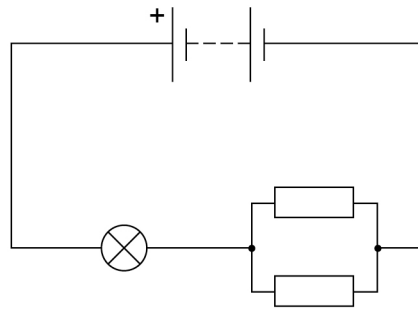


0 4

Figure 2 shows a circuit that a student built.

Figure 2



0 4 . 1

The lamp has a resistance of $10\ \Omega$ Each resistor has a resistance of $10\ \Omega$

What is the total resistance of the circuit?

[1 mark]

Tick (✓) **one** box.Between 20 and 30 Ω Exactly 20 Ω Exactly 30 Ω Less than 20 Ω

0 4 . 2

Explain your answer to Question 04.1

[2 marks]

Turn over ►

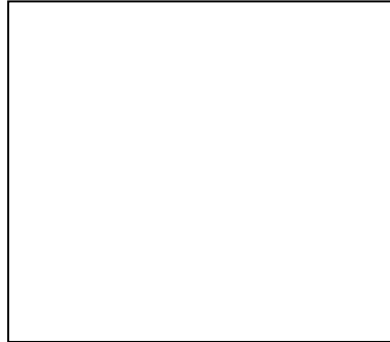


The student replaced one of the resistors with a thermistor.

0 4 . 3

Draw the circuit symbol for a thermistor in the box below.

[1 mark]



0 4 . 4

The student increased the temperature of the thermistor.

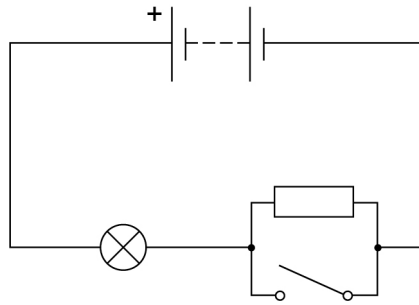
Explain how the current in the thermistor changed.

[2 marks]



0 4 . 5 Figure 3 shows another circuit the student built.

Figure 3



Explain how the potential difference across the resistor and the lamp will change when the switch is closed.

[4 marks]

The resistor _____


The lamp _____

10

Turn over for the next question

Turn over ►



Question	Answers	Extra information	Mark	AO / Spec. Ref.	ID
04.1	less than 20 Ω		1	AO2/1 6.2.2	A
04.2	the resistance of the lamp is added to the total resistance of the resistors in parallel	allow resistors in series add up	1	AO3/1a 6.2.2	E
	the resistors in parallel have a total resistance of less than 10 ohms	allow resistors in parallel have a smaller resistance than the lowest value resistor	1		E
04.3			1	AO1.1 AO1 in isolation 6.2.1.1	E
04.4	the current increased		1	AO1.1 AO1 in isolation 6.2.1.4 6.2.1.3	E
	(because) the resistance (of the thermistor) decreased	allow because the resistance of the circuit decreased	1		

04.5	the resistor			AO2.2	E
	the potential difference across the resistor becomes 0V		1	6.2.2 6.2.1.1 6.2.1.3	
	because there is a short circuit across the resistor	allow because there is no current in the resistor allow switch has no resistance	1	WS 3.6	
		If neither of the first two marking points awarded, allow 1 mark for p.d. decreases because there is less current in the resistor or p.d. decreases because components in parallel have less resistance or p.d. decreases because there is an alternative route for the current			
	the lamp				
	the potential difference across the lamp increases	allow the potential difference across the lamp will be the same as the battery	1		
	because the current increases	allow because the resistance of the circuit decreases allow because there is less p.d. across the resistor	1		
Total			10		