2025 Summer Science GCSE Revision Paper 1

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Biology Topics	Chemistry Topics	Physics Topics
• Cell Biology • Organisation • Infection and response • Bioenergetics	• Atomic structure • Periodic table • Bonding and matter properties • Quantitative chemistry • Chemical changes • Energy changes	• Energy • Particle model and matter • Electricity • Radioactivity

Answering the exam questions in the next section may help aim you towards the topics you need more flash cards for.

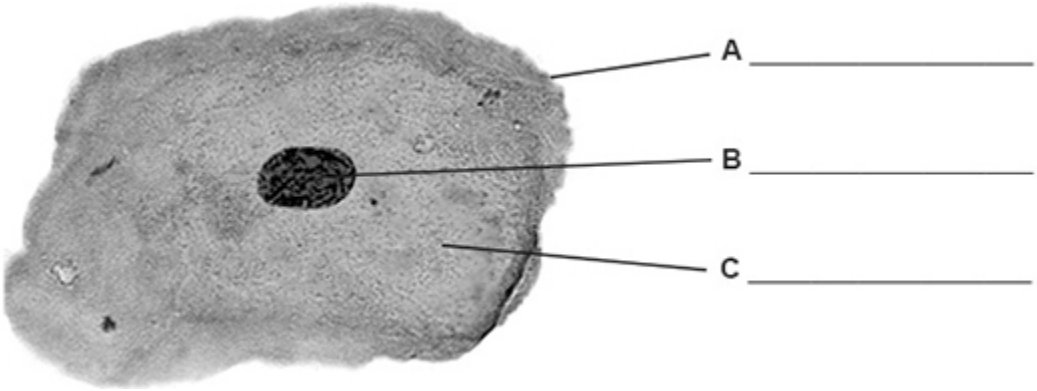
Section 1 – Biology Required practical exam Qs

Q1.

This question is about cells.

Figure 1 shows an animal cell.

Figure 1



(a) Label parts **A**, **B** and **C** on **Figure 1**.

Choose answers from the box.

cell membrane	**cell wall**	**chloroplast**
cytoplasm	**nucleus**	

(3)

(b) What is the function of the nucleus in a cell?

Tick (✓) **one** box.

To contain a solution called cell sap ☐

To control the activities of the whole cell ☐

To control the movement of substances into the cell ☐

(1)

(c) What is the function of the mitochondria in a cell?

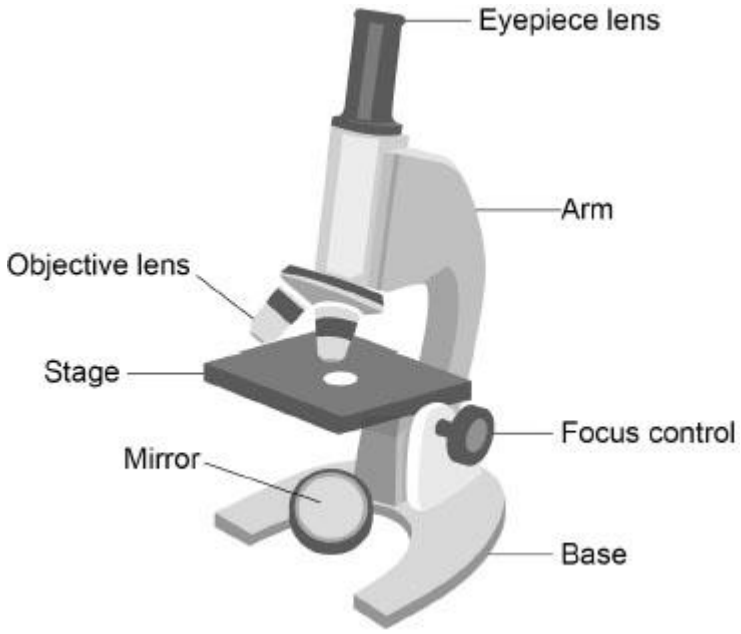
Tick (✓) **one** box.

To produce glucose during photosynthesis	☐
To produce proteins for the cell	☐
To release energy in respiration	☐

(1)

(d) **Figure 2** shows a light microscope.

Figure 2



A student is given a prepared slide of animal cells to view using the microscope.

Complete the sentences.

Use labels from **Figure 2**.

Place the slide on the _____ .

Use the objective lens that has low power.

Look through the _____.

Direct the light by moving the _____ .

Make the image larger by using the high power _____.

(4)

(e) **Figure 3** shows a different animal cell.

Figure 3

Calculate the magnification of the image in **Figure 3**.

Complete the following steps.

Measure the width of the image from **Y** to **Z**, in millimetres (mm).

Width of image = _____ mm

Give the width of the image in micrometres (μm).

1 mm = 1000 μm

_____

Width of image = _____ μm

The cell in **Figure 3** has a real width of 40 micrometres (μm).

Use the equation to calculate the magnification.

$$\text{magnification} = \frac{\text{width of image in μm}}{\text{real width of cell in μm}}$$

_____

_____

_____

Magnification = × _____

(4)

(Total 13 marks)

Q2.

Plants absorb light to photosynthesise.

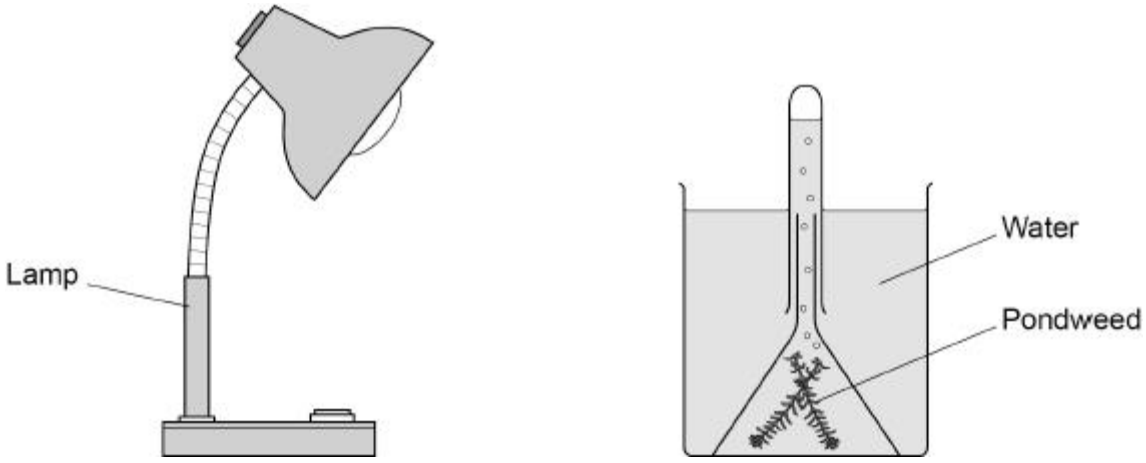
(a) Complete the word equation for photosynthesis.

