Q1.

When the current in a lamp is 0.15 A, the resistance of the lamp is 40 Ω.

Calculate the voltage across the lamp.

Use the equation

$$V = I \times R$$
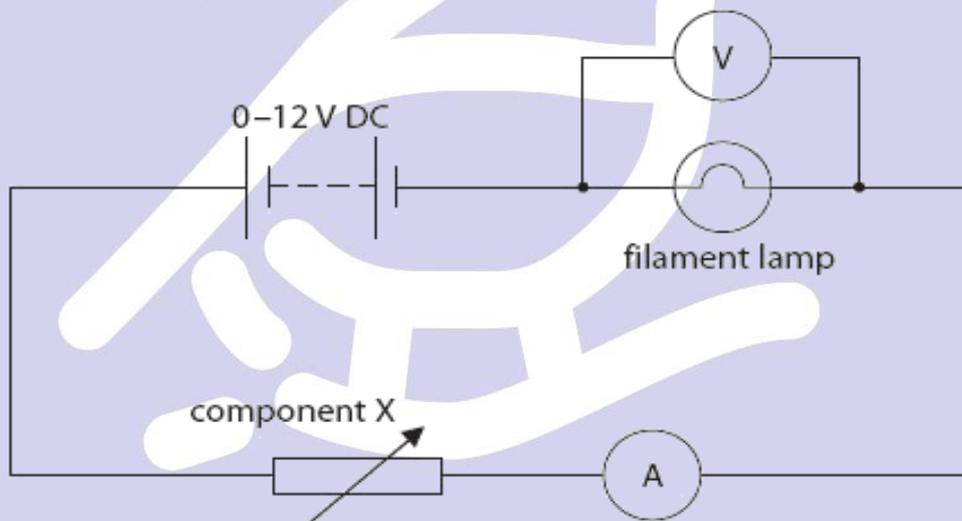
(2)

voltage = ... V

(Total for question = 2 marks)

Q2.

A student sets up an experiment to measure the potential difference (voltage) across a filament lamp.
She changes the current through the lamp.
The diagram shows the circuit she used.

Calculate the resistance of the lamp when the current is 0.44 A and the potential difference is 10.0 V.

(2)

$$R = \frac{V}{I}$$

resistance = ...Ω

(Total for question = 2 marks)

Q3.

Figure 19 shows a lamp connected to a d.c. power supply.
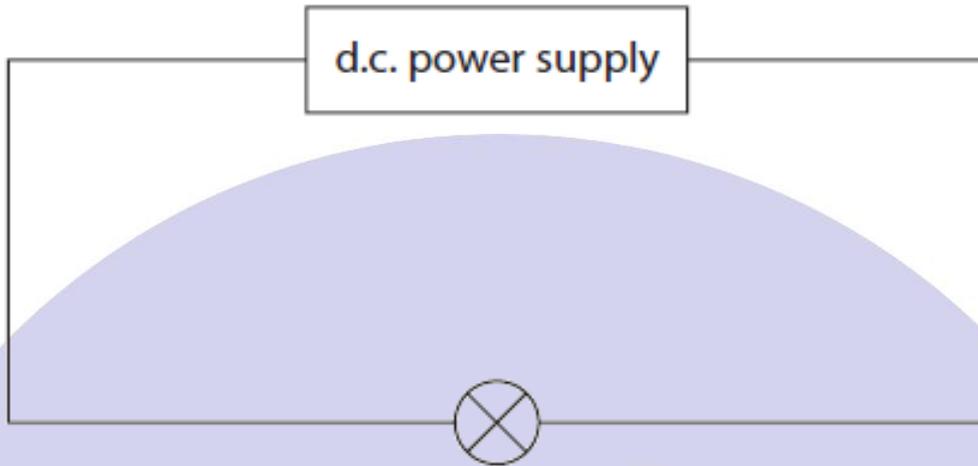
d.c. power supply

Figure 19

The power supply provides a potential difference (voltage) of 4.5 V.

The current in the lamp is 0.30 A.

  Calculate the resistance of the lamp.

   Use the equation

$$R = \frac{V}{I}$$

(2)

resistance = ... Ω

(Total for question = 2 marks)

Q4.

The potential difference (voltage) across a piece of wire is 1.56 *V*.

