

# Series and Parallel Circuits

## Question Paper

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Physics
Exam Board	AQA
Topic	6.2 Electricity
Sub-Topic	Series and Parallel Circuits
Difficulty Level	Gold Level
Booklet	Question Paper

**Time Allowed:** 21 minutes

**Score:** /20

**Percentage:** /100

**Grade Boundaries:**

**Q1.** A student is investigating some electrical components.

- (a) Describe how the student could set up a circuit to find the resistance of a lamp.

You should include a circuit diagram in your answer.

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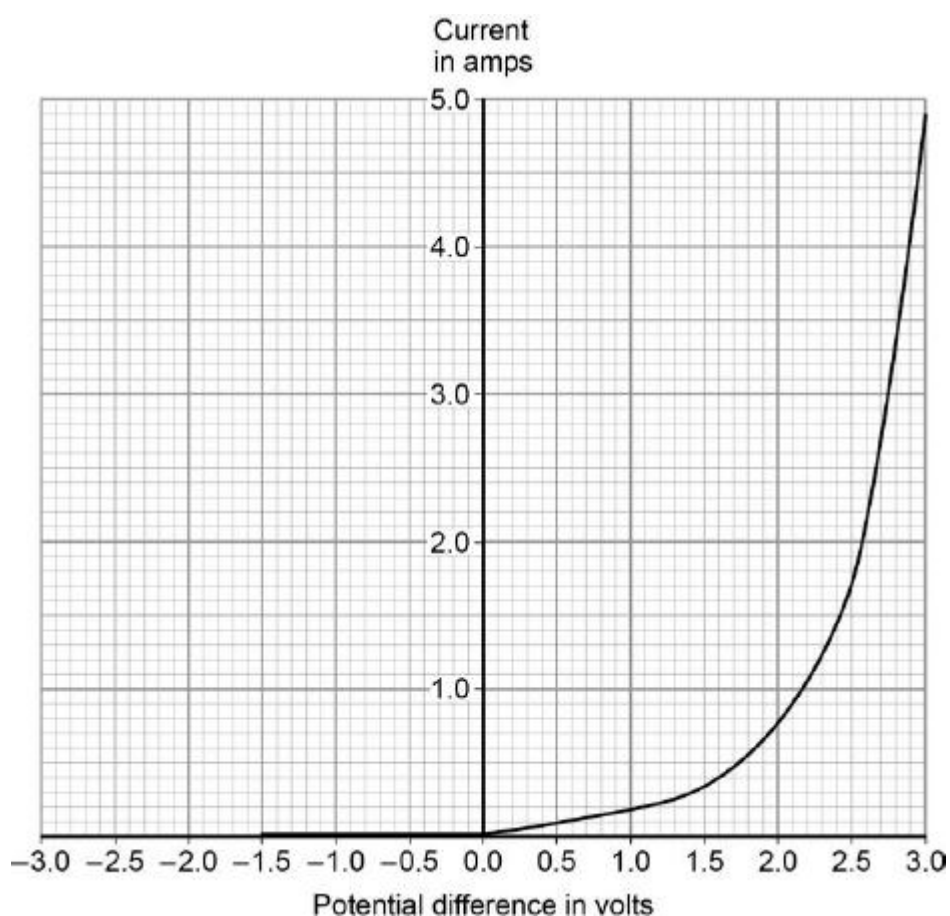
**(4)**

- (b) The student is given an electrical component in a sealed box.

She has to find out what the electrical component is by experiment.

The student records the current and the potential difference for the component.

Her results are shown in the figure below.



Explain how the student could know that the electrical component in the sealed box is **not** an ohmic conductor.

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(2)

(c) What is the electrical component in the sealed box?

Explain your answer.

Component .....

Explanation .....

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(3)

- (d) Use the graph to determine the resistance of the component at 2.3 V.

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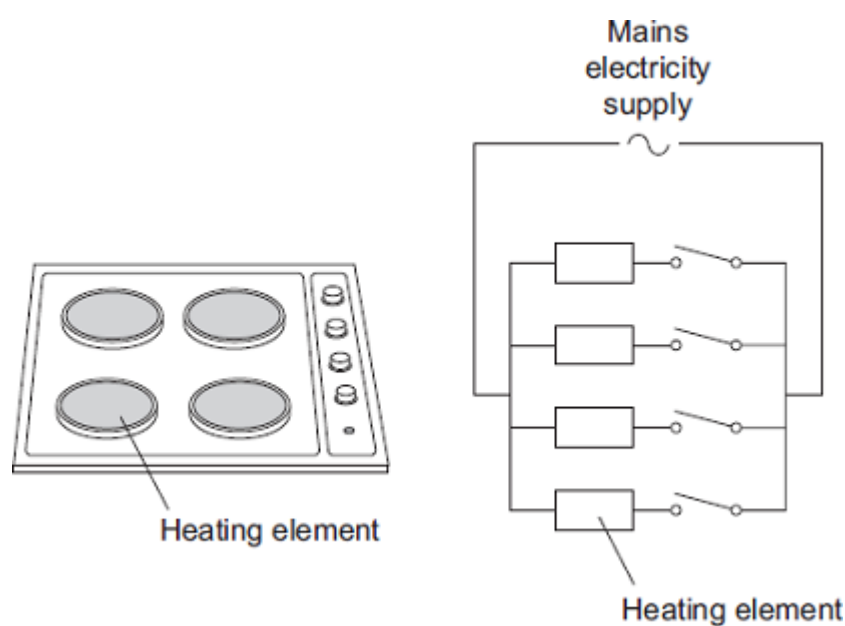
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Resistance = .....  $\Omega$

(4)

(Total 13 marks)

**Q2.** The picture shows an electric cooker hob. The simplified circuit diagram shows how the four heating elements connect to the mains electricity supply. The heating elements are identical.



When all four heating elements are switched on at full power the hob draws a current of

26 A from the 230 V mains electricity supply.

- (a) Calculate the resistance of one heating element when the hob is switched on at full power.

Give your answer to 2 significant figures.

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Resistance = .....  $\Omega$

(3)

- (b) The table gives the maximum current that can safely pass through copper wires of different cross-sectional area.

Cross-sectional area in $\text{mm}^2$	Maximum safe current in amps
1.0	11.5
2.5	20.0
4.0	27.0
6.0	34.0

The power sockets in a home are wired to the mains electricity supply using cables containing  $2.5 \text{ mm}^2$  copper wires. Most electrical appliances are connected to the mains electricity supply by plugging them into a standard power socket.

It would **not** be safe to connect the electric cooker hob to the mains electricity supply by plugging it into a standard power socket.

Why?

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(2)

- (c) Mains electricity is an alternating current supply. Batteries supply a direct current.

What is the difference between an alternating current and a direct current?

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(2)  
(Total 7 marks)