
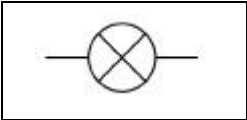

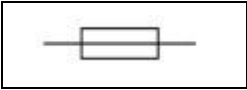



P4.2 Exam Question Practice:

Q1.

Components can be connected in electrical circuits in different ways.

- (a) Draw **one** line from each circuit symbol to the name of the component it represents.

Circuit symbol	Name of component
	cell
	diode
	fuse
	lamp
	variable resistor

(2)

- (b) Complete the sentence.

Choose the answer from the box.

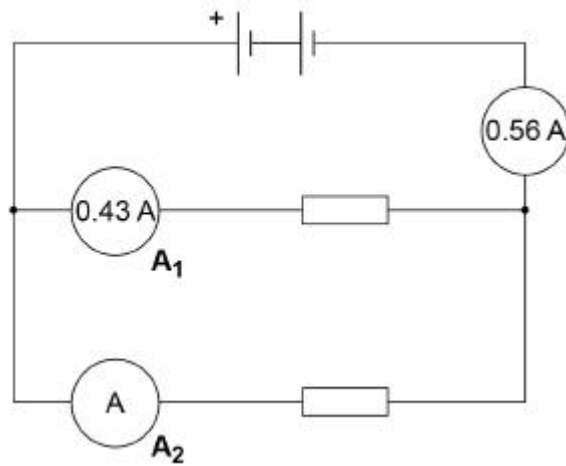
charge energy potential difference resistance

Electric current is the rate of flow of _____.

(1)

Figure 1 shows a parallel circuit.

Figure 1



- (c) Calculate the current measured by ammeter **A₂**.

Current = _____ A

(1)

- (d) The circuit is connected for 300 s
 The total current in the circuit stays at 0.56 A
 Calculate the total charge flow.

Use the equation:

$$\text{charge flow} = \text{current} \times \text{time}$$

Charge flow = _____ C

(2)

- (e) The potential difference supplied by the battery is 4.5 V
 Calculate the total energy transferred in 300 s

Use the equation:

$$\text{energy transferred} = \text{charge flow} \times \text{potential difference}$$

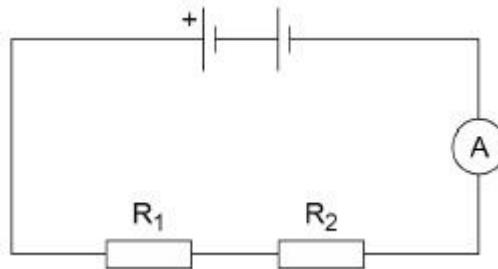
Use your answer to part (d).

Energy transferred = _____ J

(2)

- (f) **Figure 2** shows a series circuit.

Figure 2



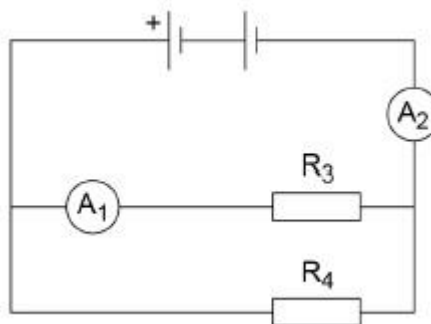
Resistor R_2 breaks.

What happens to the reading on the ammeter?

(1)

- (g) **Figure 3** shows a parallel circuit.

Figure 3



Resistor R_3 breaks.

What happens to the readings on the ammeter?