The current in the wire is 0.45 *A*.
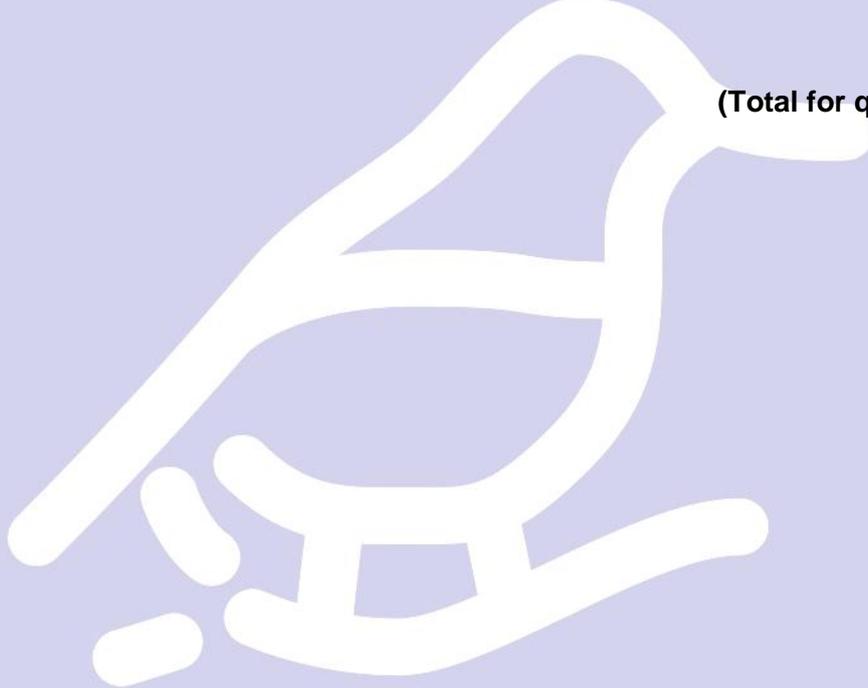
Calculate the resistance of this piece of wire.
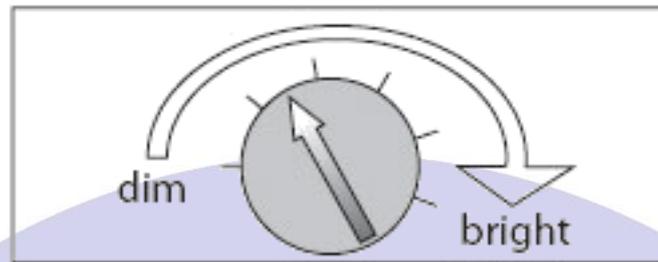
Use the equation

$$V = I \times R$$

(2)

resistance = ... Ω
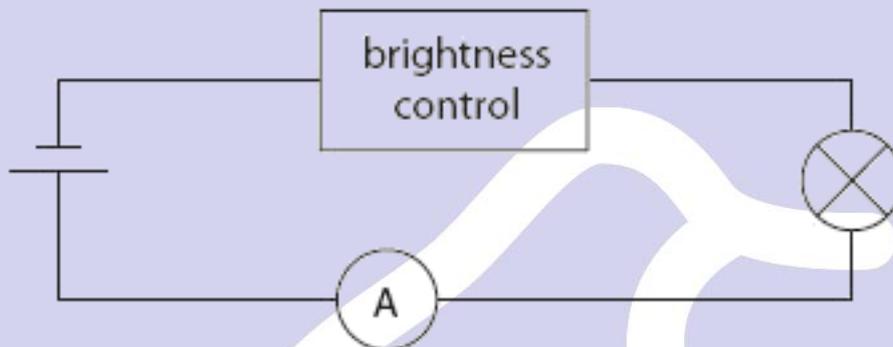
(Total for question = 2 marks)

Q5.

An inventor is designing a battery-powered torch.
She wants the torch to have a brightness control.

dim

bright

brightness control

She builds this circuit to test the lamp in the torch.

brightness
control

A

(i) Add a voltmeter to the circuit which will measure the potential difference (voltage) across the lamp.

(1)

(ii)

$$R = \frac{V}{I}$$

She sets the control at the "bright" position.
The current is 0.26 A and the potential difference (voltage) across the lamp is 6.0 V.
Calculate the resistance of the lamp.

(2)

....

(Total for question = 3 marks)

Q6.

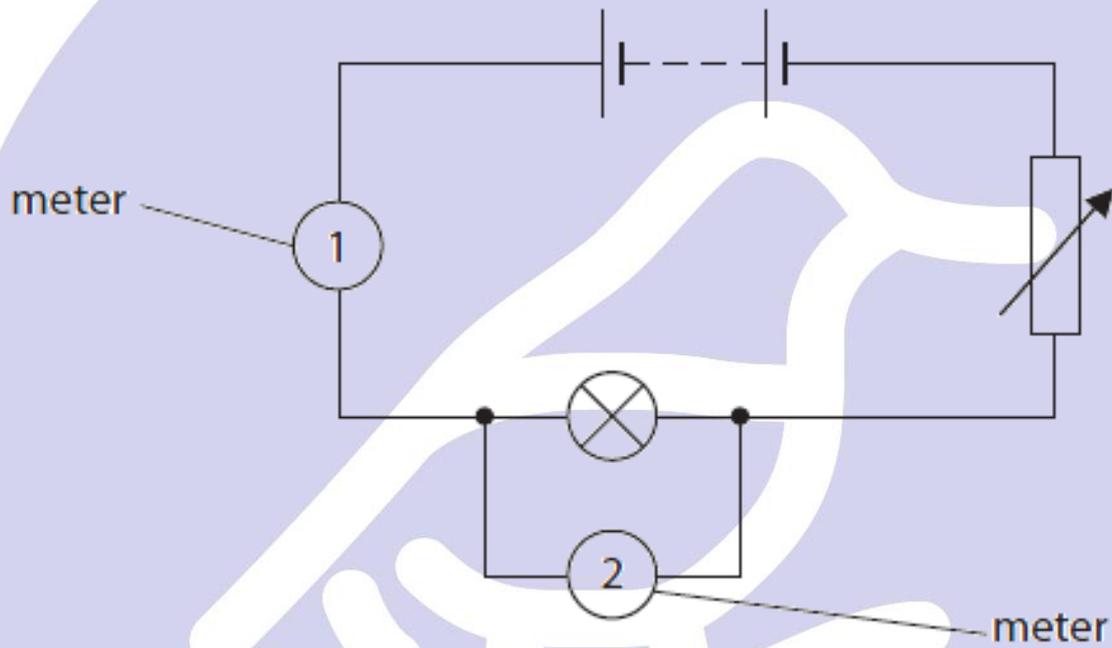A student is investigating a filament lamp.

