

**Q1.**

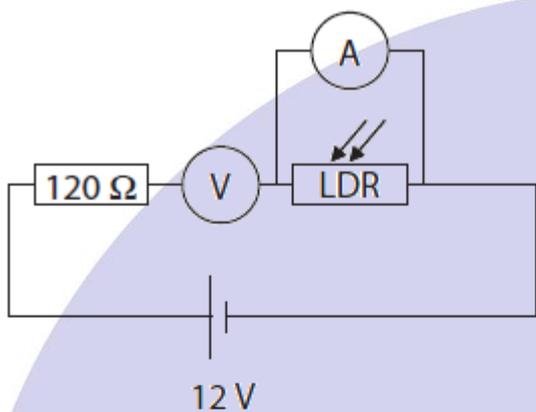
(a) A technician investigates a light-dependent resistor (LDR) connected in series with a  $120\ \Omega$  resistor and a voltage source.

The technician measures the voltage across the LDR and also the current in the LDR.

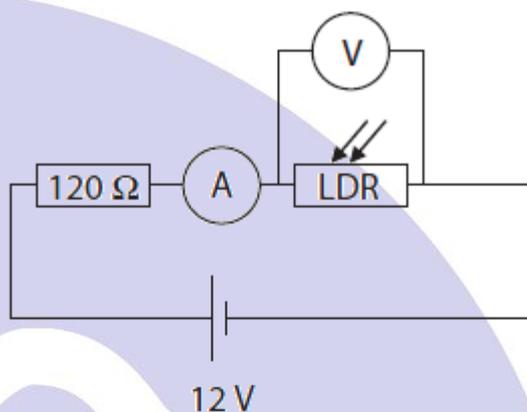
(i) Which **one** of these circuits should the technician use?

Put a cross () in the box next to your answer.

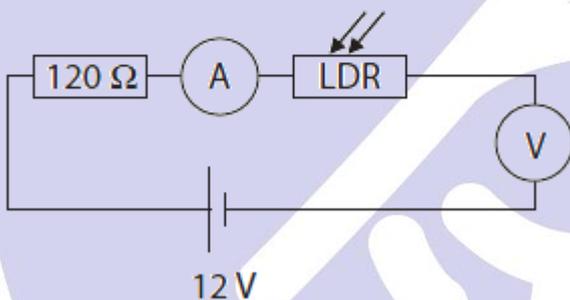
(1)



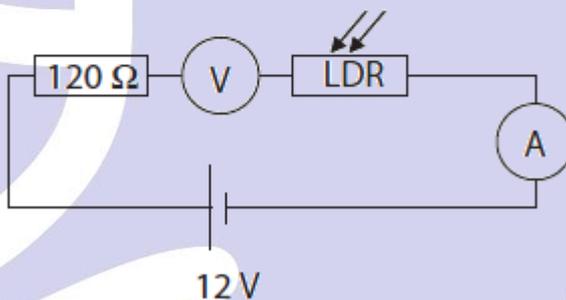
**A**



**B**



**C**



**D**

(ii) When the LDR is in bright sunlight, its resistance is  $185\ \Omega$ .  
The voltage across the LDR is then  $7.2\text{V}$ .  
Show that the current in the LDR is about  $0.039\text{ A}$ .

(2)

(iii) Complete the sentence by putting a cross () in the box next to your answer.  
The current in the  $120\ \Omega$  resistor is

(1)

- A** much more than the current in the LDR
- B** much less than the current in the LDR
- C** the same as the current in the LDR
- D** the opposite of the current in the LDR

(iv) The technician repeats the readings with the LDR in different light conditions. The table gives two of the readings.

light condition	current in LDR
bright sunlight	0.039 A
cloudy skies	0.028 A

Explain why the two current readings are different.