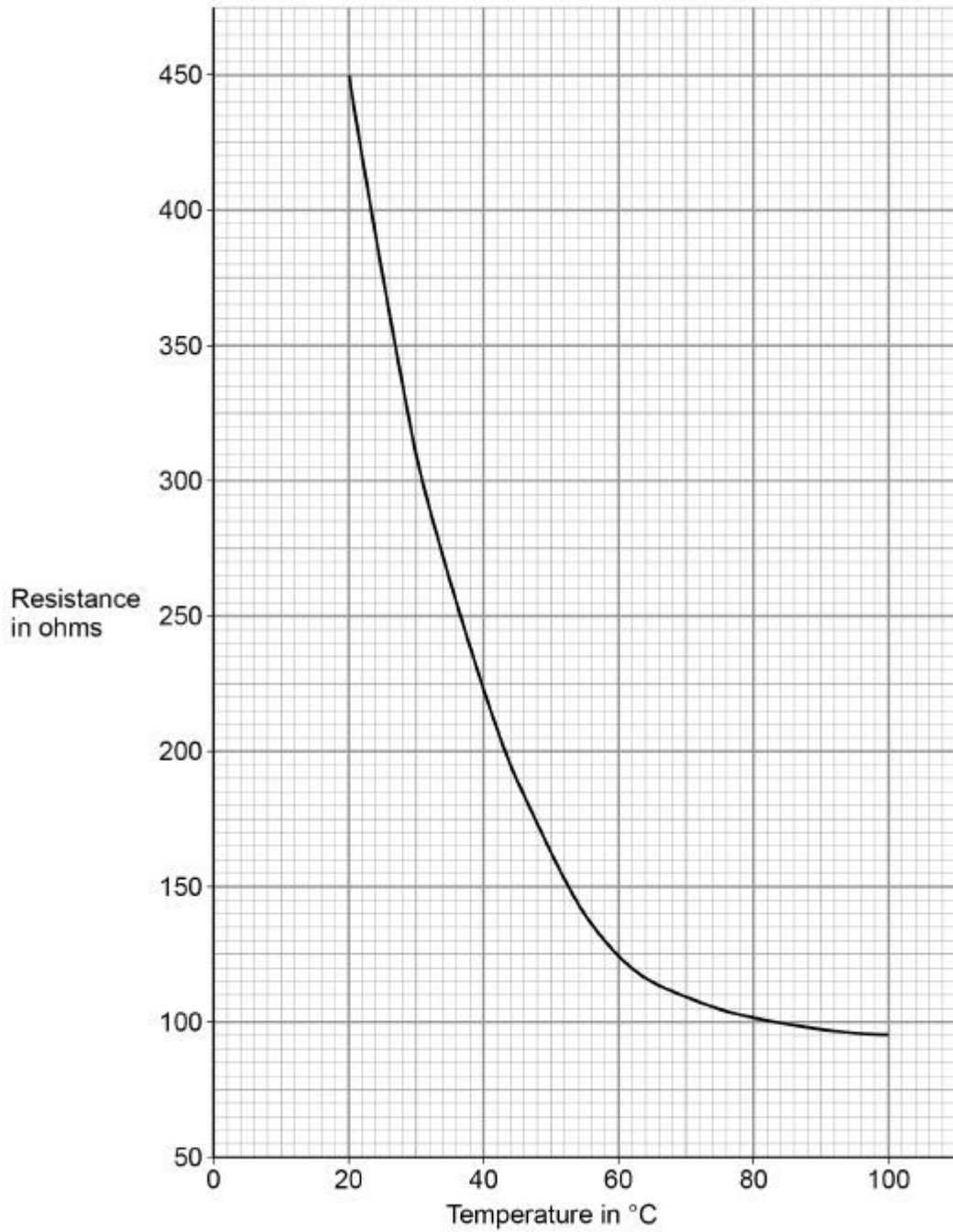
Ammeter A_1 _____

Ammeter A_2 _____

(2)

Figure 4 shows how the resistance of a component varies with temperature.

Figure 4



(h) What is the name of the component?

Tick **one** box.

- LED
- LDR
- Resistor
- Thermistor

(1)

- (i) What is the resistance of the component at a temperature of 50 °C?

Resistance = _____ Ω

(1)

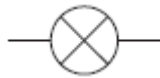
(Total 13 marks)

Q2.

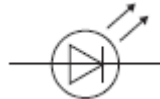
- (a) Draw **one** line from each circuit symbol to its correct name.

Circuit symbol

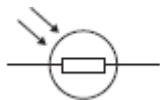
Name



Diode



Light-dependent resistor (LDR)



Lamp

Light-emitting diode (LED)

(3)

- (b) **Figure 1** shows three circuits.

The resistors in the circuits are identical.

