SPECIMEN MATERIAL

GCSE
COMBINED SCIENCE: TRILOGY

H

Higher Tier Paper 1: Biology 1H

Specimen 2018 Time allowed: 1 hour 15 minutes

Materials

For this paper you must have:
- a ruler
- a calculator.

Instructions
- Answer **all** questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- There are 70 marks available on this paper.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- When answering questions 02.2, 05.3 and 06.6 you need to make sure that your answer:
  - is clear, logical, sensibly structured
  - fully meets the requirements of the question
  - shows that each separate point or step supports the overall answer.

Advice
- In all calculations, show clearly how you work out your answer.

Please write clearly, in block capitals.

Centre number ☐☐☐☐☐ Candidate number ☐☐☐☐

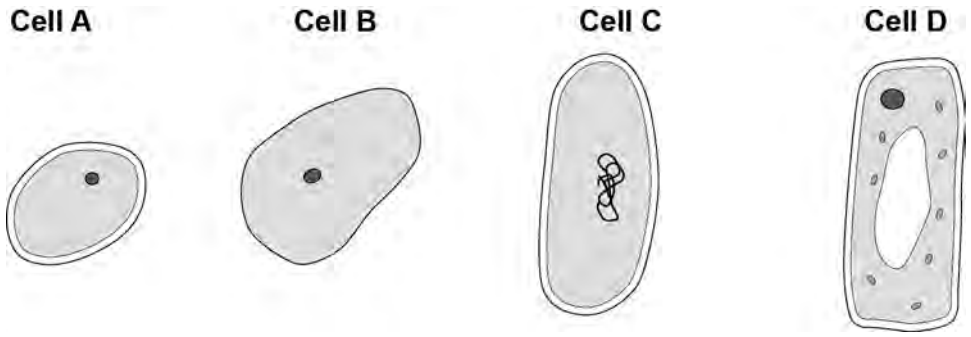
Surname ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Forename(s) ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Candidate signature _____

0 1 **Figure 1** shows four different types of cell.

Figure 1



0 1 . 1 Which cell is a plant cell?

Give **one** reason for your answer.

[2 marks]

Cell _____

Reason _____

0 1 . 2 Which cell is an animal cell?

Give **one** reason for your answer.

[2 marks]

Cell _____

Reason _____

0 1 . 3 Which cell is a prokaryotic cell?

Give **one** reason for your answer.

[2 marks]

Cell _____

Reason _____

0 1 . 4 A scientist observed a cell using an electron microscope.

The size of the image was 25 mm.

The magnification was × 100 000

Calculate the real size of the cell.

Use the equation:

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

Give your answer in micrometres.

[3 marks]

Real size = _____ micrometres

Turn over for the next question

0 2 Plants absorb light to photosynthesise.

0 2 . 1 What is the correct word equation for photosynthesis?

[1 mark]

Tick **one** box.

carbon dioxide + glucose ⟶ oxygen + water ☐

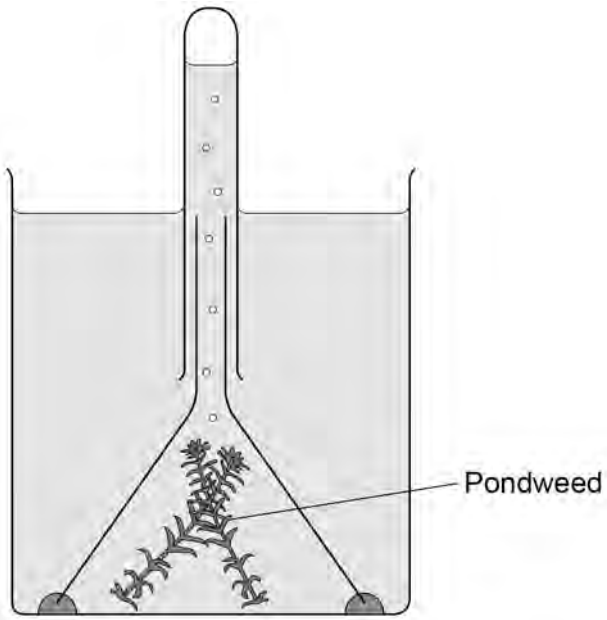
glucose + oxygen ⟶ carbon dioxide + water ☐

oxygen + water ⟶ carbon dioxide + glucose ☐

water + carbon dioxide ⟶ oxygen + glucose ☐

0 2 . 2 **Figure 2** shows some of the apparatus that can be used to measure the rate of photosynthesis.