(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The current in the filament lamp is a flow of

(1)

☒ **A** protons
☒ **B** neutrons
☒ **C** electrons
☒ **D** atoms

(ii) The student uses this circuit in his investigation.

State what is measured by the meters.

(2)

Meter 1 measures

....

Meter 2 measures

....
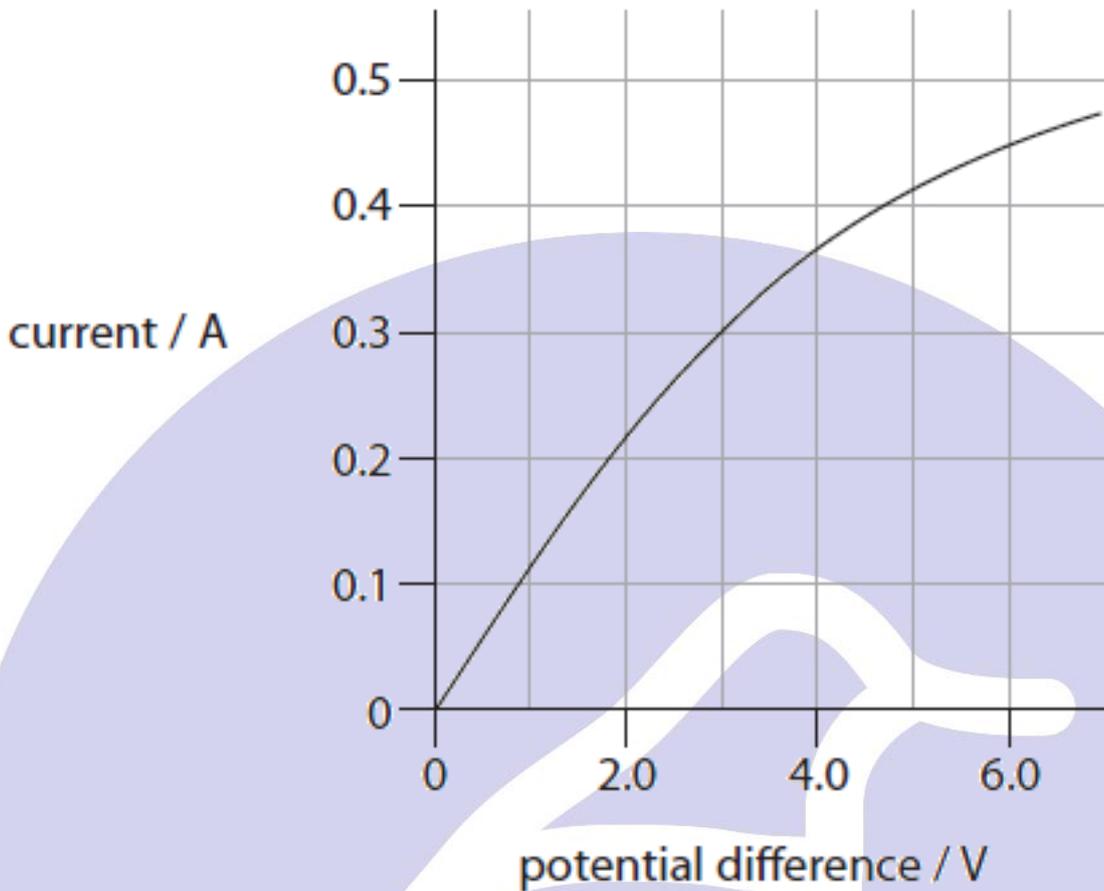
(c)   The graph shows how current varies with potential difference (voltage) for another filament lamp.

current / A

potential difference / V

Calculate the resistance of the lamp when the current in the lamp is 0.3 A.

resistance = potential difference ÷ current ($R = V / I$)

(3)

resistance = ... Ω

(Total for Question = 6 marks)

Q7.

Figure 11 shows the results from an experiment where the potential difference (voltage) across a filament lamp was varied.