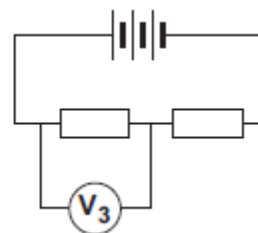
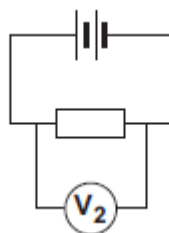
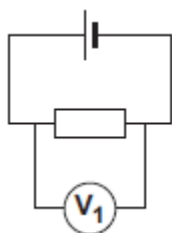
Each of the cells has a potential difference of 1.5 volts.

Figure 1

Circuit 1

Circuit 2

Circuit 3



- (i) Use the correct answer from the box to complete the sentence.

half	twice	the same as
-------------	--------------	--------------------

The resistance of **circuit 1** is _____ the resistance of **circuit 3**.

(1)

- (ii) Calculate the reading on voltmeter V_2 .

Voltmeter reading $V_2 =$ _____ V

(1)

- (iii) Which voltmeter, V_1 , V_2 or V_3 , will give the lowest reading?

Draw a ring around the correct answer.

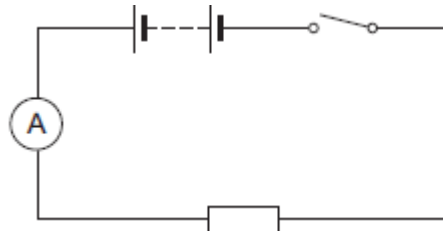
V_1 V_2 V_3

(1)

- (c) A student wanted to find out how the number of resistors affects the current in a series circuit.

Figure 2 shows the circuit used by the student.

Figure 2



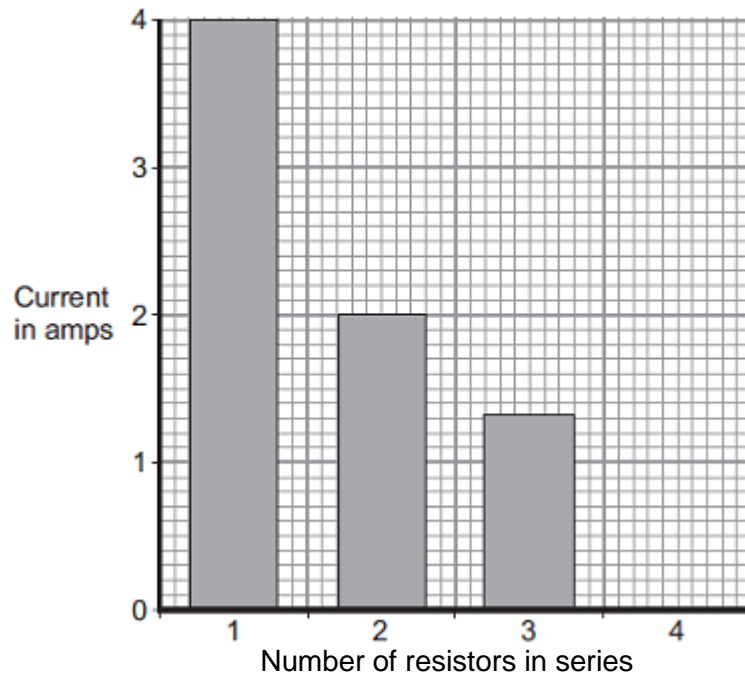
The student started with one resistor and then added more identical resistors to the circuit.

Each time a resistor was added, the student closed the switch and took the ammeter reading.

The student used a total of 4 resistors.

Figure 3 shows three of the results obtained by the student.

Figure 3



- (i) To get valid results, the student kept one variable the same throughout the experiment.

Which variable did the student keep the same?

(1)

- (ii) The bar chart in **Figure 3** is not complete. The result using 4 resistors is not shown.

Complete the bar chart to show the current in the circuit when 4 resistors were used.

(1)

(Total 10 marks)

Q3.

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.