_____ + water ⟶ _____ + glucose

(1)

Light intensity affects the rate of photosynthesis.

The diagram below shows some of the equipment used to measure the rate of photosynthesis.



(b) Describe a method to investigate the effect of light intensity on the **rate** of photosynthesis.

Use the equipment in the diagram above and other laboratory equipment.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(6)

Algal cells photosynthesise.

Scientists investigated the effect of light intensity on algal cells.

The algal cells were placed in different light intensities.

The table below shows the number of **extra** algal cells after two days.

Light intensity in lux	**Number of EXTRA algal cells after two days**
0	no extra cells
250	1.00×10^6
500	1.65×10^6
750	2.15×10^6
1000	2.40×10^6
1250	2.50×10^6
1500	2.50×10^6

(c) The initial number of algal cells was 200 000

Calculate the total number of algal cells after two days when the light intensity was 500 lux

_____

_____

_____

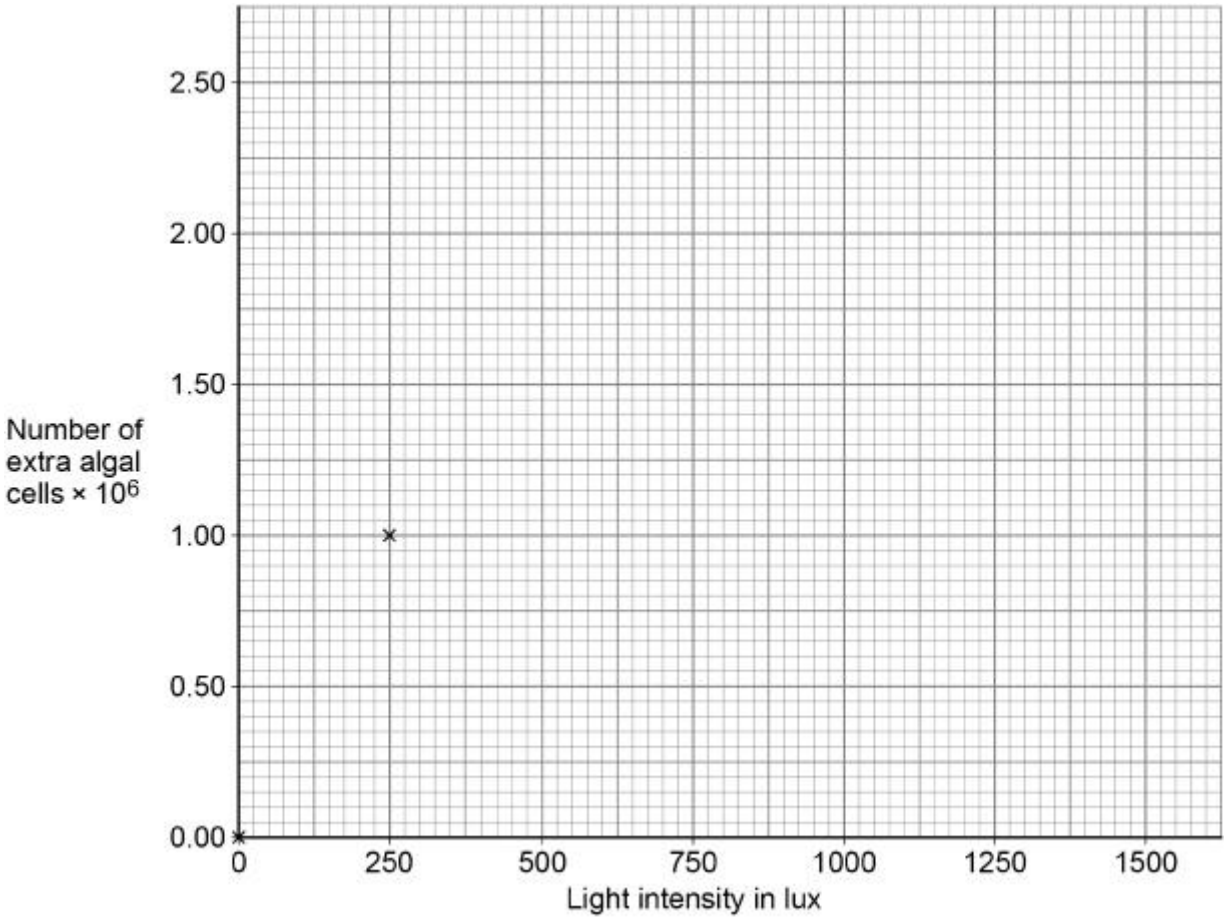
Total number of algal cells = _____

(2)

(d) Plot the data from the table above on the graph below.

The first two points have been plotted.

Draw a line of best fit.



(3)

(e) Give **two** conclusions from the results.

Use information from the table above.

1. _____

_____

2. _____

_____

(2)

(f) Explain how an increase in temperature from 20 °C to 25 °C would affect the number of algal cells.

_____

_____

_____

_____

(2)

(Total 16 marks)

Q3.

Starch is digested to form sugar molecules in the digestive system.

(a) What is the name of the enzyme that digests starch?

_____

(1)

(b) Where are most food molecules absorbed?

Tick (✓) **one** box.