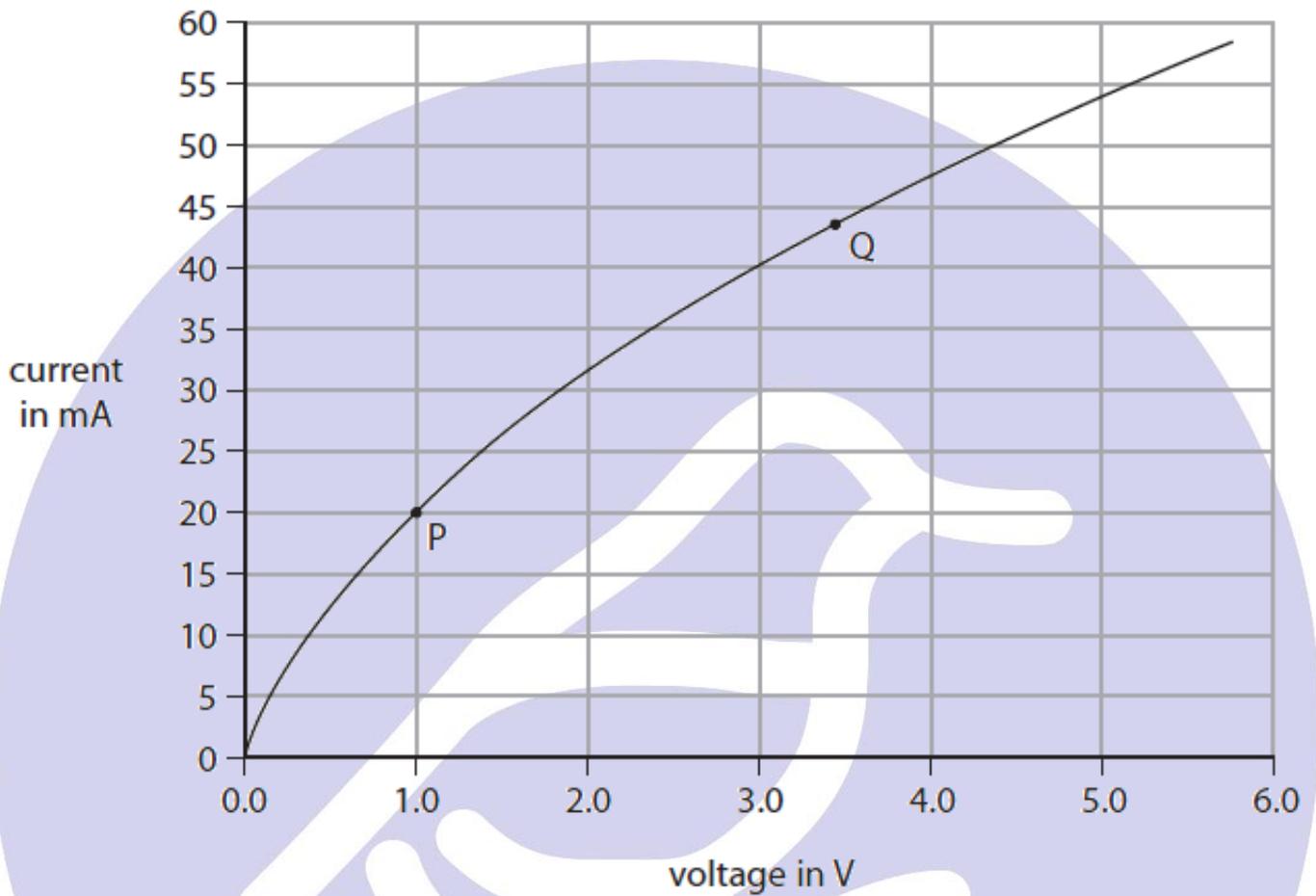The current and voltage were measured.

Figure 11

(i) Describe the relationship between the current and the voltage as shown in the graph in Figure 11.

(2)

....

....

....

....

(ii) Use the values of the voltage and current at point P and at point Q on the graph in Figure 11 to complete the table in Figure 12.

(2)

	voltage in V	current in mA
point P		
point Q		

Figure 12

(iii) Calculate the resistance of the filament lamp when the voltage is 4.5 V and the current is 51 mA.

Use the equation

$$R = \frac{V}{I}$$

(2)

resistance = ... Ω

(Total for question = 6 marks)

Q8.

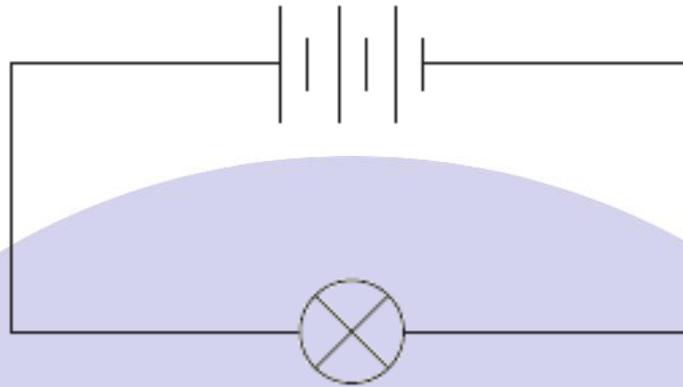Figure 10 shows a circuit used to light a lamp.