Figure 2



The rate of photosynthesis in the pondweed is affected by different colours of light.

Describe a method you could use to investigate this.

You should include:

- what you would measure
- variables you would control.

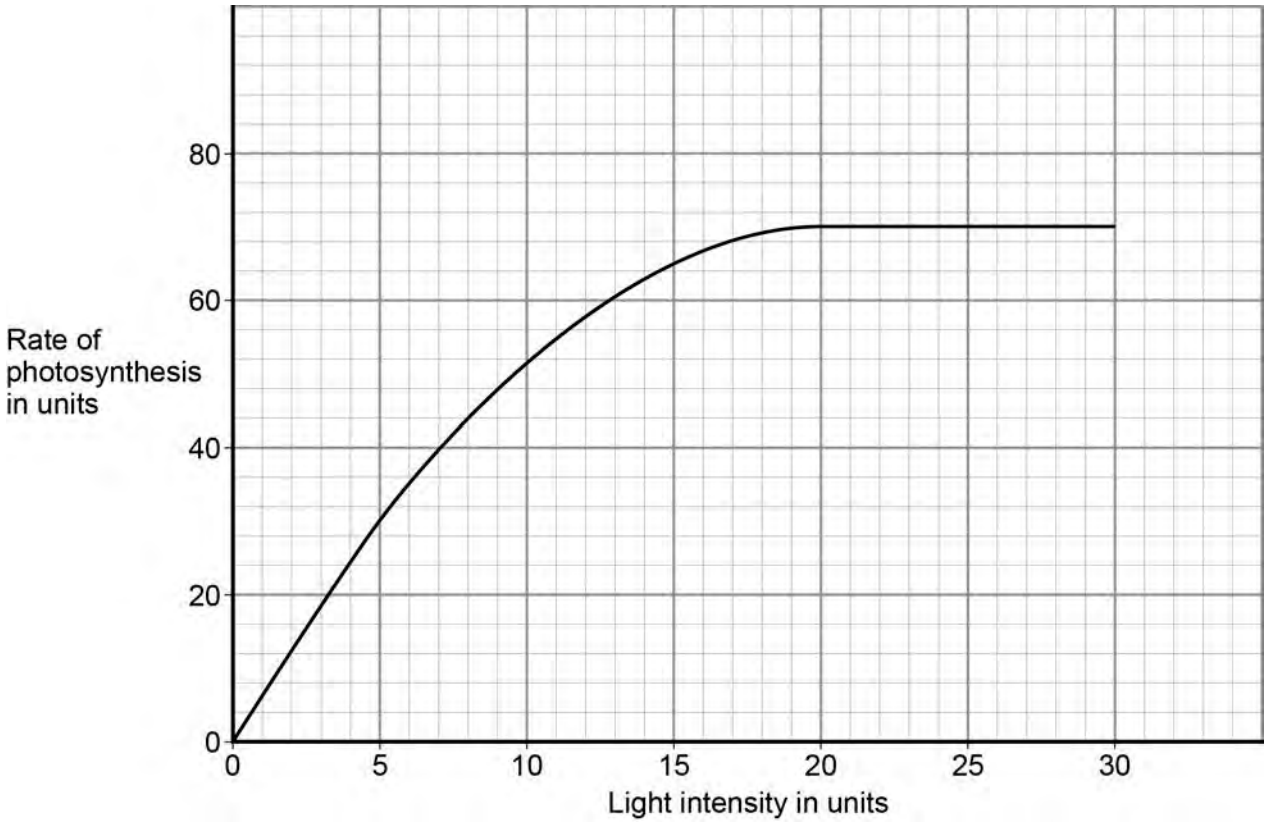
[6 marks]

Question 2 continues on the next page

A scientist carried out a similar investigation.