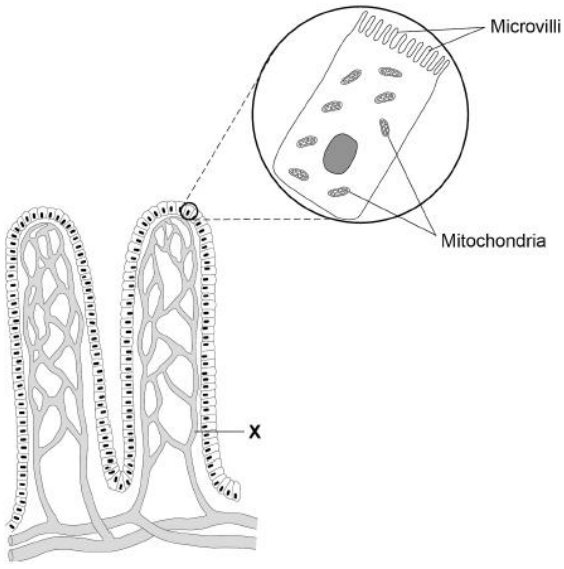
Large intestine	☐
Liver	☐
Small intestine	☐
Stomach	☐

(1)

Figure 1 shows two villi.

Figure 1 also shows one cell on the surface of a villus as seen using an electron microscope.

Figure 1



(c) Give **one** advantage of using an electron microscope compared with using a light microscope.

_____

_____

(1)

(d) What type of blood vessel is labelled **X**?

Tick (✓) **one** box.

Artery ☐

Capillary ☐

Vein ☐

(1)

(e) The real length of one villus is 0.8 mm

Calculate the image length if the villus is viewed at a magnification of ×20

Use the equation:

$$\text{magnification} = \frac{\text{size of image}}{\text{size of real object}}$$

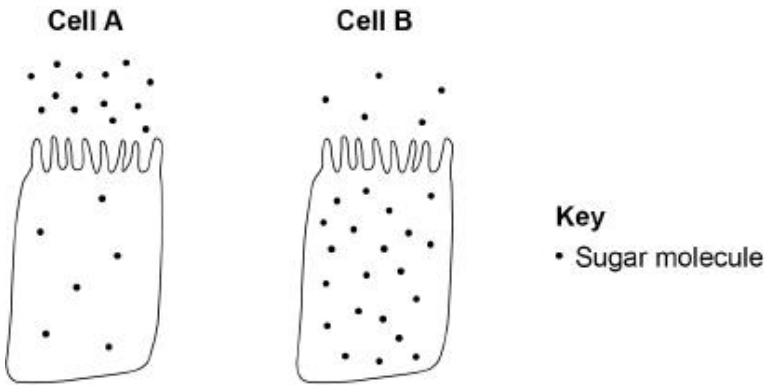
Image length = _____ mm

(3)

Figure 2 shows two cells from the surface of a villus.

There are sugar molecules inside and next to each cell.

Figure 2



(f) Name the process by which sugar moves into cell **A**.

_____

(1)

(g) Name the process by which sugar moves into cell **B**.

_____

(1)

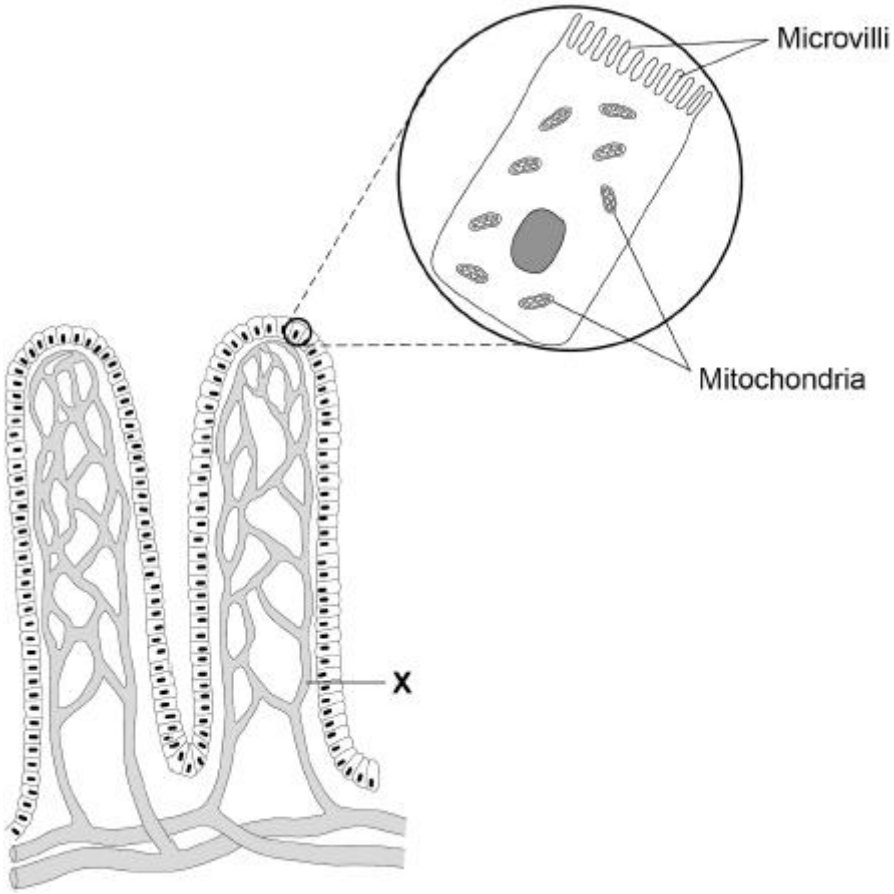
(h) Give **one** use of sugar in the body.

_____

(1)

(i) **Figure 1** is repeated below.

Figure 1



Explain how villi are adapted for efficient absorption of sugar molecules.

_____

_____

_____

_____

_____

_____

_____

_____

(4)

Section 2 – Chemistry Required practical exam Qs

Q4.

This question is about electrolysis.

(a) Complete the sentence.

