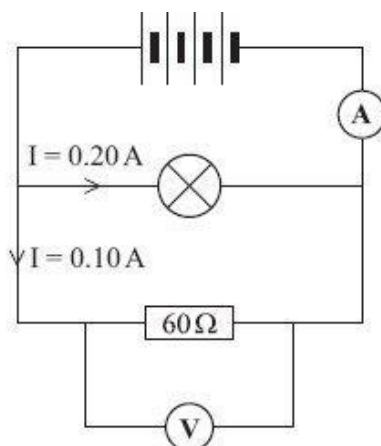


**Q1.**

A circuit was set up as shown in the diagram.



- (a) Each cell provides a potential difference of 1.5 volts.

- (i) What is the total potential difference provided by the four cells in the circuit?

\_\_\_\_\_

Total potential difference = \_\_\_\_\_ volts

(1)

- (ii) What will be the reading on the voltmeter?

\_\_\_\_\_

(1)

- (b) The current through the lamp is 0.20 amps.  
The current through the resistor is 0.10 amps.

What is the reading on the ammeter?

\_\_\_\_\_

Reading on ammeter = \_\_\_\_\_ amps

(1)

- (c) Use a phrase from the box to complete the following sentence.

<b>greater than</b>	<b>equal to</b>	<b>smaller than</b>
---------------------	-----------------	---------------------

The resistance of the lamp is \_\_\_\_\_ 60  $\Omega$ .

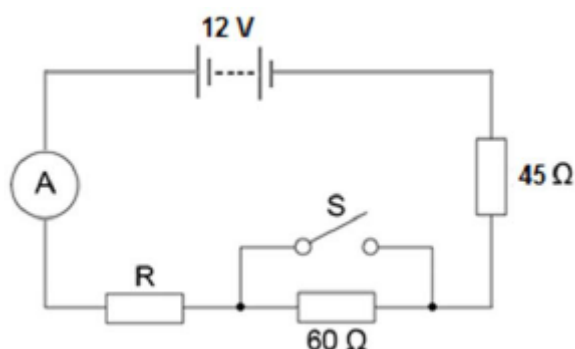
Give a reason for your answer.

\_\_\_\_\_

\_\_\_\_\_

**Q2.**

A student set up the electrical circuit shown in the figure below.



- (a) The ammeter displays a reading of 0.10 A.

Calculate the potential difference across the 45  $\Omega$  resistor.

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Potential difference = \_\_\_\_\_ V

(2)

- (b) Calculate the resistance of the resistor labelled **R**.

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Resistance = \_\_\_\_\_  $\Omega$

(3)

- (c) State what happens to the total resistance of the circuit and the current through the circuit when switch **S** is closed.

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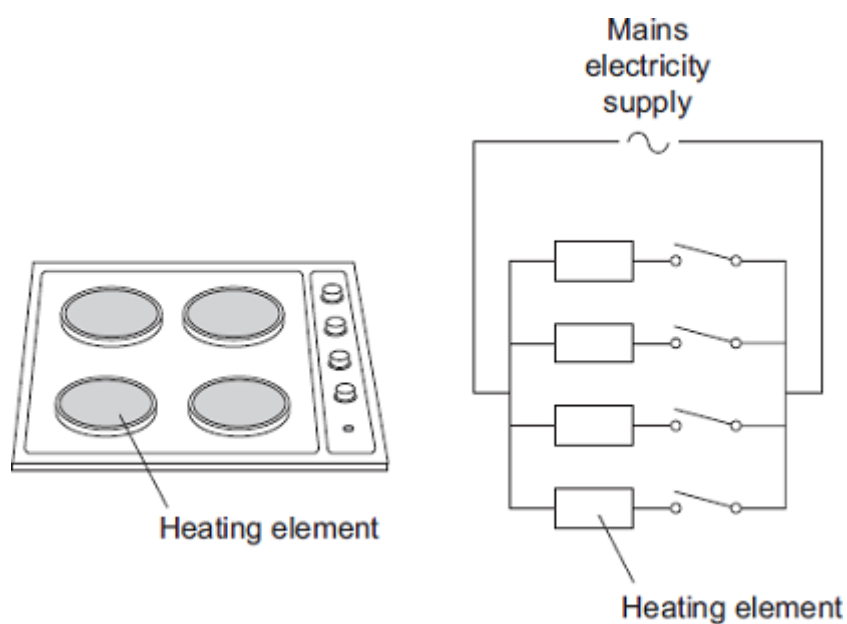
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(2)

(Total 7 marks)

**Q3.**

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)

(Total 3 marks)

## Mark schemes

### Q1.

- |     |      |   |   |            |
|-----|------|---|---|------------|
| (a) | (i)  | 6   | 1 |            |
|     | (ii) | 6 (volts)   |   |            |
|     |      | <i>accept their (a) (i) ignore any units</i>                      | 1 |            |
| (b) |      | 0.30  |   |            |
|     |      | <i>accept 0.3</i>   | 1 |            |
| (c) |      | smaller(than)   |   |            |
|     |      | <i>accept correct alternatives to smaller than e.g. less than</i> | 1 |            |
|     |      | a bigger current flows through the lamp                           |   |            |
|     |      | <i>only accept if 'smaller than' is given</i>                     |   |            |
|     |      | <i>accept converse</i>  |   |            |
|     |      | <i>accept a correct calculation</i>                               |   |            |
|     |      | <i>accept resistance is half of 60</i>                            |   |            |
|     |      | <i>accept resistance = 30 (<math>\Omega</math>)</i>               |   |            |
|     |      | <i>do <b>not</b> accept answers in terms of p.d</i>               | 1 |            |
|     |      |   |   | <b>[5]</b> |

### Q2.

- |     |  |                                     |   |            |
|-----|--|-------------------------------------|---|------------|
| (a) |  | $V = 0.10 \times 45$                | 1 |            |
|     |  | 4.5 (V)                             |   |            |
|     |  |                                     | 1 |            |
| (b) |  | $R = 12 / 0.10$                     |   |            |
|     |  |                                     | 1 |            |
|     |  | total resistance = 120 ( $\Omega$ ) |   |            |
|     |  |                                     | 1 |            |
|     |  | $R = 120 - 105 = 15 (\Omega)$       |   |            |
|     |  |                                     | 1 |            |
| (c) |  | (total) resistance decreases        |   |            |
|     |  |                                     | 1 |            |
|     |  | (so) current increases              |   |            |
|     |  |                                     | 1 |            |
|     |  |                                     |   | <b>[7]</b> |

### Q3.

(a) 35

*an answer with more than 2 sig figs that rounds to 35 gains  
2 marks*

*allow 2 marks for correct method, ie  $\frac{230}{6.5}$*

*allow 1 mark for  $l = 6.5$  (A) or  $R = \frac{230}{26}$*

*an answer 8.8 gains 2 marks*

*an answer with more than 2 sig figs that rounds to 8.8  
gains 1 mark*

3

[3]