Her results are shown in **Figure 3**.

Figure 3



0 2 . 3 The scientist said:

'Light stops being a limiting factor at a light intensity of 20 units.'

Give evidence from **Figure 3** to support this statement.

[1 mark]

0 2 . 4 What could be limiting the rate of photosynthesis at a light intensity of 25 units?

Give **one** factor.

[1 mark]

Turn over for the next question

0 3 Amylase is an enzyme that digests starch.

A student investigated the effect of pH on the activity of amylase.

This is the method used.

1. Mix amylase solution and starch suspension in a boiling tube.
2. Put the boiling tube into a water bath at 25 °C.
3. Remove a drop of the mixture every 30 seconds and test it for the presence of starch.
4. Repeat the investigation at different pH values.

Table 1 shows the students' results.

Table 1

pH	Time when no starch was detected in minutes
5.0	7.0
5.5	4.5
6.0	3.0
6.5	2.0
7.0	1.5
7.5	1.5
8.0	2.0

0 3 . 1 The student concluded pH 7.25 was the optimum pH for the amylase enzyme.

This is **not** a valid conclusion.

Suggest **two** reasons why.

[2 marks]

1 _____

_____

2 _____

_____

Question 3 continues on the next page

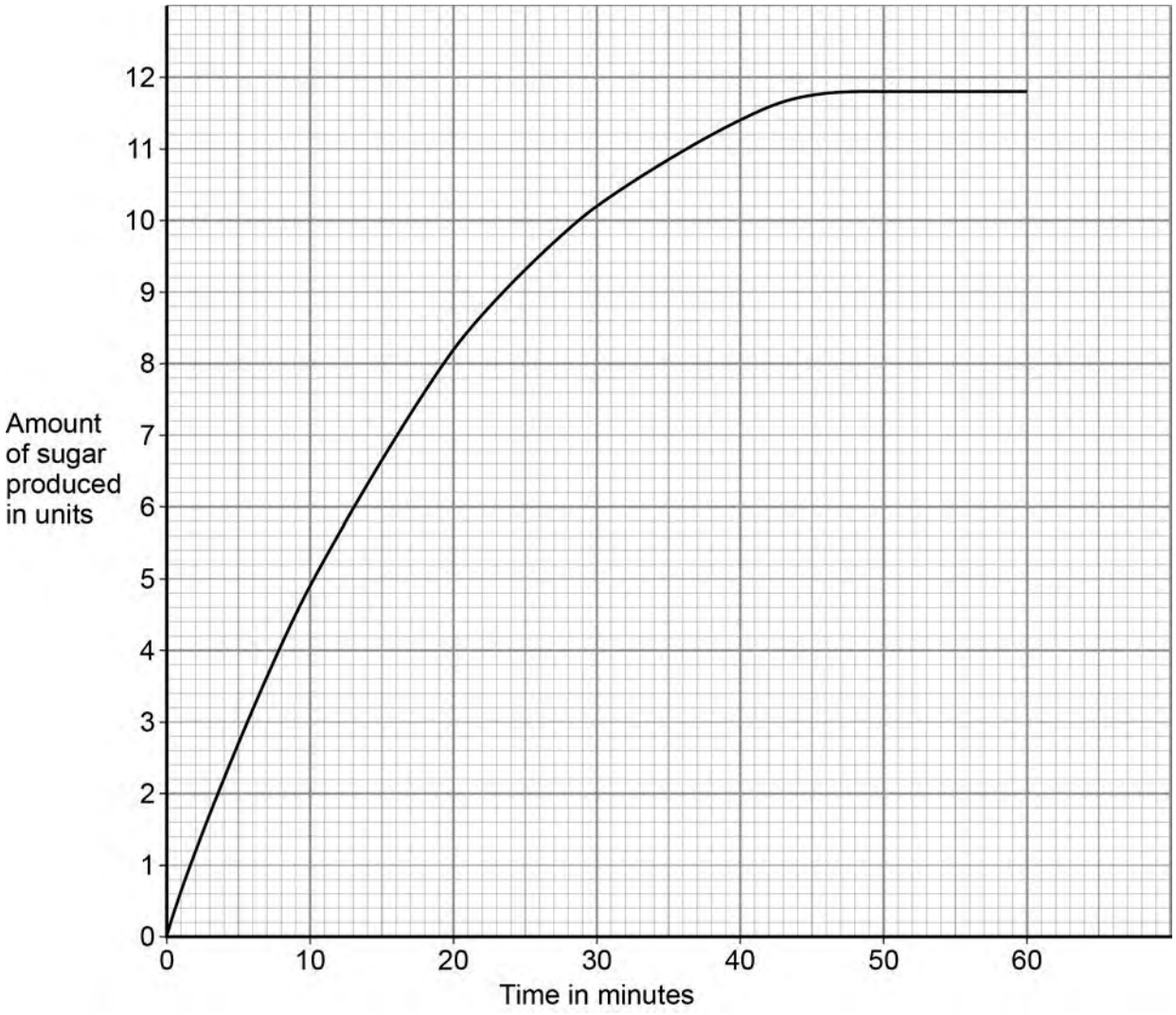
The student did another investigation.