Figure 10

The potential difference across the lamp is 4.2 V.

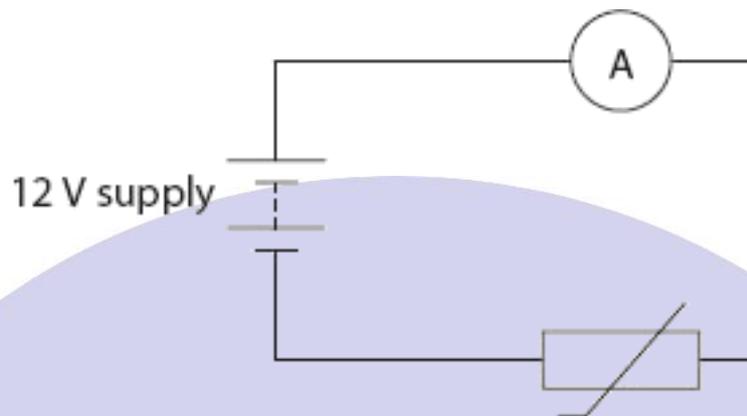The current in the lamp is then 0.19 A.
Calculate the resistance of the lamp.
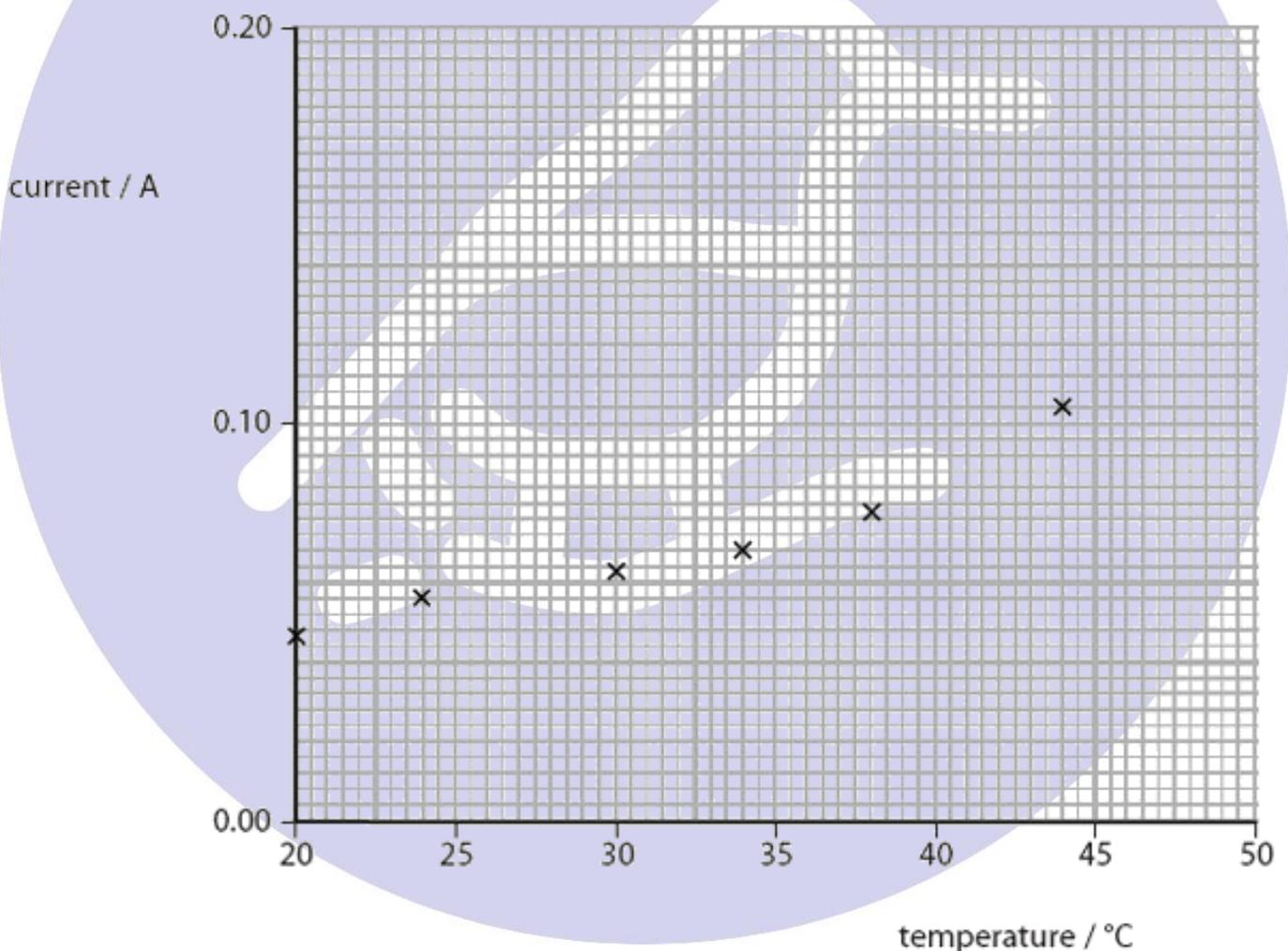
(3)

resistance of the lamp = ... Ω

(Total for question = 3 marks)

Q9.