Choose the answer from the box.

gaseous	**molten**	**solid**

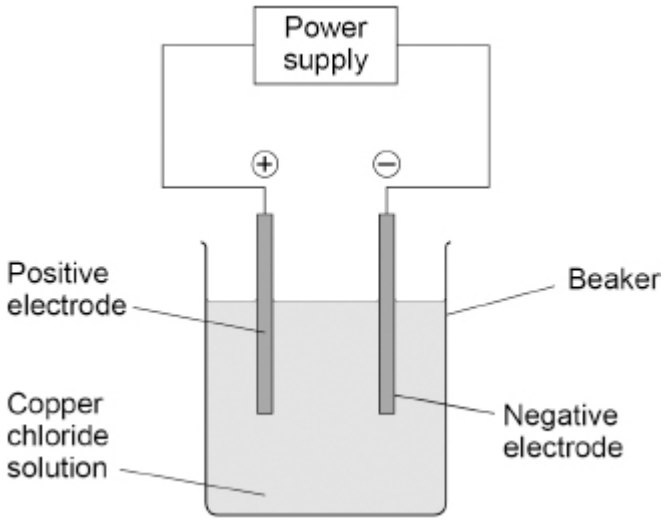
Copper chloride can conduct electricity when in solution or

when _____.

(1)

Figure 1 shows the apparatus used for the electrolysis of copper chloride solution.

Figure 1



There are four ions in copper chloride solution:

- Cu^{2+}
- Cl^-
- H^+
- OH^-

(b) Why do Cl^- ions and OH^- ions move to the positive electrode?

_____

_____

(1)

(c) Where do the H^+ and OH^- ions come from in the electrolysis of copper chloride solution?

Tick (✓) **one** box.

Air ☐

Copper chloride ☐

Water ☐

(1)

(d) Which ion produces a metal?

Tick (✓) **one** box.

Cu^{2+} ☐

Cl^- ☐

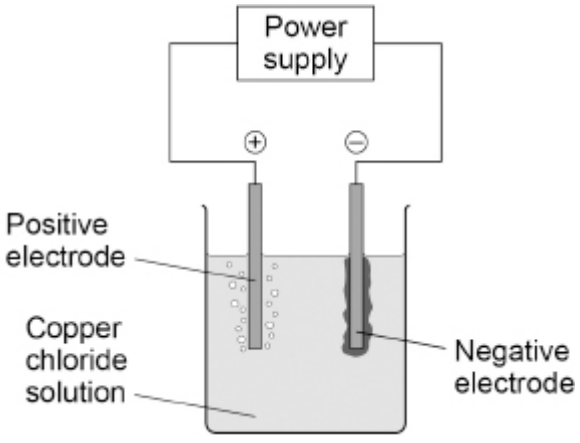
H^+ ☐

OH^- ☐

(1)

(e) **Figure 2** shows the apparatus during the electrolysis of copper chloride solution.

Figure 2



Describe what is seen at each electrode during the electrolysis of copper chloride solution.

Positive electrode _____

_____

Negative electrode _____

_____

(2)

(f) 500 cm^3 of copper chloride solution contains 6.50 g of copper chloride.

Calculate the mass of copper chloride in 40.0 cm^3 of this copper chloride solution.

_____

_____

_____

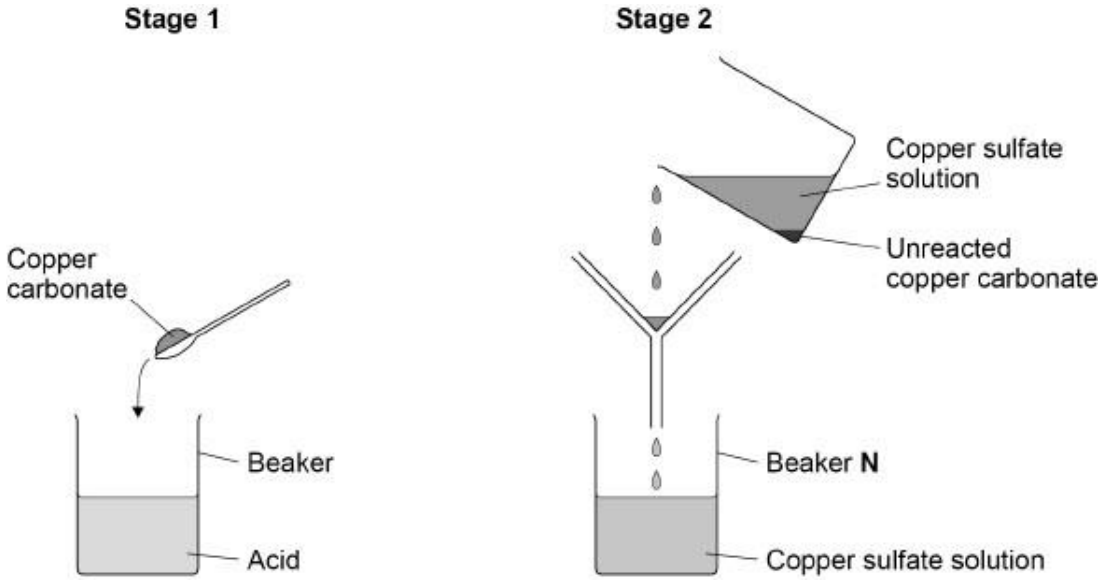
Mass = _____ g

(2)

Q5.

Figure 1 shows the first two stages in the preparation of copper sulfate.

Figure 1



(a) What is the formula of the acid used to prepare copper sulfate?

Tick (✓) **one** box.

HCl ☐

HNO_3 ☐

H_2SO_4 ☐

(1)

(b) Why is excess copper carbonate used in **stage 1**?

_____

_____

(1)

(c) Beaker **N** contained copper sulfate solution.

Describe how the student could produce copper sulfate crystals from the copper sulfate solution in beaker **N**.