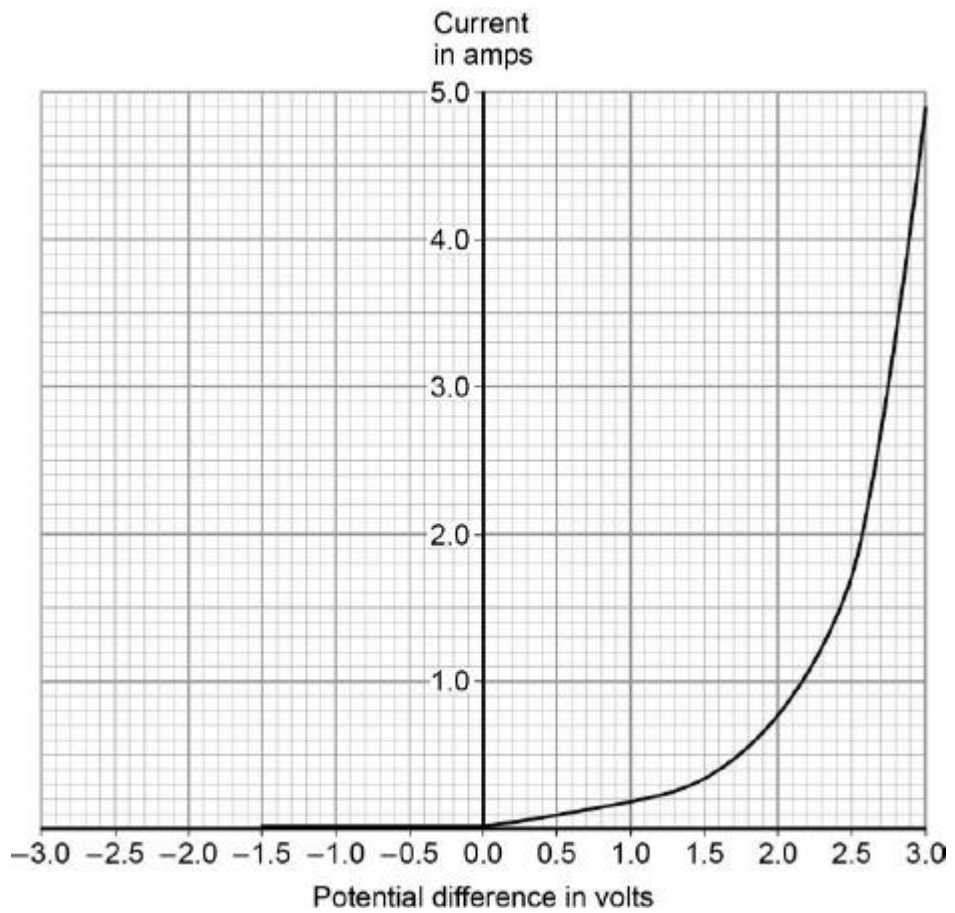
(4)

- (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.

(2)

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

Explain your answer.

Component _____

Explanation _____

(3)

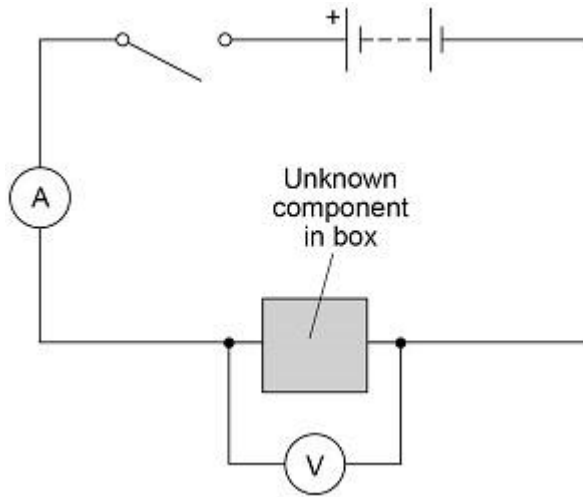
(Total 9 marks)

Q4.

A teacher gave a student an unknown electrical component hidden in a box.

The student connected the box in the circuit shown in **Figure 1**.

Figure 1



- (a) The student measured the potential difference across the component and the current in the component.

She repeated this for several values of potential difference.

Give **one** way the circuit could be altered so that the potential difference across the component could be varied.