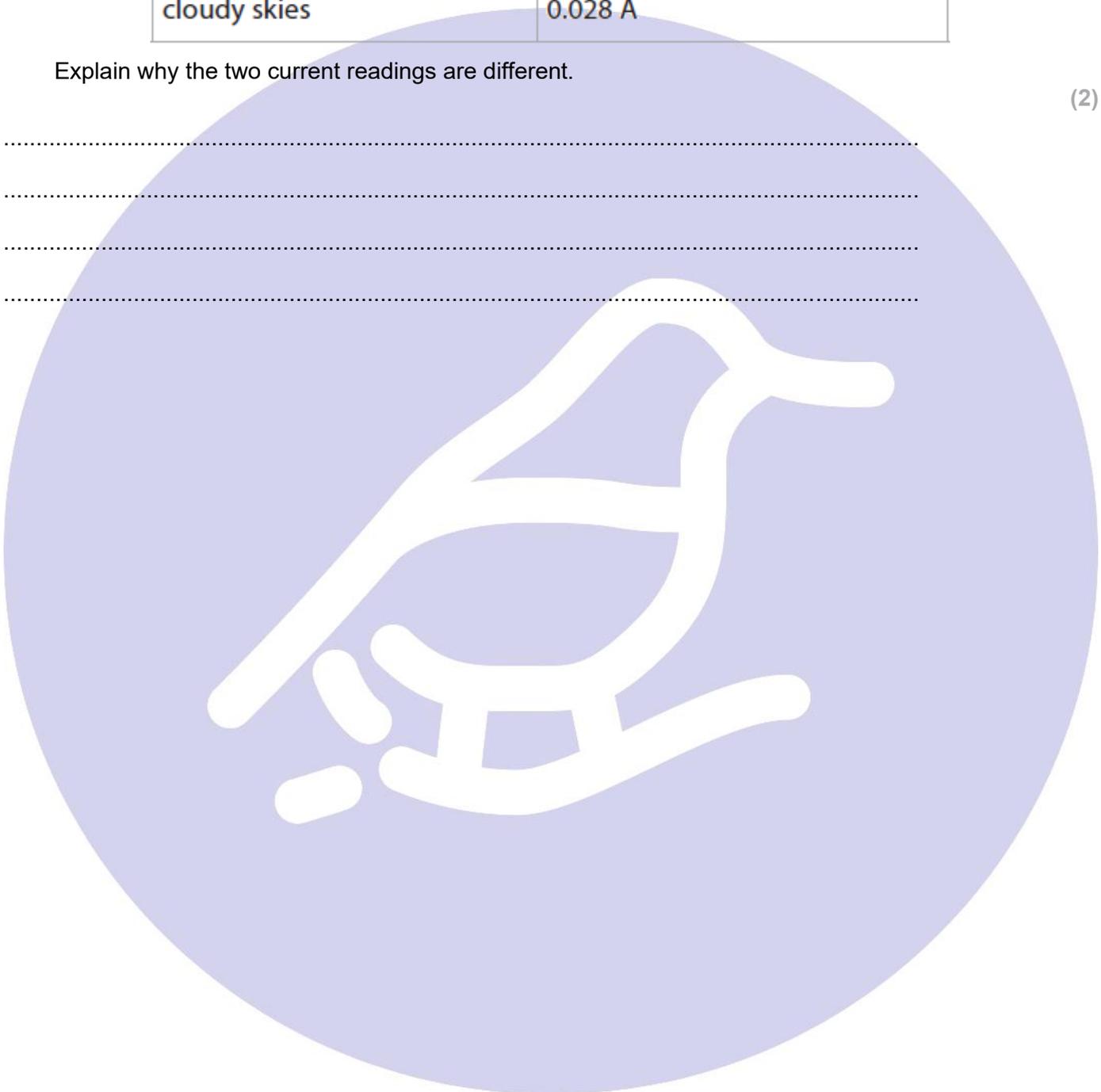
(2)

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\*(b) The photograph shows a temporary traffic sign.



The traffic sign uses many small lights all powered by a rechargeable battery. These lights need to be very bright during the day so that they can be seen clearly. They do not need to be as bright at night.

Explain how using a light-dependent resistor can make the energy stored in the battery last longer.