(a) A designer is going to use a thermistor in a temperature gauge. He connects the thermistor into this circuit.

He heats the thermistor and measures the current at different temperatures. Here are some of the results plotted on a graph.

At 47 °C the current was 0.138 A.

(i) Plot this value on the graph.

(1)

(ii) Draw the curve of best fit through the points.
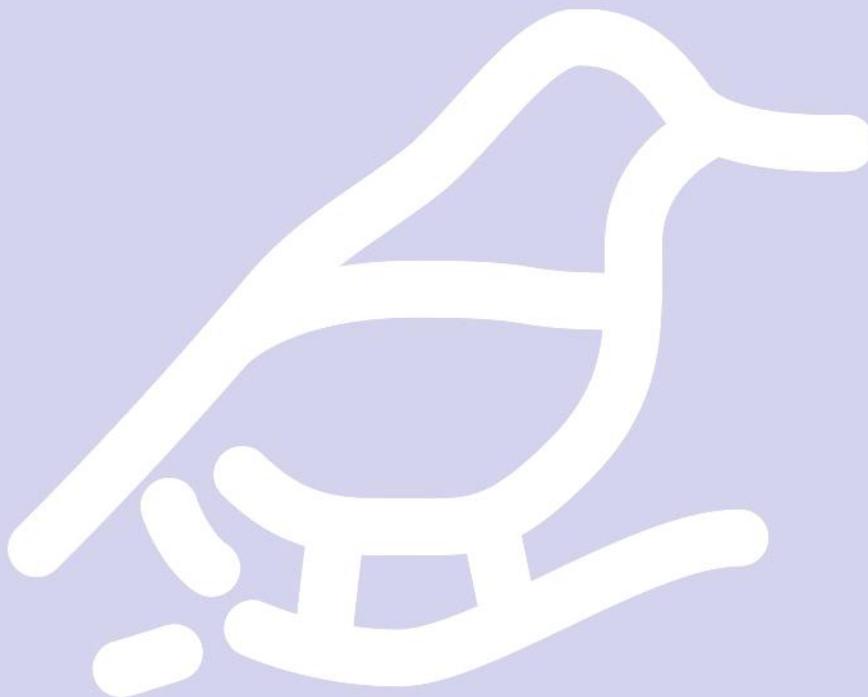
(1)

(iii) The supply voltage is 12 V.
At 20 °C the current is 0.047 A.

Calculate the resistance of the thermistor at this temperature.
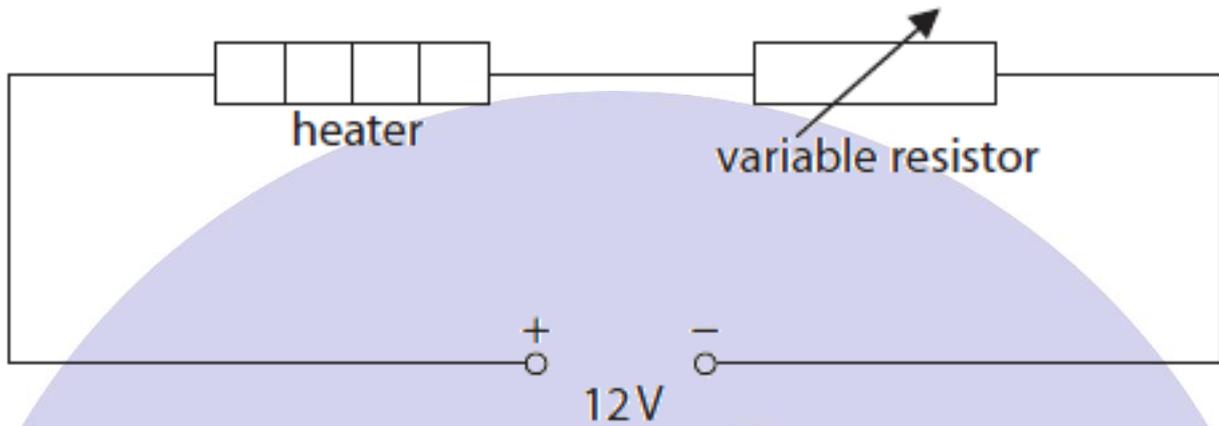
(3)

....

(Total for Question = 5 marks)

Q10.

A technician investigates the potential difference (voltage) across an electrical heater.

This circuit diagram shows the circuit the technician uses.