_____

_____

_____

_____

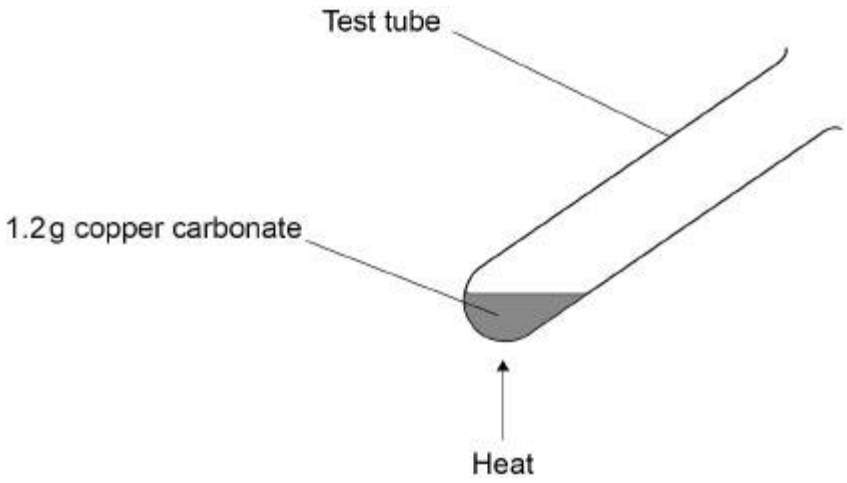
(2)

A student investigated the thermal decomposition of copper carbonate.

Copper carbonate decomposes to form two products.

Figure 2 shows the apparatus.

Figure 2



This is the method used.

1. Add 1.2 g of copper carbonate to a test tube.

2. Heat the test tube and contents until the mass does not change.

3. Record the mass of the contents of the test tube after heating.

4. Repeat steps 1 to 3 with different masses of copper carbonate.

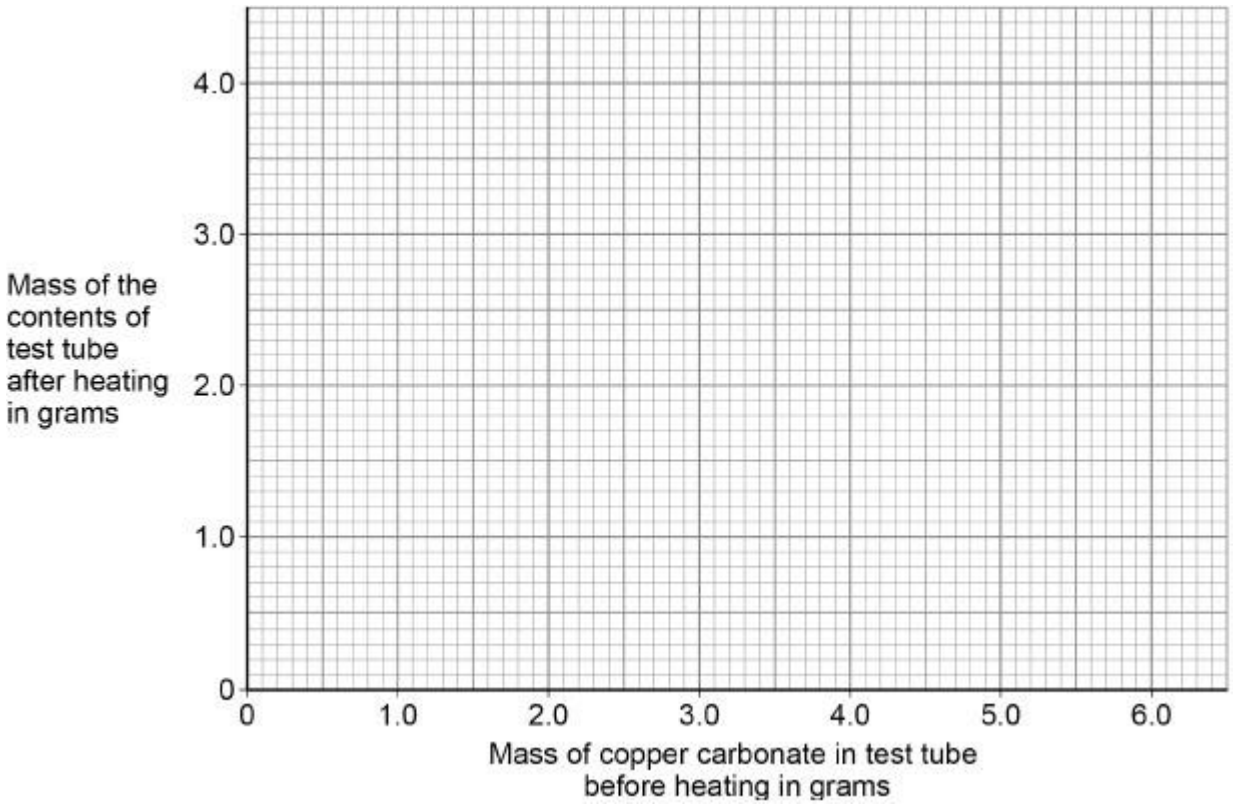
The table below shows the results.

Mass of copper carbonate in test tube before heating in grams	Mass of the contents of test tube after heating in grams
1.2	0.8
2.4	1.7
3.6	2.2
4.8	3.1
6.0	3.9

(d) Plot the data from above table on **Figure 3**.

Draw a line of best fit.

Figure 3



(3)

(e) Why does the mass of the contents of the test tube decrease in mass when copper carbonate is thermally decomposed?

_____

_____

(1)

(Total 8 marks)

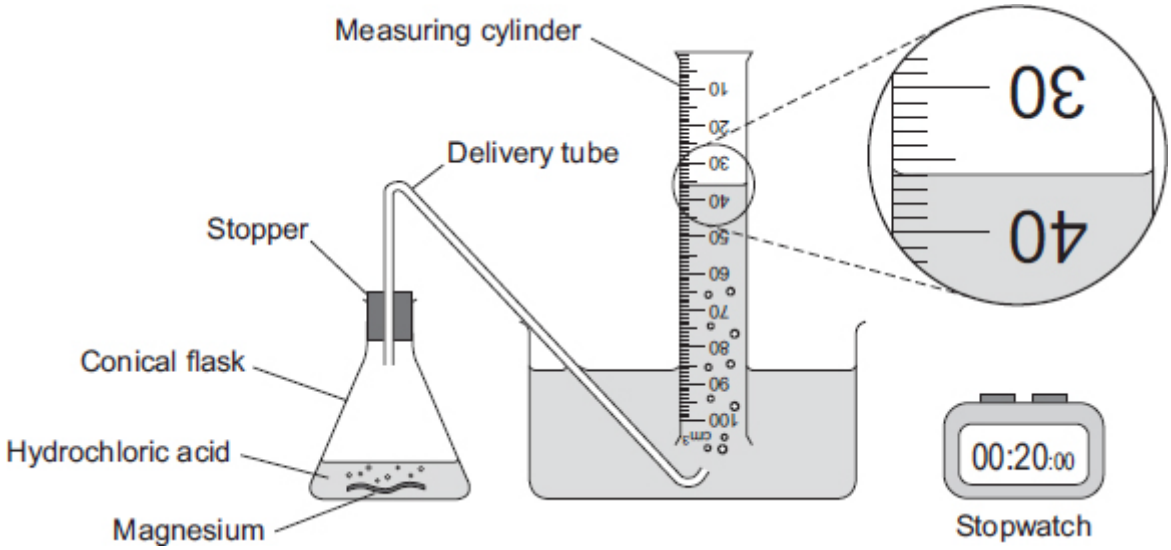
Q6.