This is the method used.

1. Put amylase solution and starch suspension into a boiling tube.
2. Make the pH 7.25.
3. Put the boiling tube into a water bath at 25 °C.
4. Measure the amount of sugar produced every 30 seconds.

The results are shown in **Figure 4**.

Figure 4



0 3 . 2 Calculate the mean rate of sugar produced per minute during the first 5 minutes.

[2 marks]

Mean rate = _____ units per minute

0 3 . 3 Iodine solution is added to a sample taken from the boiling tube after 10 minutes and 60 minutes.

Suggest what you would see in these samples.

[2 marks]

After 10 minutes _____

After 60 minutes _____

0 3 . 4 The scientist repeated the investigation at 37 °C.

Draw a line on **Figure 4** to show the results the scientist would get.

[2 marks]

Question 3 continues on the next page

0 3 . 5 The same investigation was done at 65 °C.

How would this affect the results?

Explain why.

[3 marks]

Turn over for the next question

0 4 Malignant tumours are called cancers.

0 4 . 1 Describe how a tumour can spread to different parts of the body.

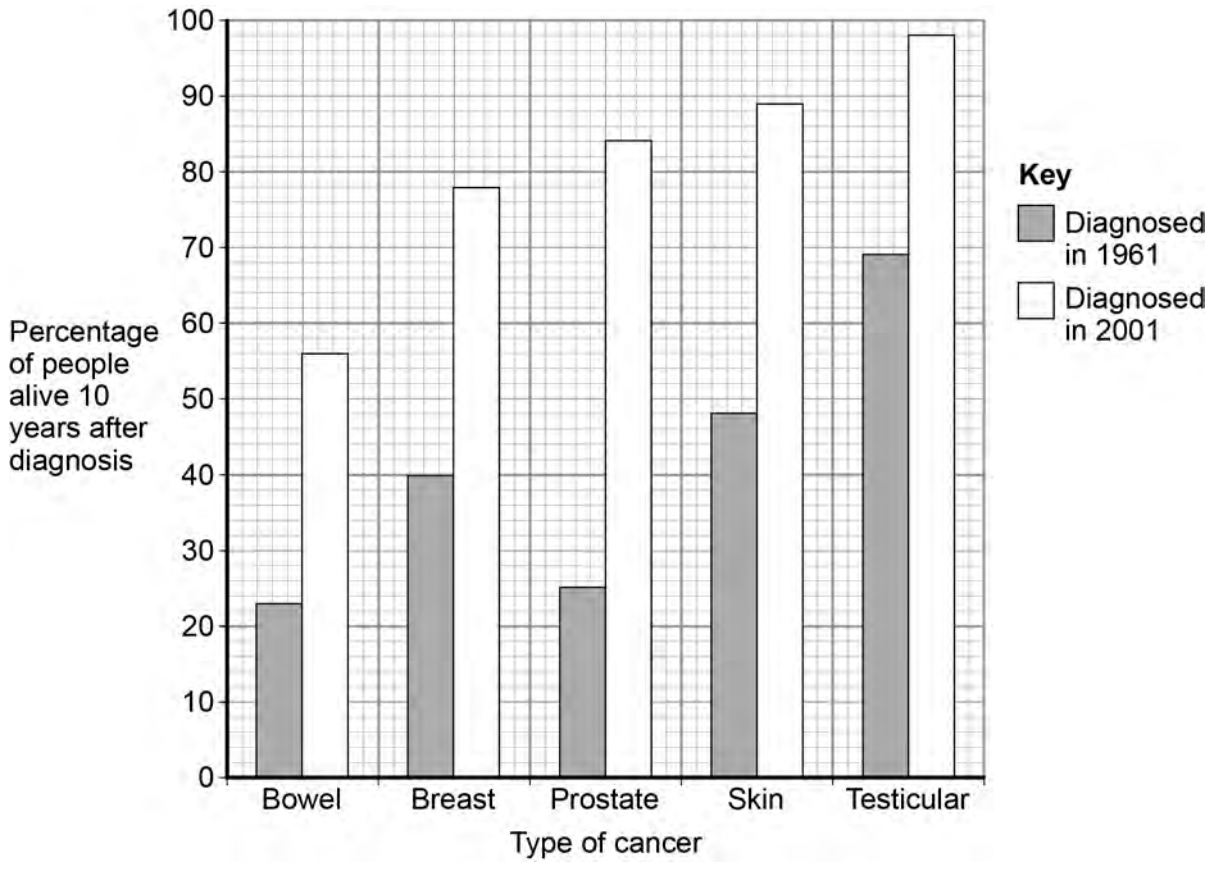
[2 marks]

Survival rates for people with cancer have improved a lot.

Some people who are alive 10 years after diagnosis are considered to be cured.

Figure 5 shows data for people diagnosed with cancer in 1961 and 2001.

Figure 5



0 4 . 2 Look at the data in **Figure 5** for skin cancer.

Calculate the percentage increase in the survival rate of people diagnosed with skin cancer in 1961 compared to 2001.