(i) Add a voltmeter to the circuit which will measure the potential difference (voltage) across the heater.

(2)

(ii) The resistance of the heater is 15 Ω.

The current in the heater is 0.56 A.
Calculate the potential difference (voltage) across the heater.

(2)

potential difference = ... V

(Total for Question = 4 marks)

Q11.

A student sets up an experiment to measure the potential difference (voltage) across a filament lamp.
She changes the current through the lamp.
The diagram shows the circuit she used.
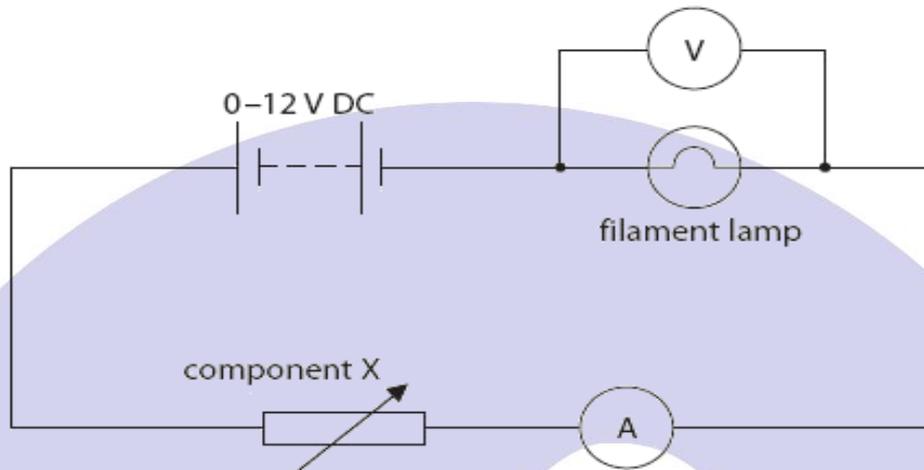
(b) The student recorded these readings.

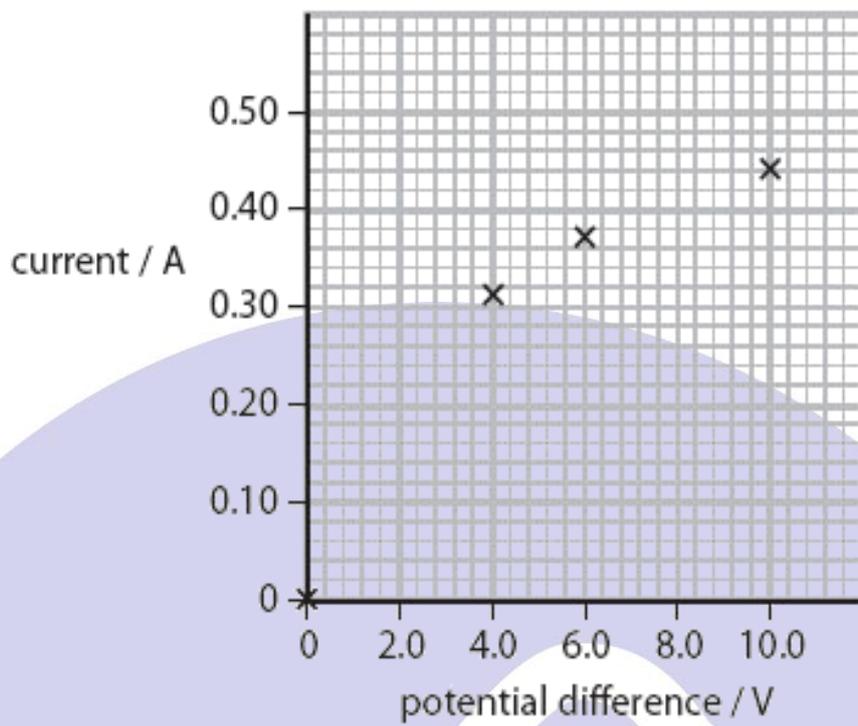| current / A	potential difference / V
0.00	0.0
0.20	2.0
0.31	4.0
0.37	6.0
0.42	8.0
0.44	10.0

Four points are plotted on the graph.

(i) Plot the points for 2.0 V and 8.0 V.

(1)

(ii) Draw the line of best fit.

(1)

(c) Calculate the resistance of the lamp when the current is 0.44 A and the potential difference is 10.0 V.

(2)

$$R = \frac{V}{I}$$

resistance = ... Ω

(d) Describe the energy transfer that takes place in the lamp.

(2)

....

....

....