Magnesium reacts with hydrochloric acid.

A student investigated the effect of changing the hydrochloric acid concentration on the rate of this reaction.

Figure 1 shows the apparatus.

Figure 1



This is the method used.

1. Add 50 cm^3 of hydrochloric acid to the conical flask.

2. Add a 3 cm strip of magnesium to the hydrochloric acid in the conical flask.

3. Fit the stopper and delivery tube to the top of the conical flask and start timing.

4. Record the volume of hydrogen gas collected in the measuring cylinder every 20 seconds for a total of 100 seconds.

5. Repeat steps 1 to 4 with a different concentration of hydrochloric acid.

(a) What volume of hydrogen gas has been collected in the measuring cylinder in **Figure 1**?

Volume = _____ cm^3

(1)

(b) The stopper and delivery tube were fitted to the conical flask in step **3**.

Explain why the time taken to fit the stopper and delivery tube may cause an error in this investigation.

_____

_____

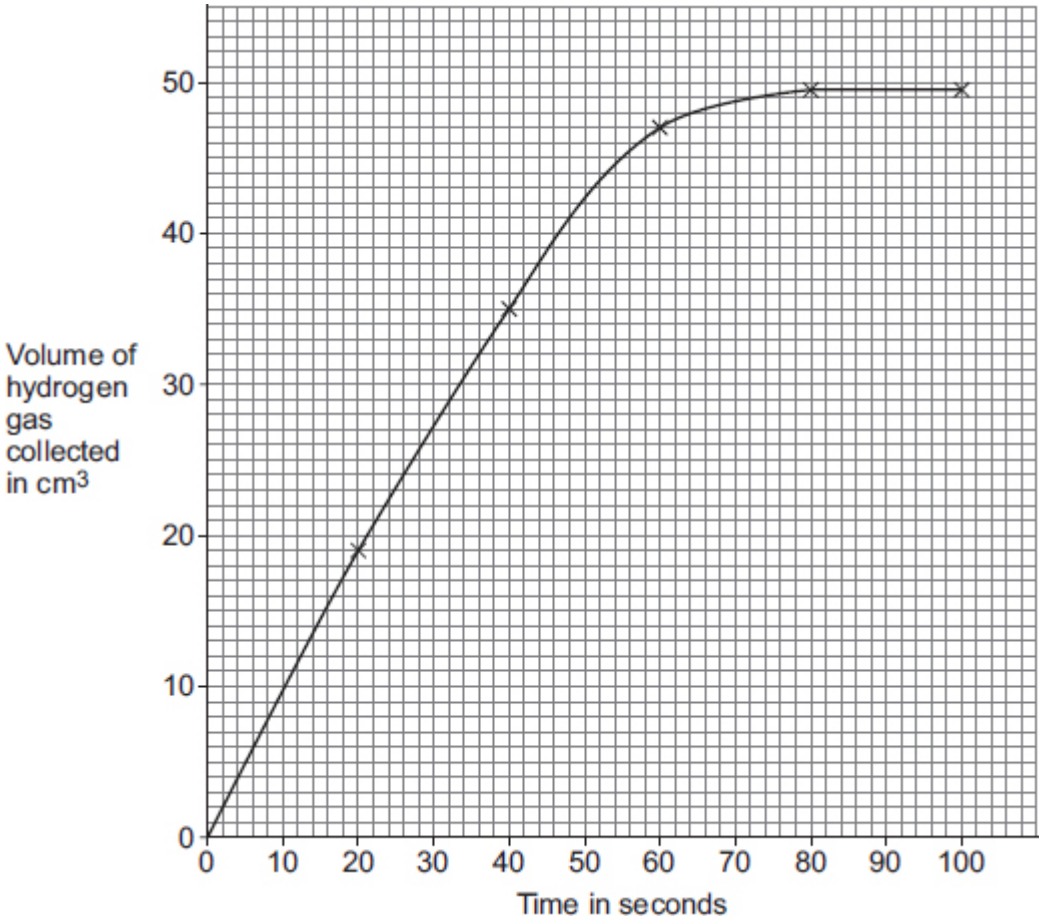
_____

_____

(2)

Figure 2 shows the results for one concentration of hydrochloric acid.

Figure 2



(c) Determine the time taken for the reaction to be complete.

Use **Figure 2**.

Time taken = _____ s

(1)

(d) The student repeated the method using a higher concentration of hydrochloric acid.

How would the line of best fit for a higher concentration of hydrochloric acid compare with the line of best fit on **Figure 2**?

Tick (✓) **one** box.

Initially the line of best fit would have a lower gradient. ☐

Initially the line of best fit would have the same gradient. ☐

Initially the line of best fit would have a higher gradient. ☐

(1)

(e) Describe the test for hydrogen gas. Give the result of the test.

