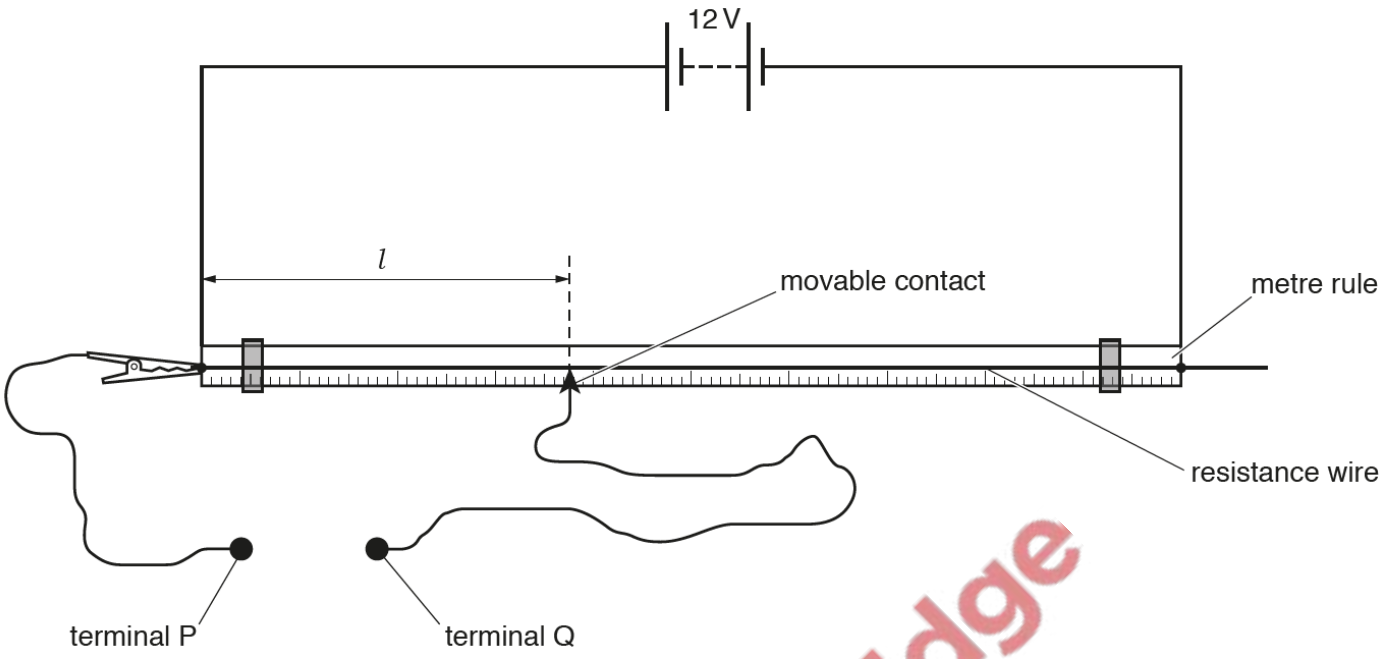

Fig. 7.3

(i) State what is meant by *electromotive force* (*e.m.f.*).

.....

.....

..... [2]

(ii) Calculate:

1. the current in the resistance wire

current = ... [2]

2. the potential difference (p.d.) between terminal P and terminal Q when $l = 0.35$ m

p.d. = ... [1]

3. the charge that passes through the resistance wire in 5.5 minutes.

charge = ... [2]

[Total: 9]

5. 0625/43/O/N/19/No.9

Fig. 9.1 shows a circuit containing an LED and two resistors in parallel, each of resistance *R*.

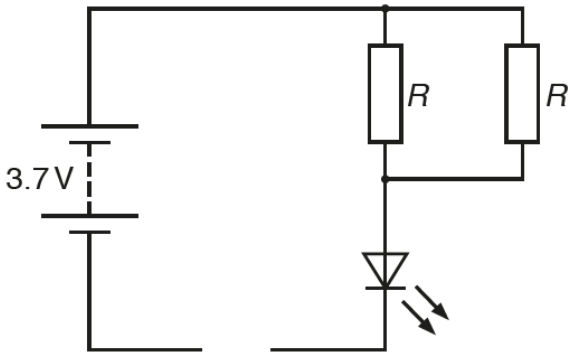

Fig. 9.1

The normal operating voltage of the LED is 2.1 V and the normal current is 0.19 A.

(a) (i) The potential difference (p.d.) across the LED is measured with a voltmeter.

On Fig. 9.1, draw the symbol for this voltmeter connected to the circuit. [1]

(ii) The current in the LED is measured with an ammeter.

On Fig. 9.1, draw the symbol for this ammeter connected to the circuit. [1]

(b) Calculate the value of *R* when the LED is operating normally.

R = ... [5]

[Total: 7]