Give your answer to **three** significant figures.

[2 marks]

Survival rate increase = _____ %

0 4 . 3 Look at the data in **Figure 5** for bowel and prostate cancer.

Compare the survival rates for bowel and prostate cancer.

Suggest reasons for the comparisons you have made.

[4 marks]

Turn over for the next question

0 5 . 1 Blood is made up of four main components.

Red blood cells and white blood cells are two of these components.

Describe the functions of the **two** other components of blood.

[2 marks]

0 5 . 2 The heart is often described as a **double pump**.

Describe why.

[1 mark]

0 5 . 3 In coronary heart disease (CHD) layers of fatty material build up inside the coronary arteries. This can cause a heart attack.

Statins and stents can be used to reduce the risk of a heart attack in people with CHD.

Evaluate the use of statins and stents in people with CHD.

Remember to include a justified conclusion.

[6 marks]

Turn over for the next question

0 6 In 2014 there was an outbreak of Ebola virus disease (EVD) in Africa.

At the time of the outbreak there were:

- no drugs to treat the disease
- no vaccines to prevent infection.

0 6 . 1 By March 2015 there were an estimated 9 850 deaths worldwide from EVD.

The number of deaths is an estimate.

Suggest why it is an estimate rather than an exact number.

[1 mark]

0 6 . 2 Why were antibiotics **not** used to treat EVD?