Test _____

_____

Result _____

_____

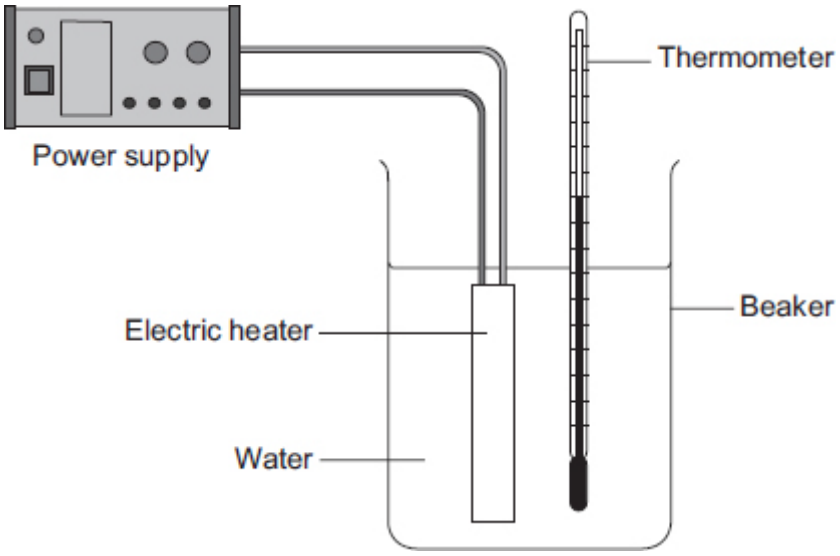
(2)

Section 3 – Physics Required practical exam Qs

Q7.

A student investigated how the temperature of water changed as it was heated.

The figure below shows some of the apparatus used.



The student switched the heater on then recorded the temperature of the water every 5 minutes.

The table below shows the results.

Time in minutes	Temperature in °C			
	Test 1	Test 2	Test 3	Mean
0	25	25	25	25
5	31	32	33	32
10	42	45	45	**X**
15	56	54	64	58

(a) What was the resolution of the thermometer used in the investigation? Use the table above.

Tick (✓) **one** box.

0.1 °C ☐ 1 °C ☐ 10 °C ☐ 100 °C ☐

(1)

(b) Calculate mean value **X** in the table above.

_____

_____

_____

X = _____ °C

(2)

(c) Draw a ring around the anomalous result in the table above.

(1)

(d) What should the student have done with the anomalous result?

_____

_____

(1)

(e) Give **two** ways to reduce energy transfer from the apparatus to the surroundings.

1 _____

_____

2 _____

_____

(2)

(f) The water in the beaker had a mass of 0.20 kg.

The temperature increase of the water was 33 °C.

specific heat capacity of water = 4200 J/kg °C

Calculate the change in thermal energy of the water.

Use the equation:

change in thermal energy = mass × specific heat capacity × temperature change

Choose the unit from the box.

°C	cm^3	J	kg

_____

_____

_____

_____

_____

Change in thermal energy = _____

Unit _____

(3)

(g) Explain what happens to the mass of water in the beaker during a test.

_____

_____

_____

_____

(2)

(Total 12 marks)

Q8.

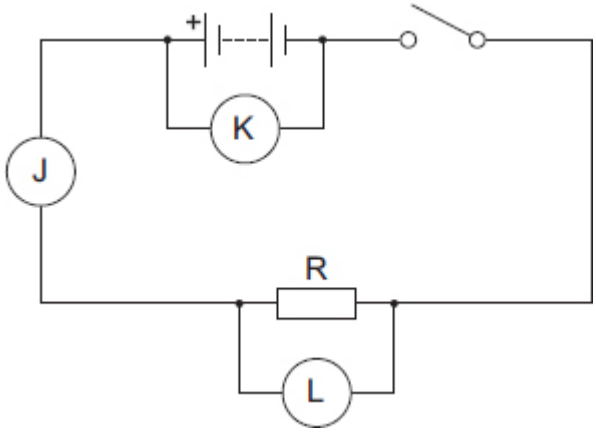
A student investigated resistance in a circuit.

The student measured:

- the current in the resistor with an ammeter
- the potential difference across the resistor with a voltmeter.

(a) **Figure 1** shows a circuit diagram.

Figure 1



Which letter on **Figure 1** shows the correct position for the ammeter to measure the current in the resistor?

Tick (✓) **one** box.

J ☐ **K** ☐ **L** ☐

(1)

(b) Draw the circuit symbol for a voltmeter in the box below.

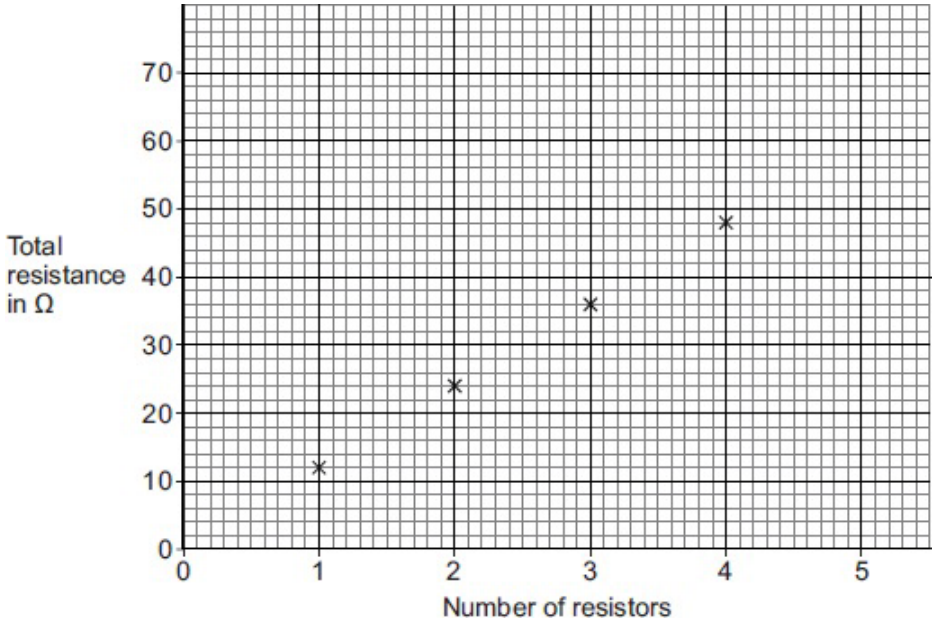
(1)

The student changed the number of identical resistors in the circuit.

The student calculated the total resistance of the resistors.

Figure 2 shows the results.

Figure 2



(c) Draw a line of best fit on **Figure 2**.

(1)

(d) Predict the total resistance when 5 resistors were connected in the circuit.