(1)

- (b) Explain why the student needed to switch the circuit off between readings.

(2)

The following table shows the student's results.

Potential difference in volts	Current in amps
0.00	0.00
0.20	0.00

0.40	0.00
0.60	0.13
0.80	0.68
1.00	1.50

(c) What was the resolution of the ammeter?

Tick (✓) **one** box.

0.01 A

0.05 A

0.10 A

1.50 A

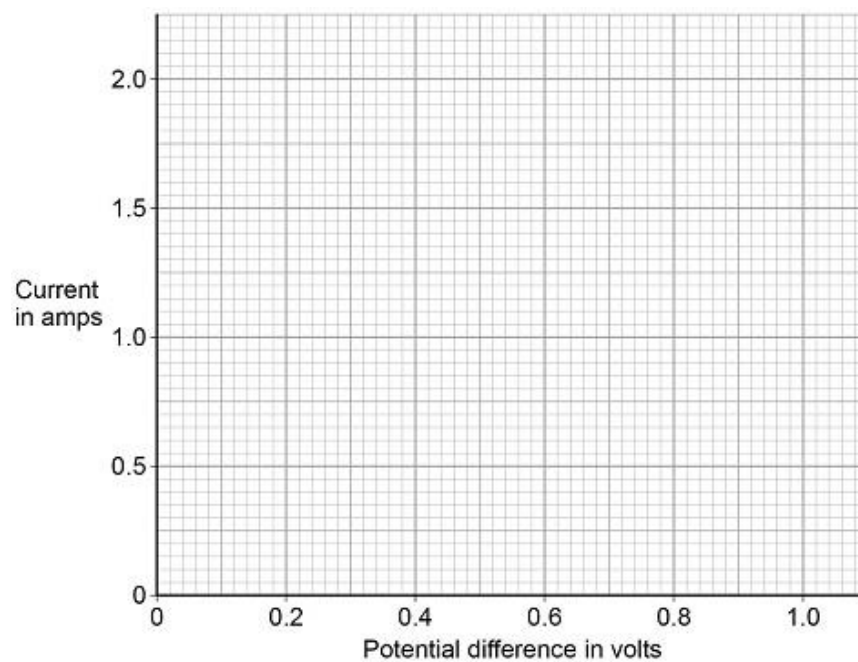
(1)

(d) Complete **Figure 2**.

You should:

- plot the data from the table above
- draw a line of best fit.

Figure 2



(3)

- (e) What was the unknown electrical component given to the student?

Tick (✓) **one** box.

Diode

Filament lamp

Resistor

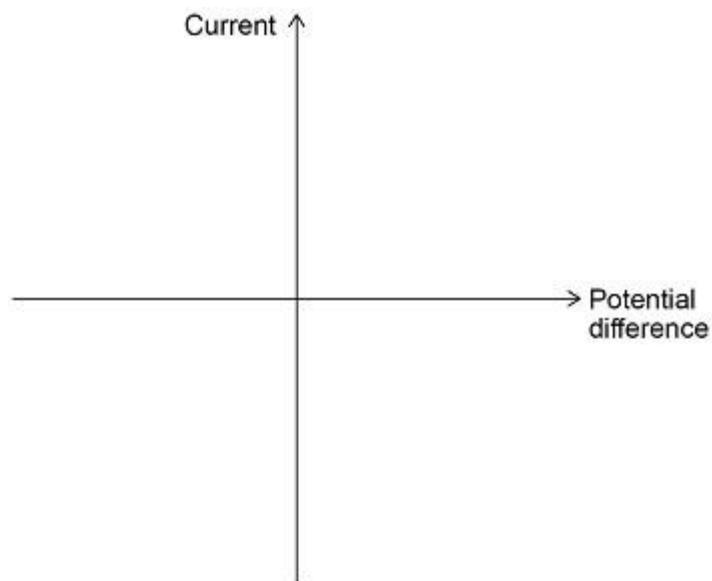
Thermistor

(1)

- (f) An ohmic conductor has constant resistance when its temperature is constant.

Sketch a current-potential difference graph for an ohmic conductor at constant temperature on **Figure 3**.

Figure 3



(2)

(Total 10 marks)