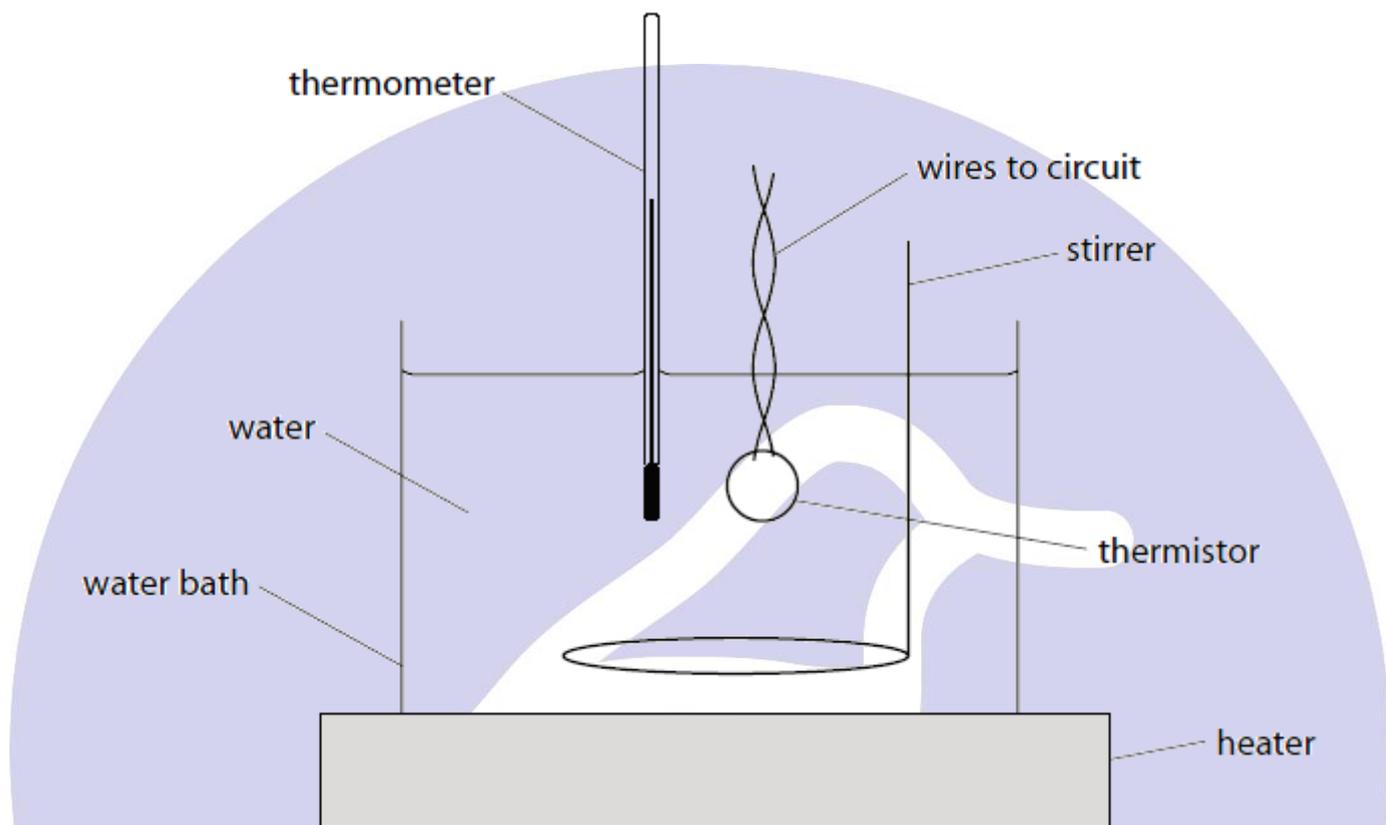
(6)

(Total for question = 12 marks)

**Q2.**

A student investigates how the resistance of a thermistor varies with temperature.

(a) The student uses the equipment shown in Figure 18 to measure the temperature of the thermistor.



**Figure 18**

(i) Give **one** reason for using a water bath.

(1)

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(ii) The equipment shown in Figure 18 is for investigations in the temperature range from 20°C to 100°C.

State **one** way the student could develop this experimental procedure to investigate temperatures outside this range.

(1)

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- (b) The student takes measurements for two other components, **A** and **B**.  
The results for both these components are shown in Figure 19.