You should extend your line of best fit.

Total resistance = _____ Ω

(1)

(e) How were the identical resistors connected in the student's circuit?

Use **Figure 2**.

Tick (✓) **one** box.

The resistors were connected in parallel.	☐
The resistors were connected in series.	☐
The resistors were connected in series and in parallel.	☐

Give a reason for your answer.

_____

_____

_____

(2)

(f) The potential difference across the battery was 3.0 V.

The maximum current in the circuit in the student's investigation was 0.25 A.

Calculate the maximum power output of the battery in the student's investigation.

Use the equation:

power = potential difference × current

_____

_____

_____

Power = _____ W

(2)

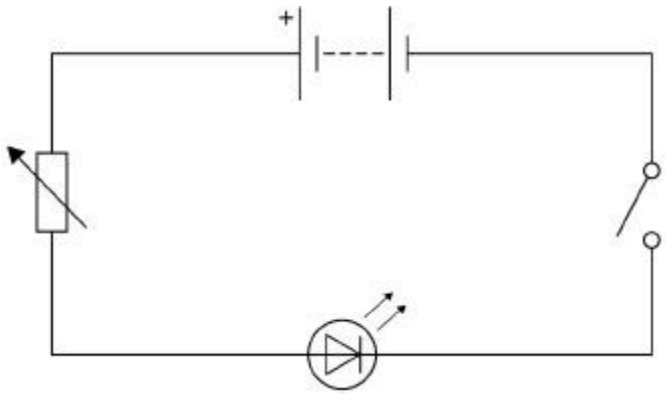
(Total 8 marks)

Q9.

A student investigated how the current in a red LED varies with the potential difference across the LED.

Figure 1 shows an incomplete diagram of the circuit used.

Figure 1



(a) Complete **Figure 1** to show how the student should have connected a voltmeter and an ammeter into the circuit.

Use the correct circuit symbols.

(2)

(b) The potential difference across the battery was +2.6 V.

The student varied the potential difference across the LED between –2.6 V and +2.6 V.

Describe how the student should have adjusted the circuit to vary the potential difference across this range.

_____

_____

_____

(2)

(c) The table below shows the results when the potential difference across the LED had positive values.

Potential difference in volts	0.0	1.0	1.8	2.0	2.2	2.4	2.6
Current in milliamps	0	0	0	5	19	41	69

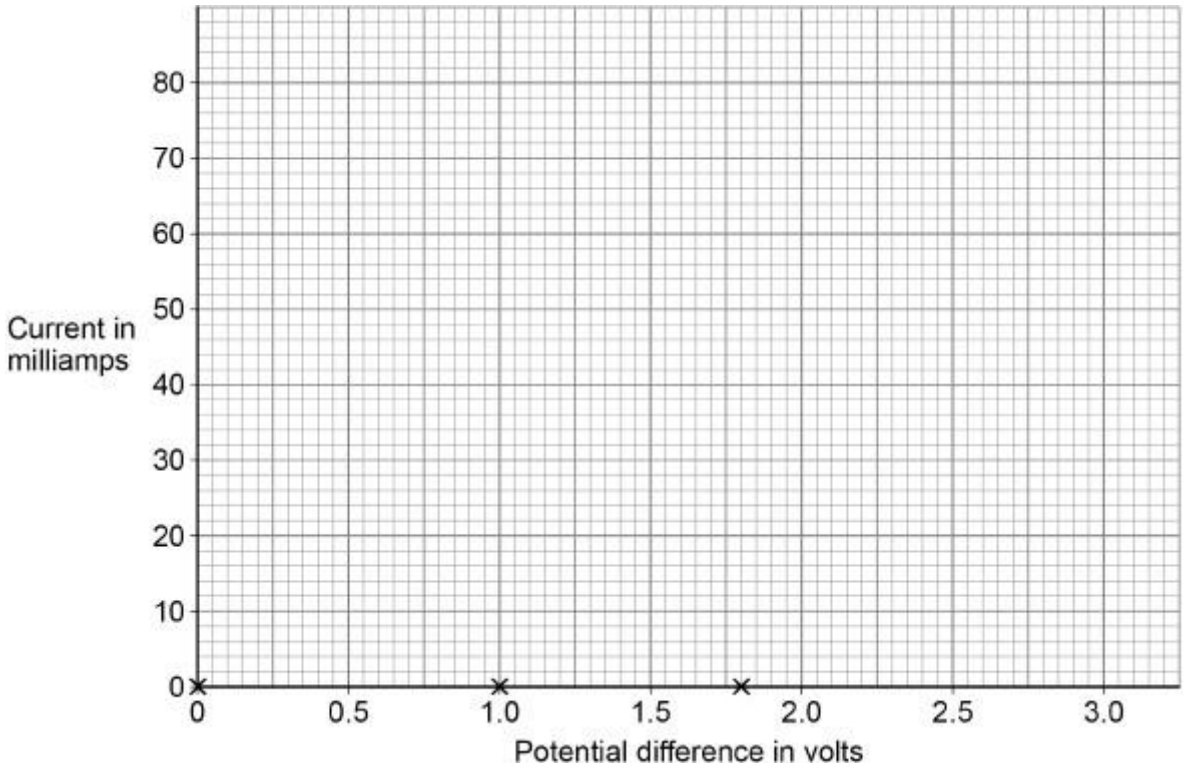
Figure 2 shows a graph of current against potential difference.

Complete **Figure 2**.

You should:

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

Figure 2



(3)

(d) Explain what happens to the current in the LED when the potential difference across the LED is negative.

_____

_____

_____

_____

(2)

(e) A second student did the investigation using a blue LED.

The results for both the red LED and the blue LED showed the same pattern.

What conclusion can be made about the investigation?

Tick (✓) **one** box.

The investigation is repeatable.	☐
The investigation is reproducible.	☐
The results were accurate.	☐

(1)

(f) The relationship between current and potential difference for an LED is non-linear.

Which of the following always shows a linear relationship between current and potential difference?

Tick (✓) **one** box.

Filament lamp	☐
LDR	☐
Resistor at constant temperature	☐
Thermistor	☐

(1)

(Total 11 marks)