....
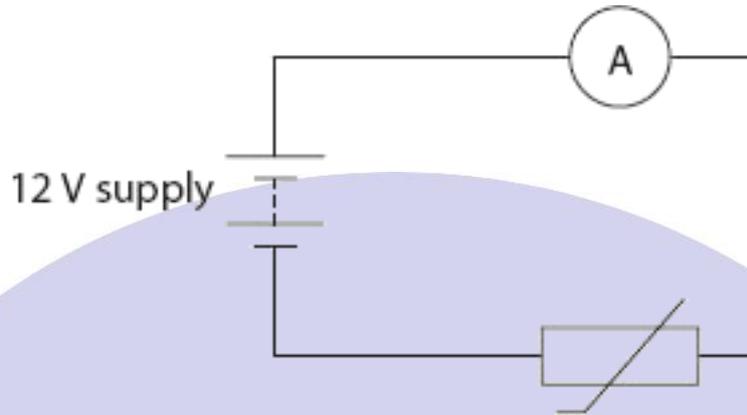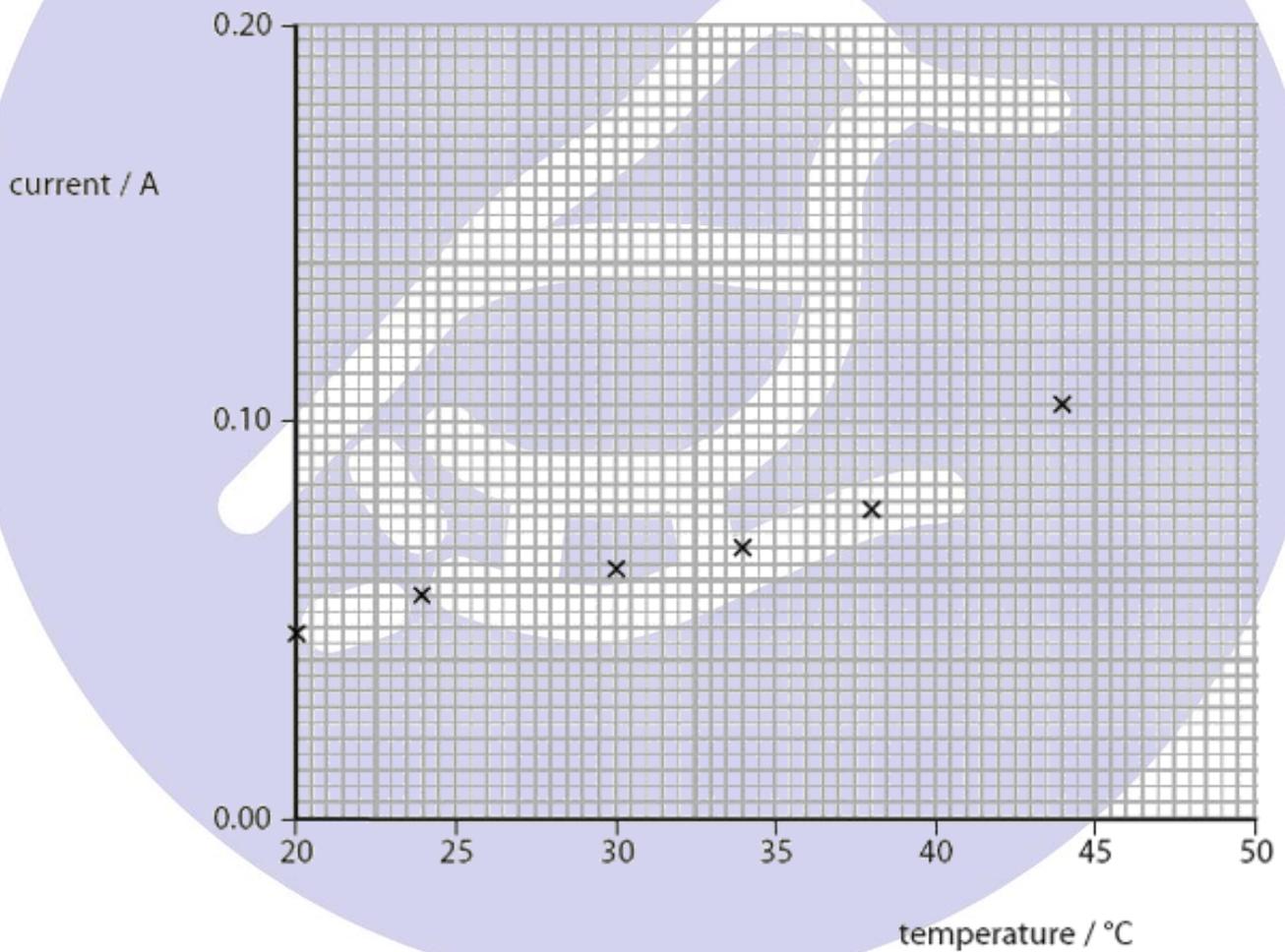
(Total for Question is 8 marks)

Q12.

A designer is going to use a thermistor in a temperature gauge. He connects the thermistor into this circuit.

He heats the thermistor and measures the current at different temperatures. Here are some of the results plotted on a graph.

At 47 °C the current was 0.138 A.

(i) Plot this value on the graph.

(1)

(ii) Draw the curve of best fit through the points.

(1)

(iii) The supply voltage is 12 V.
At 20 °C the current is 0.047 A.

Calculate the resistance of the thermistor at this temperature.

(3)

....