[1 mark]

After the outbreak began, drug companies started to develop drugs and vaccines for EVD.

A drug has to be thoroughly tested and trialled before it is licensed for use.

Testing, trialling and licensing new drugs usually takes several years.

0 6 . 3 Draw **one** line from each word about drug testing to the definition of the word.

[2 marks]

Word about drug testing	Definition
Dose	Side effects making the person ill
Efficacy	The concentration of the drug to be used and how often the drug should be given
Toxicity	Whether the drug works to treat the illness

0 6 . 4 The results of drug testing and drug trials are studied in detail by other scientists.

Only then can the results be published by the drug company.

Suggest **one** reason why the results are studied by other scientists.

[1 mark]

Question 6 continues on the next page

The number of deaths from EVD continued to increase.

The World Health Organization (WHO) decided it was ethical to use unlicensed drugs.

The WHO said unlicensed drugs could only be given to people who gave their permission.

Also, any results had to be shared with other researchers and drug companies.

Some vaccines had shown positive results in animal testing, but the vaccines had not been tested and trialled in humans.

The supplies of the vaccine were low.

At first the vaccines were only used for health workers.

0 6 . 5 How would the use of a vaccine **reduce the spread** of EVD?

[2 marks]

0 6 . 6 Evaluate the use of unlicensed drugs and vaccines during the EVD outbreak.

Give a conclusion.

[6 marks]

Turn over for the next question

0 7 A student investigated the effect of pond organisms on the amount of carbon dioxide in their surroundings.

The student set up six boiling tubes as shown in **Figure 6**.

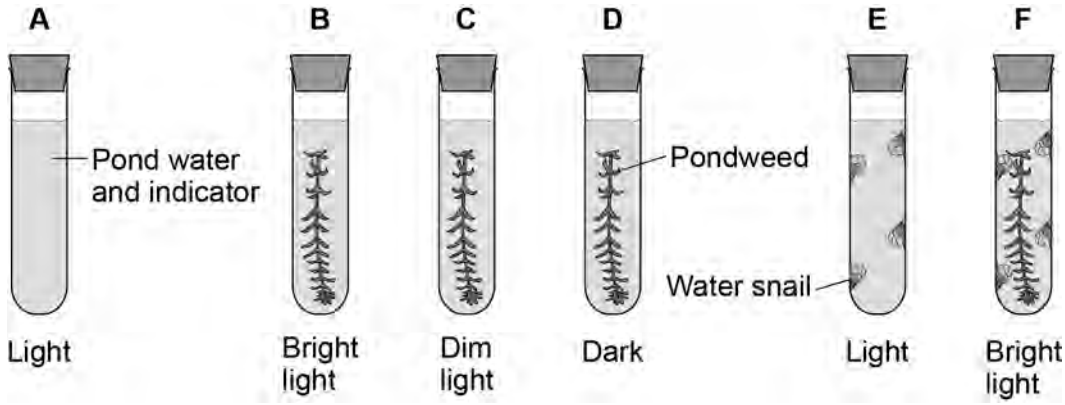
They were left for 2 days.

Each boiling tube contained pond water with an indicator.

The indicator was pink at the start of the investigation.

- If the amount of carbon dioxide in the water increased the indicator turned yellow.
- If the amount of carbon dioxide in the water decreased the indicator turned purple.

Figure 6



0 7 . 1 What is the purpose of boiling tube **A**?

[2 marks]

0 7 . 2 In which boiling tube would the indicator be the **most yellow** after 2 days?

Explain your answer.

[3 marks]

Boiling tube _____

Explanation _____

0 7 . 3 The colour of the indicator in boiling tube **C** had not changed after 2 days.

Suggest why.

[1 mark]

Turn over for the next question

0 8 Plants need nitrate ions in order to make proteins.

A plant is growing in soil flooded with water.

Explain why the plant cannot absorb enough nitrate ions.

[5 marks]

END OF QUESTIONS