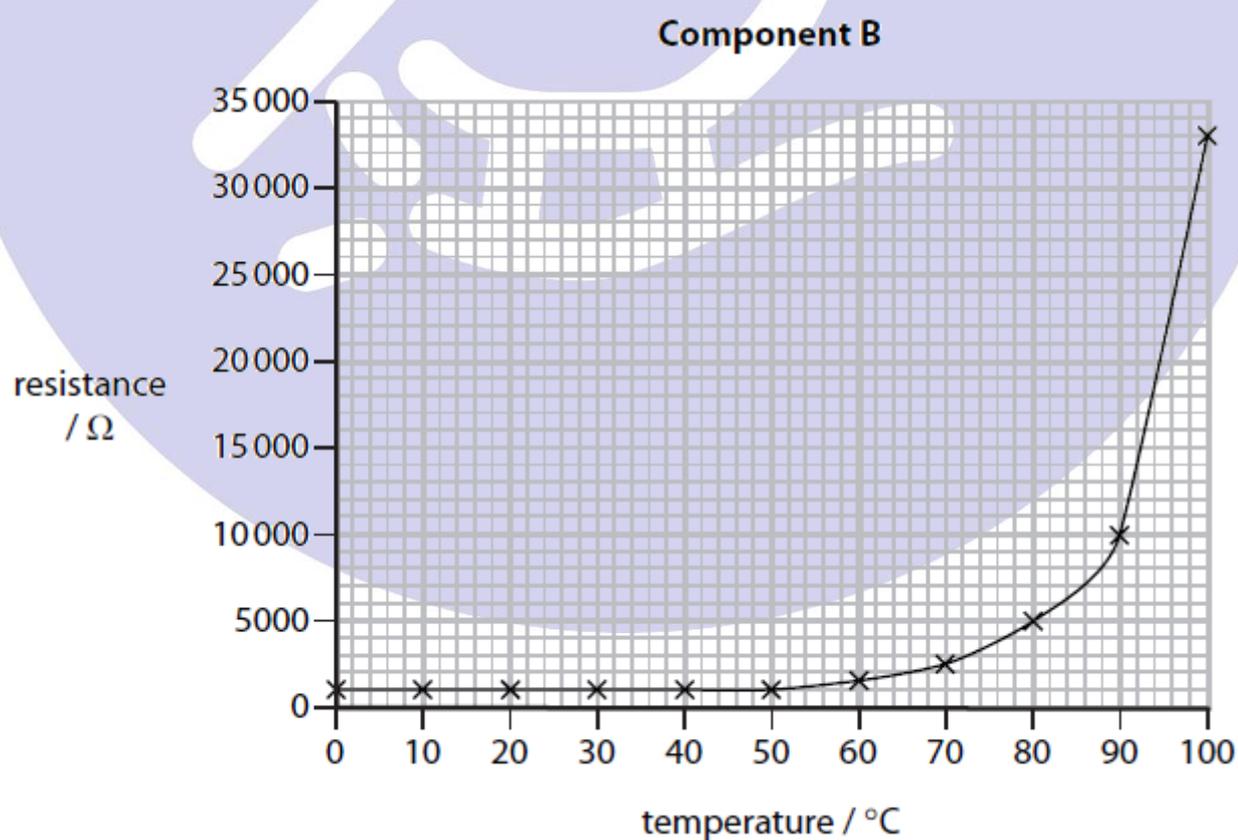
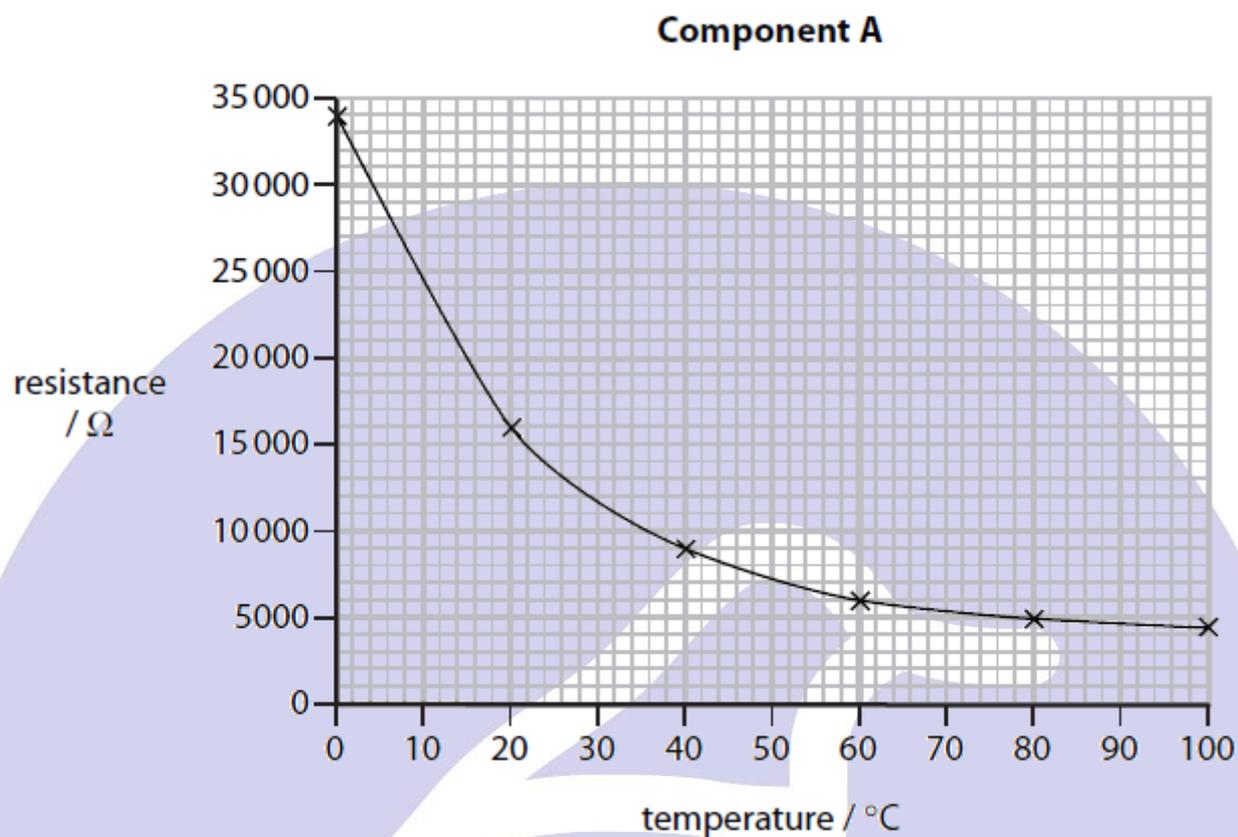


Figure 19

